Arab Journal of Plant Protection

Volume 32, Special Issue, November 2014





Abstracts Book

11th Arab Congress of Plant Protection

Organized by Arab Society for Plant Protection

and Faculty of Agricultural Technology – Al Balqa AppliedUniversity

> Meridien Amman Hotel, Amman Jordan 13-9 November, 2014

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Arab Journal of Plant Protection

Volume 32, Special Issue, Novermber 2014

Table of Contents

Contents	Abstracts No.	Page No.
Authors Index		E-2
Keynote address	KN 1	E-11
Symposia	S 1- S 21	E-11
Economic Entomology	E 1- E 59	E-18
Entomology	EN 1-NE 12	E-34
Mites	M 1- M 21	E-38
Fungal Diseases	F 1- F 67	E-43
Bacterial Diseases	B 1- B 9	E-65
Viral Diseases	V 1- V 33	E-68
Nematodes	N 1 - N 35	E-79
Weeds	W 1 - W 25	E-89
Chemicals Pesticides	P 1 - P 24	E-97
Plant Extracts	EX 1 - EX 30	E-105
Integrated Pest Management	IPM 1 - IPM 19	E-114
Biological Control	BC 1 - BC 56	E-120
Biotechnology	BT 1 – BT 23	E-137
Beneficial Insects	BE 1 - BE 10	E-145
Rodents, Birds & Snails	RO 1 - RO 9	E-147

Note: Some abstracts in this book will be subject to further edits before being published on ASPP website

Authors Index

Name	Abstract No	Name	Abstract No
Abadi, Yousef S.	BT4	Abraham, Adane	V9, BT18, E58
Abbas, Balasem Ahmed	B5	Abrahamian, Peter	V21
Abbas, Muhammad Fahim	BT22	Abu Ahmad, Youssef	V31
Abbas, Shifaa	EX8	Abu Alsel, Ahmad	F29
Abbas, Shihab A.	EX21	Abu Gelah, Omran	M6, M7
Abbasi Shaza H	W19 E19	Abu Gnoura, M.	F19 W1
Abd AlDaamm Hamad	E10 D2	Abu Oamar, Synan E	WI DT7
Abd El-Aal H T	FS FQ	Abu Qalilai, Syllali F. Abu Shirbi Abeer	V29
Abd El-Ghaffar, Mamdouh Hussain	V1	Abuamsha R	F36
Abd. Ailla Jwad	BC2	Abu-Blan, Hifizi	BC55
Abd. Ali J.	V2	Abuelnnor, N.	M16
Abdalaziz, Ahmad	BC4	Abu-Khalaf. Nawaf	BT17
Abd-Aljabar, R.A.	P8	Abul Razaq, Rupak T.	BT16
Abdalla, Omer	V27, V30	Abu-Romman, Saeid	BC38
Abdalla, Tag Elsir E.	BC28	Abu-Tara, Randa	IPM10, P15, E47, BC42,
Abdalla, Y.F.	EX10, EX11		BC48
Abd-Allah, Majed Ibrahim	P9	Acheuk, Fatma	EX30
Abdallah, Nora	F1	Achoure, Hamid	E59
Abdallah, O.	S20	Adam, Mohamed A.M.	N9
Abdalrazaq, Faek	E28	Adlan, A.M.	V18
Abdel Ghany, N.M.	E34, F53	Adour, Amina Rym	N18
Abdel Hadi, Doaa	F4	Agrawal, S.	S20
Abdel Magid, Talaat Dafalla	F3/	Ahmad, Ishtiaq	F40
Abdel Kanman, El Nour El Amin	BC3 E25	Anmad, Majdi Ahmad Malili Uyanain	P3 PC42
Abdelati, Knaled Al-Sayed	E23	Anmad, Malik Hushain	BC45 BC25
Abdel Azim Mahmoud M	E15 BT8	Ahmad, Mohammad	BC33 EV13
Abdelaziz Wided	BC/9	Ahmed Dilshad S	EA15 E48
Abdelbagi Azbari Omer	FX23	Ahmed Hassan M	V30
Abd-El-Davem M R	BE6	Ahmed Hosham S K	RO3
Abdelgader, Hayder	BC27	Ahmed, Maidy A	E9
Abdelgader, Omaima M.	V18	Ahmed, Mohamed Tawfic	S8
Abdelgani, M.E.	W10	Ahmed, Mohammad Sh.	E50
Abdelgani, Migdam Elsheikh	W17	Ahmed, Raees	F10
Abdelhamid, Gacemi	IPM9	Ahmed, Salah	BC56
Abdelnaser Elashry,	N16	Ahmed, Sayed Ali	IPM15
Abdelrahman, M.H.	E15	Ahmed, Sayeda S.	BT2
Abdel-Razek, A.S.	N17, E34	Ahmed, Suha Hassan	W17
Abdel-Samad, Salwa	BC17, BC18	Ait Kaci, Karima	EX30
Abdel-Wahab, A.E.	M8	Aitouada, Mouni	V7
Abdelwahab, S.	N15	Ajlan, Azia	IPM16
Abdelwali, Marwan	E21	Akel, Ensaf	V8, V15, V16
Abdelzaher, Hani M. A.	F26	Al -Ajlouni, Zakaria	EX8
Abderahim, Zineb	BCII V14	Al Allan, Mohammad	E3
	V 14 D22	Al-Amari, Salan Saeed	EA5
Abdou Geban V	P22 P20	Al Falleu, Maaz Abuel-wallab	BC21 W1
Abdul Kader A M	BT13	Al Ghannoum, Mohamed Izzat	FX24
Abdul Razag Amal S	EX21	Al Ghazzawi A	F19
Abdul-Fattah, Janan H.	RO6	Al- Jamil, Sahil K.	BC32
Abdulla, Maied Ibrahim	B5	Al Jassany, Radhi Fadhil	E4
Abdullah, Afef Mohammad Rageh	F64	Al Joboory, Raghad Khalaf	E4
Abdullah, Samir Khalaf	BC33	Al Jorany, Redha S.	IPM18
Abdullah, Sua'ad Irdeny	E20	Al Manoufi, Adel	E3
Abdulraheem, A.	P12	Al Mogdam, Aidae Sasy Khalefa	W9
Abdul-Rassoul, Mohammad Saleh	M20	Al Mualem, Rasmia	E3
Abed Aliem, Eltahir Ahmed	W19	Al Qasem, Mohmad	N7, N8
Abedalrefai, Mala	F60	Al Shhawi, Ayman	P3
Abi Mosleh, Farah	W24	Al Yasiri, Ismail Ibrahim	F47
Abolfadel, M.A.	E17, BC24	Al Zgoul, Mariam	N29
Abood, Sajida A.	BT11, BT12 M12	Alabdallah, Mohamed	F0
ADO-12KA, SAIZA M.	W15 N10 E57	Al-ADdelKader, Mariam	N54 DC20
Abou Kubaa, Paied	N10, F57 V25 BC15	Alabjar, Zunalf F.	DC29 F4
Abou Abmad V	v 23, DC13 V22 V23	Al-Alillau, Alillau	1'4 EN12
Aboud H M	RC45	Al-Alan M	M15
Aboud Hadi Mahdi	P8	Al-Alawi Mohammad S	S12 BT4
Abou-Jawdah, Yusuf	V21	Alam. W.	F39
Abozachar, Farhat Ali	EX5	Al-Amaary, Bushra K.	P16

Name	Abstract No	Name	Abstract No
Al-Ameri, Salma	BT7	Al-Maadhedi, Mothana E.	F21, BT15
Al-Amodi, Mohamed Othman	F46	Al-Maaroof, Emad M.	B8
Al-Anbaki, Hussein A.	BC20	Al-Maghribi, Sabah	F22, BC35
Al-Ani, Luay Khantan	M20 PO7	Al-Makhadmen, Ibrahim	EA8 PT12 PT14
Al-Annaz, Raja Mustala Al-Antary Tawfig Mustafa	RO7 P14	Al-Mallah, Mozanini K. Al-Mallah, Nazar M	D112, D114 F1
Alagtash Batool	N29	Almallahand Nabil M	P10
Al-Arabi, Sobhia	N10	Almanoufi, A.	M15
Al-Assas, Khaled	N25, N26, N34, F57, BC39	Almaroof, Ismail N.	E36
Alawamleh, Amani	E5, E6	Al-Masrey, A.R.	EX25
Al-Azzawi, Ahmed	BT7	Al-Masri, Maymounh	F57
Albagdadi, R.	F19	Al-Masri, S.	F56
Al-Baghdadi, R.	F56	Almatar, Rula	F4
Albaka, Rudinh	F57	Al-Matroud, Lina	F56
Al-Banna, Luma	N29, IPM19 W16	Al-Mmouemar, Anwar	W0, W10 PT15
Al-Barwary Mohammad A	FN3	Al-Musa Abdullah	V29
Al-Brakati, Ashraf	EX20	Al-Mykhtar, Sarab A.	V2 V2
Al-Chaabi, S.	V16, F56	Al-Nawaw, Mohamed	W18
Al-Dabbas, Maher Mahmoud	P14	Al-Neami, Khawala Taha	M20
Al-Dahwy, Sindab S.J.	BC25, BC26	Alnehlawi, Adnan	F62
Aldarrajy, Muqdad Saleh	BC9	Al-Obada, Abdul Jabar K.	E1
Al-Deen, Rudwan Badr	BE8	Al-Obadi, Shaymaa H.	E19
Aldoghi, Essam Husain	BC2	Al-Oklah, Bassam	BE8
Aldosari, Saleh A.	B18	Algarni, Abdulaziz S.	BE2, BE/
Al-Doss, Addullan A.	B18 EN4	Algasem, M.	F49 W16
Aldryhim Yousif	EN4 EN12	Al-Rifai Faisal Abdul-Rahman	B7
Al-Ebady, Emad O	EN12 EN3	Al-Rijabo Maha A	P2. EX1
Al-Favtory, Abdlrahman Yousef	EN10. EN11	Alrouechdi, Khaled	E52
Alfredo, Impiglia	S19	Al-Rubai, Adel K.	IPM11
Algalal, Haitham M.	IPM7	Alrubeai, Hussain F.	E42, EN6, IPM8
Al-Gerrawy, Amer J.A.	E8	Alsaadawi, Ibrahim S.	S16
Al-Hamdany, Mohammed K.	BE5	Al-Sadi, Abdullah Mohammed	F38
Alhaoli, H.A.	E24	Al-Salahi, Marwa	BC46
Al-Hommada, Wisal	E43	Alsalamah, Buthainah	F6 E42
All, A.I. Ali Abdul Sattar A	WIU BC25 BC26	Al-Saleh, Abboud	E45 V27 V30
Ali Fshrak	V15	Al-Salti Mohammed Navef	BC48
Ali, Hameed Hamoud	V3	Alsamara. Muussa	E29
Ali, Hussain	EX13	Al-Samarrae, Adnan I.	EX2
Ali, Juhina A. M.	E18	Al-Saoud, Ahmad Hussen	IPM16
Ali, Mai Kaser	N13	AlSha'lan, K.	F49
Alili, Fatiha	E27	Al-Shahwan, Ibrahim M.	V27, V30
Alim, Djamila	B2	Al-Shammary, Ahmed J. M.	W2
Aliyu, Yusuf	M12	Al-Shaybany, N.I.	F8
Alfa Dal, A. Al-Jalely, Basman H	IN / M20	Alsmairat Nihad	E40 IPM19
Al-Jamali Nassir A O	IPM11	Al-Taae Ali Kareem	W21 BC6 F16
Alianabi, Ahmed M.	P10	Al-Taae. Huda Hazem	W21, BC5
Al-Janabi, Ul-Basit A.	V2	Al-Taee, Nihal E.	BT12
Al-Jassani, Radhi F.	BC52	Al-Taee, Noor S.	RO6
Aljazzar, Ramy	IPM17	Al-Taweel, A.A.	EN5, P7
Al-Jboory, I.J.	P1, P7, E5, E6	Al-Turaihi, Emad Hussain	IPM4, IPM5
Aljibouri, Adedaljasim M.	EN6	Al-Waffy, Gh.	EX26
Al-Jobory, Saleh Ahmed Eesa	BC6 E10	Alwan, A.	F49
Al-Jorany, Redna S.	E19 E43 E44	Al-Tailya, Fallad Abdullall	D7 IDM8 \$14
Al-Juboory, Hurria Hussien	BC56	Al-Zubaid, Aid N	IPM11
Al-Juboory, Saba B.	EX2	Al-Zubaidy, Hamza K.	W2. E8. E42
Aljubory, Awad Jasim	IPM12	Amer, Abdolkarem	P22
Alkahtani, Safar	BC40	Amer, Mahmoud A.	V27, V30
Al-Karboli, Hameed H.	BC20	Amin, Ahmed A. Hamed	E41
Al-Kasheh, A.M.	E57	Amin, Peshtwan S.	B8
Alkassis, Wajieh	E2, EN9	Ammad, F.	F32
AI-Keiany, Usama Samy Fathi	INZ PC20 PC21	Ammar, A.	520 \$20
Alkubrusli Rim	F29	Anni, A. Amro M. Abdel-Rahman M.A.	520 F39
Alkurtany Abedul Kareem Frahi	BC10	Andaloussi Fouad Abbad	BT18
Allam, Tigani M.	BC29	Anil	BE10
Alli, Abdul- Sattar A.	BC52	Antoon, B.G.	N23
Allouf, Nada	N11, N13	Aodie, B.I.	EX25

Name	Abstract No	Name	Abstract No
Arshad, Muhammad	BC43	Benrebiha, Fatima	EX4
Asaad, Nadine	E29	Benslimane, Hamida	BT6
Asaad, Siham	B1, F13	Bentata, F.	BC12, EX6, EX9
Asaf, Samir	IPM18	Bentourtou, F.	EX9
Ashraf, Alhawamdeh	S19	Berrabaha, D.	RO1
Assaf, Lazgeen H	E48 E50 BC33	Berrai, Hassiba	RO2
Associat Salim Mohammed	E32	Besati Sameh	M12
Asslan Louai	E32 E23 E28 BC30 BC31	Bessedik Fadila	E44
Assiali, Loual	BC46 BT0	Bishe Mohamad	F27
Atoriust Magan	IDM2	Dilal II	E27 E22 E24
	IPM5		E22, E24
Atia, M.M.M.	V 19	Bin Ounman, A.M.	M19
Atmane, Amina Beldi	BI0	Bin Shuaib, Omar S.	W11
Attar, Nouran	V18, V26	Biradar, Chandrashekhar M.	BT18
Awad Mohamed Awad,	BE2	Bisaad, F.Z.	EX22
Awamleh, Raida	F52	Bishaw, Z.	V18
Aw-Hassan, Aden	BT18	Bittner, Lori	V28
Awwad, Akl	N29	Blttar, Hakima	BT21
Azame, A.	F32	Bou Baker, Ali	V33
Aziz, Eskander	E48	Bouamama, L.	BT5
Azmeh, Fawaz	F6, F48	Bouarda, J.	EX9
Azouz, H.A.	E 35	Bouassaba, Karima	BT21
Azzam, Firas	BC4	Bouchenak, Fatima	EX4
Ba-Angood S A	M19. IPM6	Boudeffeur, S	F41, F42, F43
Babiker A G T	W10	Bouhraoua, Bachid Tarek	BT23
Babiker Abdel Gabar El Taveb	W17	Boukhabti Habiba	WA
Bacha NM Ali	PT12	Boukhalfa Amina	DT2
Dadia, N.W. All	D115 DC54	Douklialla, Allilla	B15 DO5
Badawy, H.M.A.	BC34	Bouknoi, Knadija	RUS
Baghdadi, Saudi A.S.	RO3	Boureghda, Houda	F1, F2, F59
Bahaddou, H.	E56	Bourmita, Younes	EX29
Ba–Hassen, M.S.	M19	Boursas, Ghozlane	BC49
Baidaq, Zahraa M.	E47	Bouznad, Z.	F7, F54
Bakdash, Ebtesam	M10	Brahmi, Karima	E59
Baker, Safaa Zakaria	IPM12	Buriani, Giampaolo	S4
Bakri, N.	B9	Catara, Antonino	F33
Balbahry, N.	W3	Catara, Vittoria	BT19, F33
Baoum. Ali Abdulla	EX16	Ceccarelli, S.	S20
Baper, Khalid H	F48	Cellini, Antonio	84
Barakat A A	BC54	Chaker Adel Nadijb	W4
Barhoum Humam S	BTO	Chandel Y S	BF10
Bari A	\$20	Charudattan R	S15
Dall, A.	520 E21	Charif Mahamad	515 E29
	F31 DT20 E62	Cherity Adallation	F20 EV20
Basha, Shaik Thanir	B120, F03		EA29
Basheer, Abdulnabi M.	E22, E23, E24, E28, BC30,	Choueiri, Elia	V10, F31
	F29, BC31, BC39, BC46	Choumane, Wafaa	F48
Bashir, N.H.H.	EX10, EX11	Civolani, Stefano	IPM15
Bashomaila, Salem Mohammed	P1	Colazza, Stefano	\$2
Baum, Michael	BT6	Cortesi, Paolo	F30
Bawazir, Abbas A.	W11	Costa, Guglielmo	S4
Bayaa, Bassam	W20	D'Onghia, Anna Maria	V25, BC15
Bedry, Kamal A. M.	W25	Daami-Remadi, M.	F34
Béji-Hibar, N.	F34	Dabaj, Khalifa H.	N19
Bekele, Berhanu	V9, BT18, E58	Daham, Anahed W.	V4
Belhadi, Hani	B6	Dahamna. Saliha	W4
Belhamra, M.	N15	Daher Hjaij, N.Y.	M15
Bella Patrfizia	BT19, F33	Dahi, Hassan F.	BT2
Bellabidi Meriem	E59	Dahroug SMA	P13
Belmadani Kabina	BC44	Damte Tebkew	V9 BT18 E58
Ben Ammar, Farah	V23	Das Amlan	IPM14
Den Chable, Amel	¥ 33 E52	Davabah Ahmed A M	S17 N25 N26 N34
Ben Chebia, Amai	E55	Dawadali, Allileu A.M.	S17, IN25, IN20, IN34
Ben Hameda, Abealhamed	W9	Dawood, Mona G.	N5, N21
Ben Hassan, M.I.M.	E49	de Costello, B.	MI6
Ben Jemäa, Jouda Mediouni	E46, E51, EX28	de Haan, Eisse	83
Ben Remah, Ateqa	PII	Debbes, Bakri	B1, F13
Benaissa, Meriem	BC49	Dehbi, Foouzia	BT5
Benamrouche, Yasmine	BT6	Dehyna, Nawal	BC44
Benchabane, M.	B3	Deibeh, Loubna S.	V6
Bencheikh, Mohamed	B4	Denbel, Worku	BT18, E58
Bencheqroun, S. Krimi	BT18, E56	Dernane, Kawther	BC8
Benchegroun, Sanae Krimi	F11	Desoky, Abd El-Aleem S.S.	RO3
Benderradii, Laid	B6. BT10	Devamma, M. Nagalakshmi	BT20
Benhenni, Mosbah	IPM9	Devamma, M. Nagalakshmi	F63
Benmessaoud-Roukhalfa Hassina	E7	Devab. Z.O.	EX10. EX11
Dennessaoud Doukhana, Hassilla	27		

Name	Abstract No	Name	Abstract No
Diab, Eiman El Rasheed	F37	El-Shora, Hamed M.	W12
Dirar, H. A.	BC37	Elwakil, M.A.	S15
Diwan, Hussein Magtoff	P9	El-Zemaity, M.E.S.	P13
Djassinra,,Tormal	BC11	Embaby, El-Sayed M.	F45
Djelloul, Ghezali	E33, M11	Essouaadi, N.	EX9
Djelouah, Khaled	IPM1, IPM17, V25, V33,	Ewais, M.A.	BC54
-	BC19	Fadhil, Nameer Najeeb	BT1
Djilani, A.	W8	Fadhila, Guettouche	V20
Djilani, S.E.	W8	Fageer, Awad	W22
Doumandji, S.	RO1, RO2, RO8, E27, E30,	Faiod, Dina Mohmmad	M14
	E55, E59, EN8, N35, F65,	Farag, Shaimaa M.	P4
	M16, BC44	Farrag, Eman Saleh Hassan	F20
Doumandji-Mitiche, B.	RO1, EX22	Faskha,,S.M.	P13
Duvert, P.	P24	Fathy, H.M.	BE6
Edan, Mohammad F.	BC32	Fayyadh, Mohammed Amer	BC2
Edrees, M. S.	EX25	Fazouane, Fethia	EX30
Edress, Jamila A.	BC55	Fekkoum, Soumeya	E33, M18
Ehwati, Mahumoud	N9, N24	Felice Catara, Antonino	BT19
Ekzavez, Ahmed	V12, V13, V26	Fenni, Mohamed	W4
El Aissami, A.	BC12, EX6, EX9	Fetoh, Badr El-Sabah A.	E11
El Alaoui, F.E. Faris	EX6. EX9	Foda, M.A.	N17
El Atta, Hashim	BC7	Fouly, A.H.	RO9
El Barakati, Ashraf	P4	Gaber, G M	F17
EL Habieb, Rawda Y	P6	Gad. S.B.	N14 N20
El Henawy Ahmed	IPM1	Gamba F	E56 F9
El Henawy, Ahmed	BC19	Ganam Mahaba	E50, 19
El Jaouadi A	FX9 BC12	Garibaldi Angelo	S10
El Kelany, Usamy Samy Fathy	N6	Gavkare Omkar	P19
El Ossam Maha Pashed M	F55	Gapana Marwa A M	P 00
El Qasalli, Malla Rashed M.	W20	Gerges Elvis	E21
El Anger Magoud P	W20 E15	Chabbari Mabrouka	F31 F46
El-Adssal, Masoud K.	E15 IDM15	Chadhana Maylayd	E40
El-Auawy, Abualla M. M.	1FW15 V24	Chalom Amina	D0 DT12
El-Adminall, Addullall S.	V 24	Chandour Anthony	B125 W24
El-Asiliy, S.M.	IN5 E12	Chari M.V. Savad	W24 E20 EX21
El-Assar, M.K.	E13 D22	Charal Intiana	E20, EA21
Elawam, lidial Omer	P22	Ghazal, Ibussam	F48
El-Azim, Nania A.I. Abd	M1, M2	Gnezali, Djelloul	M18
EI-Bounssini, Mustapha	520, V9, B118, E40, E50,	Gogi, M. Dildar	BC43
	F9	Gomaa, Wafaa O.	M4
El-Bousaimy, A.	W3	Gondal, Amjad Shanzad	N28, BC14
El-Den Nasser, M. Gamal	EN12	Gorashi, N.E.	BC37
El-Erksousy, M.H.	MD W12	Grando, S.	S20
El-Gawad, Ahmed M. Abd	W12	Griessinger, D.	SI
El-Gayar, Ensat A.	E38	Grundler, Florian M.W.	N16
El-Hadi, M. Didi Ould	EX29	Guechi, Abdlhadi	BT3
El-Heneidy, Ahmed	BC18, BC19, BC30, IPM1,	Gullino, Maria Lodovica	S10
	IPM17, BC31	Habash, Samer	N16, N29
El-Husein, Naiem	W20	Habi, Salah	F55
El-Hussein, Hoda	N3	Habib, Wassim	V10, F31, F35
El–Kady, A.M.	E12	Habiba, Umme	F12
El-Kawas, H.M.G.	M8	Haddad, A.	E26
El-Khoması, M.	W3	Hadersdorfer, Johannes	S4
El-Khriji, O.	W3	Hadj Said, Hassina	E31
Elksel, F.	N15	Hadjira, Belkahla	V20
El-Maghraby, M. Mostafa	BC51	Hafez, Saad L.	N31, N32
El-Mesmari, Fathi S.	V24	Hafsa, Harkat	MII
El-Metwally, Ibrahim M.	P20	Hagag, Laila F.	F45
Elmokadem, Mahrashan	W18	Haggag, E. I.	BE6
El-Nagdi, Wafaa M.A.	N5, N21	Haichour, Nora	B13
El-Naggar, M.E.	M3, M8, M21	Haidar, Asma	N25, N26, N34
El-Nahas, Rania A.	M21	Haidar, Mustapha	W13, W14, W15, W23,
El-Raheem, Ahmed M. Abd	M13		W24
El-Rawy, A.M.	E12	Haj Hassan, Amal	M10
Elsaiegh, Muzahim A.	BE5	Hajali, M.	V22, V23
El-Sanady, Mariam, A.	E 35	Hajali, Mayadah	BE8
El-Sanousi, Omar M.	V17, V24	Hajjeh, H.	F36
Elsayed Edriss, Amal	EX14, EX15	Hakimi, Sakina	IPM3
El-Sayed, W.	S9	Halabi, Mohamad Hussam	V8
Elshafie, H. A.	BC37	Haleem, Raed A.	F66
El-Shazli, Ezzedine Abdelsameea	E25	Hallett, S.	\$15
El-Sherif, A.G.	N14, N20	Hama, Nizar N.	E8
Elsherif, M.	P23, P24	Hamache, Miloud	N33

Name	Abstract No	Name	Abstract No
Hamawah, Fatima Zahra	M12	Jarjees, Salim Jameel	E21
Hamdi, I.	V32	Jasim, Hammadi Kadhim	BT15
Hamdi, Soumaya Haouel	E51	Javed, Nazir	N28
Hamed, NaglaA.K.	BC54 P7	Jawhari, Maan	V21 PC20
Hamid H Δ	F/ BC37	Jawish, Alliani Ilibene M	S20
Hamid, Havat M A	EX23	Johnson Greg I	S20 KN1
Hammache, M.	N22. N35	Jreijiri. Fouad	V10
Hammouchi, O.	V14	Juber, Kamil S.	F23, EX2
Hamroune, W.	N35	Kadri, H.	W8
Hana, Samir S.	E36	Kaheel, H.	M15
Hani, Meriem	W4	Kalid, O.	P12
Hannachi, A.	BT5	Kalil, H.	N10
Hannachi, Ibtissem	F28	Kamel, Mohamed	F30
Hannachi, Monamed Ali	E33 PC12	Kanawaty, Aya Karam Ninatta	V12 W24
Haque Muhammad Shahidul	F12	Kardesh Amani Ahamed	W24 FX7
Haque, Tamanna	F12	Karta Halluma M	E57
Harba, Nezar	E29	Karso, Batool Abdullah	EX24
Hariri, Nuha S.	IPM6	Kassa, Girma	E58
Harkat, Hafsa	E33	Kassab, Isa	BC4
Harzallah, D.	B6, BT5	Kassam, Rami	N11
Hasabo, Susan A.	N6	Kassem, Mohammad	F4
Hasan, Hazem	EN1, BC38	Kasses, Wajeeh	IPM10, P15, BC42
Hasan, Mahmoud	F3 DC0 F24	Kassim, Nabel A.	V4
Hassan, Abdullan Abdulkareem	BC9, F24	Kassm, Kami Kathah Dadar, Ahmad	MIU E5 E6 EN1 EN2
Hassan, Ailiai Haj	DC33 E48 E50	Kauper H	E_{3} , E_{0} , E_{1} , E_{1} , E_{1} V_{22} , V_{23}
Hassan Ibrahim A	BC36	Kehail Sara	8C27
Hassan M	M15_M21	Kemal, Seid A	V9. BT18. E56. E58. F11
Hassan, M.M.	W10	Kenaan, Mohamad	M10
Hassan, Mohamad S.	F8	Kerdy, Belal	P11
Hassan, Nayem	IPM17, E5, E6	Keser, M.	S20
Hassan, Nihal Fakhr Al-Din	B7	Keshmer, Hussein Nayma	P9
Hatem, A.E.	E13	Khabaz, Salah Alden	F62
Haydar, Ali	W13	Khadija, Ounine	BC11
Hazzam, Hani	F4	Khalat, Mohammed Z.	EN6, IPM8
Holdi, Sinem	E33 M12	Khalifah Mahammad II	M15
Hemeida Ibtisam A M	BT2	Khamis Ziad Sheikh	F40
Hermize Ferval B	IPM2	Khan Ahmad Sattar	F40
Hibar, K.	F34	Khan, Asif Ali	F40
Himour, Sara	BT21	Khan, Iqrar Ahmad	F40
Hoceini, F.	RO1	Khan, Mohamed F.R.	S18
Homam, Homam B.	E14, E25	Khan, Rashad Rasool	BC43
Hossain, Muhammad Delwar	F12	Khan, Sajid Aleem	N28
Housein, Hafad	E10	Kharouf, Shoula	F6
Hussein, M.A.	NI7	Kharsi, M.	F41
Hyder, Sajjad Ibiibiian J	BUIS EVO BC12	Khalafi H	F42 F41 F42 F43
Ibrahim Farah Samia Mohamed	W22	Khenfer Wissem	BC49
Ibrahim, Ghassan	W6. W16	Khenioui Abderrahim	N22
Ibrahim, Jounar Aziz	E23	Khidir, Mawada M.	BC29
Ibrahim, M.Y.	P18, EX25, EX26	Khlaif, Hamed	EN1
Ibrahim, Mohammed M.	BE10	Khlaywi, Samira A.	E42
Ibrahim, Paul Bishwajeet	BC53	Khldi, Omar	P11
Idraw, Mohamed Walid	E44	Khodary, Mohamed A.	P17
Idris, Ali M.	V30	Khrfan, Wafa	N29
Imtiaz, M.	S20 E10	Khrieba, Monammad Imad	F48
Inam-ui-naq, M.	PIU BC38	Kolaib MAO	W21 E17 BC24
Ismael Halgurd R	E50	Kooman Miriam	S3
Ismael, Rezgar M.	E50	Korayem, A.M.	N3
Ismail, Ahmed Zuhair	F47	Koriem, Ali M.	F51
Ismail, Faiz	V11	Koudri, Djazira	F2, F59
Ismail, Imad	V8, V15, V15	Koula, K. Hadj	F32
Ismail, Sieve	BC56	Kribii, Mammad	BC11
Jaafar, Hadi	W24	Krida, Ghazi	E53
Jadallah, A.	N8	Krimi, Zoulikha	B2
Jaiut, Karim Kadum Jamal Maid		Kumar, Jimendra	F01 D10
Jamai, Maju Jariees Salim I	BC36	Kumari S G	V9 V12 V13 V18 V26
sarjees, sann J.	D C30	ixuillall, 5.0.	· , · 12, · 13, · 10, · 20,

E-6

Name	Abstract No	Name	Abstract No
	BT18, E56, E58	Mohammad, Jasim K.	BC52
La Rosa, Rosa	BT19, F33	Mohammad, Shleer	E48
Labadia, Fahima	E33	Mohammed, Abdulraheem S.	P12
Labhilili, M.	EX6, EX9, BC12	Mohammed, Amjad A.	BT14
Labourdette, G.	P23	Mohammed, Fatimah Qasim	RO4
Laraba, Imane	F2, F59	Mohammed, Haitham M.	E1
Larbi-Boughrarou, Fazia	F54	Mohammed, Oudamah Thaer	F 15
Leadbeater, Andy	S6	Mokabli, A.	N35
Lebaili, Nemcha	RO5	Molinari, Fabio	S11
Lehad Arezki	V7	Morris Cindy E	B1 F13
Letfi Orboa S	B9	Morsli Abdelkader	F65
Lean Qibba, 5.	\$20 V9 BT18 E56 E9	Morsli Samira	F65
Enaloui, 5.	520, <i>V</i> , B110, E30, 19,	Morsad M	\$20
I magharhi Ahdalhaki	EV4	Mostafa Fatma A	BO0
Lineghardi, Addeldaki	LA4 V28	Mostala, Fathla A.	KU9 EV12
Lonne, Neva Greig	V 20 N 7	Mostala, M.A.	EA12
	V/	Mougou, Allina	
Lowery, 10m	V28	Mounanna, Anmad M.	V0, B19
Maafa, I.	EX9, BC12	Mounouche, Fazia	E31, EX19, EX22
Madacı, İbtissem	B13	Moukahel, Abd-Al Rahman	B1, F13
Madi, Abdulla Omer	Pl	Mourad, A.E.A.A.	E12
Mahboubi, Yasmine	RO5	Moursey, Amira H.A.	BT2
Mahdi, Khadidija Mohamad	E30	Mousa, Mohammad A.	N24
Mahdi, Samir	EX4	Moussadek, Rachid	BT18
Mahdjoubi, Djillali Mohmad	P11	Moustafa, Shaima M. N.	F26
Maher, M.A.	V18	Mroweh, Ali	W23
Mahfoudhi, Naima	V7	Muhsin, Tawfik M.	F18
Mahjoubi, J.	EX22	Mukhtar, Sana K.	F14
Mahmood, E.A.	EN5	Mustafa, Abbas F.	EX21
Mahmood, Hameed H.	IPM2	Mustafa, Rebwar Ahmed	BC33
Mahmoud, Sabry Younis	V1	Mustafa, Shaheen A.	E36
Mahmoudi, Kheira	EX29	Nachit, M.	S20, BC12, F4, EX9
Mahrous, Ghazi Ali	BE1	Naher, Falah H	EN6
Makhoul Manar	F6	Najah, A M	N9
Makroud Havat	BC49	Najar Asma	V7 V13 V32
Mal Allah Lubna Laith	F16	Naser 7	F49
Malhotra P	\$20	Nasir, Maryam Hamid	F24
Malile A U	520 E20	Nassor Ahmad Bahim	E47
Malik, A.U. Malik, Danda	N12	Natshah Dagal	147 W/19
Manda M. Jamal	IVI 12 V11	Natshell, Basel	W10 E40
Mando, M. Jamai	V11 V5 IDM10 DC55	Naveeu, Gilazai	F40 D5
Mansour, Akei	V3, IPM19, BC33	Nawar, naider Hallieu	DJ DT22
Mansour, Magida Hasnem	E25 DC00	Naz, Faran	B122
Mari, J.M.	BC22	Nebin, Dhaouya	N18, N30
Massaad, Randa	V10	Negm, Mohamed W.	M1/
Matallah, Rafika	RUS	Nehal, Mohammad Quja	BC48
Matloob, Ahed A.H.	F23	Neran Salem Aljarah,	F 15
Matny, Oadi N.	F5	Newar, Hyder Hameed	P9
McMullen, M.	SI	Niebes, J.F.	P24
Mehmalgy, M.Z.	P18	Nizamani, S.M.	BC22
Mehrez, E.A.	P18, EX25	Nori, Wafa	BC7
Mehyiddinn, Aahed	V10	Nouman, Abdullaha	BE9
Meimah, Abdul Rahman	F4	Nouri, Faten	F60
Mekliche, Lila	F54	Nsarellah, N.	S20
Merabet, Samira	EN8	Nsiri, Radhouane	E53
Merdas, Lynda	BC49	Obeid, Sarah Hashim	BC10
Merghem, Ahmed	BC23	Obida, Noor	V5
Merzougui, Hamida	EX30	Ogbonnaya, F.C.	S20
Mesbah, Amira E.	M3	Oji, Francis I.	BC28
Mesbah, Mahmoud Ayad	N19	Okaily Res, R.A.	EN5
Metoui, Nebiha	V33	Okassi, Fatma	V33
Meyer, Joachim	S5	Oliveri, Cinzia	F33
Mezaachz-Aichour, Samia	BT3	Omer. Fatima	W6
Mihoub. M.	N15	Osman, A.G.	W10
Mohafez, Mohammad A	M1	Osman Entisar A	BC28
Mohamed F S	W25	Osman, Hanan H	FX20
Mohamed, Hoda H A	N2 N6	Osman Hossam H	EX20
Mohamed IS	W10	Osmanm Hossam H	P4
Mohamed M M M	N3	Othman Nada Sabaah	FX17
Mohamed Meawed MM	NI	Outlah, Naua Sabeell	EAT/ EV30
Mohamad Mana A		Oudah, Kalilia Oudah, Bassam	EAJU IDM10 D15 DC42
Mohamad, Moha A.	E14 E25 E47	Outell, Dassall	IFIVITU, P15, BC42
Mohamed Candes Al 117	Г23, Г0/ DC54	Outifiani, Delatra	E4J EX22
Millionamed, Sondos Abdel-Tawab	BC34	Outtar, F.	EA22
Monamed, Suad Abdel Gamiel	BC3	Owayss, Ayman A.	BE2, BE/

Name	Abstract No	Name	Abstract No
Paparone, Nicoletta	BT19	Saleh, Nahida M.	EX3
Petter, F.	S1	Salem, N.	F49
Prasad, Dinesh	F61	Salem, Nida'	N29, V5, IPM19
Prasad, Rajesh K.	F61	Salem, Nida'	IPM19
Prassad, Ruvalpali Durga	F28	Salemi, Roberto	BT19
Pratibha, Gautam Ram Das Sharma	BC53	Salim, Nagham Salah	BT1
Pudasaini, Mahesh P.	N31, N32	Sallam, Ahmed A.	P17
Qasem. Thyiab Ahmed	W21	Sallam, Gihan M.E.	M1
Qasim, Akram Hamdi	B7	Salman, M.	F36
Oasim, Nabil A.	E18	Salman, Mazen	W18, BT17
Radi. Basim M.	V2	Samaha, Jamal	N12
Radjai, I	EX19	Samara, Rana	V28
Ramadan, Ali M.	E47	Sameer, Saleh H.	BC25, BC26
Ramadan, Nadeem A.	F58	Samsatly, Jamil	V21
Ramdani, Abdelhamid	BT18, E56, F9	Sanad, M.I.	BE6
Ramo, Alan	F3	Sands, David C.	B1, F13
Rasheed, Halgurd I.	E48	Santosa, Advatma I.	V27
Rashid, Ousay Wadodd	F 15	Saracchi, Marco	F30
Ratcliffe, N.	M16	Sarhan, A.R.T.	F17
Rauf C. Abdul	BT22	Sarker, A	S20
Raweh, Hail S	BE7	Satti, Abdalla Abdelrahim	EN7 EX14 EX15 BC41
Raza Ali	F40	Saurborn I	S15
Reddy NP Eswara	BT20 F63	Saved Atef M M	IPM15 BC51
Reffis M	F41	Sellami, S.	N15
Reffis Mansour	F42	Selman Mazin S	F18
Rehman A	F39 F40	Selman, Nadia H	EX3
Rehman, Sagih	BC47	Selman, Zubair N	F21
Rezoui Salah	F28	Selmi Ilhem	V7
Rezk Bushra	F 22	Setbel Samira	EN8 E65
Riaz K	F39	Setti Benali	B4
Riaz, Muhammad	BC47	Sgatni Khaoula	F53
Rizk Marguerite A	F38	Shahana Vasser M	815
Rocchi Lorenzo	84	Shadeed M I	BC24
Rosca Joan	F37	Shaderma Asma Mohammad	P14
Rott Philippe	V31	Shabid Muhammad	N28
Rouag N	V14	Shahir, Kamila Ward	BF4
Rouibah Moad	F7	Shahiahn Muhammad	F10
Rowaished Ali Khamis	FX7	Shakoor Sundas	F10
Row A S	S1	Shalaby Shebata F M	P20
Royer Monique	V31	Sham Ariun	BT7
Rugheim AMF	W10	Shankarganesh K	BC53
Ruma OK	N23	Shapoo Alisar	M10
Russo Marcella	BT19 F33	Shareef Barin S	F66
Rustamani M A	BC22	Sharif Maadh M M	F21
Saab, Carine	F31	Sharma, Hari C	S13
Saad Najat Adnan	F47	Shatnawi Mohamad	EX8. BT4
Saadi, Leila	RO5	Shdeed Elie	W23
Saadon, A.A.	F17	Shedeed, Mohamed I.	E14, E15, E17
Saadoon, S.M.	N14 N20	Shehata, LE	N17
Sabbour, M.M.	BC16	Shekhmous, Sultan	E10. F3
Sabra. Alia	W14	Shereef, G.M.	M4
Sabri, K	N35	Sherif, Refat Mostafa	BC51
Sabri, Karima	N33	Shiekhmous, Sultan	BC48
Sadallah, Said Ammar	B3	Shlallo, Amanni	E2
Sadder, Monther T	BT8	Shobrak, Mohammed	EN12
Sadik, A S	N23	Shomar, Antoine	W20
Sadik, Ferval H.	IPM18	Siblani, Walaa	W15
Sadia Mohammad A	E50	Sid. Ibtissam	N30
Saed, Mahdi Mohammed Salih	BE3	Sidawi, Amal	BC4
Saedo, Khadija A.	F66	Singh, Amitabh	F61
Saeed Janan A	W5	Singh Krishna P	F61
Saeed, Salah A.	E48. E50	Smaha, D.	N35
Saeidi, Karim	E54, BC50	Smaha, Diamal	N22
Sagur, Selan H.	EX27	Sobh, Hana	V21
Sahi, Shahbaz Talib	BC13	Sobhi, Zobeida	W7
Sahle, Samuel	E58	Soliman, M.H.A.	E13
Saighi, Saida	E55	Soliman, Mahmoud A	P17
Saira, M.	F39	Soliman, Z.R.	M4
Sakr. H.E.	P13	Soltani. Ines	V7
Salam, Najeeb Ahmed Mohsen	P21	Souheib. Chebrou	E7
Saleh. Alaa	E22	Spadaro. Davide	S10
Saleh, H.M.	BC45	Spencer-Phillips, P.	M16
· · ·		r	-

Name	Abstract No
Spinelli, Francesco	S4
Steiger, D.	P23
Street, K.	S20
Suffert, M.	S1
Sulaiman, Anisa	F4
Sultan, Essam A.	V2
Suluman, w.S.	EX10, EX11
Sumaira, K.	F39 PC24 E17
Sweetani, M.E. Swiei Th	BC24, E17 W3
Svouf Maha	W1
Tabet, Dania	F35
Tadesse, Negussie	E58
Tadesse, W.	S20
Taha, Hassan Ali Ahmed	M4
Taha, Khalid H.	F27
Taher, Farhad M.	E48, E50
Tahiri, H.	EX6
Taibi, Ahmed	RO8
Taibi, K.	EX6
Tail, Gnania	N18 DC4
Tarai Nasar	BC4 E26
Tarek Ahmad M	E20 FX27
Tarek Rana	BT11
Tariq. Aliya	BT22
Taweel, Mohamad	F 22
Taxenna, Abdellaziz	F55
Thanon, Ali Hammoud	W21
Timoumi, Sana	V13
Titouhi, Faten	EX28
Tohubsum, A.	F49
Tohubsum, Mustafa A.	N7
Trailia Abdal Hamid	BII9
Treutter Dieter	S4
Trissi, Abdul Nasser	E40
Tulaymat, Fawaz	BT18
Uounis, Azea Aldain M.	N24
van der Wolf, Jan	S3
van Leur, Joop	V12
van Waetermeulen, X.	P24
Vickers Trish	521 V28
Vidvasagar Polana S P V	RT8
Vurro. M.	S7
Wadi, Hazar	F29
Waheed, Ayad Qahtan	B5
Wakim, Samer	V10
Wanius, Asma S.	N24
Wattar, Fahema	P11, E30
Yaniaoui, Dorsai Vahiya VM Zaiad	V 3 3
Yahya A	P12
Yahyaoui Amor	BT6
Yakhou, S.	F43
Yakoub, Wafaa	BE9
Yakti, Radwan	BC40
Yamina, Guenaoui	IPM9
Yaqti, Radwan	E44
Yaseen, Thaer	BC15, F35
Yassin, E.M.A.	E 35
Yazıjı, Maysa Vounis Adli	INT I W18
Youns Nasema	E30
Yousef, A.M.	RO9
Yousif, R.S.	F25, F67
Youssef, Helim	E10, F3
Youssef, M.M.A.	N4, N5, N21
Youssef, Omran	E10, F3
Youssef, Rawa Mouhsen	M14
Zanraa K.I. Saeed	F2/

Name	Abstract No	
Zahran, Eldur Balla	W19	
Zaki, JassemYahya	W21	
Zangeneh, Sima	F48	
Zaroug, Mohamed Saeed	W19	
Zeghad, F.	W8	
Zeid, R.A.	P8	
Zerroug, Mohamed Mihoub	BT3	
Zgheb, Ehab	EN9	
Zimmermann, Olaf	BC27	
Ziyaev, Zafar	V9, BT18	

KEYNOTE ADDRESS

KN1

PLANT HEALTH MANAGEMENT IN THE 21ST CENTURY–ISSUES AND RESPONSIBILITIES FOR PLANT HEALTH PROFESSIONALS. Greg I Johnson, President, International Society for Plant Pathology, PO Box 412 Jamison ACT 2614, Australia, Email: greg.johnson@velocitynet.com.au

Plant Health is Earth's Wealth is the slogan of the Australasian Plant Pathology Society and it is the theme that I am adopting for my Presidency of the International Society for Plant Pathology 2013-2018. Control of plant diseases, pests and weeds is the keystone of assuring global food security. Plant health professionals, farmers and consumers, businesses and traders, educators, government officials, the military and politicians all contribute to achieving this goal. But plant health management also goes far beyond achieving food security. It also underpins: (i) land-care and the sustainability of natural landscapes and the environment, (ii) productivity and enjoyment of forests, fibre and recreational horticulture, (iii) minimizing plant pathogen impacts on human and animal health and, (iv) optimising and enhancing discovery and opportunities in biotechnology and plant molecular biology. And above all these important subjects - plant health management assures security for the source of life on the planet – the carbon capture and conversion of carbon dioxide to oxygen by plants that allowed the move from oceandwelling to land-dwelling life forms. In the 21st century plant health professionals have vital responsibilities. They are the guardians of plant health that is earth's wealth.

Symposium I: New Invasive Pests and Phytosanitary Measures for the Arab and Near East Countries and lessons learned from other regions

S1

INVASIVE PESTS AND PHYTOSANITARY MEASURES: HOW DOES EPPO HELP ITS MEMBERS? <u>F. Petter</u>, M. Suffert, M. McMullen, D. Griessinger and A.S. Roy, European and Mediterranean Plant Protection Organization, 21 Boulevard Richard Lenoir 75016, Paris, France, Email: petter@eppo.int

One of the main roles of EPPO is to help its member countries to prevent entry or spread of dangerous pests. The Organization has therefore been given the task of identifying pests which may present a risk (early warning), evaluating their risk for the region and making proposals on the phytosanitary measures which can be taken against them. Once a pest has been identified as presenting a risk for the EPPO region, recommendations on how to detect and identify the pest may be developed (diagnostic protocols and phytosanitary procedures for inspection) as well as recommendations on how to eradicate and control this pest. To perform these activities, much information on pests presenting a risk to the EPPO region is required and is collected by the Organization and made available to its member countries. Different databases have been developed including PQR (Plant Quarantine data Retrieval system) and the EPPO database on Diagnostic expertise. In addition to pest specific activities, EPPO also develops recommendations for quality assurance in laboratories, in order to promote harmonization of procedures in the EPPO region. The different activities conducted in this framework are presented.

S2

INVASIVE PESTS IN THE MEDITERRANEAN AND NEAR EAST REGION AND RISKS ASSOCIATED WITH THEIR SPREAD. <u>Stefano</u> <u>Colazza</u>, University of Palermo, Italy

(Abstract Not Available)

S3

HOW THE NETHERLANDS CONFRONTED THE INTRODUCTION OF CROP BACTERIAL DISEASES: THE CASE OF POTATO. Jan van der Wolf¹, Eisse de Haan² and Miriam Kooman². (1) Plant Research International, P.O. Box 69, 6700 AB Wageningen, The Netherlands, Email Jan.vanderWolf@wur.nl; (2) Nederlandse Algemene Keuringsdienst - Randweg 14, 8304 AS Emmeloord, The Netherlands.

The Netherlands is the biggest exporter of seed potatoes in the world. To guarantee the absence of diseases and pests in seed potatoes, at the Dutch General Inspection Service for Agricultural Seeds and Seed Potatoes, seeds are tested using a system based on field inspections and, for selected pathogens, with advanced laboratory assays. To avoid unnoticed introductions and spread of novel pathogens, surveys are regularly conducted. In last decade, these surveys revealed the presence of blackleg causing bacterial pathogens such as Dickeya solani and Pectobacterium carotovorum subsp. brasiliense, formerly not or hardly present in the Netherlands. For risk assessment and risk reduction, the pathogens were phenotypically and genotypically characterized. Validated detection methods were developed and implemented in testing programs. To study the relative contributions of infection sources in the introduction and spreading of the pathogen, a method for track and trace was developed. The role of diagnostics and seed testing in the management of soft rot Enterobacteriaceae will be discussed

S4

IMPORTANCE OF ACCURATE AND EASY TO USE PEST DETECTION METHODS FOR THE USE BY PLANT HEALTH INSPECTION SERVICES. Antonio Cellini¹, Giampaolo Buriani¹, Lorenzo Rocchi¹, Johannes Hadersdorfer², Dieter Treutter², Guglielmo Costa¹ and <u>Francesco Spinelli¹</u>. (1) Department of Agricultural Sciences, Alma Mater Studiorum, University of Bologna via le Fanin 46, 40127 Bologna, Italy; (2) Unit Fruit Science, Technische Universität München, Dürnast 2, 85354 Freising, Germany, Email: Francesco.spinelli3@unibo.it

The globalization of trade facilitates the spread of plant pathogens and pests, especially when symptoms are not evident or discriminant. This poses a serious problem for the prevention of new introductions or spread of quarantine diseases. DNA-based protocols are the standard methods for the detection of infected plant material. Nevertheless, these methods are timeconsuming and require trained personnel, with an efficacy depending on the sampling procedure. Therefore, robust, operator-friendly and rapid methods are sought to be used on mass screening by inspectors in real conditions. Since plant responses induced by pathogens also include changes in emission of volatile compounds (VOCs), the profiling of these markers may represent a sensitive, accurate and operator-friendly alternative for screening of asymptomatic plant material. VOCs-based diagnosis allows a non-destructive mass screening of plant material. Among the analytic methods available for this purpose, the electronic nose (e-nose) is user-friendly and faster than PCR methods, and the same equipment setup may work with many different pathogens. Recent research demonstrated that the electronic nose can be successfully used in practical conditions, such as nurseries or customs. Another promising method for a fast and easy diagnose is loop mediated isothermal amplification (LAMP). The main advantages of this methods are the equipment and running costs and the very fast results. However, this method present the same limitation of the DNA-based diagnosis. Therefore, this method can be the most appropriate to complement the VOCs-based screening.

Symposium II: Prospects and Limitations of Novel Action Pesticides

S5

CHALLENGES FOR THE DEVELOPMENT OF NOVEL INSECTICIDAL PRODUCTS. Joachim Meyer, Agronomic Development Pest Management, Bayer CropScience AG, Alfred-Nobel-Str. 50, 40789 Monheim, Germany, Email: joachim.meyer@bayer.com

On a global basis, the number of active ingredients used in Plant Protection Products is decreasing, principally due to fewer companies investing in R&D, an increasing focus by these companies on seeds and traits and a greater share of R&D budget being spent on defending products when they need to be re-registered. Higher regulatory requirements in main agricultural markets, which now include also an initial evaluation of hazard criteria, have led to a situation where the risks in developing new compounds is suppressing innovation. The time to bring novel products to the market is increasing and the costs are rising. Specific challenges for insecticides are associated with the implementation of resistance management strategies and the dynamics of pest populations in highly intensified cultivation areas in countries of Asia Pacific and Latin America. Combined with the phasing out of older chemistries as a result of stricter re-registration criteria this leads to less and less products being available. The successful integration of biological control agents and natural products in commercial control programs is a challenge for R&D companies as well as for advisory services. It is considered to be a valuable tool for growers to set up sustainable control programs in various, but not in all important production segments.

S6

NEWDEVELOPMENTSINCHEMICALDISEASEMANAGEMENT.AndyLeadbeater,SyngentaCropProtectionAG,Schwarzwaldallee215,CH2004Basel,Switzerland,Email:andy.leadbeater@syngenta.com

The use of chemical fungicides to control plant diseases is an integral component of crop management. Although fungicides have been used to good effect in agriculture since the 1940s, the introduction of new fungicides is an essential element to provide sustained control of major crop diseases. The need for new and innovative fungicides is driven by resistance management, regulatory hurdles and increasing customer expectations amongst others. New fungicides can be discovered either within established mode of action groups, ideally with low resistance risk (robust modes of action), or in areas with completely novel modes of action. Compounds having a novel mode of action are of course of special interest, since they play a key role in resistance management strategies, but equally important are new fungicides with enhanced characteristics such as systemicity, curativity and longevity of disease control. With the background of increasing registration hurdles, increasing costs and increasing market needs, a review is presented on the current market position of major crop protection fungicides, current and future market needs and new fungicidal compounds in late development or recently introduced to the market. Some key features of the new fungicides will be discussed including biological target segments, business potential and future impact. New MoAs are quite rare in some segments (major new fungicides are all SDHIs), but seem to be more frequently discovered for the control of Oomycetes. Potential reasons for this will be discussed.

S7

THE ROLE OF STRIGOLACTONES IN THE BIOLOGY AND CONTROL OF PARASITIC WEEDS. <u>M. Vurro, Bari, Italy</u>

(Abstract Not Available)

ENVIRONMENTAL SIDE EFFECTS OF NOVEL PESTICIDES. HOW MUCH ARE WE AWARE OF THEIR LIMITATIONS?. <u>Mohamed Tawfic Ahmed</u>, Suez Canal University, Ismailia, 41522, Egypt, Email: motawfic@tedata.net.eg

The use of pesticides in agriculture has been one of the most important factors leading to increased yields and food security. To reach this goal, pesticides industries have spared no efforts developing new chemical species to combat emerging pests, and to counter possible development of resistance to chemicals in use. However, the use of some of the new species have had its trade offs, with significant bearing on man and his environment. Recently, the European commission has suspended the use of neonicotinoid insecticides because of their role in harming pollinating insects, and bees decline (colony collapse disorder). Imidacloprid, the most widely used member of the neonicotinoid family was also suspected of the decline of insect - dependant birds, and other non-target organisms, and for accelerating the collapse of the ecosystem. Similar ban was imposed on fipronil, a phenylpyrazole insecticide because of its role in bee colony collapse disorder. On the other hand, a number of different pesticides, including old and newly introduced ones have been classified as endocrine disturbing chemicals, causing adverse impact on wildlife, with special reference to sex ratio and the emergence of intersex organisms. International organizations have issued a number of reports that list suspected endocrine disturbing chemicals including pesticides. In addition, despite the well recognized success of some of the newly introduced bio pesticides at field level, the unfavourable toxicological impacts of some of these compounds is a matter of serious concern

Symposium III: Pest Management in Organic Farming Systems

S9

DEVELOPMENT OF BIOPESTICIDES FORMULATIONS IN THE ARAB REGION. W. El-Sayed, Department of Plant Protection, Faculty of Agriculture, University of Ain Shams, P. O. Box 68, Hadayek Shobra, 11241 Cairo, Egypt, E-mail: walach2000@yahoo.com

Considering the implementation of biological control as a modern pest control trend depends primarily on several strategies, most prominently is searching for alternatives to chemical control methods aimed to minimize hazards resulting from pesticide residue on both human and animal health, and on the ecosystem in general. In addition, one of the major strategies of the biological control concept is attempting to incorporate the biological control methods as a component of integrated pest management to achieve satisfactory control results and meanwhile, reduce pesticide

application to the minimum extent possible. Many pathogens with mycopesticide potential have been discovered, but few have become commercial realities or viable alternatives. Biological, technological, and commercial constraints have hindered progress. Many of these constraints are being addressed, but there is a critical need to better understanding the biochemical and physiological aspects of pathogenesis of potential mycopesticides. Weak links in the host plant's defense need to be exploited and the virulence of pathogens enhanced. In order to make a significant jump forward in formulation, applied research must be evaluated to include fundamental studies of physiological and biochemical changes in cellular organelles and membranes as affected by desiccation and by protections against desiccation. Shelf-life data are worth very little in practical terms for microbial products without data on bioassays and on tolerance to environmental extremes. Environmental tolerance studies and bioassays are essential for monitoring any changes in process. Toxic metabolites produced by fungal pathogens play an important role in hostpathogen interactions. These metabolites consist of a wide array of chemical structures. They can be important factors of pathogenicity or virulence, can have different behaviors with respect to the host varying from strictly host-specific to completely non-specific compounds, and can act with different mechanisms affecting several sites in the host.

S10

POST-HARVEST DISEASE MANAGEMENT IN ORGANIC FARMING: INTEGRATION OF STRATEGIES. <u>Davide Spadaro¹</u>, Angelo Garibaldi¹ and Maria Lodovica Gullino¹. (1) AGROINNOVA – Centre of Competence for the Innovation in the Agroenvironmental Sector, University of Torino, 10095 Grugliasco (TO), Italy, Email: davide.spadaro@unito.it

Organic agricultural methods internationally regulated and legally enforced by many countries. In Europe, the Council Regulation 834/2007 sets up the standards for organic production and labelling of organic products. Many strategies have been developed to control postharvest decays on various organic fruit and vegetables, including disease prevention, monitoring and control strategies. Good storage practice, such as low temperatures of storage, modification of relative humidity and atmosphere, and good hygienic practice can be adopted. Biological control using antagonists has emerged as a promising strategy. Several biocontrol agents have been widely investigated against different pathogens and fruit crops. Many biocontrol mechanisms have been suggested to operate on fruit, including competition, biofilm formation, production of diffusible and volatile antibiotics, parasitism, induction of host resistance. Essential oils are gaining increasing interest due to their volatility, relatively safe status, wide acceptance by consumers, ecofriendly and biodegradable properties.

Application of essential oils is an attractive method, due to their bioactivity in the vapour phase and the limitation of water sanitation for many commodities, which makes them useful as possible fumigants. Heat treatments have been considered as a promising prestorage method of postharvest decay control. The beneficial effect of prestorage hot water immersion treatment to prevent rot development has been shown in numerous fruit. Thermotherapy has a number of advantages, which include relative ease of use, short treatment time, reliable monitoring of fruit and water temperatures, and killing of decay agents. None of these methods used alone can provide sufficient decay control, but some of them can be applied in combination, resulting in additive or even synergistic levels of decay control, in an integrated vision of disease management.

S11

PESTMANAGEMENTSTRATEGIESFORORGANIC STONE FRUITCROP PRODUCTION.Fabio Molinari, EntomologyConsultant - SAGEA SRCentro di Saggio s.r.l.Castagnito d'Alba (CN)Italy,Email:fabio.molinari50@gmail.com

The cultivation of peach in organic agriculture today has very few limitations due to pest control problems, compared to the past decades. Research has given a number of high-efficacy technical solutions, accepted in organic fruit growing, that are widely applied in integrated fruit production as well. Carpophagous insects, belonging to lepidoptera and diptera are the major pests, and control measures are required similarly to conventional orchards, while other pests can show different harmfulness, due to the influence of organic agriculture management. An overview is given on the features of the most important peach pests and their control in organic peach orchards, underlining the best achievements and some constraints.

S12

THE POLLINATOR VECTOR TECHNOLOGY OF MICROBIAL PESTICIDES FOR PEST MANAGEMENT. Mohammad S. Al-alawi, Faculty of Agricultural Technology, Al-Balqa' Applied University, Assalt, Jordan.

The pollinator vector technology (PVT) is a novel approach for the application of microbial control agents to agricultural crops. The principle of the vectoring process relies on the ability of the hairy bodies of bee pollinators to carry the infective propagules of the microbial control agent and placing them on the crop flowers to control agricultural pests. The PVT works well against pests that attack flowers of the crop and requires the presence of an effective microbial control agent that can be formulated in a way suitable for bee acquisition and deposition. The microbial control agent is placed in special dispensers fastened at the entrance of the honey bees or bumble bees hive. When a bee exits the hive through the dispenser, it acquires the inoculum

containing the microbial control agent on its body and transfers it to the flowers of the crop where the microbe can infect and kill the target pest. The PVT has proven to be effective against a different array of insect pests, fungal and bacterial plant diseases on many plants including field crops, greenhouse vegetables and fruit trees. The PVT has several advantages over spraying as a mean to apply microbial control agents to the flowers of crops. Pollinating bees usually place the inoculum precisely in or on the flowers of the crop, thereby targeting the pests that feed on or inhabit the flowers. This precise application reduces the total amount of inoculum needed to treat a certain area and reduces exposure of beneficial non-target organism to the microbial control agent. Moreover, pollinating bees forage the crop almost daily thus, continuously carrying the inoculum to newly opened flowers which eliminate the need for frequent spraying to protect newly opened flowers. However, PVT has some limitations such as its suitability for pest that attack or inhabit flowers, the lack of effective microbial control agents for many damaging pests and the detrimental effects of some microbes on the bee pollinators. The PVT is a new and interesting approach for the application of microbial control agents to agricultural crops. It integrates pollination with pest control resulting in a win-win situation that result in better crop yields through improved pollination, sustainable pest control and reduced reliance on chemical pesticides.

Symposium IV: Natural Compounds and Other Alternatives for Pest Management

S13

ADVANCES IN USING NATURAL PLANT PRODUCTS FOR PEST MANAGEMENT. <u>Hari C</u> <u>Sharma</u>, International Crops Research Institute for the Semi-Arid Tropics (ICRISAT), Patancheru, Andhra Pradesh 502 324, India, Email: H.Sharma@cgiar.org

The insecticidal properties of natural plant products have been known since ancient times. It is estimated that over 2,000 plant species possess biological activity against insect pests. The chemicals that impart insecticidal activity include alkaloids, terpenoids, acetogenins, and flavonoids. Nicotine from Nicotiana tabacum, pyrithrins from Chrysanthemum cinerariaefolium and terpenoids from neem are most prominent. Pesticide formulations developed from neem (Azadirachta indica), karanja (Pongamia glabra), and custard apple (Annona squamosa) have shown promise for pest management. Despite voluminous information on the usefulness of these products as pest control chemicals, their exploitation in practical agriculture has been limited due to low toxicity, latent period of action, short shelf-life, rapid degradation, and limited spectrum of activity. However, there is a general belief that natural plant products are easily biodegradable, and thus, are considered safer as compared to synthetic pesticides. However, there is little information on their metabolism in soil, water and plants. Although considered safe to the non-target natural enemies, natural plant products might still have the same toxic and anti-molting effects on these organisms as on the target arthropods, in addition to their indirect effects through sub-optimal prey. There is very little information on the effects of these products on the activity of microbes in the soil, and on the aquatic organisms. Therefore, there is a need to generate information on natural plant on acute and chronic toxicity, mutagenesis, allergenicity and teratogenicity with due consideration for their safety to the environment.

S14

PHEROMONESANDATTRACTANTSANDTHEIR APPLICATIONS IN CROP PROTECTION.ShakirAl-Zaidi,RussellIPM,UK,Email:shakir@russellipm.net

The demand for residue free fruit and vegetables is a new challenge facing farmers from ever demanding consumers of the 21st century. This challenge is being fuelled by both increasing awareness of health implications of pesticide residues as well as marketing trending eager to increase the crop value and return. While the approach of biological control is gaining momentum with the entry of the big multinationals to this field, synthetic insecticides remain a key component in any pest management strategy. Pheromones and attractants can provide an important contribution in regulating and rationalizing the use of synthetic pesticides and helping to approach the challenging target of residue free fruit and vegetables. Attract and kill using pheromones and attractants in conjunction with synthetic pesticides have demonstrated an efficient pest management approach to key pests without leaving any residue on the harvested crop and may promises to be an important tool in the future.

S15

EFFECTIVENESS OF BIOHERBICIDES ON AQUATIC AND LAND WEED SYSTEMS. Yasser M. Shabana¹, R. Charudattan², M.A. Elwakil¹, J. Saurborn³, and S. Hallett⁴. (1) Plant Pathology Department, Faculty of Agriculture, Mansoura University, El-Mansoura, Egypt, Email: yassershabana2@yahoo.com; (2) Plant Pathology Department, University of Florida, Gainesville, FL, USA; Institute of Plant Production and Agroecology in the Tropics and Sub-tropics, University of Hohenheim, Stuttgart, Germany; (4) Botany and Plant Pathology Department, Purdue University, West Lafavette, IN, USA.

This work was done to examine if biological control strategy can really work in diverse weed systems. Bioherbicides were developed and tested in four weed systems namely, the floating aquatic weed, waterhyacinth (*Eichhornia crassipes*) in Egypt, the

submerged aquatic weed, hydrilla (Hydrilla verticillata) in Florida, USA, the parasitic weed, sunflower broomrape (Orobanche cumana) in Germany, and the land weed, common waterhemp (Amaranthus *tuberculatus*) in Indiana. USA. System 1 (waterhyacinth): the fungus Alternaria eichhorniae isolate #5 (Ae5) is being developed as a mycoherbicide for waterhyacinth in Egypt. Ae5 formulated in cottonseed oil emulsion caused 100% control of waterhyacinth in outdoor field plots 7-13 weeks after application and the efficacy of the bioherbicide was further improved when integrated with 3.4methylenedioxy trans-cinnamic acid (MDCA), a phenylpropanoid pathway inhibitor that weakens the plant's defense system. System 2 (hydrilla): of 1019 isolates that were recovered from hydrilla, surrounding water and sediment collected from ponds and lakes in Florida and screened against hydrilla in bioassays, the biocontrol potential of F. culmorum was established. The biocontrol activity of this fungus was enhanced by the leaf-mining fly, Hydrellia pakistanae. System 3 (broomrape): formulation of fungal propagules encapsulated in a wheat-gluten matrix (termed Pesta) has proved to be a suitable technique for the development of Fusarium oxysporum f.sp. orthoceras (FOO) as a bioherbicide for sunflower broomrape. bioherbicide Application of the containing chlamydospores amended with yeast extract, glycerol and sucrose resulted in 99% disease severity, 80% reduction in Orobanche biomass, and increased sunflower seed yield by 11 times in comparison with the negative control. System 4 (waterhemp): conidia of Microsphaeropsis amaranthi produced on corn leaves and stalks caused 100% weed kill 2 days after inoculation of weed seedlings. Thus, it can be concluded that biological control approach can be successful in diverse weed systems.

S16

USE OF ALLELOPATHY IN WEED MNAGEMENT. <u>Ibrahim S. Alsaadawi</u>, Department of Biology, College of Science, Baghdad University, Baghdad, Iraq, Email: ibrahim_alsadawi@yahoo.com

Allelopathy has brought the attention of researchers over the past four decades with aim to exploit this phenomenon as weed management strategy alternative to the synthetic chemical herbicides. Several weed management methods, in which allelopathy is involved, have been developed such as utilizing allelopathic crop in crop rotation, crop mixture and intercropping, applying allelopathic crop residues as mulches, cover crop and smother crop and searching for allelopathic molecules with potential herbicidal activity. Allelopathic plant extract and residues have been also used to control weeds in several crops. However, in most cases the efficacy of weed suppression by these methods was below the efficacy of herbicides. Recently, substantial scope has initiated to reduce the herbicide rate when applied together with allelopathic crop water extracts and residues. By using this method, it was found that combination of 50% of recommended doses of different herbicides with allelopathic crops extract and residue scored weed suppression and yield similar to that of recommended herbicide applied alone. This paper will address developments in the use of allelopathy in the above strategies to minimize or avoid the frequent use of herbicides. Particular attention is given to utilize allelopathic crops residue in combination with lower rate of herbicides as a potential and feasible method for weed management in different crops.

S17

NATURAL PRODUCTS AS ALTERNATIVES TO METHYL BROMIDE FOR THE CONTROL OF PLANT PATHOGENIC NEMATODES. <u>Ahmed</u> <u>A.M. Dawabah</u>, Plant Protection Department, College of Food and Agriculture Sciences, King Saud University. P. O. Box 2460, Riyadh 11451, Saudi Arabia, Email: adawabah@ksu.edu.sa

Methyl bromide is an effective pre-plant soil fumigant that has been used for a long time to control plant-pathogenic nematodes, especially root-knot nematodes, Meloidogyne spp., on many high-value crops worldwide. Actually, methyl bromide has provided an excellent and a reliable return on investment for nematode control. Unfortunately, methyl bromide is also a health and environmental hazard, and is being phased out according to an international ban by 2015. As a result, agricultural investment will be adversely affected, and growers who have standardized their production practices based on the use of this compound, will not be convinced unless effective and economical alternatives were identified. However, researchers concluded that, until now, there is not any single alternative that can readily substitute for methyl bromide in efficacy, low cost, ease of use and wide availability. Therefore, many alternative control measures have been tested for nematode control all over the world. Natural products are one of the most promising and interesting groups among these alternatives. In this presentation, an overview of nematode management practices, using certain natural products that could be relied upon heavily for highvalue crop production in the world, will be provided.

Symposium V: Advances in Academic Teaching and Extension to Farmers Appropriate Knowledge for Pest Management

S18

HOW TO COMBINE BASIC AND APPLIED RESEARCH IN PLANT PROTECTION TO MAKE AN IMPACT ON FARMERS LIVES. <u>Mohamed F.R.</u> <u>Khan</u>, North Dakota State University and University of Minnesota, Fargo, North Dakota, USA, 58108-6050, Email: Mohamed.khan@ndsu.edu

The United States has an abundant, safe, reliable and relatively inexpensive supply of food for its 313 million inhabitants. Just 2% of the US population is directly involved in agricultural production on 2.2 million farms. Producers are advised on production and marketing issues by Extension educators who are employed by Land Grant Universities throughout the US and associated territories. In North Dakota and Minnesota, growers produce 60% of the US sugar beet, an industry which has a total economic activity of \$3 billion. In 1998, growers lost over \$100 million because they could not effectively control Cercospora leaf spot caused by the fungus Cercospora beticola. The Extension educator conducted basic research to understand the biology of the fungus to develop management strategies. Field research was conducted to determine which fungicides could be used to control the pathogen. Growers were invited to research demonstration sites to observe how the disease was controlled. Extension educator disseminated researchbased recommendations to growers, other educators, and consultants at seminars and by using production guides, research reports, circulars, a weekly radio program during the growing season and available on the internet, and face-to-face meetings with growers. Growers successfully adopted recommendations to effectively control Cercospora leaf spot. The average number of fungicide applications was reduced by 42% compared to the last epidemic in 1998, resulting in savings of over \$14 million in crop protection costs annually with no adverse impact on yield.

S19

FARMERS FIELD SCHOOLS FOR THE DISSEMINATION OF PEST MANAGEMENT **KNOWLDGE** WITHIN FARMING COMMUNITIES OF THE ARAB AND NEAR **COUNTRIES:** SUCCESS EAST AND LIMITATIONS. Alhawamdeh Ashraf¹ and Impiglia Alfredo². (1) Participatory Extension Division, National Center for Agricultural Research and Extension (NCARE, Jordan. E mail: ash_agri@yahoo.com; (2) Food and Agriculture Organization of the United Nations (FAO), Egypt. Email: alfredo.impiglia@fao.org.

Since the late 1980s, support to agriculture has moved from top-down agricultural extension towards more participatory approaches which better suit smallholders' technical assistance. Farmer Field School (FFS) is a non-formal adult education intervention which uses intensive discover-based learning to promote farmers' skills. Although an estimated 12 million farmers have been trained by FFS in over 90 countries across Asia, Africa and Latin America, the effectiveness of this approach has long been a subject of debate. In 2014, FAO's Regional IPM Programme in the Near East - GTFS/REM/070/ITA- provided support to smallholder

farmers in ten countries on IPM for vegetable and fruit production using the FFS methodology. The FFS approach aims to provide skills in crop cultivation and resource management using sustainable agricultural production methods such as Integrated Pest Management (IPM). Furthermore, FFS programmes aim to provide skills to improve agricultural, health and environmental outcomes, and empower farmers and their communities. Achieving these outcomes means training suitable facilitators, targeting appropriate farmers to attend the full training schedule and undertaking activities to promote dissemination and diffusion.

Symposium VI. Breeding Strategies for Host Resistance to Invasive and Emerging Pests

S20

HOST PLANT RESISTANCE TO INSECT PESTS OF CEREALS AND FOOD **LEGUMES:** PROGRESS MADE OVER THE PAST FEW DECADES IN WEST AND CENTRAL ASIA AND NORTH AFRICA. M. El Bouhssini¹, M. Nachit¹, A. Amri¹, M. Mosaad¹, O. Abdallah¹, S. Grando¹, S. Ceccarelli¹, R. Malhotra¹, A. Sarker¹, M. Imtiaz¹, S. Agrawal¹; S. Lhaloui², N. Nsarellah², M. Jlibene², A. Ammar², F.C. Ogbonnaya³, W. Tadesse¹, K. Street¹, M. Keser¹ and A. Bari^{1.} (1) International Center for Agricultural Research in the Dry Areas (ICARDA); (2) Institut National de la Recherche Agronomique (INRA), Morocco; (3) Grains Research and Development Corporation (GRDC), Australia, Email: m.bohssini@cgiar.org

Cereals (durum wheat, bread wheat, barley) and food legumes (chickpea, lentil, faba bean) production in North Africa, West and Central Asia (CWANA) is affected by damage caused by insects. The most important on cereals are: Sunn pest, Hessian fly, Barley stem gall midge, Russian wheat aphid, Cereal leaf beetle and Wheat stem sawfly; and on food legumes: leafminer, Sitona and various species of aphids. Host plant resistance is the foundation of integrated pest management. Through field and greenhouse screening, several sources of resistance to Hessian fly, Russian wheat aphid, Cereal leaf beetle, Wheat stem sawfly, Sunn pest, Sitona and Chickpea leafminer have been identified. The use of Focused Identification of Germplasm Strategy (FIGS) has helped in identifying sources of resistance in wheat at vegetative stage to Sunn pest and Russian wheat aphid. The resistant sources to these pests have been shared with breeders for use in the breeding programs to develop resistant germplasm and also mapping populations to identify chromosomal region(s) and molecular markers linked to the resistance. Three bread wheat and six durum wheat varieties resistant to Hessian fly have been released in Morocco. Wheat and barley germplasm with resistance to Russian wheat aphid have been developed and shared with national programs in the region for selection and use. Germplasm carrying resistance to Chickpea leafminer has also been developed and shared with partners.

S21

DURABLENEMATODERESISTANCEINAGRICULTURALCROPS:THEMIGENEINTOMATO, A CASESTUDY.SoledadVerdejo-Lucas.IFAPA, La Mojonera.Camino deSanNicolás1.04547La Mojonera,Almería.Spain.

Plant resistance must be durable to provide an efficient protection against the target pathogen during prolonged and widespread use in environments conducive to disease development. In tomato, resistance to the root-knot nematodes (RKN), Meloidogyne incognita, M. javanica and M. arenaria, is conferred by the Mi resistance gene. This gene reduces nematode reproduction by a 90% in comparison with a susceptible genotype and increase yield up to 60%. It is an effective and economic alternative to soil fumigation in nematode infested soils. Two cropping cycles with resistant tomato followed by a susceptible one are recommended to preserve the durability of the resistance. Grafting susceptible tomato into resistant rootstocks is a nonchemical alternative to soil fumigation adopted in many countries. The rootstock response, however, varied from highly resistant to fully susceptible depending on genetic background of the genotype and the RKN population. Repeated cultivation of resistant tomatoes rapidly selected virulent populations from an avirulent one under field conditions. Virulent populations are able to overcome the Mi gene, and show higher reproductive traits than the avirulent ones. They are identified through infection tests since virulence-correlated molecular markers have not been identified so far. A time-course experiment using M. javanica populations with different Mi virulence status revealed that population with acquired virulence had increased ability to invade roots (39%) than the avirulent population (6%)but lesser ability than that of the natural virulent type (70%). Bioassays to determine the stability of the acquired virulence indicated that the virulence remained stable for at least two nematode generations on susceptible tomato regardless the genotype the populations were generated on. A 48% of the populations collected from RKN-infested tomato fields under protected cultivation showed virulence against the *Mi* gene. On the resistant genotype, populations from susceptible tomato showed lower reproductive traits than those from rootstocks, followed by those from resistant tomato. Although the Mi-gene resistance is phenotypically expressed only when soil temperature is below 28°C, intermittent peaks above 28°C did not compromise the resistance level of the rootstocks or cultivars. These results suggest that the Mi gene offers utility in a wider window of soil temperatures than previously thought which might be of interest in the scenario of change in global climate and weather patterns

ECONOMIC ENTOMOLOGY

E1

ECOLOGICAL STUDY AND SUSCEPTIBILITY OF SOME PEAR VARITIES TO ATTACK BY *DYSAPHIS REAUMURI* AND *DYSAPHIS PYRI*. <u>Nazar M. Al-Mallah</u>, Haitham M. Mohammed and Abdul Jabar K. Al-Obada, Plant Protection Department, College of Agriculture and Forestry, Mosul Univ., Mosul, Iraq, Email: Naz53ar-almalaah@yahoo.com

The result of studying the effect of some ecological factors on seasonal activity of pear leaf roll aphids Dysaphis reaumuri and Dysaphis pyri showed a significant effect on mean number of the two aphid species according to the season, pear variety and direction. The highest mean aphid number reached 29.89 aphids/leaf on the east direction of Vestibella variety during the 2010 season. The results also exhibited a significant variation among aphids general mean numbers according to direction, which reached 21.17, 6.13, 5.41 and 12.7 aphids/leaf for east, west, north, and south direction, respectively. The regression equations between the mean number of aphids and biotic and abiotic factors showed a clear effect on mean aphid seasonal activity and temperature exhibited the highest effect on mean aphid number and reached 85%, whereas the effect of moisture, rain and wind was 34.8, 53.1, 37.9%, respectively. The effect of parasites and predators reached 94.0 and 75.4%, respectively.

E2

BIOLOGICAL STUDY OF THE PEACH TWIG BORER (ANARSIA LINEATELLA ZELL.) (LEPIDOPTERA- GELECHIIDAE) ON ALMOND IN CENTRAL SYRIA. Wajih Alkassis¹ and <u>Amanni</u> <u>Shlallo²</u>. (1), Faculty of Agriculture, Damascus University, Damascus, Syria; (2) Biological Control Research Centre, Faculty of Agriculture, Damascus University, Syria, Email: amannishllalo@yahoo.com

Anarsia lineatella is the most important pest on almond fruits, but also causes serious damage on buds. In Syria, almond plantations are located mainly in the central region. This study was conducted in almond orchards during 2009-2012. Result showed that *A. lineatella* had two generations per year. The first flying peak was in late May (diapaused larvae), while the second peak was in early July (first generation). First generation lasted 80-90 days and the second generation lasted 75-85 days.

E3

EFFECT OF TEMPERATURE AND HUMIDITY ON EGG STAGE IN PEACH CAPNODIS CAPNODIS TENEBRIONIS L. Adel Al Manoufi, Rasmia Al Mualem and Mohammad Al Allan, Department of Entomology, Department of Plant Protection, General Commission for Scientific Agricultural Research, P.O. Box.113, Damascus, Syria, Email: adel-agro@hotmail.com

This study was conducted at the Laboratory of Insects Research of the General Commission for Scientific Agricultural Research during 2006-2007 to study the impact of humidity on hatching rate of Capnodis tenebrionis L. eggs under incubation conditions similar to its occurrence in nature, and the effect of temperature on the hatching rate and the period of embryonic development. Results showed that the hatched eggs was affected by the surrounding moisture conditions with different structures, meanwhile there was no effect of surrounding conditions structure on hatching rate. The hatched eggs in wet conditions were 10%, whereas it was 74.33% in dry conditions. The temperature did not show any effect on the hatched eggs within the temperature range (20, 25, 30 °C), but there was an effect only on the period of embryonic development. The shortest period was 8.9 days at 30 °C, and increased with lower temperature. There was a negative correlation (-0.99) between temperature and the period of embryonic development.

E4

SENSITIVITY OF SOME POTATO VARIETIES TO INFESTATION WITH MOLE CRICKET (ORTHOPTERA: GRYLLOTALPIDAE) AND ECONOMIC LOSES CAUSED BY IT. Radhi Fadhil Al Jassany and <u>Raghad Khalaf Al Joboory</u>, Department of Plant Protection, College of Agriculture, University of Baghdad, Baghdad, Iraq, Email: rr2002try@yahoo.com

The study was conducted to determine the sensitivity of some potato varieties (Burine, Revera, Develia, Rozorf, Alzesta, Belen) to infestation with the mole cricket. Divlea and Rivera varieties had high infestation rate of 48.86% and 38.12%, respectively, and highest loss in weight of tubers that reached 29.59% and 33.61% for the two varieties, respectively. Rudolph and Alazata varieties had less infestation rate (7.49% and 4.55%) and the loss in weight of tubers was 7.27% and 3.22% for the two varieties, respectively. A number of tunnels of mole cricket in the different varieties varied during the season, but the statistical analysis indicated absence of significant correlation between the number of tunnels and economic losses resulting from injury to tubers.

E5

BIOLOGICAL STUDIES ON THE AFRICAN FIG FLY ZAPRIONUS INDIANUS GUPTA IN JORDAN UNDER LABORATORY CONDITIONS. <u>Amani Alawamleh¹</u>, Ahmad katbeh-Bader², Nayem Hassan³ and Ibrahim Al-Jboory⁴. (1) CIHEAM/Mediterranean Agronomic Institute of Bari, Via Ceglie 9, 70010 Valenzano (Ba), Italy, and Plant Wealth Laboratories Directorate, Ministry of Agriculture, Amman, Jordan; (2) Department of Plant Protection, Faculty of Agriculture, The University of Jordan, Amman 11942, Jordan; (3) Research and Development, Russell IPM Ltd, Chester, UK; (4) Department of Plant Protection, College of Agriculture, University of Baghdad, Iraq.

The African fig fly, Zaprionus indianus (Diptera: Drosophilidae), is a widely distributed polyphagous fly of tropical origin. The occurrence of Z. indianus in Jordan was reported on date palms in the Central Jordan Valley in June 2012. Studies on some biological aspects of fly population collected from northern Jordan Valley were carried out under laboratory conditions at 25±1°C, 75±10% RH, and 14 hr photoperiod. Mashed banana fruits with dry and active yeast, Saccharomyces cerevisiae, were used for the first time as a diet for larva and adult stages. Studied parameters were mating, pre-oviposition, oviposition, and incubation periods, hatching rate of eggs, duration and mortality of larval, pupal and adult stages. The larval stage had the highest mortality rate followed by the pupal stage then the egg stage. The life cycle ranged from 13.9-23.2 days with an average of 17.9 days. Emerged adult flies showed a 1:1sex ratio. Females had lower longevity than males, but the number of emerged females was greater than that of males. The data obtained provided significant data helpful for the establishment of integrated insect management program against the fly populations.

E6

ECOLOGICAL STUDIES ON THE AFRICAN FIG FLY ZAPRIONUS INDIANUS IN JORDAN. <u>Amani</u> <u>Alawamleh¹</u>, Ahmad katbeh-Bader², Nayem Hassan³, Ibrahim Al-Jboory⁴. (1) CIHEAM/Mediterranean Agronomic Institute of Bari, Via Ceglie 9, 70010 Valenzano (Ba), Italy, and Plant Wealth Laboratories Directorate, Ministry of Agriculture, Amman, Jordan; (2) Department of Plant Protection, Faculty of Agriculture, The University of Jordan, Amman 11942, Jordan; (3) Research and Development, Russell IPM Ltd, Chester, UK; (4) Department of Plant Protection, College of Agriculture, University of Baghdad, Iraq.

The African fig fly, *Zaprionus indianus* (Diptera: Drosophilidae), is a widely distributed polyphagous fly of tropical origin. Ecological studies on this fly in Jordan were carried out under field and laboratory conditions. The studied ecological aspects were distribution, host range, evaluation of bait traps and the susceptibility of eight local fig varieties to fly infestation. The survey showed that *Z. indianus* was found in different ecosystems with variable abundances on many hosts. The highest percentages of adult flies were obtained by collecting fallen fruits and banana baited trap methods. Colorless plastic bottle traps of 0.5 L capacity, with two holes of 8 mm diameter, and Torula yeast bait solution were found the most efficient

traps for capturing adult flies in date palm orchards, while the red traps were the most efficient in fig orchards. The local fig varieties showed variable susceptibility levels to *Z. indianus* under field and laboratory conditions. Hmaree was the most susceptible variety and Esalee was the least suceptible. The data obtained provided essential information for monitoring and implementing control measures against fly population.

E7

MORPHOLOGICAL DESCRIPTION OF A NEWELY RECORDED WHITEFLY SPECIES PARALEYODES MINEI IACCARINO, 1990ON CITRUS IN ALGERIA, Benmessaoud-Boukhalfa Hassina and Chebrou Souheib, Département de zoologie agricole et forestière, Ecole Nationale Supérieure Agronomique Hassen Badi 16200 Alger, Algérie, Email: h.benmessaoud@ensa.dz.

The whitefly *Paraleyodes minei* Iaccarino, 1990 (Homoptera: Aleyrodidae) was observed for the first time in Algeria on lemon and orange leaves. The morphology of the various developmental stages was described. The species was identified based on the last instar collected on the underside of leaves.

E8

ESTIMATION OF THE ECONOMIC THRESHOLD AND ECONOMIC LOSS FOR TOMATO BORER TUTA ABSOLUTA (MEYRICK) IN PLASTIC HOUSES. <u>Amer J.A. Al-Gerrawy¹</u>, Hamza K. Al-Zubaidy² and Nizar N. Hama³. (1) Ministry of Agriculture, Directorate of Agriculture in Wassit Province, Iraq; (2) College of Agriculture, University of Baghdad, Iraq; (3) Ministry of Agriculture, Plant Protection Office, Iraq, Email: amer_kut692004@yahoo.com

The economic threshold for tomato borer *Tuta absoluta* (Meyrick) (Lepidoptera: Gelichiidae) on tomato crop in plastic houses was estimated to be 28 and 42 adults/pheromone trap/week when the price of tomato fruits was 1000 and 500 Iraqi Dinar/kg, respectively. The relationship between number of adults captured in traps and tomato productivity was a linear regression equation. The yield loss in tomato fruits as a result of plants infestation was estimated to be 49.14%, that is 1247 kg/plastic house (266 m²).

E9

EFFECT OF PLANT POPULATION DENSITY ON APHID INFESTATION AND PRODUCTIVITY OF THREE FABA BEAN CULTIVARS. <u>Majdy A.</u> <u>Ahmed¹ and H.T. Abd El-Aal². (1) Piercing & Sucking</u> Insects Research Department, Plant Protection Research Institute, ARC, Dokki, Egypt; (2) Food-Legume Crops Research Department, Field Crops Research Institute, ARC, Giza, Egypt, Email: magdyazeim@yahoo.com

The present investigation was conducted in middle Egypt, during 2008/09 and 2009/10 seasons, to

determine the effects of different plant populations on varietal response, crop productivity, and aphid abundance. Three local recommended cultivars, i.e., Masr 1, Giza 2 and G 429 grown under four plant populations (8, 16, 24 and 32 plants/m²) were investigated in a randomized complete split block design replicated four times. Dense planting satisfactorily decreased the proportion of plants infested with cowpea aphid by 31.4 and 22.6% in 2008/09, 47.8 and 33.8% in 2009/10 seasons at plant densities of 24 and 32 plants/m², respectively. It reduced the subsequent rate of aphid multiplication and finally the aphid population size per unit area. This probably because individual plants in dense stands are less nutritious and have a shorter maturation time than plants in sparse stands. Therefore, small-scale farmers are advised to plant faba bean at a population density ranging from 100,800 to 134,400 plants/feddane(acre).

E10

EVALUATION OF SUSCEPTIBILITY OF SOME WHEAT AND BARELY VARIETIES TO CEREAL LEAF MINER SYRINGOPAIS TEMPERATELLA LED. UNDER FIELDS CONDITIONS. Omran Youssef, Sultan Shekhmous, Helim Youssef and Hafad HouseinThe General Commission for Scientific Agricultural Research (GCSAR), Al-Qamishli Agricultural Research Center, Al-Qamishli, Syria, Email: om_youssef@yahoo.com

This study was conducted in Oiran village in zone 2 in the northeastern part of Syria during 2010/2011 and aimed to investigate susceptibility of the commonly grown wheat and barley varieties (10 varieties of durum wheat, 10 varieties of bread wheat and 13 varieties of barely) under natural conditions to leaf miner Syringopais temperatella (Lepidoptera: Scythrididae). Infestation rate was calculated and a scale of 1-6 was used to assess the damage on leaves. The results showed differences in the infestation rate and damage index among the tested varieties. The infestation rate and damage index were 75.93%, 4.66 and 52.42%, 3.66 on the most and least susceptible varieties Douma 4 and Bhous 6 (bread wheat), respectively. The average infestation rate and damage scale were 87.18%, 5 and 50.60%, 3 on the most and least susceptible varieties Bhous 11 and Douma 1 (durm wheat), respectively. In addition, the results showed that the infestation rate and damage index were 91.76%, 5 and 57.76%, 4.66 on the most and least susceptibility barely varieties Fourat 5 and Arabi Abied, respectively. In general, barely varieties were more susceptible than wheat varieties to attack and feeding by the leaf miner.

E11

EFFECT OF FRUIT SIZE ON THE INFESTATION BY THE CUCURBIT FLY, DACUS CILIATUS AND THE MELON FLY, DACUS FRONTALIS. Badr El-Sabah A. Fetoh, Plant Protection Research Institute, ARC, Dokki, Giza, Egypt, Email: drabadrelsabah@hotmail.com

Different sizes of marrow fruits (small, medium and large fruits) were studied to detect their effect on the infestation by the cucurbit fly. Dacus ciliatus (Leow) and the melon fly, Dacus frontalis Becker. The results obtained showed that the small fruits were the most preferable, and produced large number of pupae although the fruit was small and had less punctures. There were ascending significant effect of the increasing size of fruits on pupae weights, and descending significant effect of the increasing size of fruits on egg, larval and pupal periods with no significant effect on fruit size and sex ratio. The biochemical analysis for small, medium and large fruits indicated that the small fruits had higher amounts of protein. phenols, potassium, magnesium and phosphorus. Furthermore, the small fruit had low amounts of carbohydrates, glucose and moisture content, and this explained why the small fruits were more favorite to the infestation by D. ciliatus and D. frontalis than the large fruits.

E12

EVALUATION OF SOME GRAIN SORGHUM FOR RESISTANCE ТО SESAMIA LINES CRETICA LED. AND YIELD POTENTIAL. A.M. El-Rawy¹, A.E.A.A. Mourad² and A.M. El-Kady². (1) Plant Protection Research Institute, ARC, Dokki, Giza, Egypt; (2) Sorghum Department, Field Crops Research Institute. ARC. Giza. Egypt, Email: adel elrawy69@yahoo.com

The aim of the present study is to evaluate seven restorer and nine maintainer sorghum lines compared with the commercial check variety "Dorado" for resistance to Sesamia cretica and yield potential. A field experiment was carried out at Nubaria Agricultural Research Station, under two conditions; the first was under optimum natural infestation of S. cretica during the growing seasons 2011 and 2012, and the second was under artificial infestation with newly hatched larvae of the insect during 2012 season. Three traits expressing resistance to S. cretica were recorded, i.e. percentage of infested plants, percentage of plants with dead hearts and intensity of damage. Results showed that restorer line ICSR-91022 showed high resistance level expressed by the three above mentioned resistance criteria under both natural and artificial infestation conditions (17.50%, 5.74% and 1.85) and (23.12%, 6.72% and 2.11), respectively, with high yielding potential under natural infestation condition of 19.75 ardab/faddan. The restorer line ICSR-94006 showed moderate resistance under natural infestation (34.74%, 12.73% and 2.52, respectively) and had relatively high yield potentiality of 18.07 ardab/faddan. The tallest restorer line was ICSR-94006 (235.83 cm), while maintainer lines that showed early flowering were GZB-9-1, BTX-807 and BTX-623 (65.67, 66.83 and 67 days, respectively). The highest 1000 grains weight were obtained from restorer lines ICSR-89028, ICSR-89053 and ICSR-91022 (29.86, 27.80 and 27.32 g, respectively). The restorer line ICSR–91022 was highly resistant to *S. cretica* and gave high yield potential. On the other hand, restorer line ICSR-94006 showed moderate resistance and relatively high yield potential.

E13

THEDELAYEDEFFECTOFCERTAINMODIFIEDHORTICULTURALOILSONSOMEBIOLOGICALASPECTSOFCOTTONLEAFWORM,SPODOPTERALITTORALIS(BOISD.)(LEPIDOPTERA:NOCTUIDAE)UNDERLABORATORYCONDITIONS.M.H.A.Soliman,S.F.Abd-Elatty,M.R.El-Assar and A. E.Hatem,ProtectionResearchInstitute,ARC,Dokki,Giza,Egypt,Email:drmohamedsoliman351@yahoo.comHatemHatemHatemHatem

The toxicity and the latent effect of some plant oils (Neem, Bitter and Thyme oils) on some biological parameters of Spodoptera littoralis (Boisd.) after the treatment of the 4th instar larva, pupa and adult) were studied under laboratory conditions. Neem oil 30%, Bitter oil 30% EC., Thyme oil 30% EC were used at 75%, 50% and 25% concentration. Concerning total duration of 4th, 5th and 6th larvae instar, the results showed that horticultural oils increased duration of 4th instar larvae compared with control. Neem oil at 50% concentration produces the longest duration of 11.17 days compared with 9.7 days for the control. Bitter oil produced the highest mortality (33.33%) and Neem oil the lowest (3.33%). Bitter oil at 75% significantly prolonged the duration of pupal stage to 11.60 days. In addition, Thyme oil at 75% produced recorded the least pupation rate (7.20%) compared with the control (90%). Bitter oil at 50% produced the least weight of 276 mg, compared with other treatments. In addition, Neem oil at 75% produced 24.43% malformed pupa followed by the other concentrations, but pupa in the control were completely free from any malformation. Some oil concentrations caused prolongation in longevity of S. littoralis adults, and males were more sensitive than females. Neem oil 75% increased longevity for both males and females (13 days and 11.17 days, respectively) compared with the control (10.5 and 10 days, respectively). Concerning, malformation and sex ratio, the results indicated that females were more sensitive to horticulture oils than males. Thyme oil 50 and Neem oil 75% caused malformation to males and females of 100 and 49.64%, respectively. Bitter oil 75 and 25% and Thyme oil 25% increased male to female ratio, but neem oil 25% and Thyme oil 50% caused equal ratio of males to females.

E14

EFFECT OF PROTEIN QUALITY OF SOME NUTRIENTS ON CERTAIN BIOLOGICAL ASPECTS OF TROPINOTA SQUALIDA SCOP. <u>Homam B. Homam</u>, Mona A. Mohamed and Mohamed I. Shedeed, Plant Protection Institute, 7 Nadi El-Said Street, Dokki, Giza, 12618, Egypt, Email: HomamBekheet@Gmail.com

The adults of some species visit flowers to consume pollen as a protein source required for their sexual maturation and/or body maintenance. Three types of nutrients (apple, bean flowers and banana fruit slices) were used to study some aspects of feeding and oviposition rates of Tropinota saualida (Coleoptera, Scarabaeidae) in the laboratory. Feeding and oviposition rates of T. squalida were measured for ten weeks under mean room temperature of 17 °C and also at constant 24 ± 1 °C. Duncan analysis was used for evaluating the nutrional and oviposition rates of T. squalida. The analysis, placed the three offered food types into three categories. The highest consumption category rate by T. squalid was on bean flowers. While the second category was represented by banana slices, and the apple flowers came in the third category. The data also indicated that there was significant difference between the rate of food consumption at room temperature and at constant $24\pm1^{\circ}$ C Duncan analysis indicated that, females of T. squalida which fed on apple flowers laid the highest mean number of eggs, and was significantly higher than that laid by any of the other two food types Polyacrylamide gel electrophoresis (PAGE), indicated that the total number of bands in each of apple, bean flowers and banana fruit were 18, 26 and 8 bands. In spite the fact that bean pollen contained the highest number of protein bands (26 bands), and apple pollen had 18 bands, apple pollen had the highest lipoprotein bands (Nine out of ten present in the tested samples). Bean pollens showed three lipoprotein bands, while banana fruit showed two lipoprotein bands. This reflects the effect of lipoprotein nutrition on the fecundity of T. squalida. Finally, the data indicated that the nutritional value is not usually dependent on its protein content but on the protein quality. The results of this study suggested that pollen source could influence the population dynamics of T. squalida adults that search for pollen with high lipoprotein content.

E15

BIOLOGICAL ACTIVITY OF THE TOMATO BORER, *TUTA ABSOLUTA* **INFESTING TOMATO LEAVES AND FRUITS, AT THREE PLANTING DATES ALONG TWO SUCCESSIVE SEASONS IN EGYPT. Mohmad I. Shedeed, <u>Masoud R. El-Aassar</u> and M.H. Abdelrahman. Plant Protection Research Institute, ARC, Dokki, Giza, Egypt, Email: Malassar@yahoo.com**

These experiments were conducted at a private farm of Quessena location for two successive years 2011 and 2012 to study the occurrence of the tomato borer *Tuta absoluta* (Lepidoptera: Gelechiidae) stages,, along the vegetative and fruiting periods of tomato plants, *Lycopersicon esculentum* (Mill), (Alita cultivar), using direct examination with the aid of a dissecting binocular and hand lens or pheromone traps. Results indicated that there were significant differences in the population numbers of tomato borer stages among the three planting times. Green tomato fruits were infested with larvae at all stages of growth. Pheromone traps effectively suppressed the population density of tomato borer moths. It could be reported that, planting tomato seedlings as early as possible (15 of February), significantly reduced the population density of tomato borer stages in comparison with the other two planting dates (5 and 15 March).

E16

COMMON INSECTS OF THE ORDERS COLEOPTERA, LEPIDOPTERA AND HEMIPTERA IN MIDDLE REGION OF AL-JABAL AL-KHDAR, LIBYA. Youssef Mousa Zaied Yahiya, Plant Protection Department, Faculty of Agriculture, Omer Al-Mukhtar University, Al-Baida, Libya, Email: ymzaied@yahoo.com

The study was carried out in many sites of the middle region at Al-Jabal Al-Akhder in Libya through the period from March to April 2011. In this study, we collected common insects of Hemiptera, Coleoptera and Lepidoptera, which were associated with the vegetation cover. The results indicated the presence of 82 species, those species were arranged in the above mentioned orders in13 Families, 32 Genera and 34 Species;6 Families, 16 Genera and 18 Species;10 Families, 27 Genera and 30 Species, respectively. The aim of this study was to identify the common insect species prevalent through out the year in the region of the study.

E17

EFFECT OF SIX FOOD TYPES ON SOME BIOLOGICAL ASPECTS OF THE POTATO TUBER MOTH, *PHTHORIMAEA OPERCULELLA* (ZELLER). <u>Mohamed I. Shedeed¹</u>, M.A.O. Kolaib², M.E.M. Sweelam² and M.A. Abolfadel¹. (1) Plant Protection Research Institue, Agric. Research Center, Dokki, Giza, Egypt,;(2) Economic Entomology and Agric. Zoology Department, Faculty of Agriculture, Menoufia University, Shebin Elkom, Egypt., Email: abuelfadel@yahoo.com

The present study aimed to investigate the effect of different concentrations of six food types (sucrose, bee honey, medical dried yeast, sucrose + medical dried yeast, bee honey + medical dried yeast and water as a control) on the biological parameters of the potato tuber moth, *Phthorimaea operculella* (Zeller) (Lepidoptera, Gelechiidae) such as number of laid eggs and hatching, the adult emergence and the adult longevity. Statistical analysis of the results obtained indicated that there were significant differences among most of the tested food treatments. Results concluded that the preferable food was the bee honey, followed by bee honey + yeast, which produced 340 and 270 eggs/3 moths at 10% concentration, respectively. The highest hatching rate 88.0 and 93.7% were obtained with 10% bee honey and 30% bee honey + yeast, respectively.

Generally, the bee honey treatment at 10% concentration proved to be the best food for adult emergence, whereas 17 males and 43 females emerged with 28.3 and 71.7%, respectively. The bee honey + yeast at 30% concentration ranked in the second category, 20 males and 30 females, representing 40.0 and 60.0% emergence, respectively.

E18

STUDY ON THE POPULATION DENSITY OF THE GREEN PEACH APHID *MYZUS PERSICAE* **IN NINEVEH PROVINCE, WITH REFERENCE TO THE MOST IMPORTANT NATURAL ENEMIES.** Juhina A. M. Ali¹, Nabil A. Qasim¹ and Shaza H. Abbasi². (1) Plant Protection Department, Faculty of Agriculture and Forestry, University of Mosul, Mosul, Iraq; (2) Plant Protection Department, Faculty of Agriculture and Forestry, University of Agriculture and Forestry, University of Arbil, Arbil, Iraq, Email: Juhina1234@yahoo.com

The results obtained showed that, according to the randomly sampling program in the two study locations (the College and Al-Qubba), the insect appeared in the two locations at the beginning of September 2006 and then gradually increased to reach an autumn peak of 472 insects in the College area, with the predators Coccinella septempunctata L. and Aphidius transcaspicus Tele, appeared in the middle of October. The number of insect pests increased and reached a spring peak in the middle of March, and then disappeared due to the increasing numbers of predators and parasitoids in July. The pest appeared again in the 3rd week of November with an average 644 insects at the autumn peak in Al-Qubba. The population of the insect pest increased again and reached the spring peak with an average of 520 insects in the middle of March with their natural enemies, so that the pest population decreased and gradually disappeared by the end of July.

E19

EFFECT OF GOSSYPOL & TANNIN AND SOME MORPHOLOGICAL TRAITS OF COTTON GOSSYPIUM SPP. LEAVES ON THE POPULATION DENSITY OF THE WHITEFLY BEMISIA TABACI (GENN.). <u>Redha S. Al-Jorany</u> and Shaymaa H. Al-Obadi, Plant Protection Department, College of Agriculture, University of Baghdad, Iraq, Email: redha_aljorany@ahoo.com

Field and laboratory experiments were conducted to study the effect of gossypol, tannin and some morphological traits of four varieties of cotton *Gossypium* spp. (Ashure, Marsomy 4, Coker and Lashata) on the population density of the whitefly *Bemisia tabaci* (Genn.) during the growing season of 2012 at the College of Agriculture, University of Baghdad, Iraq. The results showed that the biochemical and morphological traits of cotton varieties leaves had an influence on the population density of the whitefly. The highest number of the insect was recorded on cv. Lashata (6.58 insects/leaf) and the lowest number was recorded on cv. Coker (3.25 insect/leaf). Results of correlation analysis between number of gossypol glands and population density of insects was negative, while it was positive between the average number of hairs, thickness of leaf, leaf area, concentration of gossypol and of tannin. The strongest correlation of these traits was between the number of hairs, concentration of gossypol and tannin. The highest concentration of these traits were 58.93 hairs/cm², 0.634 and 0.285 mg/g in cv. Lashta, respectively, which is susceptible to whitefly infestation. Whereas the values for these traits in cv. Coker were 23.63 hairs/cm², 0.283 mg/g and 0.230 mg/g, respectively.

E20

THE EFFECT OF SUMMER TILLAGE ON THE NUMBER OF LIVING LARVAE AND CYSTS MADE BY FIRST INSTAR LARVAE OF THE WHEAT LEAF MINER **SYRINGOPAIS** TEMPERATELLA LED. Sua'ad Irdeny Abdullah and Mohammed Yousuf Sayed Ghani, Plant Protection Department, College of Agriculture and Forestry, University of Mosul, Mosul, Iraq, Email: Suaad53irdeny@yahoo.com

The summer tillage had significant effect in infestation by the wheat leaf miner insect. The largest number of cysts made by first instar larvae and living larvae inside those cysts in zero-tillage soils (control), especially at the depth of 5-10 cm in October with an average of 92.32 cyst/3 kg soil and 91.66 living larvae/3 Kg soil, respectively. The number of tillage times was inversely related to the number of cysts and living larvae. Their numbers steadily decreased with the increase of number of tillage especially in the soil tilled two times, in which the lowest number of cysts was found at the depth of 20-25 cm in September with an average of 0.66 cyst/3 kg soil. The least number of living larvae especially at the 25-30 cm depth in all sampling dates averaged 0.33 larvae/3 kg soil, for each. In addition, the total number of cysts (partially damaged) made by the first instar larvae increased in the soil tilled for one time at a depth of 5-10 cm in November with an average of 26.66 larvae/3 kg soil.

E21

TEMPERATURE THE EFFECT OF AND **RELATIVE HUMIDITY ON THE BIOLOGY OF** TOMATO LEAFMINER TUTA **ABSOLUTA MEYRICH (LEPIDOPTERA: GELECHIIDAE)** UNDER LABORATORY CONDITIONS. Salim Jameel Jarjees¹ and Marwan Abdelwali². (1) College of Agriculture and Forestry Department of Plant Protection, Mosul University, Iraq; (2) NCARE, Department of Plant Protection, Amman, Jordan, Email: Salim1941@yahoo.com

The study was conducted in the research laboratory of the National Centre for Agricultural Research and Extension (NCARE) at 30 ± 2 , 20 ± 2 °C and relative humidity of $60\%\pm1$. The total mean number

of eggs laid were 222, 134.8 eggs/female at 30 °C and 20 °C, respectively. The mean of eggs incubation period for the first, second, third and fourth instars larval and pupal stages were 3.61, 3.66, 2.33, 2.66, 3.33, 6.0 day and 5.6, 2.3, 3.33, 2.6, 6.0, 7.5 days at 30 °C and 20 °C, respectively. The mean longevity of females was 8.66 and 12.6 days, whereas the longevity of males were 4.66, 6.66 days at 30 °C and 20 °C, respectively. The mean sex ratio was 1:1.23 and 1:1.39 (female: male) at 30 °C and 20 °C, respectively. Mean morality rates for the larval and pupal stages were 15.7% at 30 °C and 20% at 20 °C. The Tomato leaf miner had a life span of 29.6 days at 30 °C and 42.9 days at 20 °C.

E22

THE EFFECT OF TEMPERATURE ON THE BIOLOGY OF THE CIGARETTE BEETLE, *LASIODERMA SERRICORNE* (F.) IN THE LABORATORY. Abdulnabi Basheer¹, Hamze Bilal¹ and <u>Alaa Saleh²</u>. (1) Department of Plant Protection, Faculty of Agriculture, Damascus University, Syria; (2) Biological Control Studies and Research Center, Faculty of Agriculture, Damascus University, Syria, Email:basherofecky@yahoo.com

The biology of the cigarette beetle was investigated under controlled laboratory conditions at 17, 22, 27, 32, and 37 °C, and 65% RH with a photoperiod of 16h, when reared on Baker's yeast. *Lasioderma serricorne* (Coleoptera: Anobiidae) had a significantly shorter mean total developmental period at 32 °C compared with other temperatures. The female did not lay eggs at 17 and 37°C. The highest mean of fecundity was found to be 85.40 eggs/female at 32 °C. The lower developmental thresholds (LDT) for eggs, larvae and pupa were 11.0, 13.5 °C and 14.6°C, respectively. *Lasioderma serricorne* required a sum of effective temperatures (SET) of 555.5 degree-days above the lower developmental threshold of 13.5°C to complete development from egg to adult.

E23

STUDY ON LARVAL INSTARS OF LEOPARD MOTH ZEUZERA PYRINA (L.) IN APPLE AND WALUNT ORCHARDS BY USING BROOKS-DAYR RULE IN LATTAKIA, SYRIA. Jounar Aziz Ibrahim¹, Abdulnabi Mohamed Basher² and Louai Hafez Aslan². (1) Lattakia Centre for Mass Rearing of Natural Enemies, Directorate Agriculture, Syria; (2) Department of Plant Protection, Faculty of Agriculture, Damascus University, Damascus, Syria, Email: jounar800@yahoo.com

This study was carried out in two apple and walnut orchards in two locations (Aramo and Bushraghe) in Lattakia Governorate during the 2011-2013 seasons. The aim of this study was to determine the number of the larval instars of leopard moth, *Zeuzera pyrina* (L.) (Lepidoptera: Cossidae), by using Brooks-Dyar Rule on both apple and walnut hosts. The

measuring of the head-capsule width and length of the larva was recorded from the field-collected larvae during its seasonal activity. The results showed that the leopard moth followed the Brooks-Dyar rule on both apple and walnut. The larval stage had 8 instars, and constantly increased in size between instars which was 1.299 and 1.303 for head-capsule width and 1.6 and 1.58 for length of larvae in both apple and walnut, respectively. A regular geometric progression in successive instars was observed, with a difference in the measure of head-capsule width and length of larvae between apple and walnut, suggesting that the host has an effect on the size of larval stage without any effect on number of instars.

E24

FIELD STUDY ON SOME BIOLOGICAL CHARACTERISTICS OF THE DUBAS BUG **OMMATTISSUS LYBICUS** De. BERGEVIN (HOMOPTERA: **TROPIDUCHIDAE**) IN ALJALLA PALM OASIS IN DATE ALBOKAMALCITY, SYRIA. Abdulnabi Mohamad Basheer, H.A. Alhaoli and H. Bilal, Department of Plant Protection, Faculty of Agriculture, Damascus University, Damascus, Syria, Email: basherofecky@yahoo.com.

The aim of this study was to study some biological parameters of Dubas bug Ommatissus lybicus De. Bergevin (Homoptera: Tropiduchidae) in Aljalla date palm oasis in Albokamal city, Syria. The study was conducted during 2010-2011. The results showed the presence of two summer and winter generations of the insec. The results showed that there were differences in biological parameters between the two generations, and the summer generation was shorter than winter generation. The mean generation time (T) was 104.86 days for a summer and 196.22 days for the winter generation. The trend index was 1.3, the survival rate (SG) was 0.33 for summer and 0.2 for winter generation. The gross reproduction rate (GGR) was 2507.2 females/90 females/summer generation, and 2060.5 females/90 females/winter generation. The net reproductive rate (R0) was 27.85 female/female/summer generation, and 22.9 female/female/winter generation. The intrinsic rate of increase (rm) was 0.0317 female/female/day for the summer generation, and 0.0159 female/female/day for the winter generation, and the doubling time DT was 21.86 days for the summer generation and 43.59 days for the winter generation, and the λ was.032 times for the summer generation, and 1.016 times for the winter generation.

E25

INFESTATION OF COWPEA CULTIVARS WITH LARVAE OF PEA POD BORER (ETIELLA ZINKENELLA) AND ELECTROPHORETIC SEPARATION OF COWPEA SEEDS PROTEINS. Ezzedine AbdelsameeaEl-Shazli¹, Khaled Al-Sayed Abdelati², Humam Bakheet Humam³ and <u>Magida</u> Hashem Mansour³. (1)Economic Entomology and Pesticides Department, Faculty of Agriculture, Cairo University, Egypt; (2) vegetable Crops department, Faculty of agriculture, Cairo University, Egypt; (3) Depatment of Vegetable Pests Research, Plant protection Research Institute, Agriculture research Center, Dokki, Egypt, E-mail Magda.hashim@gmail.com.

Pea pod borer (Etiella zinkenella) is one of the insect pests which attack cowpea. Infested pods cause vield loss. An experiment was conducted on the summer grown crop during two successive seasons, 2010 and 2011, in Oaha, Oalyoubia Governorate. The study aimed to investigate pods infestation of four cowpea cultivars with pea pod borer. Duncan statistical test was used to evaluate infestation with the pod borer and pod damage. On the basis of pods infestation rate with larvae and % of pod's damage, the tested cultivars are arranged in ascending order as follows: Oaha 1<Karim 7 and Kafr El-Sheikh 1<Dokki 331. The results obtained from both seasons were similar, and the cv. Dokki 331 was the most invaded with highest damage by the pea pod borer's larvae, especially because of early infestation. The cowpea cultivar Qaha 1 was the least infested with lowest damage and yield loss in both seasons. This could be because othis cultivar plant type, which has dense growth, with high plants (40-50 cm) and small leaves as compared with the other cultivars. The protein isolated from the seeds of adult plants with large mature green pods and separated by polyacrylamide gel electrophoresis (PAGE). The cultivars Dokki 331, Kafr-Elsheikh 1 and Kareem 7 produced 2LGP2+Lp, 2LGP+1Lp, 1LGP lipoprotein bands, respectively, whereas cv. Qaha 1 did not produce lipoprotein bands. It could be that the differences in the PAGE proteins pattern in mature pods is associated with infestation with the pod borer. It could well be that the high lipoprotein content in mature seeds of cowpea cvs. Dokki 331, Kafr-Elsheikh 1 and Kareem 7is attractive food source for the pod borer larvae.

E26

ECOLOGICAL STUDY OF TUTA ABSOLUTA AT TOLGA, BISKRA OASIS, ALGERIA. <u>Naser Tarai</u> and A. Haddad, Laboratories DEDSPAZA, Department d'Agronomie, University Mohamed Khider, Biskra, Email: tarainacer@yahoo.fr

A survey for *Tuta absoluta* (Lepidoptera: Gelechiidae), which is newly introduced to tomato grown under greenhouses at Tolga in the oasis of Biskra, a region which produces more than 45% of the national tomato production for the fresh market. This survey is based on the instalation of the traps TUTASON with the sexual pheromone Pherodis in 35 greenhouses installed with different orientation (north-south- east– west). The highest captured number of male adults was recorded during the end of March 2013, whereas the lowest captured number was recorded during November, 2013. The study also dealt with the

most important natural enemies to this borer and their potential role in the biological control of this pest.

E27

PEAR PSYLLA *CACOPSYLLA PYRI* **L.** IN NORTH ALGERIA. <u>Fatiha Alili</u>¹, Mohamad Biche² and Salah Doumandji². (1) Institut National de la Protection des Végétaux El Harrach Alger Algérie; (2) Ecole National Supérieur Agronomique El Harrach Alger, Algérie, Email: alili.fatiha@gmail.com

Population dynamics of Cacopsylla pyri L. (Psyllidae: Homoptera) were studied for the first time in Mitidja in a pear orchard in northern Algeria in 2004. Psyllid developed into 6 successive generations during the pear vegetative period, and the eggs of the first generation were observed around mid-March. An overlap of larvae belonging to the second, third and fourth generations was noted from June until August. The insect overwintered as adult. The emergence of the winter population occurred at the beginning of October. Overwintering adults lived some time on pear trees before moving to their winter shelters. The main predator Cacopsylla pyri activity and spread in pear orchards during the period from the end of May to October was monitored. Aranea, Coleoptera (Chrysopidae, (Coccinellidae), Neuroptera Hemerobiidae)) and Heteroptera (Anthocoridae) were the most abundant potential natural enemies that attack C. pyri.

E28

SUSCEPTIBILITY OF TEN GENOTYPES OF SAFFLOWER CARTHAMUS TINCTORIUS L. TO FRUIT FLIES (DIPTERA: TEPHRITIDAE) AND IDENTIFICATION OF ITS ASSOCIATED PARASITOIDS. Abdulnabi Basheer¹, Louai Asslan¹ and <u>Faek Abdalrazaq²</u>. (1) Faculty of Agriculture, Damascus University, Damascus, Syria; (2) Biological Control Study & Research Center (BCSRC), Faculty of Agriculture, Damascus University, Damascus, Syria, Email: infobcsrc@damasuniv.edu.sy

Safflower *Carthamus tinctorius* L. (Asteraceae) is a multi-purpose crop, with many cultivated varieties. Many safflower genotypes with superior qualities became recently available. Economic considerations made the application of pesticides impractical, and developing resistant cultivars as well as employing biological control are the most attractive and effective methods for the management of safflower pests. Safflower is attacked by many fruit flies species. The most important is safflower fly Acanthiophilus helianthi Rossi 1790, which is one of the most dangerous pests of safflower in Asia, Europe and North Africa. Ch. carthami Stackelberg 1929, is another pest of safflower in West Asia and North Africa. Therefore, a study was carried to test the reaction of ten safflower genotypes for infestation with fruit flies species in the 2012 spring and summer seasons. Results showed that all studied Safflower genotypes were susceptible. Two species of fruit flies were recorded *Acanthiophilus helianthi* and *Chaetorellia carthami*. The average infestation rates in summer growing season were higher than that of the spring season, and the genotype Son11 had the highest and PI 301055 had the lowest infestation rate. there was a positive correlation between the size of flower heads and pest infestation, with correlation of R = 0.72 at sowing and R = 0.62 for spring and summer sowing, respectively. Six hymenopteran parasitoids were recorded belonging to the genera *Bracon* spp., *Eurytoma* spp. and *Torymus* spp. Infestation levels linked with some studied indices related to sowing dates as well as parasitism rates will be discussed.

E29

EVALUATION OF PRODUCTION AND MORPHOLOGICAL TRAITS OF SOME STRAINS OF MAIZE UNDER ARTIFICIAL INFESTATION CONDITIONS WITH LARGE CORN STEM BORER SESAMIA CRETICA. Nezar Harba, Muussa Alsamara and <u>Nadine Asaad</u>, Faculty of Agriculture, Tishreen University, Lattakia, Syria, Email: nadine.asaad013@hotmail.com

This study was conducted at the field research station Sianow of the General Commission for Scientific Agricultural Research at Lattakia, to evaluate the susceptibility of six strains of maize [IL.257-09 (P1), IL.298-09 (P2), IL.286-09 (P3), IL.255-09 (P4), IL.262-09 (P5), IL.228-09 (P6)], and fifteen maize crosses obtained by half diallele cross, under conditions artificial infestation conditions with the large corn stem borer, Sesamia cretica Led. during the 2013 season. The experiment was conducted following a randomized complete block design. General combining ability was significant desirable showed effects: Strain P1(expressed high capacity to transfer all of the attributes of number of kernels per row, number of holes, to their resulting offspring when crossbred with other breeds. P2 also expressed high capacity to transfer the attributes of ear length, ear height, damage intensity, percentage of yield loss, to their offspring. P3 had high capacity to transfer the attributes of ear diameter, number of rows per ear. P4 and P5 also expressed high capacity to transfer the attributes of days to silking, physiological maturity and grain yield. P6 expressed high capacity to transfer the attributes of plant height, 100 kernel weight, infestation grain yield, tunnel length and percentage of dead hearts. Specific combining ability showed significant desirable effects: the hybrid P1xP2 expressed high capacity for ear length, percentage of dead hearts, damage ntensity, number of holes, and percentage of yield loss. The hybrid P1xP3 expressed high capacity for grain yield. The hybrid P1xP4 expressed high capacity for days to silking, physiological maturity, 100-kernel weight, percentage of yield loss. The hybrid P2xP6 expressed high capacity for number of rows per ear, percentage of dead hearts, and number of holes. The hybrid P2xP4 expressed high capacity for plant height, infestation grain yield, damage intensity. The hybrid P5xP6 expressed high capacity for number of kernels per row, ear height, percent of dead hearts, tunnel length, and number of holes. A study of the correlation coefficient showed a highly significant negative linear relationship for percentage of dead hearts, tunnel length, number of holes, yield loss %. This showed that these qualities effectively contributed to to the reduction of grain yield. It turned out that percentage of dead hearts of the developing top has the highest direct impact on grain yield, followed by number of holes, and tunnel length.

E30

IMPORTANCE OF THE FACTORS LIMITING THE POPULATION OF THE TOMATO LEAF MINER TUTA ABSOLUTA (MEYRICK, 1917) IN THE REGION OF ALGIERS. <u>Khadidija Mohamad</u> <u>Mahdi¹</u>, Nasema Youns², Fahema Wattar¹ and Salah El Deen Doumandji³. (1) Faculty of Natural Sciences and Life, University of Ackley and Mohand al-Haj Bouira, Algeria; (2) Department of Biology, Faculty of Science, University Mohammed Bougherra Boumerdes, Algeria; (3) Ecole National Supérieur Agronomique El Harrach Alger Algérie, Email: Mahdi.khadidja@yahoo.fr

The purpose of this research was to study the factors limiting the population of the tomato leaf miner (Tuta absoluta) in the region of Algiers. The study showed that the development cycle was 18.5 ± 2.52 days at 30±1 ° C, 32.9±4.22 days at 21±1 °C, and 71.5± 12.16 days at 15±1 °C, suggesting that fertility varied with temperature. At 15±1° C. The number of eggs laid per female varied between a minimum of 64 eggs and a maximum of 190 eggs. At 21±1° C the number of eggs per female was between 28 and 115 eggs. The maximum fecundity per female was recorded at 30±1° C with 260 eggs. The study of insect fauna associated with TPW in the vegetable crops station at Heuraoua with the Barber pots method allowed the capture of 3781 individuals, including 2557 individuals were trapped outside the greenhouses (199 species) and 1224 individuals belonging to 93 species in greenhouses. In vellow traps, 3,908 individuals distributed among 298 species were captured at the Heuraoua vegetable staion. 2815 specimens were trapped outside greenhouses and 1093 were captured in greenhouses. The total number of species recorded in greenhouse was 125 and 265 species in the field. The predator Nesidiocorise tenuis significantly reduced the number of pest caterpillars. Applying the extract of Nerium oleander, Melia azedarach, Inula viscosa and Lawsonia inermis on larvae and pupae of *Tuta absoluta* proved effective with a mortality rate of 100% after 2-6 days.

E31

EMERGENCE PERIOD OF CAPNODIS TENEBRIONIS ADULTS AND DURATION OF OVIPOSITION IN A CHERRY ORCHARD AT LARBAA NATH IRATHEN, ALGERIA. <u>Hassina</u> Hadj Said and Fazia Mouhouche, Zoology Agricultural and Forest animal's laboratory, National High School of Agronomy, rue Hassan Badi El Harrach, Algiers 16000, Algeria, Email: hassinahadjsaid@yahoo.fr

Capnodis tenebrionis is the most dangerous species for stone fruit trees. It attacks the roots of trees where it digs galleries that lead to the death of damaged plants. This study was conducted on some aspects of adults and oviposition in a cherry orchard at Larbaa Nath Irathen to determine the factors that govern their distribution in the study area. In 2008, the emergence of adults was observed in May, their presence was marked until early October. The number of adults reached its maximum in August with 46 individuals. The south and east orientation were preferred directions for adults with 44.04% and 27.46%, respectively. Egg laying was observed from mid-June to late August. Eggs were laid at the base of the trunk or at a distance of 10 cm away.

E32

REDPALMWEEVILRHYNCHOPHORUSFERRUGINEUSOLIV. A NEW PEST ON DATEPALMTREESINYEMEN.SalimMohammedAssggaf,PlantProtectionDepartment,Agri.ResearchStation,Sieyun,Hadhramout,Agri.Research andExt.Authority,Yemen,Email:salim.assggaf@yahoo.com

The red palm weevil Rhynchophorus ferrugineus Oliv. (Coleoptera: Curculionidae), is an important tissue-boring pest of date palm in neighboring countries and in many parts of the world. It was recorded for the first time in Yemen in May 2013 in Wadi-Hadhramout in Al-Aggad area in Al-Qaten Province. All stages of the insect: larva, pupa and adult insects were observed in the infested stems of date palm trees. Most infestation symptoms and the insect stages were found similar to what is known for red palm weevil. The first source of infestation is unknown, but it may have entered the country with infested date palm trees unofficially introduced from neighboring countries. Detection and monitoring of red palm weevil should be undertaken in other areas of Wadi-Hadhramout and all locations where date palm trees are grown in Yemen.

E33

DISPERSION OF INSECTS ACCORDING TO CARDINAL DIRECTIONS. <u>Ghezali Djelloul</u>, Fahima Labadia, Hafsa Harkat and Soumeya Fekkoum, National School of Agronomy, Department of Zoology, 16200 Algiers, Algeria, Email: D.ghezali@ensa.dz

Insects engage in vertical or longitudinal "micro-migration" of small amplitude imposed by foraging or search for prey, mating and climatic conditions. This phenomenon is observed most often during the colonization of free space competition. However, these reflections are hypothetical because no effective method could be considered with the exception of a few studies in the laboratory. The objective of this study is to see the spread of insect populations in the four cardinal directions and find the intrinsic and extrinsic factors that are at the origin of this dispersion. The present study was conducted in an orchard tree during the year 2013/2014 and where 22 species have been recorded. The present study was conducted in a Citrus orchard in the region of Rouiba, which is 7 km from the Mediterranean and 25 m above sea level. The inventory conducted in this station has shown the presence of 22 species of pests, and the results obtained in this study showed a difference when the dispersal of species and a significant dominance was noted at the northern cardinal direction. This is a general trend, however, it should be noted that at the individual level, species behave differently and it is the same for the monthly changes.

E34

REDUCING RISK OF INFESTATION WITH TOMATO LEAF MINER, TUTA ABSOLUTA (MEYRICK) (LEPIDOPTERA: GELECHIDAE) **TO TOMATO PLANTS IN EGYPT.** <u>A.S.</u> Abdel-<u>Razek</u> and N.M. Abdel Ghany, National Research Centre, Department of Pests and Plant Protection, El-Tahrir Street, Dokki 12622, Cairo, Egypt, Email:abdelrazek820@yahoo.com

Tuta absoluta is a very challenging pest to control. Field studies were conducted to evaluate the influence of pheromone as mass trapping and lure and kill application has been used as an early detection tool and found to be effective to control Tuta absoluta in Egypt. Effect of trap color, trap direction and trap position on the tomato leaf miner moth, Tuta absoluta (Meyrick) capture was evaluated in this study. Each trap was baited with a pheromone capsule type O lure-TUA. This pheromone trap with its high capture rate is ideal for mass trapping of Tuta absoluta. It helps to reduce population. Mass trapping is a technique that involves placing a higher number of traps in the crop field in various strategic positions to remove a sufficiently high proportion of male insects from the pest population. It is widely used in conjunction with other control measures to achieve acceptable level of reducing pest infestation through reducing the mating incidence and therefore reducing the number of viable eggs. White pheromone traps caught more moths than yellow, blue, green and red traps. Significant differences between mean catches by white trap and other colored traps were observed. The trap when located at south or center of the infested area caught more moths than when located at west, east or north although there were no significant differences between mean catches at each direction. The collective catch of T. absoluta moths by the traps rested on the ground was more than that of the two other positions (50cm and 100cm above the ground), where comparison test of catches showed significant differences between 0 cm position (rested on the ground) and the other two positions.

E35

EVALUATION OF CERTAIN EGGPLANT CULTIVARS TO IFESTATION BY SOME SAP SUCKING PESTS AND ITS RELATION TO LEAF PHYTOCHEMICAL COMPONENTS. H.A. Azouz, E.M.A. Yassin and <u>Mariam, A. El-Sanady</u>, Plant Protection Research Institute, Dokki, Giza, Egypt, Email: abdelrazek820@yahoo.com

Field experiments were carried out at Beni-Suef Governorate, during two successive eggplants growing summer seasons 2012 and 2013 to evaluate the relative susceptibility of three eggplant cultivars namely, Long black (Anan), White long (Soma) and Spherical black (Classic) to some sap sucking pests; Spider mite (Tetranychus urticae), White fly (Bemisia tabaci), aphid (Aphis gossypii) and Jassid (Empoasca lypica) infestation. The relationship between the infestation level of different sap sucking pests and some plant leaves phytochemical components were investigated. Results obtained showed that there was significant relationship among eggplant cultivars infestation level with sucking pests and leaf phytochemical components. Spherical black was highly susceptible to spider mites, tolerant to aphids, whiteflies and intermediate to jassids. This performance could be associated with presence of specific leaf components, whereby Spherical black had the lowest potassium and highest phosphorus content. On the other hand, long black was tolerant to spider mites, susceptible to aphids and whiteflies and intermediate to jassids, which could be associated with high total protein, amino acids and nitrogen content.

E36

BIOECOLOGY OF THE POPLAR LEAF BEETLE, *CHRYSOMELA POPULI* L. (COLEOPTERA: CHRYSOMELIDAE). <u>Shaheen A. Mustafa¹</u>, Ismail N.Almaroof² and Samir S.Hana². (1) Dept. Of Forestry, College of Agriculture, Kirkuk University, Iraq; (2) Dept. Of Forestry, College of Agriculture and Forestry, Mosul University, Iraq, Email: shahinkifre@yahoo.com

The life cycle of poplar leaf beetle, Chrysomela populi L. that attack poplar species was studied in Iraq during 2013. The study showed that the mean length of incubation, eggs viability and larval stage were 5.61 days, 87% and 8.1±0.80 days, respectively. It appeared that the larval stages live and feed on the leaves of poplar trees. The mean of pupa was 4.8 days. After the emergence of adult, it laid the eggs on the lower surface of the leaves. The study also indicated that the mean number of eggs laid by a single female was 105.3 egg. The sex ratio of male to female was 1:1.7. The longevity of adult, males and females were 47.10, 56.21 days respectively. In addition, it was found that this species has two generations per year. The hibernation occurred in the adult stage. The ecological study has shown that the area and percentage of damage started with the primary appearance of the poplar leaves beetle adults as the beginning of April. The increasing of insect number caused an increase in the area and percentage of damage which reached their maximum means at 10.70, 16,30 and 12.10 cm², 41.18, 45.00 and 17.3% for *Populus euphratica*, *Populus nigra* and *Populus deltoids*, respectively. This happened when the insects number means reached the maximum 2.0, 2.75 and 2.30 insect/leaf for the above mentioned poplar species at mean temperature of 27.30° C and R.H. 32.5%. The statistical analysis showed that there was a significant correlation between the mean insect number and mean of area and percentage of damage in the 3 poplar species with r value (93.45, 90.16 and 89.25) for damaged area and for damage percentage (90.86, 88,71 and 89,60) respectively.

E37

PAST, PRESENT AND FUTURE FOR SUNN PEST (*EURYGASTER INTEGRICEPS* PUT.) IN **ROMANIA.** Ioan Rosca, Department of Plant Sciences, University of Agronomic Science and Veterinary Medicine, Bucharest, 011464 Bucharest, Romania, Email: ioanrosca_usamv@yahoo.com

The problem of cereals bugs in Romania is E. integriceps (Sunn bug or Sunny bug) through propagation, spreading, dominance, and how could make damages problems, it is, the only species whose metabolism is able to in about 30-40 days of development to accumulate fat reserves sufficient to ensure survival and continued development for 8-9 months. In Romania, damaging area is currently located in 22 counties and affecting over one million hectares and depending on the year and zone about 300,000-500,000 ha should be chemically treated. The survival of the pest is closely related with presence and distribution of oak forests. Southern and Eastern areas of Romania is mainly damaged areas and pest problem is determined by Eurygaster integriceps, which represent 95-99% of total cereals bugs found in wheat crops. It is presented evolution of pest in Romania, from entrance in country till the present, main characteristics of biology and ecology of pest in Romania, evolution of different pest control systems during the years and prognosis for the future. In the last 24 years, the sunny pest problem seems to be sub evaluate from the government or Ministry of Agriculture point of view and main responsibility to forecast and warning of the pest was transferred to the farmers, from which in main farms (over 200 ha), through education and interest of the owners, the problem is under control. In present it is underlined the role of pesticides company representatives in helping farmers for identifying and solving pest problem. Increasing protein quantity (especially gluten) in cultivars during breeding activity besides modifying technological parameters of the resulting flours by the addition of products for flour improvement (enzyme systems with mono or multiple specificity, other flour improvers), together chemical pest control seems to solve the *E. integriceps* problem in Romania, but the future will depend on pesticides and products for flour improvement EU regulation.

E38

INTERCROPPING EFFICIENCY AND ITS EFFECTS ON SOIL FAUNA POPULATIONS IN EGYPT. <u>Marguerite A. Rizk¹</u> and Ensaf A. El-Gayar². (1) Plant Protection Research Institute, Agriculture Research Center, Dokki, Giza, Egypt; (2) Zoology Department, Faculty of Science, Tanta University, Tanta, Egypt, Email: reta19492001@yahoo.com

Intercropping of non-legume plant with a legume crop provded a successful system for better use of nutrients by plants, particularly in nitrogen deficient soils. Such a system may affect soil fauna activity. The present experiment was conducted in Fayoum Governorate, Egypt, in order to study the impact of wheat intercropped with faba bean on soil fauna populations. Cultivation period was between November 2010 and April 2011. Five treatments were designed: (1) wheat alone, (2) faba bean alone, (3) wheat intercropped with faba bean (1:1), (4) wheat intercropped with faba bean (2:1), and (5) wheat intercropped with faba bean (1:2). Soil fauna were collected monthly during the cultivation period by means of the pitfall traps. Data of soil fauna populations were statistically treated by statistical advanced multivariate methods, correspondence analysis and ascending hierarchic classification. Soil fauna were dominated bv Collembola, spiders, Diptera, Aphididae, Formicidae, Orthoptera and Coleoptera. Generally, intercropping increased soil fauna populations. This increase was associated with wheat intercropped with more rows of faba bean. These populations also increased as the age of plants increased. The percentages of trophic groups of herbivores, carnivores and detritivores were also discussed.

E39

INFLUENCE OF THE PLANT **CHARACTERISTICS** ON THE FIELD INFSETATION AND RESISTANCE STATUS OF CERTAIN COWPEA CULTIVARS TO THE LIMA BEAN POD BORER ETIELLA ZINCKENELLA TREITSCHKE AND THE SOUTHERN COWPEA WEEVIL CALLOSOBRUCHUS **MACULATES** (FABRICIUS). Mohamed Abdel-Rahman Mohamed Abd Allah Amro, Plant Protection Research Institute, Agricultural Research Center, Dokki, Giza, Egypt, Email: moamro1953@yahoo.com

Ten locally produced and imported cowpea cultivars were used to evaluate the influence of their characteristics on the infestation caused by the two main cowpea pests *Etiella zinckenella* Treitschke and *Callosobruchus maculatus* (Fabricius). The study showed that certain plant and/or pod characteristics influenced infestation in the field and consequently in storage. Cultivars with small pods; small and colored seeds with high-density plantations showed less infestation by the two pests. Concerning the lima bean pod borer, levels of infestation showed a positive highly significant (r) between infestation percentage and the vield loss. The relative susceptibility of the tested cultivars to this pest varied. The resistant and relatively resistant cultivars were distinguished by the same above-mentioned characteristics. According to the storage infestation caused by C. maculatus most of the tested cultivars lost 100% of their seeds through 8-9 months post storage. However, the two common locally produced cultivars. Kaha 1 and Cream 7, which recorded low percentages of shattering pods and the lowest mean numbers of field introduced bruchid eggs did not suffer from any weevil's infestation. Based on these results, it is recommended to use cowpea cultivars that have high-density plantation, small pods, small and colored seeds and those which recorded low percentage of shattering pods in the integrated pest management (IPM) programs against these two pests.

E40

MECHANISMS OF RESISTANCE IN WHEAT TO WHEAT STEM SAW FLY CEPHUS PYGMAEUS F. IN SYRIA. <u>Bashar Alsheikh</u>¹, Mustapha El Bouhssini², Ziad Sheikh Khamis¹ and Abdul Nasser Trissi³. (1) Al-Baath, University, Faculty of Agriculture, Homs, Syria; (2) ICARDA, Rabat, Morocco; (3) University of Aleppo, Faculty of Agriculture, Aleppo, Syria, Email: bashar@live.jp

Wheat stem sawfly, Cephus pygmaeus L. (Hymenoptera: Cephidae), is an important pest of wheat and barley in many of the wheat producing regions around the world. Host resistance is considered the most effective management tactic for wheat stem sawfly. The aim of this study was to determine the preference of wheat lines (varying in morphological characters and phonological stage of development) to the wheat stem sawfly oviposition under field cages infested with insects at two different periods. The experiment was conducted at the International Center for Agricultural Research in the Dry Areas (ICARDA). The results showed that WSS females prefer laving their eggs in the stems of the tallest wheat varieties. The bread wheat variety (Suha-17/shuha18) was preferred for female oviposition when it was grown with varieties of similar heights. This cultivar was found to contain similar level of the compound Isopropyl palmitate that of the susceptible bread line NN25. Also the durum wheat Ammar-5, which was preferred for female oviposition, contained similar level of the compound (11-Tricosene) to that of the susceptible durum wheat line WSS94-42. These findings could be used in screening wheat for resistance to WSSF.

E41

IMPACT OF TEMPERATURE ON THE RATE OF GROWTH AND DEVELOPMENT OF COTTON INSECT PESTS. <u>Ahmed A. Hamed Amin</u>, Plant Protection Research Institute, ARC7, Nady El- Sayed, Dokki-Giza, Egypt 12311, Email: aahakaa@yahoo.com

Climate has a profound effect on the distribution and abundance of invertebrates such as insects, and the mathematical description of the climatic influence on insect development has been of considerable interest among entomologists. Additionally, as temperature exerts great influence among the climate variables, by directly affecting insect phenology and distribution, most of the models that describe insect development are temperature driven. More than a dozen different species of insect pests attack the cotton crop in Egypt. Cotton insect pests i.e. Agrotis ipsilon. Thrips tabaci, Aphis gosypii, Tetranychus urticae, Bemisia tabaci, Spodoptera littoralis, Earis insulana, Pectinophera gossypiella and Helicoverpa armigera. Zero of development as well as the summation of heat units (DD'S) required for the completion of one generation of these insect pests were calculated.

E42

BIOLOGY OF THE MEDITERRANEAN FRUIT FLY *CERATITIS CAPITATA* (WIEDEMANN) (**DIPTERA:TEPHITIDAE**) **AT DIFFERENT TEMPERATURES.** <u>Samira A. Khlaywi¹, Hamza K.</u> Al-zubaidy² and Hussain F. Alrubeai¹. (1) Directorate of Agricultural Research, Ministry of Science and Technology, Iraq; (2) Plant Protection, College of Agriculture, University of Baghdad, Iraq; Email: samira_odaa@yahoo.com

Laboratory rearing program revealed that the highest duration of eggs development for ten days period (10 days) was recorded at (10 \pm 1) °C, whereas it was 1.25 days at $35\pm1^{\circ}$ C. Development rates of larvae was found to be 27 days at 15±1°C, whereas it was 6 days at 35±1°C. The highest duration for pupa development was 33 days at 15±1°C. The duration of pre-oviposition period was 21 days at 20±1°C, and 4.5 days at $35\pm1^{\circ}$ C. The life-cycle took 118 days at $20\pm1^{\circ}$ C, and 36 days at 35±1°C. The lower development threshold of eggs and larvae were at 7.8 and 11.2 °C respectively, whereas it was 12.2°C and 15.19°C for pupae and pre-oviposition periods, respectively. Thermal requirements for the development of eggs, larvae and pupae were 49.5, 151.5 and 147 day-degree, respectively, whereas it was 92.5 day-degree for the preoviposition period.

E43

SENSITIVITY OF SOME SYRIAN BREAD WHEAT VARIETIES FOR KHAPRA BEETLE *TROGODERMA GRANARIUM* EVERTS. Ebraheem <u>Al-Jouri¹</u>, Abboud Al-Saleh² and Wisal Al- Hommada³. (1) Entomology Research Department, Plant Protection Research Administration, General Commission for Scientific Agricultural Research (GCSAR), Al-Halbouni, Damascus, Syria; (2) Department of Food Science, Agricultural Engineering Faculty, Al-Fourat University, Deir Ez-Zor, Syria; (3) Cereal Analysis Laboratory, Deir Ez-Zor Branch, General Establishment for Cereal Processing and Trade (GECPT) Syria, Email: jouri@myway.com

The sensitivity of three bread wheat varieties (Sham8. Bohoth8 and Douma2) to infestation with khapra beetle, Trogoderma granarium Everts, were studied at 3 levels of infestation with khapra beetle, 3, 6 and 9 couples/kg under laboratory condition (Tem. 32±1 C° and Hum. 60±5%). Six months later, quantitative loss, ash content, protein content, specific weight, and the number of living and dead Khapra beetle individuals at different stages were recorded in average. The results showed a significant increasing of quantitative lost average with the increasing of the injury level, which were about 7, 13 and 18% at level 3, 6 and 9 couples/kg respectively for Sham8; 15, 24 and 39% for Bohoth8 and 17, 21 and 52% for Douma2. The results also showed a significant decreasing of ash content, protein content, specific weight with the increasing the injury level for all varieties. Finally, Douma2 was the most sensitive variety to Khabrh beetle while Sham 8 was the most tolerant.

E44

INFLUENCE OF SOWING DATE OF THE MAIZE VARIETY "GHOUTA 1" ON THE INFESTATION LEVEL OF STEM BORERS IN DEIR EZ-ZOR **REGION-SYRIA.** Ebraheem Al-Jouri¹, RadwanYaqti² and Mohamed Walid Idraw³. (1) Insects Research Department, Plant Protection Research Administration, General Commission for Scientific Agricultural Research (GCSAR), Al-Halbouni, Damascus, Syria; (2) Biotechnology Engineering Department, Technology Engineering Faculty, Aleppo University, Syria; (3) Plant Protection Department, Agricultural Engineering Faculty, Aleppo University, Syria, Email: jouri@myway.com

Sesamia cretica Led., Sesamia nonagrioides Lef. and Ostrinia nubilalis (Hübner) are the most important species of maize stem borers and most prevalent in Syria especially Deir Ez-Zor Region. The effect of sowing date of maize crop variety "Ghouta 1" on the infestion of maize stem borers was studied during the intensive cultivation system at 3 different dates starting at the beginning of July with one weak interval between dates in two consecutive seasons. The infestation rate, infestation density and damage scoring on stems and cones were calculated to estimate the economic losses and grain yield components. The results showed a decreasing of infestation rate and density and damage on stems and cones by delayed sowing date. There was a significant difference between the first and the last sowing date for both consecutive seasons. The infestation rate and damage% to stems were 34 and 19% respectively, for the first sowing date, and 28 and 15% respectively, for the third sowing date at the first season. The infestation rate and damage rate to stems were 31 and 17% respectively, for the first sowing date and 26 and 12% respectively, for the third sowing date at the second season. This influence was reflected on decreasing the average of economic damage and increasing the average of all grain yield components by delayed sowing date. The average yield was 6.61, 6.83 and 7.31 tons/hectare for the first, second and third dates respectively, in the first season, and 6.91, 7.16 and 7.64 tons/hectare for the same dates scheduled in the second season.

E45

INVENTORY OF THE FAMILY CICADELLIDAE (HOMOPTERA) IN THE FIELDS OF THE POTATO (Solanum tuberosum L.) IN THE HIGHLANDS OF ALGERIANS. <u>Belatra Oumhani</u>, Department of Agricultural and Forest Zoology. National Agronomic Higher School. Algiers 16200, Algeria, Email: mami17dj17@yahoo.fr

An inventory study, at two stations for two years (2010-2011), in the highlands Algerians was performed potato fields. The sampling method was using yellow sticky traps and yellow plates. In both study sites, we found 11 species included in three subfamilies: Eurymelinae (Agallia constricta, Agallia Deltocephalinae quadripunctata) (Macrosteles fascifrons, Macrosteles borealis, Balclutha abdominalis, Psammotettix alienus and Endria inimica) and Typhlocybinae (Typhlocyba pomaria and Empoasca fabae). The largest gathering in the family was that of the Typhlocybinae which was represented by Empoasca fabae. It was more frequent in potato fields within the two stations, with 1038 individuals attracted to into the vellow plates and 1432 individuals trapped in the sticky traps.

E46

THE MEDITEREAN FRUIT FLY CERATITIS CAPITATA POPULATION DYNAMICS AND IMPORTANCE OF DAMAGE IN TWO OASES OF SOUTH TUNISIA. Mabrouka Ghabbari^{1,2} and Jouda Mediouni Ben Jemâa¹. (1) Laboratory of Biotechnology Applied to Agriculture, INRAT, Tunisia; (2) Faculty of Sciences of Bizerte, Tunisia, Email: joudamediouni@lycos.com

In Tunisia, the Mediterranean fruit fly (Medfly), *Ceratitis capitata* (Diptera: Tephritidae), was first recorded in 1885. It is a serious pest causing quantitative and qualitative losses to several crops; mainly citrus and summer fruits. This pest was well established from north to south of the country. Nevertheless, research on its bio-ecology and population management was only concentrated in northern and central parts of the country. Thus, oasis of south, despite the importace of host plants in them, did not receive any interest in terms of biology, population quantification and management of this pest. In this respect, the present study was conducted in two oasis of south Tunisia

(Tozeur and Nafta) on citrus and apricots during 2013. In each field, five traps (Tephri trap) baited with the synthetic food attractant (Protein hydrolisate) and dichlorvos (0.5 mg a.i. dimethyl 2.2-dichlorovinyl phosphate DDVP on moistened rolls of cotton wool as insecticide were used. In each field, ten trees were randomly selected and marked. On each tree, every fruit was weekly checked for Medfly punctures and the infested ones were marked to be recognized in the subsequent examination. Results showed that in the two oasis, the insect developed in continued generations. Captures varied between 4 to 32.67 insect/trap/week in the region of Tozeur and 2.33 to 28 insect/trap/week in the region of Nafta. Moreover, respective rates of fruit damage at harvest were 34.16 and 29.52% in Tozeur and Nafta. Results reflected the importance of Medfly populations and the urgency to develop an appropriate control approach in the oasis fragile ecosystem.

E47

THE DEVELOPMENT OF THE OLIVE MIDGE *DASINEURA OLEAE* **F. LÖEW IN THE SYRIAN COAST.** Ali M. Ramadan¹, Randa Abu Tara² and <u>Zahraa M. Baidaq³. (1)</u> Department of Plant Protection, Faculty of Agriculture, Tishreen University, Syria; (2) Faculty of Science, Damascus University, Dams, Syria; (3) Plant Protection, Scientific Agriculture Research, Lattakia, GCSAR, Syria, Email:. Zahraaok2@hotmail.com

The study showed the time of the appearance of different larval instars of Olive - leaf midge Dasineura oleae F. Löew (Diptera: Cecidomyiidae) during 2013 and 2014 in the Syrian Coast. There were different numbers of galls on leaves & inflorescences. In addition, we noted that damage took place in the middle of leaf. The study of leaves galls showed that Olive leaf midge entered diapause in the second larva instar from July to the end of December & the beginning of January. The second larva instar reached high percent 81.36% in October and 100% in July, August & September 2013. D. oleae ended diapause & moulted to the third larva instar. The third larva instar lasted for 23.9±2.5 days. The number of the third larva instar reached the peak on January & February in 2013 about 43.40% and 43.56% respectively. In 2014, it reached 44.77% and 21.74% in January and February, respectively. The pupapation occurred on the last third of January. The pupa lasted for 10.7±1.5 days. The highest percent of pupa was recorded in February, which was 27.27% and 45.29% for 2013 & 2014. Adults appeared in the end of February and reached the peak on March with 27.05% and 28.27% in 2013 and 2014. The females laid eggs on undersurface of leaves & inflorescences singly or as small group 4-6 egg. The eggs hatched after 12.9±2.3 days, then the first larva instar fed and made the galls. This instar lasted for 13.9±2.8 days. It reached 20% in March and 25% in April and June for 2013 and 22.81% in March 2014.

One generation of Olive – leaf midge was recorded in 2013 and in 2014.

E48

GENERAL SURVAY OF INSECT PESTS IN DHOUK REGION. <u>Lazgeen H. Assaf¹, Feyroz R.</u> Hassan², Halgurd I. Rasheed², Dilshad S. Ahmed¹, Salah A. Saeed¹, Farhad M. Taher¹, Khalid H. Baper¹, Eskander Aziz¹ and Shleer Mohammad¹. (1) General Directorate of Agriculture-Duhok, Duhok, Iraq; (2) Dept. of Plant Protection, Faculty of Agriculture and Forestry, University of Duhok, Kurdistan Region, Iraq, Email: lazgeenassaf@yahoo.com

A cooperation program between, the General Directorate of Agriculture - Duhok/Kurdistan region and the University of Duhok/Faculty of Agriculture and Forestry/Plant Protection Department, was carried out to survey the insect pests in Duhok region. The program lasted eight months during 2013-2014. The survey started at beginning of June to the end of October 2013 and at beginning of April to end of May 2014. The survey was conducted in seven districts related to Duhok Province; Duhok center, Summel, Zakho, Akra, Bardarash, Amadia and Shekhan. Insect samples were collected, kept in different size cages, labelled then transferred to the laboratory. Each sample (insects and symptoms) was examined and classified. The samples also sent were to the Iraq Natural History Research Center and Museum - University of Baghdad for identification. During survey period, more than 1500 samples were collected. The maximum number of insect samples was recorded during June 2013 that reached to more than 350 sample. The maximum number of samples also was collected from Summel district which included three regions; Batel, Faida and Summel centre. The results also showed that the highest number of insects was related to Coleoptera and followed by Lepidoptera, Hemiptera, Homoptera, Orthoptera, Neuroptera, Dermaptera, Odonata and Phasmida, respectively.

E49

THE BIOLOGICAL BEHAVIOR OF DATE PALM SCALE, *PARLATORIA BLANCHARDI* TARG. 1892. ON THREE VARITIES OF DATE PALMS IN THE REGION OF ADRAR –ALGERIA. <u>M. I. M.</u> <u>Ben Hassan</u>, Algeria, Email: ma.benhassan@hotmail.fr

The work is a study of the biological behavior of date palm scale, *Parlatoria blanchardi* Targ. on 3 local varieties of date palm (Takerboucht, Tgazza and Tilemsou) in the region of Adrar (Algeria). It appeared that this scale developed best on Takerboucht and Tgazza varieties. Tilemsou the variety is less preferred. With regard to fertility, it was also high on Takerboucht variety and the variety Tgazza while females exhibited low fertility on Tilemsou variety. The population dynamics of *Parlatoria blanchardi* during the study
period extended from August 2011 to April, 2012. It had two generations, one autumn and one Vernal.

E50

SURVEY AND POPULATION DENSITY OF TOMATO LEAF MINER TUTA ABSOLUTA MEYRICK. (LIPEDOPTERA: GELECHIIDAE) IN DUHOK REGION. Lazgeen H. Assaf¹, Feyroz R. <u>Hassan¹</u>, Halgurd R. Ismael², Mohammad A. Sadiq¹, Rezgar M. Ismael¹, Mohammad Sh. Ahmed¹, Salah A. Saeed¹ and Farhad M. Taher¹. (1) General Directorate of Agriculture-Duhok, Duhok, Iraq; (2) Dept. of Plant Protection, Faculty of Agriculture and Forestry, University of Duhok, Kurdistan Region, Iraq, Email: feyrozrh77@yahoo.com

The aim of this work was to investigate the population density and infestation percentage of Tuta absoluta on tomato crop Lycopersicum esculentum Mill under field conditions in three locations at Duhok Province/Kurdistan Region/northern of Iraq in 2012. The average number of mines/leaflet, larvae/leaf and larvae/fruit during the study season were 2.33, 0.34 and 0.61, respectively. The results showed significant differences in infestation percentage and number of male per trap among the three locations. A highest percentage of infestation was recorded in September as 74.00, 72.00 and 60.00 for Summel, Shekhan and Zawita, respectively. A maximum number of males/trap/week was 1205.40 recorded on 26/8/2012 in Summel. Concerning the use of pheromone traps for pest monitoring, linear regression analysis results was significant between trap catches and the number of mines per leaf and the infestation rate of leaves.

E51

THE CHEMICAL COMPOSITION OF THREE EUCALYPTUS ESSENTIAL OILS AND THE ASSESSMENT OF THEIR FUMIGANT TOXICITY AGAINST COWPEA WEEVIL. Soumaya Haouel Hamdi¹, and Jouda Mediouni Ben Jemâa². (1) Laboratory of Applied Biotechnology in Agriculture, INRAT Tunisia; (2) Faculty of Sciences of Bizerte, Tunisia, Email: joudamediouni@lycos.com

Legumes are essential constituents of the cultural systems in Tunisia due to their high content in proteins in the dried seed and to their capacity of symbiotic fixation of the atmospheric nitrogen. They covered a total area of 23000 ha. These plants are regrettably targeted by insect pests both during culture and storage. Beetles of Bruchidae are among the most dangerous seed pest insects. Larvae consume and The cowpea develop only in seeds. weevil Callosobruchus maculatus (Fabricius, 1775) is the most devastating and serious postharvest pest of many legumes in Tunisia. Current control program of this pest is based on the use of chemical insecticide. The harmful effects of these synthetic insecticides on the environment and human health lead to the research of alternatives. The biological control using plant extracts

mainly essential oils were investigated against numerous insects. The genus Eucalyptus is well known to possess various insecticidal activities including its fumigant action. The present work was carried out to investigate chemical composition and fumigant toxicity of three Eucalyptus essential oils namely E. camaldulensis, E. astringens and E. lehmani against adults of C. maculatus. The GC-MS analyses showed that the major common compounds were pinene and 1,8 cineole. Moreover, results showed that all tested essential oils possessed insecticidal activity against C. maculatus. At the lowest tested dose 78.95µl/l air, E. camaldulensis and E. astringens oils exhibited 100% mortality after only 42 hours of exposure. However, E. lehmani oil reached 100% mortality at this same dose after 54 hours. The respective Median Lethal Concentration (LC_{50}) was 24.87 for E. camaldulensis, 41.90 for E. astringens and 31.55 µl/l air for E. lehmani. The results suggested that Eucalyptus essential oils might have potential as a control agent against Cowpea weevil.

E52

A NEW ECONOMIC FRUIT FLY IS THREATENING THE MEDITERRANEAN REGION: THE SPOTTED WING DROSOPHILA, *DROSOPHILA SUZUKII* (MATSUMURA) (DIPTERA: DROSOPHILIDAE). <u>Khaled Alrouechdi</u>, Email: kh.alrouechdi@gmail.com

A species of fruit flies appeared recently as economically important pest. It does not belong to the family Tephretidae but Drosophilidae. Given the economic importance of this new pest and the possibility spreading rapidly in many countries of Near East and North Africa as well as elsewhere, a brief information will be given, related to its acronyms, wide range of fruit hosts, distribution, morpho-biology, monitoring and control. The origin of the pest is Southeast Asia, but it moved recently to several European-Med countries. According to some data (personal communication), it appears that it has moved to the Southern Mediterranean, particularly in some countries of North Africa.

E53

SURVEY AND MAPPING OF INFESTATIONS CAUSED BY THE HESSIAN FLY, THE BARLEY STEM GALL MIDGE AND THE CEREAL LEAF BEETLE IN NORTHERN TUNISIA. <u>Ghazi Krida¹</u>, Khaoula Sgatni², Amal Ben Chebla³, Sihem Hbibi³, Radhouane Nsiri, Mohamed Ali Hannachi². (1) Agronomic National Institue of Tunisia, University of Carthage, 43 Av. Charles Nicille, 1082 Tunis, Tunisie; (2) National Institute of Crops of Tunisia, BP 12-8170 Bou Salem, Tunisie; (3) National Institute of Applied Biological Sciences of Tunisia, University of Tunis-EL Manar, 9, Rue Docteur Zouheir Safi - 1007 Tunis, Email: gkrida@yahoo.fr

The Hessian fly, *Mayetiola destructor* (Say) is the most destructive pest of wheat worldwide. While,

the barley stem gall midge, Mayetiola hordei (Kieffer) was reported only in North Africa and Southern Europe. In Tunisia, severe damages caused particularly by M. destructor have been reported since 1930. Infestations by M. destructor and M. hordei in commercial durum wheat and barley crops were investigated by sampling 100 fields of cereals in the governorate of Zaghoaun, located in the North-east of Tunisia. This study showed that *M. hordei* and at lower degrees *M. destructor* were very widespread in barley and durum wheat fields respectively in the study area. Infestations with the Hessian fly were lower than 20%. While, M. hordei infestations exceeded 20% of the infested plants in 32% barley fields. On the other hand, the cereal leaf beetle, Oulema melanopus (Linnaeus) has recently started getting serious on cereals in Tunisia. It has been noticed in 50% and 32% of investigated wheat and barley fields respectively.

E54

POPULATION DYNAMICS OF CITRUS PSYLLA, DIAPHORINA CITRI KUWAYAMA AND EXOCHOMUS NIGROMACULATUS ON CITRUS PLANTS IN IRAN. <u>Karim Saeidi</u>, Department of Entomology, Natural Resources Research, Research Center of Agricultural and Natural Resources, 351, Yasouj, Iran, Email: Email: saeidi391@yahoo.com

Diaphorina citri Kuwayama (Hem.: Psyllidae) has been recognized as a serious pest of citrus in Asia for many years. In Iran, the pest has spread in Hormozgan, Sistan-Baluchestan and Kerman Provinces. Both nymph and adult stages are phytophagous sucking plant sap and able to transfer the Liberobacter asiaticum Greening bacteria which is considered as the most serious disease of citrus in the world. In this survey, population fluctuation of D. citri and Exochomus nigromaculatus (Col.: Coccinellidae) in Kohgiluyeh and Boyerahmad provinces were studied during 2010–2011. Results showed that the citrus psylla was found on sweet orange and citrus plants at every occasion during the study. In contrast, the predator, E. nigromaculatus was found only on the potted sweet orange plants (Citrus sinensis) where pruning and insecticide application was not practiced. Not only did the flushing condition appear to regulate the psylla population, but also rainfall, the only one climatic factor that significantly influenced the psylla population fluctuation. The results implied that E. nigromaculatus could establish well only in the stable habitat. Hence, in practice, it may be utilized as a biological control agent against D. citri when releasing this predator is carried out on the plants neither pruned nor sprayed with insecticide.

E55

BIOSYSTEMATIC STUDY OF APHIDS AND THEIR NATURAL ENEMIES IN THE PARK OF HIGHER SCHOOL ELHARRACH. <u>Saida Saighi¹</u> and Salah Eddine Doumandji². (1) Department of Agronomy, University of Biskra, Algeria; (2) Department of Zoology, National High School of Agriculture, El Harrach, Algeria, Email: saidasaighi@gmail.com

This study allowed us to identify 29 species of aphids. Among which, are the species little known in Algeria. We noticed that Aphis fabeae is the most polyphagous species. We recorded this species on 38 host plants belonging to 20 botanical families. We observed this aphid on 6 host plants of the family Fabaceae: Vicia faba, Phaseolus vulgaris, Melilotus infestation, Medicago sativa, Lathyrus ochrus, Medicago arborea. Similarly, we found this pest on plants belonging to the family of Malvacae, Poaceae, and Solanaceae Chenopodiacae. Among the natural enemies of Aphis fabeae the following was recorded: Coccinella algerica, Adonia variegata and some spiders. In addition, we find 4 parasitoids: Lysiphlebus fabarum, Trioxyus angelicae, Lysiphlebus confusus and Aphidius matricariae.

E56

STATUS OF INSECT PESTS OF CEREALS AND FOOD LEGUMES IN MOROCO. <u>Saadia Lhaloui</u>¹, M. El Bouhssini², H. Ramdani³, S. Krimi Bencheqroun¹, S. Kemal², S.G. Kumari³, F. Gamba² and H. Bahaddou¹. (1) INRA-CRRA-Settat. Morocco; (2) International Center for Agricultural Research in the Dry Areas (ICARDA), Rabat, Morocco; (3) INRA-CRRA-Meknès, Morocco; (4) ICARDA, Tunis, Tunisia, Email: slhaloui@yahoo.com

Cereals are basic food crops in the world. In Morocco they occupy more than 5 million ha yearly, representing more than 70% of the arable land. Food legumes are important crops grown in rotation with cereals. However, these crops are attacked each year by several agents of biotic stress, namely insects, diseases and weeds that depreciate their quantity and quality. Hessian fly and the barley stem gall midge are the major insect pests of cereals. In years of heavy infestations, yield losses of up to 100% can be recorded. Food legumes are also attacked by a large number of pests. A survey of fields of these two crops was under taken during the last 3 years to determine the magnitude of insect pest's incidence and severity, and monitor the change for years due to seasonal and climate changes. Stops for sampling were made every 20-25 km. More than 250 fields (3/4 cereals and 1/4 legumes) were surveyed yearly in 4 different agro-ecological zones of the country (Abda: rainfed, semi-arid environment; Doukkala: irrigated area; Saiss/Taza: rainfed, favorable environment; and the Middle Atlas: rainfed, high altitude environment). Crop conditions, production system, and growth stages as well as pest incidence were all recorded. Insect's incidence was categorized as low, medium or high. The results of these surveys showed that the major insect pests of wheat was Hessian fly and that of barley is the barley stem gall midge. The pest's severity was higher in the 2011-2013 seasons

while in the 2013-14 season, the severe cold and extreme drought conditions that occurred during the adult flight period, caused severe mortality, thus lowering the infestations. Other insects such as the cereal leaf beetle, the wheat stem sawfly, and aphids were omnipresent, and caused various levels of damage in different regions. On the other hand, during the 2013-2014 season, an increased number of sunn pest adults was also noticed. This pests needs to be monitored carefully as it used to be very damaging in the 80's, and climate change may favour its development again in the country. Food legumes were infested by several pests such as Sitona weevil, pod borers, and the chick pea leaf minor. The Lixus weevil infestation levels were recorded at a damaging level these seasons, mainly in faba bean major and in the northern part of the country. This pest was more sporadic in earlier years. Consequently, it appears that the climate change that is occurring in most of the world cereal and food legume cropping regions is causing severe pest's variations of incidence and population dynamics. Also, some currently minor pests like the faba bean Lixus are becoming more devastating, and others like the sunn pest are coming back.

E57

BIOLOGICAL STUDY OF PSEUDASPIDOPROCTUS HYPHAENIACUS ON DATE PALM IN OASIS LIBYA. Halluma M. Karra and A.M. Al-Kasheh, Faculty of Agriculture, University of Tripoli, Department of Plant Protection, Libya, Email: Kerra50@hotmail.com

Biological study of the soft red palm scale Pseudaspidoproctus hyphaeniacu was conducted in a farm oasis Ajkrh that contained most of the varieties of the three areas of oases. Six varieties of palms were selected: Saidi, Altds, Aljdg, Almceleo, Diklah and Musrm. Three palms of each were chosen totaling 18 date palm trees. Insect samples were taken monthly, from October 2007 to September 2008, for all phases of the holder Achammarej and palm leaves (Palme). The results showed that the insect begins to emerge and become active at May and increased in numbers during July, August, September and October. However, in November and December low numbers were recorded. The insect was not found in January, February, March and April. The results also showed that the life cycle of this insect took from 55-57 days for the insect three generations, which appeared in November, July and September. Six species of predators were found associated with this insect belonging to Orthoptera, Neuroptera and Coleoptera. Four species of Hymenoptera were recorded.

E58

STATUS OF DISEASES AND INSECT PESTS OF MAJOR CEREAL AND PULSE CROPS IN ETHIOPIA. <u>Tebkew Damte¹</u>, Worku Denbel², Adane Abraham³, Girma Kassa¹, Samuel Sahle⁴, Negussie Tadesse¹, Birhanu Bekele⁵, Seid A. Kemal⁶, Safaa Kumari⁷. (1) Ethiopian Institute of Agricultural Research, DebreZeit Center, Ethiopia; (2) Kulumsa Center, Ethioia; (3) Holeta Center, Ethiopia; (4) University of Gondar, Ethiopia; (5) Ambo Center, Ethiopia; (6) International Center for Agriculture Research in the Dry Areas (ICARDA), Addis Ababa, Ethiopia; (7) ICARDA, Tunis, Tunisia, Email: tebkew@yahoo.com

Surveys were carried out for two consecutive cropping seasons (2012 and 2013) with the objective of determining the status of diseases and insect pests of cereals (barley, durum wheat and bread wheat) and pulses (chickpea, lentil and faba bean) in central and north-western Ethiopia. Surveyed fields of each crop were randomly selected at 5 to 10 km intervals and diseases and insect pests incidence observed were rated as low (< 20%), medium (21-50%) and high (> 50%). The pea aphid, Acyrthosiphon pisum, was recorded at low levels on lentil in both seasons throughout the surveyed areas. The pod borer, Helicoverpa armigera infestation on chickpea was high in 2012 cropping season where 6-34% of the fields showed >50% infestation. The cutworm, Agrostis sp., was reported in few fields with low incidence only on chickpea in the north-western part of the country. Among the fungal diseases, the chocolate spot, Botrytis fabae, occurred in all surveyed faba bean fields and more than half of the fields showed >21% incidence. Moreover, the rust caused by Uromysis fabae and the wilt/root rot caused by Fusarium sp. were prevalent at low incidence on faba bean. The new gall like disease of faba bean (Olpidium sp.) was found in cooler faba bean growing regions mostly at low to medium incidence. The majority of lentil and chickpea fields showed low-medium wilt/root rot disease incidence in all the surveyed areas and seasons. In Dembia district of north-western Ethiopia, Ascochyta blight (Ascochyta rabiei) on chickpea was recorded in 2013 season and according to farmers, this was the first appearance of the disease in the district. On lentil, the lentil rust, Uromyces viciafabae, was prevalent at low to medium level in central Ethiopia in 2013 season, nearly 15 years after the deployment of rust resistant variety Alemaya in 1998. The occurrence of insect pests in cereals was very rare. Thus, the rose wheat (grass) aphid (Metopolophium dirhodum), Russian wheat aphid (Diuraphis noxia) and epilachna (Chnootriba similis) were found infesting wheat and barley at a very low level in cooler areas. The occurrence of yellow Puccinia striiformis, leaf P. triticina and stem P. graminis tritici rusts of wheat were very low in both seasons in the surveyed areas. On the other hand, Septoria tritici was the most prevalent wheat disease, although there was variation between years. On barley, net blotch Drescslerateres and scald Rhynchosporium secalis were common in most surveyed fields followed by loose smut Ustilago tritici.

E59

INVENTORY AND CONTRIBUTION TO THE STUDY OF MAJOR TOMATO PESTS IN M'RARA GAMA'A, OUED SOUF REGION IN ALGERIA. <u>Karima Brahmi</u>¹, Meriem Bellabidi², Hamid Achoure³ and Salahuddin Doumandji⁴. (1) Faculty of Biological and Agricultural Sciences, Dept. Of Biology, University Mouloud Mammeri Tizi Ouzou; (2) Faculty SNV, Dept. of. Agronomy, University Kasdi Merbah Ouargla, Algeria; (3) Representative of CLAUSE Company Plant in Algeria; (4) Dept. of Agricultural Zoology ENSA El Harrach, Algeria.

The study of tomato pests was performed in the M'Rara (Gama'a) region known to have a Saharan winter climate. Insect pests samples were collected from Chebbeb station by applying five methods, namely pots barber, sweep net, quadrat Orthoptera, direct capture and orange colored traps. By using pots barber method, 99 species (distributed between 6 classes) were collected. However, by using sweep net method, 77 species (divided between two classes) were collected, as compared to the method of quadrat 27 Orthoptera species (distributed in 2 families) by the quadrat method. The direct capture method collected 52 species distributed between two classes. Finally, the colored traps (orange) method collected 48 species divided between four classes. The damage caused by Tutas absoluta on tomato leaves and the rate of proliferation of aphids and mites was estimated.

ENTOMOLOGY

EN1

ESTIMATION OF POST MORTEM TIME BY DEVELOPMENT OF IMMATURES OF LUCILIA **SERICATA** AND **CALLIPHORA VICINA** (**DIPTERA: CALLIPHORIDAE**). Hazem Hasan¹, Ahmad Katbeh-Bader² and Hamed Khlaif². (1) Department of Plant Production and Protection, Faculty of Agricultural Technology, Al-Balqa' Applied University, Al-Salt, 19117, Jordan; (2) Department of Plant Protection, Faculty of Agriculture, The University of Jordan. Amman, 11942, Jordan. Email: Hazem@bau.edu.jo

The development of *Lucilia sericata* and *Calliphora vicina* was studied on lamb liver at 17, 25 and 30°C. The durations of immature stages, and length of larvae were recorded. Postmortem interval estimation (PMI) was estimated using isomorphen diagrams. The minimum development threshold was calculated by linear regression, and found to be 10.3° C for *L. sericata* and 3.2° C for *C. vicina*. The accumulated degree-days (ADD) were calculated for each immature stage. The total ADD for *L. sericata* were 4965.2, and for *C. vicina* were 8268.3. The ADD data were used to estimate the PMI by developing a computer program, which use accumulated day degree data obtained from the results of the study.

EN2

ROLE OF INSECTS IN LEGAL DISPUTES: A CASE STUDY ON RICE IMPORTED FROM USA. <u>Ahmad Katbeh-Bader</u>, Department of Plant Protection, Faculty of Agriculture, The University of Jordan, Amman, 11942, Jordan, Email: Ahmadk@ju.edu.jo

Insects, their distribution, hosts, life cycles and behavior can be used in legal disputes. Rice imported from USA was found to contain large numbers of insects and a dispute between the exporter and the imported originated. The question was if the insects were pests of rice, if the infestation occurred in the exporting country, during shipping or in the destination country. Insects were collected from the external surface of rice bags, in between card boards and from floor of containers imported from USA. A total of 62 bags of rice samples collected from the surface of rice inside the rice bag and from beneath the surface and the middle of the bags. The samples were examined and more than 10000 insects were found; about 95% of them belonged to one species aquatic insects of North American origin. In addition, 4 aquatic species were observed frequently in many rice samples. Most of the examined insects (98%) were found outside the rice bags. Only 3 species were found to be secondary rice pest representing 0.3%of the examined insects. Therefore, most of the insets were either predators on small aquatic animals, feed on algae or other organic matter in water, or feed on plant juices or other organic materials. It is not possible that such insects could infest the rice during shipping because such insects do not live in oceans or seas. Many of the insects were seen trapped under the 1000kg rice bags. Most of the examined insects can swim but not crawl in rice. Almost all examined insects are known to be attracted to light, especially when they leave water searching for new habitats. All examined insects were in the adult stage except 3 dead larvae and one pupa of Red Flour Beetle (Triboliumcastaneum). All examined insects were dead and no signs of development of insect on rice were seen such as molting exoskeletons, eggs, larval skins, pupal skins or insect feces. Therefore, the infestation was proved to be at the exporting country depending on the geographical distribution of the identified species. An explanation of the infestation scenario is presented in the discussion.

EN3

THE EFFECT OF WHEAT TYPE AND METHODOF EXPOSURE IN RESPONSE KHABRABEETLE TO MICROWAVE RADIATION. EmadQ. Al-Ebady and Mohammad A. Al-Barwary, PlantProtection Department, College of Agriculture &Forestry, Mosul University, Iraq, Email:Semad82@yahoo.com

The results proved study the effect of two wheat varieties (rough July 2, soft Smito) and method of exposure insect without food and with food in response are adult and larvae and pupa of Khabra Beetle

Trogoderma granarium Everts microwave radiation at power level of 200, 500 and 800 watts and extended exposure time 15, 30, 45, 60 and 90 seconds. The mortality percentage for adult and larvae and pupae were mixed on the class of wheat coarse and fine. amounting to 40.00% and 32.59% for adult and 32.87% and 30.15% for larvae and 38.15% and 41.39% for the pupa in showed that the average ratio of food to kill the insect with the most efficient of the insect without exposing the food as it stood at 32.41% and 40.19% for adult and 30.46% and 32.59% for larvae and 38.15% and 41.39% for the pupa, and the results of the study demonstrated that the average murder rate for the adult and larvae and pupae fit directly proportional to the increase in the level of 200,500,800 watts of energy, amounting to 17.36, 42.64 and 48.89% for the adult, 6.94, 34.86 and 52 0.78% of the larvae, 24.86, 35.14 and 59.31% for the pupa and fit the average murder rates commensurate with extended exposure 0, 15, 30, 45, 60 and 90 seconds, with zero percent and amounted to 24.44, 28.33, 43.89, 53.06 and 68.06% for adult, 0, 10.28, 23.06, 39.72, 48.89 and 76.22% of the larvae and 0, 31.11, 40.28, 47.22, 56.67 and 63.33% for the pupa.

EN4

QUANTITATIVE CHANGES IN PROTEIN AND CHOLESTEROL IN HAEMOLYMPH OF THE PALM WEEVIL RHYNCHOPHORUS RED **FERRU** TREATMENT **GINEUS** AFTER LEUCOKININII. Mouna M. Al-Dosury, Sulman Ben Abdul Aziz University, Saudi Arabia. Email: wisdom1425@yahoo.com

We estimated quantitative changes to the content of protein and cholesterol in the Haemolymph of adult Red Palm Weevil after being fed on sugar cane treatment with different concentrations of LeucokininII. In males, 0.05% has recorded significant increase in total protein, then 0.25% concentration compeer control, while the maximum high of females 4.846 mg at 0.05% compeer control. The effect of leucokininII on content of haemolymph cholesterol has shown result that 0.05% concentration for both sexes with an average reduction of 37.989 mg in males compeer with 120.123 for control, and 57.263 in females compeer with 96.087 mg for control.

EN5

ANNUAL ABUNDANCE OF FLIES SPECIES (ORDER : DIPTERA) IN BABYLON PROVINCE USING OF ATTRACTIVE STICKY TRAP (ST). <u>R.A. Okaily Res¹</u>, A.A. Al-Taweel¹ and E.A. Mahmood². (1) Integrated Pest Control Center, Directorate of Agricultural Reseach, Ministry of Science & Technology, P.O. Box 765, Baghdad, Iraq; (2) University of Baghdad, Baghdad, Iraq, Email: riyadkaily@yahoo.com

In the current study one kind of attractive traps : Sticky Trap (ST) was used to conduct survey and

monitoring the population of Flies (Order: Diptera) The survey was held in the Babylon Province (Iraq) for the period 12/3/2008-4/12/2009.The result Showed abundance of three families of flies were most dominated Calliphoridae. Sarcophagidae : and Muscidae. In addition, the results showed that Luciliasericatawas found in highly rate in Sticky Trap (ST) 36.11, while *Calliphoravicina* was found in lowest rate 6.88. The rates of other species: Ch. Albiceps, Ch. megacephala were 33.68 and 23.33, respectively Curve of the population density of Luciliasericata and Ch. megacephala showed two peaks during the period of the study, in spring and autumn, while the population density of Calliphoravicina and Ch. albiceps were appeared in highly level in spring only.

EN6

EFFECT OF MICROWAVE ON STAGES OF FIG MOTH *EPHESTIACAUTELLA* **IN STORED DATES.** Falah H. Naher¹, Adedaljasim M. Aljibouri², Mohammed Z. Khalaf¹ and Hussain F. Alrubeai¹. (1) Ministry of Science and Technology, (2) Agricultural Research Directorate, Biotech. Res. Center, Alnahrain University, Baghdad, Iraq.

Eggs, larvae, pupa and adults of date moth Ephestiacautella were exposed to three levels of microwave power (600, 800 and 1000 W) at different exposure time (0, 6, 8, 10, 12, 14, 16, 18, 20 and 20 second). The results showed that microwave had high ability to kill different stages of fig moth. The effect increased by increasing of microwaves power and exposure time. The percentage of egg mortality was 100% at 600 and 800 W, and exposure time. Similarly, egg mortality was also increased at 1000 W in less than 12 sec. The highest motility of larvae was 90% at 600 W and 96.67% at 800 W, when the exposure time was 10 sec., while, the mortality was 100% at 1000 W and 18 sec. male and female pupa mortality rates was 100% at 800 W, when the exposure times were 20 and 18 sec., respectively. The ranges of lethal time of 50% and 95% (LT 50, LT 95) at 600-1000 W were 501-9.9 and 15.7 -34.2, 3.0-7.5 and 9.0-50.0 and 3.2-4.8 and 7.9-39.1 for egg, larvae and pupae, respectively . However, the results showed that all adult treatments significantly affected age average and emergence of adult male and female. The age of emerged males and females did not exceeded 4.267 and 5.267 day respectively, at 600 W and 6 sec. exposure. While, adult emergence stopped at 800 W and 14 and 16 sec., for male and female pupae, respectively. The results of this investigation indicated the affectivity of using microwaves technique and further research efforts is needed before the feasibility microwave technique can be evaluated as alternative in stored date's chemical method using Methyl Bromide

EN7

BREEDING TIMES AND MULTIPLICATION OF THE COCCINELLID PREDATOR, *HIPPODAMIA VARIEGATA* GOEZE, IN KHARTOUM AREA, SUDAN. <u>Abdalla Abdelrahim Satti</u>, Environment, Natural Resources and Desertification Research Institute, National Centre for Research, P.O. Box 6096, Khartoum, Sudan, Email: satisattisat@yahoo.com

Various coccinellid ladvbeetles, including some Hippodamia spp., are potential predators in IPM programs worldwide. Studies in Sudan proved that Hippodamia variegata is one of the common and widespread coccinellids in different parts of the country. The current research aimed to follow the breeding times and multiplication of this predator on two major crops. "Abu-sabein" forage sorghum (Sorghum bicolor) and alfalfa (Medicago sativa), which grown all the year round in Khartoum area. Therefore, regular surveys were conducted on these crops at fortnight intervals and continued for two consecutive years, where the encountered adults and immature stages (egg batches, larvae and pupae) were separately counted and recorded. The results showed that the highest breeding and abundance of H. variegata on sorghum crop occurred in the period from January to March, but in the other months of the year the adults were gradually decreased and the immature stages were scarcely detected. On alfalfa crop, all stages of the insect roughly revealed gradual increases in numbers starting from the onset of winter in December and up to the end of summer period in June. Thereafter, sharp reduction in all stages were observed during the first half of autumn (July – August), but resurgence occurred soon in subsequent months. However, the first months in both winter and autumn seasons witnessed the lowest reproduction rates of the predator on the two crops. On the other hand, it was found that the numbers of immature stages were comparable with or exceeded the numbers of adults in mid winter (January-February) and end of autumn (September–October) on sorghum and alfalfa, respectively. Besides the suitable climate in winter, also, the conditions in autumn seemed to encourage the multiplication of this insect, but mechanical suppression through direct rainfall was thought to be found in the first phase of the latter season. It is concluded that H. variegata breeds successfully throughout the year without any noticeable resting period in the studied area, a fact that certainly adds to its potential value in pests' control.

EN8

INVENTORY OF ARTHROPOD FOREST DARNA

(KABYLIE, ALGERIA). <u>Samira Setbel¹</u>, Samira Merabet² and Salaheddine Doumandji². (1) Faculté de biologie-Agronomie, Université de MouloudMammeri (Tizi-Ouzou), Lab. Ornith., Dép. Zoologie agri. et for., Inst. nati. agro., El Harrach, Algeria, Email: ellisonam2001@yahoo.fr

The inventory of arthropods is made of three stations in an oak grove at the forest Darna .SmenAgni, Agni and Bir El EghilLekhmis. The work was done from November 2012 until August 2013 except for the months of January and February when the snow cover

made the middle inaccessible.les trapping methods used are the pots Barber, yellow plates, but also direct capture. Total wealth trapped in 64 pots traps in the Agni station N Smen species of 16 species with an average 9.25±3.45 species distributed between 4 classes including that of Insecta dominate (AR%= 71.86%) with such species Messorbarbara (N = 27 ind, AR%= 26.05%). In the station Bir El Eghil total wealth is equal to 14 species (s ' = 8.5 ± 3.87 species) Insecta the first position (AR% = 89.47%); Messorbarbara is the most abundant (211 individus, AR% = 84.28%). In the Agni Lekhmisstation, the total wealth of 10 species with an average of 8 ± 1.73 species. Also, the predominant Insecta (AR%= 60.99%) and Messorbarbara is ubiquitous (92 individuals; AR% = 28.48%). The Shannon-Weaver index in the three study sites reaches 3.79 bits in the Agni Smen station N, 3.27 bit Eghil El Bir and 2.30 bits Agni Lekhmis. The evenness is close to 1 for the three study sites. Sequestration through yellow plates has noted the total wealth are 8 species Agni Smen N (s' = 5.38 ± 1.51 species) distributed among four classes whose Insecta who occupy the first place (AR= 76 and 07%). Hymenoptera dominate (AR% = 36.75%) with Allectis sp. (AR%= 13.68%). In the station Bir El Eghil total wealth of 11 species (s' = 6.88±3.23) divided into three classes whose Insecta (AR% = 95.04%) dominate; Messorbarbara is important (A. R.% = 52.48%). The value of the total wealth is Agni Lekhmis 9 species (s'= 7.38 ± 1.69) divided into three classes with that of Insecta (AR%= 85.4%) and it is always that Messorbarbara dominates with 18.25%. The Shannon-Weaver diversity reaches 2.85 bits Agni SmenN, 2.75 bits and 2.81 EghilBir El Agni Lekhmis. The value of fairness approaches in the three study sites.

EN9

MORPHOLOGICAL STUDY OF *CERAMBYX DUX.* **F** EGGS USING THE SCANNING ELECTRONE MICROSCOPE. <u>Ehab</u> Zgheb¹ and Wajieh Alkassis². (1) Biological Control Studies and Research Center, Faculty of Agriculture, University of Damascus, Syria; (2) Dept. Plant Protection, Faculty of Agriculture, University of Damascus, Syria, Email: szgheb@yahoo.com

The Longhorn beetle, Cerambyx dux F. (Cerambycidae, Coleoptera) an important polyphagouswood borer insect, attacks fruit and ornamental trees or brushes. Morphological description of the egg of Cerambyx dux was carried out during 2012 to 2014 in the Scanning Electron Microscope (SEM) lab at Biological Control Studies and Research Center, Faculty of Agriculture, University of Damascus by using KYKY2800B SEM. Results indicate that the Wall of eggs were festooned with hairs at a rate of 485.38±23.41 Rite / 1 mm², with an average length of 23.136±1.44 µm, respiratory holes are located between capillaries at a rate of 27.36±3.88 respiratory gap/1 mm², with an average length of 16.17 ± 0.61 µm.

EN10

THESTUDYOFINTRASPECIFICCOMPETITIONBETWEENINDIVIDUALOFORYZAEPHILUSSURINAMENSISL.ONRICE.AbdlrahmanYousefAl-Faytory,University of OmarMukhtar,Libya,Email:insecta2005@yahoo.com

The results indicated that competition between members of the beetle increased when the number was her big primary, and the results showed that the effect of periods (time) on the competition between its members began with the beginning of the experiment and continued while the end of the experiment. It was also noted that competition among its members was high when the few primary population density increased in number of insects with time.

EN11

STUDY OF HOST PREFERENCE AND FOOD TYPE FOR CONFUSEDFLOUR BEETLE TRIBOLIUM CONFUSUM DUVAL. Abdlrahman <u>Yousef Al-Faytory</u>, University of Omar Mukhtar, Libya, Email: insecta2005@yahoo.com.

The results showed the food preference of the flour beetle with compering the local food with imported one. In addition, the access to their diet was study using fly or climbing. The favorite food was corn and rice and wheat. Finally, the education periods (time) did not have an impact on the behavior of food preference for where this insect settled on a favorite food and she lived it.

EN12

IDENTIFICATION KEY FOR CHEWING LICE
PARASITIZEDINDIANPEACOCK
(PAVOCRISTATUS L., 1758)WITH ONE NEW
RECORD AND NEW RECORD HOST FORM
THIS EXOTIC BIRD IN SAUDI ARABIA.Mohamed Gamal EL-Den Nasser¹, Azzam Al-Ahmed¹,
Mohammed Shobrak² and Yousif Aldryhim^{1,3}. (1)
Department of Plant Protection, College of Food and
Agriculture Science, King Saud University, Riyadh; (2)
Department of Biology, Science College, Ta'if
University, Ta'if, Saudi Arabia; (3) King Saud
University Museum of Arthropods. Sadia Arabia, Email:
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Chewing lice of Indian peacock were studied by collecting new lice samples from Riyadh bird market, examining the samples that preserved on King Saud University Museum of Arthropods (KSMA) and revised all previous records of chewing lice infested this bird. Only 3 species of chewing lice were collected from this bird on Saudi Arabia: *Menacnthusstramineus* (Nitzsch, 1818) which have a wide range of Galliforms hosts, *Amyrsideaminuta* Emerson, 1961 form a new record for the kingdom parasitic fauna and *Goniodesdissimilis* Denny, 1842 is recorded for the first time from Indian peacock to increase the total number of recorded lice species from this bird to 13 species. Identification key for the 13 species, synonyms, type host, taxonomic notes and new photo editing technique for chewing lice images were provided through this paper.

MITES

M1

LIFE CYCLE OF UROCTEA LIMBATA (C.L. KOCH, 1843) IN EGYPT (ARANEAE: OECOBIIDAE). <u>Gihan M.E. Sallam</u>, Nahla A.I. Abd El-Azim and Mohammad A. Mohafez, Fruit Acarology Department, Plant Protection Research Institute, Agriculture Research Center, 7 Nadi Al-seeid St. Dokki, Giza, Egypt, Email: gihansallam2006@hotmail.com

Uroctea limbata (Koch, 1843) spiders, of the family Oecobiidae, were collected from greenhouses in Giza Governorate in Egypt. The life cycle was studied under the laboratory conditions. Males reached maturity after 6-7 spider instars (230.7 ± 3.4 days), and females after 7-8 spider instars (273.1 ± 3.1 days). Spiders were fed on different instars of the cotton leaf worm. Food consumption and mating behavior were observed. This study is a necessary step to know the role of *U. limbata* in biological control especially in greenhouses.

M2

REARING OF THERIDION MELANOSTICTUM CAMPRIDGE, 1876 (ARANEAE: THERIDIIDAE) ON TWO PREYS, TETRANYCHUS URTICAE AND LARVAE OF SPODOPTERA LITTORALIS. Nahla A.I. Abd El-Azim, Vegetables and Ornamental Plants Acarology Department Plant Protection Research Institute, Agriculture Research Center, 7 Nadi Al-Seeid St. Dokki, Giza, Egypt, Email: nahlaaly2006@Yahoo.com

Theridion melanostictum was collected from Apple trees, El-Sadat city in El- Menofia governorate. The individuals were reared under laboratory conditions (25-26°C and 60-70% R.H.). Females reached maturity after 5 spider instars while Males reached maturity after 4 spider instars. Spiders were tested on two preys, *Tetranychus urticae* and larvae of *Spodoptera littoralis*. Life cycle, Food consumption and mating behavior were observed.

M3

EFFECT OF INFESTATION WITH THE ASTIGMATID MITE, LEPIDOGLYPHUS DESTRUCTOR (SCHRANK) (ACARI: GLYCYPHAGIDAE) ON THE GERMINATION OF RICE AND MAIZE STORED GRAINS. Mahmoud E. El-Nagger and <u>Amira E. Mesbah</u>, Plant Protection Research Institute, ARC, Dokki, Egypt, Email: Ameramites@yahoo.com

Astigmatic mites are pests infested stored products and cause various diseases to workers handling infested commodities or lead to gastric disorders in

animals that eat infested food. Many species of astigmatid mites attacks the germ of (wheat, maize, rice, other cereals and seeds), resulting, destroying their germination power and changing the moisture content of the medium, and initiates growth of moulds. In our the percentages of infestation research. bv Lepidoglyphus destructor (Schrank) on maize and rice grains from October, 2005 to October, 2006, using different infestation rates (20 mites, 40 mites, 50 mites, 60 mites, 80 mites, 100 mites, 200 mites and (noninfested with mites)control) per 100 grains. In this study, the infestation of rice grains with L. destructor at the laboratory-controlled conditions was conducted on non-washed and washed grain (after 4, 8 and 12 months). The numbers of normal, abnormal and analyzed grains were counted for 100 grains. The obtained results denoted that the number of abnormal and analyzed grains was increased by increasing the number of mites. On the other hand the number of normal grains increased with decreasing the number of mite infestation. The problem of mite infestation of stored grains became severe especially in the investigated years. L. destructor considered the most harmful pest cause damage in quality and in the hygienic condition of the grain, and sometimes it was possible to detect loss in weight.

M4

EFFECT OF DIFFERENT PREY TYPES AND TEMPERATURE ON BIOLOGICAL ASPECTS, FECUNDITY AND REPRODUCTION OF THE PREDATORY MITE PROTOGAMASELLUS DISCORUS MANSON WITH REFERENCE TO SOME CHEMICAL ANALYSIS OF PREY. <u>Hassan</u> Ali Ahmed Taha¹, G.M. Shereef², Z.R. Soliman² and Wafaa O. Gomaa¹. (1) Plant Protection Research Institute, Dokki, Giza, Egypt; (2) Agric. Zoology Dept., Faculty of Agriculture, Cairo University, Egypt, Email: hassanalitaha@yahoo.com

The predatory mite, Protogamasellus discorus Manson (Acari: Gamasida: Ascidae) was isolated from soil under debris of palm trees at Giza governorate and reared under laboratory conditions of (25 and 30°C) on bulb mite, Rhizoglyphus robini, larvae of Musca domestica, free living nematode, Rhabditella masculata and three species of fungi, Fusarium oxysporium, Asperagillus niger and Pencilium notatum. Obtained results showed that significant effects of different prev and temperature on biological aspects, fecundity and reproduction, whereas, life cycle duration lasted (9.9 and 9.4), (12.5 and 10), (10.7 and 9.4), (15.6 and 13.1), (10.9 and 9.6) and (9.2 and 8.8) days, when the predatory mite P. discorus fed on the above mentioned diets at 25 and 30 °C, respectively. Female fecundity affected by temperatures and food types, where it is generally increased as temperature increased, also it being higher with free living nematodes (61.4 and 64.5) followed by R. robini (59.6 and 62.0) and larvae of M. domestica (32.3 and 36.5) eggs at 25 and 30 °C, while,

deposited eggs are very low with fungi, The rate of reproduction was greater at 25 °C when mite fed on fungi and at 30 °C on other prey where, the highest rate obtained with nematodes while the lowest with *P. notatum*. Chemical analysis of some prey showed that free living nematodes contain the highest percent of phosphorus (2.9%), So females deposited the highest number of eggs when it fed on nematodes than others.

M5

EFFECT OFDIFFERENTFACTORSONTHEABUNDANCEOFTRUESPIDERSONTHEDIFFERENTDATEPALMVARIETIESINEGYPT.M.H.El-Erksousy,PlantProtectionResearchInstitute,Dokki,Giza,Egypt,Email:El_erksousy10@yahoo.comElemainElemainElemain

A survey of true spiders on date palm varieties has been made in Egypt. The results indicated that the soft and semi dried varieties harbored many of spiders and these spiders obviously decreased in the dried varieties. The study indicated also that the most abundant families were *Philodromidae* and *Salticidae* on leaves and *Miturgidae*, *Hersilidae* and *Lycoseidae* associated with fruits in the field and on stored date fruits.

M6

SURVEY OF DUST MITE DERMATOPHAGOIDES PTERONYSSINUS. Omran Abu Gelah, University of Omar Mukhtar, Libya, Email: omranabusalah@yahoo.com.

Mites one of the most important organisms that invade homes and animal shelters and facilities specifically dream house dust, which live inside the houses and barns and frequenting the places frequented by human reasoned Many of his illness in his machine tract when inhaled laden air particles strange bearer with dream dust and therefore settle in the lungs and the people aerobic at other times resting on the surface of the outer skin and in such this topic cases does not stand the human body spectator to what is happening, but begins to attack the objects Bank of antibodies to expel the invading organisms and then challenged many of the interactions that may result in some of the symptoms and various diseases know the symptoms of allergies.

M7

THEEFFECTOFTHEPLANTEXTRACTZYGOPHYLUMALBUMLINPHASESREDSPIDER.OmranAbuGelah,University of OmarMukhtar, Libya, Email:omranabusalah@yahoo.com.

The extract of Zygophylum album known from Zygophyllaceae, a plant with wax leaves Michhma and white blossoms and Tamra Kmitrih shape, dry parts of it are poisonous to animals. Use the focus 0, 25, 50, 100, 200, 500, 1000 mg/l at different stages of the scourge of the dream of a howler Bakotain *Tetranychus urticae* Koch larvae, nymphs, and adults of males and females using direct way of spraying and dipping tablet paper.

The percentage was calculated to kill in two phases Zmnatan after 24,48 hours of treatment. The study indicated the presence of significant differences to the effect of different concentrations of extracts in the different phases throughout the results were good.

M8

MITES ASSOCIATED WITH ORCHARDS AND FIELD CROPS IN SHARKIA GOVERNORATE, EGYPT. <u>H. M. G. El-Kawas¹</u>, A.E. Abdel-Wahab² and M.E. El-Naggar¹. (1) Plant Protection Research Institute, ARC, Dokki, Giza, Egypt; (2) Faculty of Agriculture, Agric. Zoology and Nematology Department, Al-Azhar University, Egypt, Email: hmg733@yahoo.com

A survey of 66 species of 26 families of mites found to be associated with orchards i.e. Mango Guava, grape and Mulberry and field crops i.e. Faba bean, Eggplant, Hot pepper and Okra were recorded in three districts namely; Zagazig, Abo Kabeer and Belbais located in Sharkia Governorate.

M9

PREDATORY EFFICIENCY OF PHYTOSEIULUS PERSIMILIS ATHIAS-HENROIT IN CONTROL OF TWO SPOTTED RED SPIDER MITE **TETRANYCHUS** URTICAE KOCH ON A VARIETY OF AGRICULTURAL CROPS. Alissar Chaabo and Ibtisam Bakdash. Mites laboratory, Latakia Center for Natural enemy rearing, Directorate of Plant Protection. Latakia. Svria. Email: alisar.nadeem@yahoo.com.

The two-spotted spider mite Tetranychus urticae Koch is considered one of the most important pests that attack most fruit trees and field crops, which cause significant losses to many of them, such as straw berry, eggplant, beans, cucumbers, apples and cloves. The importance of pest that all moving stages feed on the host plant. It also secrete spider spinning, which hampers the vital processes in addition to large-inflicted damage to plants. In spite of this scourge that is still in many cases are struggling with pesticides, but the feasibility of their use is limited because of the privacy of the pest and its presence on the bottom surface, in addition to the fact that all specialized miticides are non-systemic. With the recent trend towards rationalization of pesticides use to get a clean product free of residual effect of pesticides, was thinking about alternative solutions to get rid of this dangerous scourge through integrated pest management approach and reliance on natural enemies present in nature to control the pest. From here came to rely on predatory mite belonging to the family Phytoseiidae and fore most predatory Phytoseiulus persimilis Athias-Henroit who gave good results of successful globally and locally.

M10

LETHAL EFFECT OF *BEAUVERIA BASSIANA* AND *CLADOSPORIUM* SPP ON DIFFERENT

LIFE STAGES OF TETRANYCHUS URTICAE. Amal Haj Hassan, Alisar Shapoo, Rami Kassm, Mohamad Kenaan and Ebtesam Bakdash, Lattakia Center for Rearing Natural Enemies, Agriculture Department, Lattakia, Syria, Email: amal.haj@gmail.com

This study conducted in the was Entomopathogenic Agents Laboratory in Lattakia Center for Rearing Natural Enemies, to determine the effect of one isolate of the entomopathogenic fungus Beauveria bassiana and tow isolates of the fungus Cladosporium spp on different life stages of two-spotted spider mite Tetranychus urticae by direct application of conidial suspension at concentration of 1×10^7 conidia/ml. The results showed significant differences in the impact of the different isolates on one stage and also it was found significant differences in the effect of one isolate on the different stages of the tested mite. Adult was the most susceptible stage, the mortality of adults caused by B. bassiana isolate was 100% and it was 72.5 and 58.5% by Cladosporium spp. isolates, while egg phase was less sensitive to the entomopathogenic fungi and the mortality was 45% for one isolate of Cladosporium spp and 22.5% for another one while it was 23% of B. bassiana isolate.

M11

INFLUENCE OF CLIMATIC FACTORS ON SOIL MITES. <u>Harkat Hafsa</u> and Ghezali Djelloul, Higher School of Agriculture, Al Ketaneh, Building 5 No. 102, Muhammadiyah, Algeria 16000, Email: hafsa.meriem@yahoo.com

Wildlife in general and soil fauna in particular, is not without showing a change over time. Some species make their appearance or become more abundant while others are scarce or even disappear completely. This investigation covers the analysis of monthly changes in soil mites, and the results are very interesting. They show that species respond differently when their temporal dispersion. A total of 15 species of Oribatida was identified. They are most abundant especially during the months when temperatures are milder, especially in the months of June and July when the displayed values are 24% and 17%. However, the lowest abundances are recorded during the period when temperatures are relatively less favorable, especially in the months of January, February, November and December, the values of the abundances range from 0.09 to 3.6%.

M12

BIOECOLOGY OF SPIDERS POPULATIONS IN CHOTTOF AIN ELBAIDA, **ALGERIA**. Fatima Zahra Hamawah, Randa Malik, Sameh Besati and Yusuf Aliyu, Department of Agricultural Sciences, College of Natural Sciences and Life, University Kasdi Merbah Ouargla, PO Box 511, 300000, Ouargla, Algeria, Email: ha.fatima@ymail.com

The ecological and biological study of spiders in the area of Chatt Ain El Beida in Ouargla was carried out in a palm grove that is totally neglected and very dense in vegetation. Two sampling methods, pitfall trapping and direct hunting were used to collect spiders. The collection consisted of 136 individuals, 51 are males, and 21 females and 64 juveniles, the last group was neglected, because they are difficult to identify. Adults were studied taxonomically to reveal 21 species belonging to 5 families and 13 genera. The Gnaphosidae family is composed of 11 species, Saltisidae family presented by 6 species and Lycosidae family is represented by two species and the Zodariidae Philodromidae and families were represented only by a single species (Philodromus sp.1 and Zodarion sp.1). The Gnaphosidae family is the most diversified compared to the other identified families. The study of species richness, diversity index and evenness showed that males are more abundant than females among the species found in this study area.

M13

THE MACROCHELID MITE, *MACROCHELES MUSCAEDOMESTICAE* AS A BIOLOGICAL CONTROL AGENT AGAINST HOUSE FLY *MUSCA DOMESTICA* IN EGYPT. Safaa M. Abo-Taka, <u>Hany M. Heikal</u> and Ahmed M. Abd El-Raheem, Economic Entomology and Agricultural Zoology Dept., Faculty of Agric., Menoufia University, Egypt, Email: Hanyheikal61@yahoo.com

Numerous species of macrochelids (Acarina; Mesostigmata) have now been proved to be capable in attacking housefly larvae and eggs, but it is presumed that only a few of them play a crucial role in the control of flies in nature. Macrocheles muscaedomesticae (Scopoli) is one of several mites that feed on eggs, newly hatched and small larvae of house fly Musca domestica L. Furthermore; this study proved that macrochelid mite attacks housefly adults. This mite was reared in the laboratory on house fly frozen eggs and first instar of larvae at constant conditions of 28±1 °C and 90% relative humidity using sterilized artificial diet. The mean incubation period of eggs, total immatures, female longevity were 0.7, 4.0 and 25.2 days when fed on frozen eggs; while means were 0.8, 7.0 and 22.6 days when fed on first instar larvae of M. domestica respectively. The total consumption of female was 131.1 eggs/female or 82.7 larvae. Results of the present research reported that, the mean mortality percentages of eggs due to predation of three levels of predator 2, 5 and 10 individuals were 57.2, 74.9 and 96.5 after 5, 4, 2 days, respectively. Also, the larval stage of M. domestica was introduced with three levels 10, 20 and 25 larvae for each level of predatory mite 2, 5 and 10 adults. Results revealed that the best results were recorded at the level of 5 mites, where the mean mortality percentage of larvae was 100% after one day when introduced with 10 houseflies larvae, but it was 96.0% after two days when introduced with 20 houseflies larvae and 76.2% after three days when introduced with 25 houseflies larvae at level 5. In addition the present study proved that mites can consumed the adult stages of house fly, results indicated that the best results were recorded at the level of 10 mites, where the mean mortality percentages of adults were 83.55% the fly died after two days of one prey treatment, 62.5% after four days of two preys treatment, while it was only 55.57% after three days of three preys treatment.

M14

PRELIMINARY STUDY ON THE EFFECT OF HOST PLANT ON THE PRODUCTIVITY AND DEVELOPMENT OF TWO SPOTTED SPIDER MITE TETRANYCHUS URTICAE KOCH. Dina Mohmmad Faiod and <u>Rawa Mouhsen Youssef</u>, Agricultural research Centre, Lattakia, Syria, Email: rawayoussef@hotmail.com

The effect of host plant of three families we studied on the productivity and development of twospotted red mite. The leaf disc taken from six hosts was considered for rearing spider mites; the results were showed differences in productivity and the development among hosts. The great number of egg was on Phaseolus vulgaris, Cucumis sativus, Lycopersicum esculenum from families Fabaceae (Leguminoase), Cucurbitaceae, Solanaceae, and with average 6.6, 4.02, 1.88 egg/ day respectively. The period till adult was different according to hosts and with clear differences among families which was 10.67, 11.22, 12.4 day on Ph. vulgaris, C. sativus, L. esculentum, respectively, the results were showed important of the host when we estimate damage and density of pest, for its effects on biological properties of pest according to various effects such us morphology and physiology structure of leaves which important in feeding, ovulation and development in addition to density of individuals and suitable place and food.

M15

EFFECT OF THE AQUEUS AND ALCHOLIC EXTRACTS OF ROSEMARY (*ROSMARINUS OFFICINALIS* L.) TO CONTROL VAROA DESTRUCTOR OUD. PARASITE. <u>N.Y. Daher Hjaij</u>, B.S. Khaled, M. Al-Alan, H. Kaheel, M. Hassan and A. Almanoufi, Plant Entomology division, Plant Protection Administration, General Commission for Scientific Agricultural Research. Damascus, Syria, Email: nouraldinz@gmail.com

This study was conducted on honeybee colonies in cooperation between the General Commission for Scientific Agricultural Research and the Department of Plant Protection-Faculty of Agriculture/Damascus University (Apiary Research Laboratory) during March and April 2014. The aim of the study was to evaluate efficiency of aqueous extract and alcoholic extract of rosemary (*Rosmarinus officinalis*) to control *Varroa destructor* parasite in field.

Results showed that spraying the aqueous extract of rosemary directly on honeybees presented on the frames with tow concentrations 125, 250 mg plant/colony (50 ml extract per each colony) which gave efficiency of 64.49 and 65.49%, respectively. There were significant differences (p=0.05) in comparison with water treatment control which gave efficiency 31.46%. But the alcoholic extract which exploded with water showed an efficiency of 72.73 and 77.37% with two concentrations 2000, 4000 mg plant/colony, respectively, which used it by entering three wood slices that dipping in the alcoholic extract with 2 and 4 ml/slice per each colony between the frames. There were significant differences (P=0.05)in comparison with control and the effect continued for 5 days after applying. We recommend using the alcoholic extract for its easy application and long effect. Consequently, using rosemary plant extract repeatedly is important to control Varroa parasite and to reduce the development of its population to provide beehive products free from pesticide residues.

M16

IDENTIFICATION OF VOLATILE COMPOUNDS AS INDICATORS OF SPOILAGE MITES IN GRAIN. N. <u>Abuelnnor</u>, N. Ratcliffe, B. de Costello and P. Spencer-Phillips, Faculty of Agriculture, University of Tripoli, Tripoli, P.O. Box 13538, Libya, Email: alkhaweldi_na@yahoo.com

Solid-phase micro-extraction (SPME) fibres and automated thermal desorption (ATD) tubes were used with gas chromatography-mass spectrometry (GC-MS), to investigate volatile secretions from the headspace gas of flour mite Acarus siro L. and storage mite Glycyphagus domesticus (De Geer). This study has identified a number of VOCs which may enable the early detection of storage mites in grain stores. No differences were observed between the volatiles extracted from A. siro, and volatile identified in the G. domesticus. Several compounds were found to be associated with A. siro and the G. domesticus. These compounds were (Z)-3,7-dimethyl-2,6-octadienal, (E)-3.7-dimethyl-2,6-octadienal, 2-methyl-3-buten-2-ol,2, 6dimethyl-1, 5-heptadiene, methacrolein and 2-methyl-3pentanone. Interestingly, the first five of these VOCs were also present in infested wheat grain containing mites, but were absent from infested wheat grain without mites and the non-infested wheat grain used in this study. There were several other volatiles found to be possible markers able to differentiate between the infested and non-infested wheat grain in the SPME fiber and the ATD tube experiments. These were 2methylpentanal, 2-methyl-1-propanol, 2-pentanone, 3-1-octen-3-ol, 3-octanone, hydroxy-2-butanone, 2octanone, benzothiazole, undecanal and tetradecane

M17

MITEFAUNAOFTHEUNITEDARABEMIRATES:NEWRECORDSANDACHECKLIST.MohamedW.Negm,Departmentof

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Mite fauna of the United Arab Emirates (UAE) is poorly studied. Based on published works, only 26 species (representing three orders, 18 families and 24 genera) were previously reported from coleopteran insects, plants, leaf litter and soil. This paper reports 11 new records of mites from Dubai. A checklist of the taxa reported from the UAE up to date is presented.

M18

MITE SOIL AS BIOLOGICAL INDICATORS OF THE QUALITY OF THE SOIL IN THE FORESTED AREA OF THE COAST OF ALGERIA. <u>Soumeya Fekkoun</u>¹, Djelloul Ghezali² and Salaheddine Doumandji³. (1) Mohammed Bougherra University Faculty of Sciences Boumerdes, Algeria; (2) National High School of Agriculture, El Harrach, Algeria, Email: fekkoun_sss@yahoo.fr

Mite fauna contribute to the decomposition of organic matter in the soil, the richness or poverty is a way of knowing the quality of the soil. we studied the ecological aspect of the soil mite in a forest Bouchaoui « coast of Algeria ».by taking 6 soil samples every month for the year 2010/2011. The samples are collected and extracted using the technique of Berlese Tullgren funnel and was found 604 individuals. This richness can be indicated to the fertility of soil and knead the high proportion of organic material in it. The largest number observed in the spring, followed by the separation of the individual 252 fall 222 individual and then the summer with 106 individual and winter 80 individual. Among the 18 families obtained the Scheloribatidae is the most dominant with 30.6% followed by Ceratozetidae 16%, then Euphthiracaridae 14%. The families remain involved with low percentages. The diversity index Schanonweaver varied between 2.3 bits in the summer and 3.83 bits in the spring. As the results of the analysis statistic confirm the existence of a clear difference between the four seasons and the wealth of soil mite and diversity.

M19

SURVEY OF MITE FAUNA IN THE REPUBLIC OF YEMEN. <u>M.S. Ba-Hassen¹</u>, S.A. Ba-Angood² and A.M. Bin Othman³. (1) College of Education- Lawder, Univ. of Aden, Yemen; (2) Department of Plant Protection, Nasir's College of Agric, Yemen; (3) El Kod Research Station-Agricultural Research and Extension Authority, Yemen, Email: m_seed2020@yahoo.com

This research work was conducted at the Department of Plant Protection, Nasir's College of Agriculture, University of Aden, during the period January 2006-December 2009. A survey of both harmful and useful mite species was collected from fields in different climatic regions in the country, the coastal area was represented by Giar, Zingibar, Elkod, Halamah, Al khamlah, Almusaimeer, Dahl Ahmed, Alfanah,

Alhussin, Azzuraiey, Batais, Miklan, Ahwar, Lawder, and Mudiah in Abyan Governorate, Mukalla, Thalah, and Assubaikhat, at Hadramout Governorate. The high altitude areas were represented by Mathbah, Dhala'a Shamlan, Wadi Dhahr, Bani Hushaish, in Sana'a Governorate; and Ma'aber and Rasaba from Dhamar Governorate. Desert-like areas were represented by Seivun, Agarn, and Mariamah, areas from Hadramout Governorate. Mite species were collected in these areas from aerial parts of various plants and trees particularly vegetable plants and fruit trees as well as weeds neighboring them. Mite species were identified at the Department of plant Protection, Nasir's College of Agriculture, University of Aden, El Kod Research Station, and were confirmed at the Department of Acarology, Faculty of Agriculture, University of Cairo. The collected species were compared with was registered previously in Yemen. The results have shown that the newly registered mite species were 37 that belong to 14 families. Seven species were just identified to the genus level and were sent abroad for further identification. Of the newly harmful registered ones, Six species belong to the family Eriophyidae, three to the family Tenuipalpidae, two to the family Tetranychidae and two species belong to Tuckerellidae where one of them was just identified to the genus level; and one species to the family Tarsonemidae.

M20

FIRST RECORD OF RED- BACK SPIDER LATRODECTUS SCELIO THORELL, 1870 (ARANEAE:THERIDIIAE) IN BAGHDAD, IRAQ. Mohammad Saleh Abdul-Rassoul, Basman H. Al-Jalely, <u>Khawala Taha Al-Neami</u> and Luay Khahtan Al-Ani, Faculty of Agriuclture, Baghdad University, Iraq, Email: ktalneami@yahoo.com

The female is easily recognizable by her black body with a prominent red strip on the upper surface of abdomen it is about 1 centimeter in length. The female red-back has a round body in size of a large pea, with long, slender legs, body is a deep black color, often containing an obvious orange to red longitudinal stripe on the upper surface of abdomen, and has a body about the size of a large pea and slender legs. Widow spiders of the genus *Latrodectus* have worldwide distribution. Red- back spider *L. scelio*, are widow spiders. Generally; for the first time in Iraq, two females of redback spider were found in Baghdad city. The presence of *L. scelio* in Baghdad, and its possible spread to other provinces, is of human health significance, and the species may also impact on native biodiversity.

M21

LIFE TABLE PARAMETERS AND BIOLOGICAL ASPECTS OF CHELETOGENES ORNATUS (CANESTRINI & FANZAGO) (ACARI: CHEYLETIDAE) WHEN FED ON THREE DIFFERENT TEMPERATURE. <u>Rania A.El-Nahas¹</u>, M.F. Hassan² and M.E. El-Naggar². (1) Faculty of Agriculture, Cairo, University, Giza, Egypt; (2) Plant Protection Research Institute, A.R.C., Dokki, Giza, Egypt, Email: rania.elnahas1@gmail.com

The Cheyletid mite, *Cheletogenes ornatus* was reared on three different preys (Crawlers of scale insect) *Parlatoria oleae*; immatures of *Eutetranychus orientalis* (Klein) and Acarid mite, *Tyrophagus putrescentiae* at laboratory conditions (20 & $25\pm2^{\circ}$ C and $65\pm5^{\circ}$ R.H) this study showed that females had two nymphal stages while males had one nymphal stage. The predator mite found in under *Parlatoria oleae* scale insect at *Ficus carica* Fruit in low numbers while it was found on *Lonicera japonica* (Caprifoliaceae) with high numbers. The presence of predator in *lonicera japonica* was the first time described in reviewed literature generally concluded that *Chelotogenes ornatus* is considered promising biological control agent against Acarid mites, scale insect and phytophagous mites.

FUNGAL DISEASES

F1

STUDY OF PATHOGENICITY OF SOME FUSARIUM SPP. AND MICRODOCHIUM NIVALE ISOLATES CAUSAL AGENT OF FUSARIUM HEAD BLIGHT AND ROOT ROT OF WHEAT. Houda Boureghda and Nora Abdallah, Department de botanique-Ecole Nationale supérieure Agronomique (ENSA), El Harrach, Algiers, Algeria, Email: hou.boureghda@gmail.com

Root rot and Fusarium head blight of wheat are considered among the most serious and widespread diseases in the world. They are leading cause of economic losses which may reach 50% and also of mycotoxins accumulation in wheat seeds. Both diseases are caused by a fungal complex of Fusarium spp. and Microdochium nivale. They may be associated with the attacks on the crown, roots and the ear. This investigation focused on the study of the pathogenicity of a collection of fungal isolates obtained from the ear. the collar and root of samples of different wheat cultivars harvested in the central region of northern Algeria. This collection consisted of 7 species: F. culmorum, F. graminearum, F. solani, F. verticilliodes, F. torulosum, F. poae and M. nivale. Pathogenicity tests were assessed by using three different methods: pathogens effect on the in vitro coleoptile growth rate of wheat seedlings, soil inoculation (to evaluate disease severity on the collar and the root of wheat seedlings) and ear infection during flowering stage. Study of Fusarium isolates and M. nivale effect on coleoptile growth rate evaluated by the percentage of reduction of coleoptile growth compared to the control showed that there is variability in the aggressiveness of different species. The most aggressive was F. graminearum species (99.03% reduction) while the least aggressive was F. solani (70% reduction). According to aggressiveness degree, these species were ranged into

two groups: the most aggressive group consisted of four species: F. graminearum, F. culmorum, F. poae and F. verticilioides, and the least aggressive group contained three species: F. torulosum, M. nivale and F. solani. The aggressiveness of Fusarium spp. and M. nivale isolates evaluated by soil inoculation and estimated by a disease scale ranging from 0 to 3 showed that only two species F. graminearum (1.74) and F. culmorum (1.15) have a significant disease index on the collar. Whereas M. nivale (0.60), F. torulosum (0.36), F. solani (0.25), F. poae (0.20) and F. verticillioides (0.20) had a weak disease index. Spikes inoculation showed that the most aggressive species were F. culmorum (3.45) followed by F. torulosum (1.80), while F. solani (0.81), F. graminearum (0.70), M. nivale (0.60), F. poae (0.33), and F. verticilioides (0.26) had weak disease index. Furthermore, results obtained in this study showed that Fusarium spp. and M. nivale isolates obtained from roots and diseased collar were able to induce symptoms on the ear and also those obtained from the spike were aggressive on the collar and root. Significant correlation between in vitro coleoptile growth reduction and disease index on the ear was observed for F. solani (r=72), also for F. graminearum a significant positive correlation (r=0.65) was observed between disease index on the collar and that on the ear.

F2

INFLUENCE OF WHEAT GENOTYPE ON PROTECTION FROM FUSARIUM ROOT ROT BY SEED TREATMENT WITH TRICHODERMA ATROVIRIDE. Houda Boureghda, Imene Laraba and Djazira Koudri, Département de botanique- Ecole Nationale Supérieure Agronomique (ENSA), El Harrach, Algiers, Algeria, Email: hou.boureghda@gmail.com

Evaluation of wheat genotype influence on wheat protection against two causal agents of root rot F. culmorum and F. graminearum showed a difference in the effectiveness of the antagonist Trichoderma atroviride (Ta.13) according to the genotype used. In this study four genotypes were used, 2 durum wheat (Vitron and Waha) and 2 bread wheat (Hiddab and Ain Abid). Wheat seed were treated with *T. atroviride* (Ta.3) spore suspension at a concentration of $10^6 - 10^7$ conidia/ml before sowing in a sterile soil and inoculating by the pathogen. F. culmorum and F. graminearum isolates were selected based on their aggressiveness from data recorded in a previous study. Difference in efficiency was evaluated by percentage of disease index reduction compared to the control for each genotype used. The results showed that the percentages of disease index reduction varied following the pathogen inoculated and according of wheat genotype used. Disease severity was reduced for Hiddab variety (bread wheat) inoculated with F. culmorum and F. graminearum, respectively by 77% and 71%, followed by Vitron (durum wheat) genotype inoculated with F. culmorum and F. graminearum with a respective reduction of 65% and 58%. Whereas for Ain Abid (Bread wheat) genotype treated and inoculated with *F. culmorum* and *F. graminearum* percentages of disease reduction were respectively 40% and 45% and 32 and 38% for Waha (Durum wheat) genotype. It should be noted that the two genotypes Hiddab and Vitron for which we recorded the highest disease indices for the controls (2.23, 2.26, respectively) showed the highest percentage of disease reduction.

F3

THE EFFECT OF SOWING DATE AND VARIETY IN SEVERITY OF THE POWDERY MILDEW DISEASE CAUSED BY ERYSIPHE GRMINIS DC. F. SP. HORDE ON BARLEY UNDER NATURAL CONDITIONS. Omran Youssef, Helim Youssef, Sultan Shekhmous, Alan Ramo and Mahmoud Hasan, The General Commission for Scientific Agricultural Research (GCSAR), Al-Qamishli Agricultural Research Center, Al-Qamishli, Syria, Email: om_youssef@yahoo.com

Powdery mildew disease of barley caused by Erysiphe grminis Dc. F. sp. horde has been causing losses in barley yield. This study was conducted in 2009-2010 season in two sites (Al-Qamishli researches center and Al-Yanbouh in Al-Malikya) aimed to investigate the ability of 13 barley cultivars to the disease under natural conditions (4 sowing dates, starting in 15 November with 10 days between sowing dates). The results showed differences in cultivars' reaction to infection with significant differences between cultivars and sowing dates for the same cultivar in the two sites. Furat 2, Furat 3 and Furat 6 cultivars were not infected with the disease, while Furat 7, Furat 9 and Arabi Aswad cultivars were more susceptible to infection in the two sites. The effect of the first sowing date was the highest on disease severity in the two sites. In the Al- Qamishli, severity was 71.7%, 60% and 56.7% for Furat 7, furat 9 and Arabi Aswad, respectively, while disease severity was reduced for the same cultivars in the respective sowing dates. In the fourth sowing date, severity was 21.7% and 18.3% for Furat 7 and furat 9, while Arabi Aswad cultivar was not infected at this sowing date. Infection severity was 10-40% on the other cultivars for the first, second and third sowing dates and without infection in the fourth sowing date. While in Al-Yanbouh site infection severity was 68.3%, 53.3% and 46.7% for Furat 7, furat 9 and Arabi Aswad, respectively, for the first sowing date, whereas for the fourth sowing date infection severity was 25%, 18.3% and 15% for Furat 7, furat 9 and Arabi Aswad, respectively, whereas no infection appeared on the other cultivars with the fourth sowing date.

F4

WHEAT LEAF RUST IN SYRIA: NEW VIRULENT RACES AND RESISTANCE DURUM WHEAT GENOTYPES. <u>Mohammad Kassem¹</u>, Anisa Sulaiman¹, Abdul Rahman Meimah¹, Doaa Abdel Hadi¹, Rula Almatar¹, Ahmad Al-Ahmad¹, Hani Hazzam² and Miloudi Nachit². (1) Durum Wheat Diseases Lab Plant Protection Department, Faculty of Agriculture, University of Aleppo, Syria; (2) International Center for Agricultural Research in the Dry Areas (ICARDA), Aleppo, Syria, Email: agromohammad@msn.com

Leaf rust, caused by Puccinia triticina Eriks, is a major disease in most of the wheat growing areas worldwide. It caused severe losses in grain yield and losses in epidemic years reached up to 50%. In Syria it became an important disease in the last two decades and considered at present as the most common and important wheat disease, as it occurs annually throughout most wheat growing areas. Under favorable disease conditions, crop losses of 30% or more can be expected in cv. Doma1, Since 2002, pathogen virulenc was monitored by conducting survey and races analysis in Syria and some neighboring countries, studying their virulence, identifying resistance gene(s) in local and promising cultivars. The increasein pathogen's virulence in Syria dictated the search for new sources of resistance genes in the wheat wild relatives. This was the main aim of this study, in addition to the study of new races of wheat leaf rust. Results identified new physiological races in Syria and Lebanon (SCBK, TBRM and LGRC) when North American System of Nomenclature was used. These races have the ability to attack many major resistance gene(s). while promising durum cultivar were rich in major and minor resistance gene(s), many more were identified. Hybrids (Cham5 x wheat wild relatives T. dicoccoides, Ae. umbellulata and Ae. tauschii) were also a source of major LR genes and expressed slow rusting in some crosses.

F5

ISOLATION AND DETECTION OF A PATHOGEN CAUSING CROWN ROT ON WHEAT IN IRAQ. <u>Oadi N. Matny</u> and Mohammed H. Khalifah, Department of Plant Protection, College of Agriculture, University of Baghdad, Iraq, Email: Oadi77@yahoo.com; Oadimatny@hotmail.com

This study was carried out to detect crown rot disease on wheat and identify the associated fungi, and evaluate the pathogenicity of pathogen isolates on wheat seedlings under greenhouse conditions. Crown rot on wheat was detected in nine provinces. The disease was present in Baghdad, Anbar, Wasset, Najaf, Erbil, Babil, Deyala, Mosul and Karbala provinces. *Fusarium* spp were found the main fungi associated with the disease in these fields. The results of isolation from infected wheat with crown rot symptoms showed that *Fusarium* spp is the most frequent with an incidence of of 84.47%. Results of molecular identification of *Fusarium* spp using species-specific primers, showed that *F. graminearum* was the most common pathogen in Iraq with 92%, and *F. pseudograminearum* 8% incidence.

F6

STUDY OF GENETIC VARIATION OF WHEAT STRIPE (YELLOW) RUST PUCCINIA STRIIFORMIS F. SP. TRITICI USING DNA **MOLECULAR MARKERS DURING 2010-2011 IN** SOME REGIONS OF SYRIA. Shoula Kharouf¹. Manar Azmeh². Makhoul¹, Buthainah Fawaz Alsalamah¹ and Mohamed Alabdallah¹. (1) National Commission for Biotechnology (NCBT), P.O. Box 31902, Damascus, Syria; (2) Damascus University Faculty of Agriculture (GCBT), Damascus, Syria.

Analysis of molecular variance (AMOVA) o of 55 yellow rust *Puccinia striiformis* f.sp *tritici* isolates examined by amplified fragment length polymorphism (AFLP) revealed high genetic variation within population. Multi dimensional scale analysis (MSD) and tree diagram showed that the Syrian yellow rust isolates were clustered in three groups. The first group contained isolates derived from durum wheat, the second group contained bread wheat isolates, but the third group was made of mixture of isolates derived from both wheat species.

F7

A STUDY OF CHICKPEA CICER ARIENTINUM WILT COMPLEX IN ALGERIA, PARTICULAR CASE OF FUSARIUM OXYSPORUM F.SP. CICERI. <u>Moad Rouibah¹</u> and Zineddine Bouznad². (1) Department of Environment Science, Faculty of Natural Science, University of Jijel, Algeria; (2) Department of Botanic, National Higher School of Agronomy, Algiers, Algeria, Email: rouibahm@yahoo.com

Several fungal species restricted to chickpea cultivation were detected and isolated chickpea infected plants with wilt and/or root rot symptoms. These plants were collected from various regions of Algeria: Algiers, Khemis Miliana, Constantine, Setif and Guelma. The main species identified were Fusarium oxysporum, F. solani. F.roseum and Rizoctonia solani. The pathogenicity of F. oxysporum, F. solani and R. solani isolaes on chickpea was checked and the respective characteristics symptoms observed were: yellowing vascular, black rot and dry root rot. The technique of soil inoculation when compared to inoculation with spore suspension proved more efficient and was used to study cultivars reaction. High sensitivity of cultivars Rabat9 and ILC 482 to infection with two species F. oxysporum and F. solani was detected. Finally, understanding parasitic specificity of two species of Fusarium have allowed us to define the specificity of F. oxysporum against the genus Cicer. Results obtained confirmed that the isolated fungal pathogen is the special form F. oxysporum fsp. ciceris described by many authors in chickpea.

F8

INDUCED RESISTANCE AGAINST USTILAGO MAYDIS, THE CAUSAL AGENT OF COMMON SMUT ON MAIZE. Mohamad S. Hassan and N.T. AlShaybany, Department of Plant Protection, College of Agriculture, University of Baghdad, Iraq, Email: mohamad2004S@yahoo.com

This study was conducted to induce systemic resistance in maize to common smut disease and evaluation of fungicides seed treatments to control the disease. The study showed that treatment with salicylic acid at the rate of 400 mg/kg soil during planting and sprayed at vegetative stage was the best concentration reduced disease incidence and which severity significantly and reached 17.7 and 15.6%, respectively. compared with the control treatment which reached 30.2 and 37.3%, respectively. Seed treatment with the fungicides Carboxin and Vitavax at the rate of 2 and 1 g/kg seeds, respectively, decreased seedlings death, disease incidence and severity significantly and reached 5.7, 31.4 and 18%, respectively, for the Carboxin treatment and 5.7, 34.3 and 18.6 % for Vitavax treatment, as compared with control treatment which reached 25.7, 62.8 and 29.4%, respectively.

F9

STATUS OF WHEAT AND BARLY DISEASES IN MOROCO DURING 2012-2013 CROPPING SEASON. <u>A. Ramdani¹</u>, S. Lhaloui¹, M. EL Bouhssini² and F. Gamba². (1) INRA, Maroco; (2) ICARDA, Rabat, Morocco, Email: ramdani.abdelhamid@gmail.com

Wheat and barley are affected by many biotic constraints in Morocco. Leaf rust, septoria and yellow rust are the most damaging diseases on wheat and net blotch is so on barley. The objective of this survey was to assess the prevalence, incidence and severity of wheat and barley diseases across Morocco. The survey was carried out from February to July 2013 and the growth stage ranged from heading to physiological maturity. The data recorded were host species and its growth stage, visual assessment of grain yield and incidence and severity of the main diseases. A total of 78, 39 and 40 fields of bread, durum and barley were inspected, respectively. The survey revealed that the most prevalent diseases on both bread and durum wheats were Septoria-like diseases (SLD), leaf rust, yellow rust and to some extent root rot. Stem rust and powdery mildew were less prevalent and were detected both on bread and durum wheat, whilst common bunt was observed in some fields of bread wheat. Loose smut was not observed at all. 71 and 72% of bread and durum wheat fields, respectively, were infected by SLD, whilst leaf rust was detected in 82 and 74% fields, respectively. Yellow rust was detected in 73 and 33% fields and root rot was detected in 45 and 44% of bread and durum fields, respectively. In bread wheat, the severity of SLD ranged from zero to 44% with SAÏS being the area where Septoria was relatively most severe. The coefficient of infection (CI) for leaf rust ranged from zero to 50 with the highest infection observed in TAZA area. Yellow rust CI ranged from zero to 100. Yellow rust was very severe in all but two

inspected areas. In ABDA and DOUKKALA where SLD and leaf rust were less severe, yellow rust was not detected at all due to very dry season. In durum, the severity of SLD ranged from zero to 78% with TAZA being the area where it was most severe followed by ZEMOUR and SAÏS. The coefficient of infection for leaf rust ranged from zero to 30. Moreover, yellow rust was less severe on durum and the highest infection (CI =30) was observed in one field at ZEMOUR. For barley, the most prevalent diseases were net blotch, covered smut, leaf rust, root rot, loose smut and to some extent barley stripe, scald and powdery mildew, with the former one being the most devastating disease. Both spot-type and net-type net blotch diseases induced, respectively, by Drechslera teres f.sp. maculata and D. teres f.sp. teres were simultaneously detected even on the same leaf with the predominance of spot-type in TAZA and Middle ATLAS. Crop growth conditions were good to excellent in all inspected regions except in ABDA and Middle ATLAS. Moreover, the estimated average grain yield across regions was 25, 23 and 14 q/ha for bread, durum and barley, respectively.

F10

INFLUENCE OF ROOT INOCULATIONS WITH VESICULAR ARBUSCULAR MYCORRHIZA AND RHIZOMYX FOR THE CONTROL OF DRY AND WET ROOT ROT OF CHICKPEA. Sundas shakoor, M. Inam-ul-Haq, Muhammad Shahjahn and <u>Raees Ahmed</u>, Department of Plant Pathology, Pir Mehr Ali Shah Arid Agriculture University Rawalpindi, Pakistan, Email: raees.agri@gmail.com

Chickpea is one of the most important crops grown worldwide including Pakistan. However, root diseases are one of the most important limiting factors in chickpea production. In Pakistan, chickpea crop is susceptible to various root pathogenic fungi like Macrophomina phaseolina causing dry root rot and Rhizoctonia solani causing wet root rot. Considerable evidence has been accumulated in recent years to support and identify the benefits associated with the use of VA mycorrhizae in crop protection. In this study when different treatments of Rhizomyx and VAM were applied, it was observed that Rhizomyx and VAM produced significantly controlled the root pathogenic fungi, by minimizing infection rate with chickpea root pathogenic fungi to a minimum level. Glomus etunicatum, Glomus mosseae and Rhizomyx inoculation alone and in combination significantly increased shoot length, shoot fresh weight, shoot dry weight, and root fresh weight in plants inoculated with M. phaseolina and R. solani compared to the un-inoculated control plants. Application of most of the VAM species and of root pathogenic fungi and biological control with endophytes offers an effective strategy for disease management. Rhizomyx when applied in different concentrations showed a positive impact on chickpea growth by improving plant height, plant fresh weight and plant dry weight. Endophytes colonize the roots of plants similar to that of root pathogenic fungi.

F11

STATUS OF FOOD LEGUME DISEASES IN MOROCCO. <u>Sanae Krimi Bencheqroun</u>¹, Seid Ahmed² and Saadia Lhaloui¹. (1) National Institute of Agricultural Research (INRA), P.O. Box 589, Settat, Morocco; (2) International Center for Agricultural Research in the Dry Areas (ICARDA), P.O. Box 5689, Addis Ababa, Ethiopia, Email: krimisanae@gmail.com

Diseases caused by fungi are important biotic factors limiting yields and quality of food legumes in Morocco. Surveys were carried out in four major food legume producing regions in Morocco (Abda, Doukkala, Saiss and Taza), during two cropping seasons 2011/12 and 2012/13. The results showed that chocolate spot (Botrytis spp.), rust (Uromyces fabae), Ascochyta blight (Ascochyta fabae), downy mildiew (Peronospora viciae) and root rots were common diseases on Faba bean. However, chocolate spot was the most widespread and destructive disease with high incidence in the surveyed regions. On chickpea, Ascochyta blight (A. rabiei) and Fusarium wilt (Fusarium oxysporum f.sp. ciceris) were the principal diseases. Ascochyta blight was the most prevalent disease in all surveyed regions and caused damage with high incidence in 33% of surveyed fields, mainly in early sown spring crops. Whereas for lentil, the main diseases were rust (caused by Uromyces viciae-fabae) and Fusarium wilt (F. oxysporum f.sp. lentis) with low to moderate incidence. Further extensive surveys are required to develop useful disease distribution maps and to contribute to the establishment of the Expert System for plant protection on food legumes.

F12

ANTHRACNOSE RESISTANCE IN CHILLI PEPER AND MOLECULAR DIVERSITY OF *COLLETOTRICHUM CAPSICI* IN BANGLADESH. <u>Muhammad Shahidul Haque</u>, Muhammad Delwar Hossain, Umme Habiba and Tamanna Haque, Department of Biotechnology, Bangladesh Agricultural University, Mymensingh 2202, Bangladesh, Email: haquems@yahoo.com

Chilli peper (*Capsicum* spp) is an important spice crop and a good source of cash for subsistence farmers, generating up to four times the income of cereal crops and providing a major source of employment and income for women. The average yield of chilli in Bangladesh is generally low and unstable due to pre- and post-harvest diseases. Anthracnose has been a real threat to chilli production. Anthracnose is caused by a complex of *Colletotrichum capsici*, *C. gloeosporioides* and *C. acutatum* as reported in China, India, Taiwan, Vietnam, Brazil, and Thailand. It becomes epidemic especially when the humidity is above 90-95% at 26-32 °C and can account for more than 50% of the crop losses. Researches on anthracnose resistance in cultivated chilli genotypes and virulence of Colletotrichum spp. isolates responding to their hosts have not been reported in Bangladesh. Resistant varieties are rarely available in other countries. The objectives of this study were to search for resistance in cultivated varieties and to assess diversity of anthracnose pathogens that might be useful for the development of resistant variety. Chilli fruits with typical symptoms of anthracnose were collected, pathogen isolated and identified by microscopic study. Pure culture of *Colletotrichum capsici* was established. Genetic diversity of ten isolates was performed using five RAPD markers. After DNA extraction and PCR amplification, bands were separated by agarose gel electrophoresis. A total number of 64 loci were scored 52 polymorphic. where were The average polymorphism was 81.25%. The size of amplified bands ranged from 104 bp to 4740 bp. UPGMA dendrogram generated two main clusters on the basis of Nei's genetic distance. RAPD analysis can be used to classify C. capsici more rapidly than any other method. The chilli fruits were inoculated with pathogen suspension. SSR markers were employed to assess diversity among the cultivars and lines and high diversity among them was found. On the basis of pathogen inoculation, the cultivars and breeding lines were identified as susceptible, moderately resistant and resistant to Colletotrichum spp. One line was found to be highly resistant. The present finding is a step forward towards development of resistant cultivars.

F13

ASSOCIATION OF ICE NUCLEATING ACTIVE BACTERIA (*PSEUDOMONAS SYRINGAE*) WITH UREDINOSPORES OF YELLOW RUST OF WHEAT. <u>Abd-AlRahman Moukahel¹</u>, Siham Asaad¹, Bakri Debbes², Cindy E. Morris³ and David C. Sands⁴. (1) International Center for the Agriculture Research in the Dry Areas (ICARDA), Aleppo, Syria; (2) Department of Plant Protection, Aleppo University, Aleppo, Syria; (3) INRA, UR0407 Pathologie Végétale, F-84143 Montfavet cedex, France; (4) Department of Plant Sciences and Plant Pathology, Montana State University, Bozeman, MT 59717-3150, USA, Email: a.moukahel@cgiar.org

One of the possible roles of biological ice nucleation in the life history of micro-organisms is to facilitate their dissemination by enabling them to form ice crystals in clouds that fall out as precipitation, thereby returning the micro-organism to terrestrial and aquatic habitats. For microorganisms that are not ice nucleating, their association with biological ice nucleators might assist in this trajectory. This study was designed to determine the relationship between *Pseudomonas syringae* with uredinospores of yellow rust, on wheat leaves. Spores were collected from infected wheat leaves and suspended in sterile distilled water, rinsed and filtered across polycarbonate filters and then resuspended in sterile distilled water free of ice nuclei at -

9°C. The concentration of the suspension was determined using haemocytometer. The capacity of the spores to induce freezing of water at temperatures from -2°C to -9°C was determined from droplets of the spore suspension placed on a metal surface floated on a cooling bath. To determine if the ice nucleation activity of spore suspensions was due to bacteria or rust spores, an aliquot of the suspension was incubated with lysozyme (final concentration of 3 mg/ml) for 72 hrs. at 4°C and an aliquot of the suspension was boiled for 10 min. as the ice nucleation activity is sensitive to boiling. The freezing profiles of the spore suspensions indicated that these spores were associated with ice nuclei at concentrations of ice nucleus per 60 spores at -6°C, and per 6700 spores at -6°C. Lysozyme eliminated detectable ice nucleation activity at -6° and -7°C even at -10 °C. Boiling eliminated detectable ice nucleation activity at -8°C and colder (down to -10°C). This trial could present preliminary results to pursue the interaction between rust spores and ice nucleating bacteria.

F14

GENETIC DIVERSITY IN ASPERGILLUS FLAVUS STRAINS IN KORDOFAN, SUDAN BY RANDOM AMPLIFIED POLYMORPHIC DNA (RAPD). <u>Sana K. Mukhtar</u>, Plant Protection Department, University of Kordofan, Sudan, Email: sanamukhtar2009@hotmail.com

This study was conducted in Agricultural Research Centre, Giza, Egypt, 2014 to study the genetical variation in *Aspergillus flavus* from Kordofan state. DNA from five *A. flavus* isolates were taken from two locations were extracted and subjected to polymerase chain reaction (PCR) amplification with different primers through the (RAPD) technique. Phylogenic tree obtained by RAPD showed that the five tested isolates 70% simillar, isolates two and three from ElObeid very closed genetically (90%). The study showed that Isolate one from El Obeid is differed to some extent may be related to specific strain differed from the others.

F15

EFFICIENCY OF BOKASHI COMPOST IN CONTROLLING DAMPING OFF AGENT PYTHIUM APHANIDERMATUM IN NURSERIES. Neran Salem Aljarah, Qudamah Thaer Mohammed and Qusay Wadodd Rashid, Plant Protection Department, Faculty of Agriculture, Bagdad University, Iraq, Email: Neranaljarah@yahoo.com

This study was conducted to evaluate the efficiency of Bokashi compost damping off agent *Pythium aphanidermatum* the casual against of cucumber (*Curcumas sativaus*) seedling damping off in nursery. The pathogenicity test was done in water culture and in sterilized soil in pots. Two inoculation methods were used, by mycelium and spore suspension

(275 ×105 oospore /ml). The results showed that oospores inoculum was more effective in causing infection compared with mycelium inoculum. The time required for symptoms development on seedling was 21 and 42 h. of oospore and mycelium after addition in water culture, respectively. The percentage of infected seedlings were increased by increasing the amount of oospore inoculum/pot. The addition of 8% Bokashi /Kg of sterilized soil contaminated with 10 ml of oospores suspension/pot caused significant increase in healthy plants 15 and 30 days after inoculation, and reached 73.3 and 86.7%, respectively, compared with 40 and 33.3% in the control treatment (pathogen only). No symptoms were observed on seedlings cultivated in Bokashi: peatmoss mixture (1: 10) (w :w) then translocated to contaminated soil with oospore inoculum after 30 days, suggesting a high efficiency of the Mixture in protecting cucumber plants from infection with Pythium aphanidermatum in nurseries.

F16

FIRST RECORD OF WHITE MOLD DISEASE ON EGGPLANT IN NINEVAH ROVINCE. Ali Kareem Altaae and Lubna Laith Mal Allah, Plant Protection Department, Faculty of Agriculture and Forestry, University of Mosul, Iraq, Email: aaltaae@yahoo.com

The results of isolation and diagnosis of white mold disease showed that the causal agent is Sclerotinia sclerotiorum (Lib) de Bary. Two isolates of the pathogen were obtained the first was SSB isolated from greenhouses in Bashika area and the second was SSC from greenhouses of the College of Agriculture and Forestry. The first isolate was more aggressive than the second based on the pathogenicity test for the two isolates. This is the first record of this disease in the province of Ninevah Infection symptoms appeared as a white cottony mycelium growth, which expanded to include large parts of the infected area. In the infected areas, the leaves in touch with the infected branches, were also attacked by the mold and seen on the infected branch as mycelial growth on the plant surface. The pathogenicity tests, revealed that the infection method with mycelium produced the largest canker that reached 18.58 cm, with no significance from the infection method with sclerotia, and canker size reached 16.29 cm. The infection with mycelium comes in second rank, with no injury and the average canker size reached 11.75 cm, whereas smaller canker was obtained following infection by sclerotia without injury and reached 4.81 cm. Field evaluation for three eggplant cultivars (almahali, alkhadhraa and albaraa) to infection with S.sclerotiorum was carried out. The results showed that the three cultivars were equally susceptible. Cultivar Albaraa was the most susceptible, with plant hight reduction of 46.08%, and it differed significantly from the other two cultivars (Almahali and Alkgadhraa). On the other hand, the cultivar alkhadhraa was the least susceptible in terms of the reduction in plant hight (22.48%) and also in terms of reduction in dry and the fresh weight that reached72.92 and 53.65%, respectively. Moreover, there were no significant differences between the cultivars Albaraa and Alkhadhraa in terms of reduction in fresh weight.

F17

FIRST RECORD OF ROOT AND FOOT ROT DISEASE ON ROSELLE (*HIBISCUS SABDARIFFA* L.) IN AL-DIWANIYA, CENTRAL IRAQ. <u>A.R.T. Sarhan¹</u>, G.M. Gaber² and A.A. Saadon³. (1) Private University College of Humanities, Najaf, Iraq; (2) College of Sciences, Babylon University ,Babylon, Iraq; (3) College of Sciences, Al-Qadisiya University, Al-Diwnniya, Iraq, Email: artsarhan@yahoo.com.

Roselle (Hibiscus sabdariffa L.) is an important plant for food and medical uses in Iraq. A new disease causing decline of roselle plants was observed in several farms in Al-Diwaniya province, central Iraq. The etiology of root and foot rot disease on roselle was investigated to identify the causal agents of this decline. Out of 150 roselle plants examined, 68% exhibited root and foot infections. Plants were infected with two different phytopathogenic fungi: Rhizoctonia solani (Kuhn) and Fusarium solani (Mart.) Sacc., which caused the root and foot rot disease. Also, the fungus Alternaria alternata (Fr.) Keissl. was isolated from the infected tissues. The soil assay revealed the presence of these three fungi, in addition to other two fungi (Penicillium notatum and Trichoderma sp.). Also, it was found that roselle seeds harbored seven fungi including the above three fungi (R. solani, F. solani and A.alternata). The pathogenicity tests emphasized that R. solani and F. solani were the causal agents of root and foot rot of the roselle plants. R. solani showed the highest rate of root and foot rot (59.5 and 36.9%, respectively) and it was the most pathogenic fungus affecting both wounded and unwounded roselle plants, followed by F. solani. However, A. alternata did not has any role in plant infection but it affected the wounded roselle plants. According to the available information, this is the first record of the disease on roselle plants in Al-Diwaniya province, central Iraq.

F18

OPTIMIZATIONOFGROWTHANDSECONDARY METABOLITES PRODUCTION OFTHEFUNGUSRHIZOCTONIASOLANIISOLATED FROM POTATO.Tawfik M. MuhsinandMazin S.Selman, Department of Biology, College ofEducation for Pure Sciences, University of Basrah, Iraq,Email:tmuhsin2001@yahoo.com.

The aim of the study was to optimize the fungal growth and production of secondary metabolites of the fungus *Rhizoctonia solani* Kuhn isolated from potato tubers using different media, temperatures, pH, carbon and nitrogen sources. The bioactivity of fungal secondary metabolites was also tested against two strains of bacteria using disc diffusion technique. The results showed that the optimal growth of R. solani was in Trypto Soy (TS) broth medium at pH 6 and 30°C temperature. Different sources of carbon and nitrogen were added to the culture media. Starch and Sodium nitrate were the most suitable for the fungus growth and secondary metabolites production. Highest dry weight of fungal crude extract was obtained in TS broth medium at pH 6 and 30°C. The fungus exhibited higher antibacterial metabolic bioactivity (30 mm and 34 mm inhibition zones diam) against E. coli and S. aureus, respectively, by using TS broth medium amended with starch and (NH4)2SO3 at pH 6 and 25 °C. Effect of incubation time on the production and bioactivity of the fungal secondary metabolites revealed that the bioactivity increased on the third day of incubation. IT can be concluded that the fungus R. solani is a good natural source for production of antimicrobial agents under optimized conditions.

F19

PRELIMINARY SURVEY OF SOME CAUSAL ORGANISMS OF TOMATO STEM ROT AND PITH NECROSIS IN GREENHOUSES OF THE COASTAL REGION OF SYRIA. <u>A. Al Ghazzawi¹</u>, M. Abu Ghoura² and R. Albagdadi¹. (1) Plant Protection Administration, General Commission for Scientific Agricultural Research, Douma, Syria; (2) Department of Plant Protection, Faculty of Agriculture, University of Damascus, Damascus, Syria, Email: ghazawi11@gmail.com.

Surveys of greenhouses in the coastal region of Syria during the period 2010 and 2011 confirmed the occurrence of tomato stem pith necrosis disease. Percentage of greenhouses infected with the disease in Tartous governorates during the two years were 17.7% and 24.4%, respectively, with average spread of 0.19% and 0.28%, respectively. Plants infection rate index was and 0.97%, respectively. Percentage of 0.72% greenhouses infected with the disease in Lattakia governorate in 2010 and 2011 were 23.20% and 24.86%, respectively, with average spread of 0.32% and 0.35%, respectively. Plants infectionrate index was 0.65% and 0.85%, respectively. More than 100 bacterial isolates were collected during the survey and 62 isolates were identified as Pseudomonas corrugata and 13 isolates Pectobacterium carotovorum as subsp. based on biochemical tests. carotovorum The identification of 4 isolates of P. carotovorum was confirmed by PCR using specific primers.

F20

FIRST RECORD OF CERCOSPORA LEAF SPOT DISEASE ON OKRA PLANTS AND ITS CONTROL IN EGYPT. Eman Saleh Hassan Farrag, Plant Pathology Department, Faculty of Agriculture, South Valley University, Qena, Egypt. Email: emfarrag@gmail.com

During June to September 2011, okra plants (Hibiscus esculentus L) in Kafr El-Sheikh Governorate exhibited typical symptoms of Cercospora leaf spot (CLS) at different locations. Symptoms of infected okra leaves firstly started as light brown spots then turned to purple and varyied in size. The spots spread to cover large areas of infected leaves. In case of severe infection, spots joined together and formed patches. Later, leaves were dry and remained intact and attached to the stem. Samples of diseased leaves were collected to isolate the causal organisms. Isolated fungi were purified using single spore culture technique. Developed fungus was identified as Cercospora sp. Fresen based on cultural and morphological characteristics after light microscope examination. Alternaria alternate and Aspergillus niger were also isolated as associated fungi. Pathoginicity test confirmed efficiency of Cercospora sp. to induce typical symptoms on okra plants compared with other fungi. Foliar application using different concentrations of Topsin M-70WP and lemongrass oil significantly reduced disease incidence compared with control. According to the available literature, this is the first record of CLS on okra in Egypt under natural infection conditions in the field.

F21

QUANTITATIVE STUDIES ON DOWNY MILDEW (*PERONOSPORA DESTRUCTOR* BERK. CASP) AFFECTING ONION SEED PRODUCTION IN UPPER EUPHRATES AREA IN IRAQ. <u>Mothana</u> <u>E. Al- Maadhedi¹</u>, Maadh M.M. Sharif² and Zubair N. Selman³. (1) Office of Agricultural Research, Ministry of Agriculture, Baghdad, Iraq, (2) College of Agriculture, University of Anbar, Rhamadi, Anbar, Iraq; (3) Office of Horticulture, Ministry of Agriculture, Baghdad, Iraq, Email: mothna200398@yahoo.com;.

This study was conducted during the 2009 and 2010 seasons in upper euphrates area (Rawa city, Anbar Province) on the local Red Onion cultivar in order to determine plant densities and number and timing of fungicide sprays for the purpose of reducing downy mildew (DM) incidence and severity, to improve the quality of vegetative growth and flowering in order to achieve high yielding crops. The distances 10, 15, 20, 25, and 30 cm between plants were used , and four dates of spraying the fungicide Redomil MZ 72 WP were evaluated.Spraying one and two months after planting, in addition to spraying one month after flowering were compared to no spray (control). This study revealed that the plant spacing of 25 cm between plants was the best density that gave the highest flowering rate, number of racemes blossoms/plant, % of fertilized flowers, reduction inDM infection rate and highest production of seeds that reached 63.75%, 2.99 racemes/plant, 64.27%, 14.86%, and 408.48 kg/ha, respectively. Results also showed that treating the plants two times with the fungicide(one and two months after planting), using spacingof 25 cm between plants gave a significant increase on a number of tubular blade,% of flowering, number of raceme blossoms/ plant, % of fertilized flowers, reduction in DM infection rateand highest seed yield that reached 9.92 Blades/plant, 64.44%, 3.47, 80.41%, 4.38%, and 423.63 kg/ha, respectively.

F22

EFFECT OF MYCORRHIZAL FUNGI ON TOMATO WILT DISEASE CAUSED BY FUSARIUM OXYSPORUM F. SP. LYCOPERSICI UNDER GREENHOUSE CONDITIONS. Sabah Al-Maghribi¹, Mohamad Taweel² and <u>Bushra Rezk²</u>. (1) Faculty of Agriculture, Tishreen University, Lattakia, Syria; (2) Agricultural research Center, Tartus, Syria.

The effect of mycorrhizal fungi on tomato wilt disease caused by a Fusarium oxysporum f.sp. lycopersici following two inoculation dates with *Fusarium* fungi (early inoculation at the date of planting seedlings and late inoculation 15 days after planting) was studied. Mycorrhizal inoculum was added to the soil before planting. The results showed that the mycorrhizal fungi were Glomus spp., and the reductionin disease incidence was highest when mycorrhizal fungi and Fusarium were added together, and disease was 18% in early inoculation and 27.27% in late inoculation. The results showed significant increase in plant height, leaves number, fresh and dry matter of shoot and root in treated plants with mycorrhizal fungi and Fusarium compared with the infected control. In treatment with mycorrhizal fungi and Fusarium, the increase in plant height and number of leaves in the early inoculation were 30. 67% and 20.38%, respectively and in the late inoculation were 32.97% and 20.38%, respectively. In treatment with mycorrhizal fungi and Fusarium in early inoculation, the increase fresh and dry matter of shoots were 55.69% and 42.21%, respectively, and in the fresh and dry matter of root were 87.30% and 40.35%, respectively. Whereas in the treatment with mycorrhizal fungi and Fusarium with late inoculation, the increase in fresh and dry matter of shoots were 58.36% and 45.08%, respectively, and in the fresh and dry matter of roots were 98.75% and 42.11%, respectively.

F23

SURVEY OF BEAN FOOT AND ROOT ROT DISEASE AND IDENTIFICATION OF THE ASSOCIATED PATHOGENIC FUNGI AND THEIR PATHOGENICITY. <u>Ahed A.H. Matloob¹</u> and Kamil S. Juber². (1) Department of Biological Control tech., Al-Musaib Tech., Iraq; (2) Department of Plant Protection, College of Agriculture, University of Baghdad, Iraq, Email: Collegeahad_20071980@yahoo.com

The aim of this study was to survey foot and root rot disease of Bean (*Phaseolus vulgaris* L.), identifythe fungi associated with infected plants and test their pathogenicity. Results of the field survey in

Babylon city, Iraq (80km south of Baghdad) showed the presence of foot and root rot disease in all the surveyed districts with disease incidence of 40-100% and severity of 18-75%. Results showed the presence of 19 species of fungi associated with infected plants with variable incidence. Fusarium solani was presented in most samples with a rate of 14-65% followed by Rhizoctonia solani and Macrophomina phasealina with 28.1 and 22.6%, respectively, whereas other fungi such as Alternaria alternata, Ulocladium atrum, Botrytis sp., Acremonium sp., Stemphylium sp., Cylindrocarbon sp., Chaetomium globosum, Fusarium oxysporum, F. semitectum, F. sulphureum, Aspergillus niger, Drechslera australiensis. Phoma glomerata, Cladosporium tenuissimum, Trichoderma harzianum and *Torula* sp. were found at a low rate. The Preliminary test of pathogencity for isolates showed that all isolates caused significant reduction in cabbage seed germination rate, most isolates of R. solani, F. solani, F. sulphureum, M. phasealina were pathogenic and prevented seeds germination completely (93.33%) compared to the control. The isolated fungi reduced bean seed germination which was 0.0-70.0% compared to control treatment of 87.5%. These isolates caused negative effects on growth parameters of bean plants by increasing disease incidence to 100% and severity to 45-100%.

F24

EVALUATION OF INTERACTION BETWEEN BIOCONTROL **FUNGUS TRICHODERMA** HARZIANUM AND MYCORHIZAL FUNGUS **GLOMUS MOSSEAE IN INDUCING SYSTEMIC** RESISTANCE AGAINST FUSARIUM WILT DISEASE ON SOME PEPPER CULTIVARS. Abdullah Abdulkareem Hassan and Maryam Hamid Nasir, Plant Protection Department, Faculty of Agriculture, Tekrit Univerity, Iraq; Email: Abdullah has67@yahoo.com

The systemic resistance markers (SRMs) induced by biocontrol agent Trichoderma harzianum (T.h) and mycorrhizal fungus Glomus mosseae (G.m) and the interaction between them were studied in pepper plants infected with Fusarium oxysporum f.sp. capsici, the causal agent of Fusarium wilt disease. These markers were total phenols and pathogen related proteins (PRPs) including peroxidase, β -1,3glucanase, chitinase, polyphenol oxidase (PPO) and phenyl alanine ammonia lyase(PAAL). Although there are significant superior on all systemic resistance markers induced by T.h, G.m and the interaction between them (T.h+G.m) in all studied pepper cultivars, the maximum total phenols content was 14.203 mg/g plant tissue recorded in the infected Ic stevert cultivar treated with (T.h+G.m) compared with 6.953 mg/g plant tissue in the same infected cultivar without treatment. In PRPs markers, G.m gave maximum PAAL specific activity resulting in 0.383 unit/mg protein in Ic stevert cultivar compared with 0.2 unit/mg protein in the same cultivar without

treatment. Maximum specific activities of PPO, chitinase, β -1,3glucanase and peroxidase were 3.6, 3.526, 2.020 and 9.963 unit/mg protein recorded for the interaction (T.m+G.m) treatment in the infected Ic stevart, mandaran F1. Ic stevart and local cultivars. compared with 1.233, 1.79, 0.17 and 5.9 unit/mg protein in the same infected cultivars without any treatment, respectively. Maximum reduction in dead cells (%) of the infected local, Ic stevart and mandaran F1 cultivars was 17, 14 and 12% obtained with the T.h+G.m treatment compared with 55.5, 54.5 and 48.5% in the same infected cultivar without any treatment, respectively. The interaction T.h+G.m also reduced infection severity in the infected Ic stevart, mandaran F1, and local cultivars to 0.184, 0.203 and 0.254 compared with 0.76, 0.784 and 0.83 in the same infected cultivars without any treatment, respectively. The increases in systemic induced resistance markers by both fungi T.h., G.m and the interaction T.h+G.m were significantly increased cultivars productivity, with maximum yield 372, 411 and 373 g dry fruits/plant in the infected Ic stevart, mandaran F1, and local cultivars treated with T.h+G.m, as compared with 97.0, 175.0 and 74.3 g dry fruits/plant in the same infected cultivars without treatment, respectively. It can be concluded that there was synergic effect between T.h and G.m on systemic resistance induction in pepper cultivars which led to a significant disease inhibition with an increase in plant productivity. The SRMs can also be considered as suitable, simple and accurate parameters for the detection of plant diseases and plant resistance.

F25

THE FIRST RECORD OF THE UNCINULA NECATOR FUNGUS IN VINEYARDS IN AL-JABEL AL AKTHER REGION, LYBIA. <u>N.</u> <u>Mohamed</u> and R.S. Yousif, Plant protection Department, Faculty of Agriculture, Omar Al Mukhtar University, Elbeida, Libya.

The present work identifyed Uncinula necator as a new record through field surveysof twelve locations with varied altitudes in grape trees at Al-jabel Al-Akther region during 2010. The results pointed to Uncinula necator as the causal agent of powdery mildew disease. The microscopic analysis indicated that the conidiphore length of 48.16µm and average conidiospores were colorless, light, oval or barrel form, 31.95±3.84 µm long and 15.65±1.77 µm wide. the hyphae were spetate, colorless $5.34 \pm 0.7 \ \mu m$ thick. The highest incidence was recorded in Al-Bayda and Monsoura farms and reached 93 and 88%, respectively. According to pathogenicity tests, isolates varied widely in virulence, and the most virulent isolates were from Al-Belangi district, where incidence and severity reached 80 and 40%, respectively. The result obtained proved that there was a positive correlation between fungus infection and chlorophyll and sugar quantity. Infection caused an increase in total phenols as well as resveratrol.

F26

ROLE OF FUNGI IN ROTTING VEGETABLES AND FRUITS IN THE OUTLET MARKETS IN SAKAKA AFTER HARVEST AND THE POSSIBILITY OF SPOILAGE CONTROL. Shaima M. N. Moustafa and Hani M. A. Abdelzaher, Department of Biology, College of science, Aljouf University. Sakaka. Saudi Arabia. Email: halawa4 12@yahoo.com

Mishandling fruits and vegetables during harvest, absence of suitable cooling and storage facilities and poor quality sales outlets and markets are the main reasons behind increased postharvest losses that can reach 20%. This significant waste is mainly due to several factors, starting from pre-harvest to postharvest which leads to rotting caused mainly by by fungi. This study was designed to identify fungi present and responsible for the spoilage of vegetables and fruits in storage and market outlets. The study also aimed to evaluate the effect of three types of volatile oils of eucalyptus, peppermint, and a commercial mixture of menthol, camphor and methyl salicylate (Abu Fas). Three fungi, Rhizopus stolonifer, Penicillium italicum and Alternaria alternata were isolated and purified from rotten cucumber, lemon and tomato, respectively. The isolated fungi were identified using morphological and molecular criteria. The commercial oil (Abu Fas) showed 100% inhibition of the growth of Rhizopus stolonifer and Alternaria alternate and 50% inhibition of the growth of *Penicillium italicum*, compared to the control samples. It can be recommended that using any composite commercial product that contains a mixture of menthol oil, eucalyptus oil and methyl salicylate can to pervade, alleviate and possibly eliminate the fungi that may cause rotting of vegetables and fruits during storage.

F27

THE SECONDARY GRAPEVINE BLACK FOOT DISEASE IN NINEVEH NURSERIES IN IRAQ. <u>Khalid H. Taha</u> and Zahraa K.I. Saeed, Plant Protection Department, Collage of Agriculture and Forest Mosul University, Iraq, Email: khldhassan@yahoo.com

This study aimed to study the most important black foot disease in Nineveh grapevine nurseries. The following fungi were isolated from diseased young grape plants: *Botryosphaeria parva* Pennycook & Samuels, *Phaeoacremonium aleophilum* W.Gams & Crous, MJ. Wingf.et L.Mugnai, *Phaeomoniella chlamydospora* Crous & W.Gams, *Pestalotiopsis menezesiana* (Bres & Torrend) Bissett, as the secondary causal disease agents. *Pm. aleaophilum* was the most frequently isolated fungus from roots of diseased grape young plants (5.80%) and stems (8.13%). The fungus *P. menezesiana* was recorded for the first time in Iraq. The pathogenicity tests proved that all fungi were pathogenic to grapevine cutting (cvs. Shada soda, local seedless and hallawanii) causing black foot in nurseries, whereas the highest disease severity was caused by *P. menezesiana* in the three cultivars.

F28

THE GENETIC STRUCTURE OF FUSARIUM WILT DISEASE OF CITRUS IN TUNISIA. Ibtissem Hannachi¹, Salah Rezgui², Ruvalpali Durga Prassad³ Mohamed Cherif¹. (1)Laboratory and of Phytopathology, National Institute of Agronomy of Tunisia, 43 Av Charles Nicolle, 1082 Tunis, Tunisia; (2) Department of Agronomy and Biotechnology, National Institute of Agronomy of Tunisia, 43 Av Charles Nicolle, 1082 Tunis, Tunisia; (3) Laboratory of Plant Pathology, Directorate of Oilseed Research. Rajendranagar, Hyderabad 500 030, India.

Fusarium wilt disease of Citrus is becoming recently an important disease of citrus in Tunisia. It causes decline of quantity and quality of citrus production. In addition, Fusarium oxysporum isolates were collected from citrus fields located in different regions of Tunisia during the 2011 and 2012 seasons. A molecular approach was used in order to identify the mating types. The genetic variability and population structure of thirty isolates were investigated by SSR markers. A set of 4 SSR primers which generated seven polymorphic loci were used. The analysis of population structure revealed that genetic diversity within populations represented 86% of the total genetic diversity. Analysis of molecular variance AMOVA confirmed these results. The cluster analysis with UPGMA using genetic distances failed to identify any special clustering among the different geographic regions. Such results suggest that Fusarium oxysporum in Tunisia is composed of a single population.

F29

EVALUATION OF THE EFFICIENCY OF *TRICHODERMA HARZIANUM* RIFAI, *T. VIRIDE* **PERS AND THE FUNGICIDE BAVISTIN® FL IN CONTROLLING GREY MOULD CAUSED BY BOTRYTIS CINEREA PERS ON STRAWBERRY IN GREENHOUSES.** Ahmad Abu Alsel¹, Rim Alkubrusli², Abdulnaby Basheer¹ and Hazar Wadi¹. (1) Biological Control Study and Research Center BCSRC, Faculty of Agriculture, Damascus University, Syria; (2) Department of Plant Protection, Faculty of Agriculture, Damascus University, Syria.

This research aimed to evaluate the efficacy of the antagonistic fungi *Trichoderma harzianum* Rifai, *T. viride* Pers and the fungicide BAVISTIN® FL in inhibiting the growth of *Botrytis cinerea* Pers, the causal agent of grey mould disease on strawberry in under greenhouse conditions. The fungi were isolated from different areas from Syria, (Damascus - Damascus Countryside – Kenitra - Dara) and were brought to the laboratory and grown on potato dextrose agar medium (PDA). Inoculums of the pathogenic fungus and suspensions of antagonistic fungi in concentration of 10^6 -10^7 conidia/ml sterile water were prepared from 2 weeks old fungal colony. The plants were treated with a suspension of antagonistic, pathogenic fungus and fungicide by aerosol sprayer after one month. The results showed that BAVISTIN® FL fungicide had the highest efficiency (92.98%) in inhibiting the pathogenic fungus, followed by antagonistic fungi *T. harzianum* and *T. viride* when they applied together (68.00%), whereas *T. harzianum* fungus had a lower efficiency (58.45%), followed by *T. viride* (47.57%).

F30

FUNGI ASSOCIATED WITH CROWN ROT OF ORGANIC BANANAS IN DOMINICAN REPUBLIC. Mohamed Kamel¹, Paolo Cortesi² and Marco Saracchi². (1) Plant Pathology Research Institute, Agricultural Research Center, 9 Gamaa St., 12619 Giza, Egypt. Current address Università degli Studi di Milano, Department of Food, Environmental and Nutritional Sciences, Via Celoria 2, 20133 Milano, Italy; (2) Università degli Studi di Milano, Department of Food, Environmental and Nutritional Sciences, Via Celoria 2, 20133 Milano, Italy, Email: Mkhidom85@yahoo.com

Crown rot is a devious disease with a great impact on organic banana production. Infections occur at harvest time and develop as a postharvest disease. A broad community of fungal pathogens is involved in the development of crown rot and the components of the community can vary from one area to another. In order to determine the fungi associated with crown-rot in Dominican Republic, as the first study in this area, five organic farms and their corresponding packing stations were sampled in the Mao area. More than 300 hands were collected over a period of one year. A total of 2274 fungal colonies were obtained from the crown and 460 representative colonies were purified, characterized and identified using morphological and molecular methods. Fungi were found in all the analyzed samples from field to packing houses and the community was composed by 2 most frequent genera and 9 less frequent genera. Fusarium, the most frequent genus 59%, was represented by 7 identified species and five were the most frequent: F. moniliforme, F. clamidyosporum, F. solani, F. equiseti, and F. oxysporum. Other identified strains belong to Colletotrichum musae, Lasiodiplodia theobromae, Nigrospora spp., Pestalotiopsis spp., Curvularia spp., Alternaria spp., Cladosporium spp., Acremonium spp., Phoma spp. and Penicillium spp. Other species were saprophyte and their role in the crown rot development could be ancillary.

F31

DISTRIBUTIONOFGRAPEVINETRUNKDISEASESOFTABLEGRAPESINNORTHLEBANON.WassimHabib¹CarineSaab¹ElvisGerges¹FarahBaroudy¹andEliaChoueiri²(1)LaboratoryofMycologyDepartmentofPlant

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Table grapes are among the most important tree crops in Lebanon especially in Akkar region. Recently, reports on severe vine decline and loss of productivity have been reported. Many farmers have uprooted their vines and shifted towards the production of greenhouse protected crops. Grapevine trunk diseases, caused by a series of fungal pathogens, can produce a range of symptoms on the vine in different ages. In order to assess the potential causes of vine decline, a survey was carried out in Akkar region from May till August 2013 covering 27 orchards. Samples of wood were collected from 114 vines showing symptoms of decline, dieback or esca. Isolations were done on PDA amended with Streptomycin sulphate 0.5 g.1⁻¹ and internal symptoms were recorded for each sample. The most frequent internal symptoms were sectorial necrosis (38.6%) recovered in 77% of the visited sites, brown/black striations (27.8%) and white rot (18.7%). The incidence of Botryosphaeriaceae fungi was the highest (33.3% samples), associated mainly to sectorial necrosis (81.6%), followed by Fomitiporia sp. (17.5%) recovered from 92.7% of grapevines with white rot symptoms, and Phaeomoniella chlamydospora (15.8%) associated with internal striations (74.5%). These pathogens were recovered in more than 45% of the visited sites. Also, Phomopsis viticola and Phaeoacremonium sp. were recorded in 1% of the samples. Morphological and molecular characterization of the remaining isolates are ongoing to complete the identification of all isolates. This high incidence of grapevine trunk diseases could be associated with the age of the vines and the poor agricultural practices in Akkar region.

F32

FUNGAL PATHOGENS ASSOCIATED WITH CITRUS TREE WOOD LESIONS IN ALGERIA. <u>F.</u> <u>Ammad,A.Azame</u> and K. Hadj Koula, Departement of Biotechnology,University Blida1, BP 270 Blida 09000, Algéria, Email: sahraoui_a_f@yahoo.fr

A citrus field survey was conducted in Algeria to assess the state of dieback and to determine the fungal pathogens associated with citrus tree decline in Mitidja. Field surveys conducted during spring seasons in 2014 revealed that the average disease incidence was 7% based on herbaceous symptoms. Some cross sections of wood trunk collected from two localities showed many kinds of necrosis, central and sectoral (brown color), sectoral necrosis (grey color) and central light brown. Wood samples used for isolation and placed on potatodextrose (PDA) medium showed the presence of wood fungi *Botryosphaeria* species. Two species: Botryosphaeria dothidea and Diplodia seriata were isolated and identified from infected wood using a combination of morphological, cultural characters and from sexual form (fruiting body). This is the first report of a canker disease of citrus tree associated with *Botryos phaeriaceae* in Algeria.

F33

ALTERNARIA BROWN SPOT OF CITRUS AS A LIMITING FACTOR FOR TANGERINE AND THEIR HYBRIDS: A FOCUS ON THE ITALIAN EXPERIENCE. Patrizia Bella¹, Vittoria Catara¹, Antonino Catara², Marcella Russo², Cinzia Oliveri¹ and <u>Rosa La Rosa¹</u>. (1) Department of Agricultural and Food Science (DISPA), University of Catania, Via S. Sofia 100, 95123 Catania, Italy; (2) Science and Technology Park of Sicily, Z.I. Blocco Palma I Stradale V. Lancia, 95121 Catania, Italy, Email: larosar@unict.it

Alternaria brown spot of citrus (ABS), caused by the "tangerine pathotype" of Alternaria alternata (Fr.) Keissl., induces considerable damage mainly on hybrids of Dancy tangerine. The fungus causes brown to black spots on leaves, fruit and young twigs resulting in severe defoliation, twig dieback and yield losses and reduced fruit quality. From the first report in Queensland, Australia, in 1903 on Emperor Mandarin, the disease spread worldwide. Currently, it is present in citrus-growing regions (Florida, Brazil, humid Argentina, Colombia, Cuba, Peru, and China) but also in semi-arid areas. In the last 25 years, ABS was also reported in many Mediterranean regions such as Israel, Spain, Italy, Greece, Turkey and Egypt. In Italy, the disease has been reported since year 2000 on susceptible Fortune mandarin on which yield losses up to 100% were observed. As in other countries, Alternaria brown spot has become a limiting factor for tangerine and their hybrids in Italy, where the disease was also observed on Nova, Winola mandarin and, under particular conditions, becomes to be reported on different varieties of sweet orange. In the last 14 years studies were undertaken to characterize local isolates and to plan an integrated disease management to reduce the disease pressure. Alternaria isolates were identified by conidial morphological characters and by molecular methods as endoPG gene sequences; fAFLP analysis allowed to detect fungus mixed populations in the same citrus orchard. The efficacy of different fungicides against Alternaria alternata was evaluated by in vitro and in vivo tests showing that products other than copper could be more effective in controlling the disease. Epidemiological studies carried out in a grove of Fortune mandarin showed that the infection occurs mainly in spring and in autumn and is related to rainfall, temperature and to the inoculum density. To control the disease, an integrated approach has been evaluated. Cultural practices as spacing, pruning and intercropping, associated to spray programs, helped in reducing the disease severity.

F34

CONTROL OF SOME APPLE POSTHARVEST DISEASES. N. Béji-Hibar¹, K. Hibar² and M. DaamiRemadi³. (1) Higher Agronomic Institute of Chott-Mariem, 4042 Chott, Mariem, Tunisia; (2) Regional Center of Agronomic Research in Sidi Bouzid, 9100 Sidi Bouzid, Tunisia; (3)Regional Center of Research on Horticulture and Organic Agriculture, 4042 Chott, Mariem, Tunisia, Email: Khaled_htn@yahoo.fr

In Tunisia and precisely in the region of Kasserine (West Central), apple culture is one of the most important speculations where planted area is estimated at 5200 ha. At harvest, 80% of production is stored; however, during storage, enormous losses exceeding 30% are recorded in the cold rooms. These losses are mainly due to pathogens, which following isolation from rotten apples showed the presence of Penicillium expansum, Alternaria alternata and Botrytis cinerea. Chemical control of these pathogens was successfully achieved with thiabendazol, azoxystrobin, and fludioxonil based treatments where pathogen's development was significantly reduced. Indeed, the use of fludioxonil on apple fruits has entailed a rot diameter less than 1 cm, compared to the control where this value exceeded 3 cm. Biological control against the three pathogens using Trichoderma harzianum and T. viride revealed that in addition to their in vitro inhibitory effect, these biocontrol agents have significantly reduced rot severity estimated on the basis of three disease parameters. This reduction was more important (rot diameter < 1 cm) when inoculated and treated fruits were incubated at 6°C. Bio-fungicides based on Pseudomonas putida, the grapefruit seed extract, neem oil, garlic extract, Bacillus subtilis, T. viride or mineral salts "Sp Végétaux" suspensions or solutions against P. expansum, A. alternata and B.cinerea had significantly reduced the development of these pathogens both in vitro and in vivo. In the latter case (in vivo), after incubation of inoculated and treated fruits for 30 days at 6°C, the effectiveness of these products was always greater than 59% and exceeded 72% with "Sp végétaux".

F35

SURVEY OF SOIL BORNE **FUNGAL** PATHOGENS OF CITRUS AND OLIVE IN LEBANESE NURSERIES. Dania Tabet¹, Wassim Habib² and <u>Thaer Yaseen¹</u>. (1) Integrated Pest Management of Mediterranean fruit and vegetable crops de Hautes Etudes from Centre International Agronomiques Méditerranéennes (CIHEAM)/Mediterranean Agronomic Institute, Via Ceglie 9, 70010 Valenzano (BA), Italy; (2) Department of Plant Protection Laboratory of Mycology, Lebanese Agricultural Research Institute Fanar, Jdeidet El Metn, Lebanon, Email: y.thaer@iamb.it

Soil and root samples were collected from 21 nurseries and 3 mother plots of citrus and olive Lebanese nurseries. Thirty four soil samples were assayed by plating on a selective medium to quantify the pathogens inoculum density. Real time PCR was used to

detect *V. dahliae*. The percentage of infected plantlets was assessed by isolation on semi-selective media. Results revealed that Lebanese nurseries are free from *V. dahliae* whereas the frequency of *Phytophthora* was 72.7% and *Fusarium* 63.6%. *Phytophthora nicotianae*, *F. oxysporum* and *F. solani* are the predominant species in citrus nurseries, whereas *P. palmivora* and *F. oxysporum* were the most common in olive nurseries. These results are preliminary observations of soil borne fungal pathogens in Lebanese citrus and olive nurseries.

F36

INCIDENCE. EARLY DETECTION AND POSSIBLE BIOLOGICAL CONTROL OF PEACOCK OLIVE LEAF SPOT. M. Salman¹, H. Hajjeh² and R. Abuamsha³. (1) Palestine Technical University-Kadoorie, Palestine; (2) National Agriculture Palestine, Research Center. Email: salman mazen@daad-alumni.de

Olive leaf spot (OLS) or peacock disease is one of the most destructive diseases on olive trees in many parts of the world. The disease is caused by the fungus Spilocaea oleagina and can reduce the growth and yield of olive trees (Olea eurapaea). Investigations were carried out to measure the incidence (% infected leaves) and severity (number of lesions/leaf) of OLS in olive growing regions in Palestine. OLS was found in all study areas with significantly higher incidences in Jenin and Nablus (67.16 and 46.06%, respectively). OLS was more severe in Northern regions of Palestine (severity level 3.0-3.7). To determine the latent incidence and severity of OLS, olive leaves were collected routinely every two weeks from five growing regions in Palestine. In each grove, 100 new and another 100 old leaves from 5 trees were collected. Results showed that the highest latent severity and incidence occurred in March during the winter season. The rate of visible incidence and severity (70% and 4) in old leaves was higher than that in the new leaves (40% and 3). Main infection period occurred during winter. Observations also indicated that young leaves were highly susceptible to infection in spring. Current control mechanisms of OLS depend mainly on application of copper-containing fungicides prior to winter rains. However, fungicides are not effective in most cases. Biological control may be an alternative to chemicals in the control of the disease, in addition to reducing environmental pollution. Around 176 bacterial isolates were screened for their efficacy against the disease. Six bacterial strains proved to have an inhibitory effect on conidial germination under in vitro conditions (63-96% inhibition of germination). The percent of germination of OLS conidia in the presence of the bacterial isolates was significantly lower than that of the control. Interestingly, no disease development on olive leaves grown in growth chamber was recorded after bacterial application. This study provided information about the epidemiology of OLS

that might be of importance in planning strategies for better control management.

F37

THE ROLE OF SHELTERBELTS IN PLANT PROTECTION. <u>Eiman El Rasheed Diab</u>¹ and Talaat Dafalla Abdel Magid². (1) National Center for Research, Sudan; (2) College of Natural Resources, University of Bahri, Sudan.

This review summarizes the conclusions of the more pertinent literature on shelterbelts in relation to conditions in Sudan. The paper reviews the findings of some long-term studies related to shelterbelts establishment and management in the dry land of Sudan. The review recapitulates earlier and latest information shelterbelts under on characteristics Sudanese conditions. It is acknowledged that there are considerable gains to be made in increasing yield in environments characterized by drought stress. Several success stories related to shelterbelts benefits are outlined. The Sudanese experience is characterized by the involvement of the local institutions and has succeeded in rehabilitating an ecosystem, which was moving ahead toward degradation. The various cases presented in the paper provide sufficient evidence to support the claim that the economic benefits of investing in Sudan dry lands can be economically rational. The paper comes out with some recommendations which may perhaps contribute in the efforts directed towards reducing land degradation and desertification processes in Sudan. Afforestation, predominantly in the form of irrigated and rain-fed forest plantations, is a priority in the dry zones of Sudan, where heavy demand for forest products is draining the natural forests.

F38

DIVERSITY IN PLANT PATHOGENS ASSOCIATED WITH CROPS OF ECONOMIC IMPORTANCE IN OMAN. <u>Abdullah Mohammed Al-</u><u>Sadi</u>, Department of Crop Sciences, College of Agricultural and Marine Sciences, Sultan Qaboos, University, P.O. Box 34, Al Khoud 123, Oman, Email: alsadi@squ.edu.om

Oman is located in the South-Eastern part of the Arabian Peninsula. It shows diversity in terms of climatic conditions and cultivated crops from one region to the other. Several plant pathogenic fungi, viruses and prokaryotes are common in different parts of the country and result in various types and levels of diseases. Witches' broom disease of lime (WBDL), which is caused by Candidatus Phytoplasma aurantifolia, is the most serious disease of acid lime (Citrus aurantifolia) in Oman. The disease killed over one million lime trees in Oman, UAE and Iran and is currently threatening lime production in other parts of the world. In addition, soil borne plant pathogenic fungi cause considerable losses in several vegetable and fruit crops. Pythium spp., Fusarium spp., Botryosphaeria spp. and Ceratocystis spp are among the most common fungal pathogens in the country. The present work summarizes research, which has been carried out to tackle the major disease problems in Oman. The focus will be on characterization of the disease problems, full genome sequencing and genetic analysis of the causal agents, characterizing mechanisms of diseases, studying pathogen-vector relationships, and disease management using biological control cultural practices and disease resistance.

F39

MANAGEMENT STRATEGIES TO REDUCE HARVEST LOSSES IN PAKISTANI POST MANGOES. <u>A. Rehman¹</u>, W. Alam¹, A.U. Malik³, K. Sumaira¹, M. Saira² and K. Riaz¹. (1) Department of Plant pathology, University of Agriculture Faisalababad, 38040, Pakistan; (2) Plant Pathological research Institute, AARI, Faisalabad, Pakistan; (3) Postharvest research and training center, university of Agriculture Faisalabad. Pakistan. Email: arb041@hotmail.com

Stem end rot of mango is considered to be a most threatening post-harvest disease worldwide. Fully mature mango fruits variety Chaunsa (Samar Bahisht) were collected from selected orchards having export potential in Punjab province in Pakistan and brought to the laboratory. Samples were then stored in cold storage (temperature 10-12 °C) and ambient (25 °C temperature). Pathogens appearing during ripening were isolated and identified (Colletotrichum gloeosporioides, Lasiodiplodia theobromae, Phomopsis mangiferae. Alternaira alternata, Aspergillus niger, Rhizopus spp. and mixed type infection). Consequently, mature green mango fruits were inoculated with these fungal pathogens and placed at room temperature (25 ±2 °C) for 21 days, and in cold storage (10-12 °C) for 35 days, separately. Results revealed that in case of inoculation with L. theobromae maximum mean disease severity (39.23%) was recorded at ambient temperature. During cold storage, maximum mean disease severity (35.55%) was recorded when mangoes were inoculated with P. mangiferae. In vitro efficacy of various fungicides viz., Cabriotop®, Nativo®, Scholar®, Tecto®, Amistar® and Sportak® were also evaluated at 50, 100, 150, 200 and 250 ug/ml concentrations against these fungal pathogens by Poison Food Technique. Results indicated that Cabriotop and Nativo were statistically significant against all the tested pathogens. In vitro efficacy of various ethanolic and methanolic plant extracts of Cichorium intybus, Peganum harmala, Syzgium aromaticum, Moringa oleifera, Coriandrum sativum and Cinnamomum aromatic were tested against pathogenic fungi at 5, 15, 25 and 50 ug/mL concentrations and S. aromaticum, P. harmala and M. oleifera were statistically significant against all the tested pathogens.

F40

HISTOPATHOLOGICAL CHANGES IN MANGO (MANGIFERAE **INDICA**) **SEEDLINGS INOCULATED** WITH **CERATOCYSTIS** MANGINECANS. THE CAUSAL AGENT OF MANGO SUDDEN DECLINE. Abdul Rehman¹, Iqrar Ahmad Khan², Ghazal Naveed¹, Ahmad Sattar Khan², Ishtiaq Ahmad³, Ali Raza⁴, Asif Ali Khan⁵. (1) Department of Plant Pathology, University of Agriculture Faisalabad 38040- Pakistan; (2) Institute of Horticultural Sciences, University of Agriculture Faisalabad 38040, Pakistan; (3) Department of Horticulture Bahau Din Zakriya University Multan, Pakistan; (4) College of Agriculture, Sub Campus Burewala, University of Agriculture Faisalabad, Pakistan; (5) Center of Agriculture Biology and Biotechnology, University of Agriculture Faisalabad, Email: arb041@hotmail.com

Mango production is hindered by the attack witha number of diseases such as malformation, anthracnose, leaf spots and die back. The recently emerged mango sudden decline caused by Ceratocystis manginecans which appeared as gum exudation, white and black streaks in vascular bundles under the bark, and ultimately sudden death within few weeks is considered as the most serious threat to mango industry of Pakistan. Present studies were designed to identify resistance sources. To achieve this, inoculation was done with C. manginecans on one year old fifty mango seedlings having good morphological characters collected from district Khanewal, Punjab province. Data was recorded after 10, 25, 40 and 55 days of post inoculation. Lesion length of each 50 mango seedlings with three replications was measured in both upward and downward direction in centimeters. Movement of C. manginecans in the vascular tissues by fungal mycelium was examined in the cross sections of artificially inoculated seedlings. Movement of fungus was higher in upward direction as compare to downward. Maximum lesion length in both upward and downward directions was found in seedlings of KHW-515 followed by KHW-506 and KHW-490, whereas least lesion length was recorded in seedlings of KHW-48. Re-isolation from artificially inoculated seedlings confirm that C. manginecans is responsible for wilting and death of infected mango seedlings. Histopathological studies indicated that the fungus colonization and tylosis formation results in the blockage of vascular system and tissue discolourations, which is the mechanism responsible for wilt and death of infected mango seedlings was also observed.

F41

THE IMPACT OF THE BAYOUD DISEASE IN THE DETERIORATION OF GENETIC RESOURCES BIODIVERSITY OF DATE PALM IN ALGERIA. S. Boudeffeur¹, H. Khelafi², M. Reffis³ and M. Kharsi¹. (1) National Institute of agricultural research of Algeria; (2) Laboratory of Plant Physiology and Plant Breeding, Algeria; (3) Management of Agricultural Services, Algeria, Email: s.touat@voila.fr

The date palm is a tree of ecological, economic and social interest for many countries of the arid and semi-arid regions. However, the date palm is subject to several biotic and abiotic constraints, among them are desertification, drought, global warming, aging palms, soil salinity, the decrease of water resources, and the extension of the urban fabric, and the appearance of pests and diseases such as bayoud disease. This plague is caused by *Fusarium oxysporum* f.sp. *albedinis*, which caused the decline of 3 million palm trees in Algeria, and unfortunately it continues to ravage our palm groves. All our efforts to select resistant cultivars and breeding ex-situ did not allow us to protect our palm groves and finally our efforts were doomed to failure. Indeed, it is an ecological disaster whose socioeconomic consequences could adversely affect our country. This devastating disease remains undoubtedly the main cause of degradation of the date palm genetic resources in oasis of the south west and center of the Algeria, in particular at Adrar department where has been a serious degree of attack, in some cases it reached 50%. Some cultivars underwent severe attacks, whereas others with high organoleptic quality are in total extinction. In this context, we conducted a series of surveys on the palm groves of Adrar region, where the degree of morbidity during 02 decades was determined. Similarly, we have established a recent epidemiological map of the distribution of the bayoud disease. Our investigations also revealed a real regression of date palm genetic resources which is contributing to the imbalance of biodiversity in our palm groves. This important heritage of date palm biodiversity is threatened, mainly due to the spread of the bayoud disease whose expansion has become a source of real worries for the socio-economic interests of farmers and the rural communities.

F42

THE SCOURGE OF BAYOUD DISEASE FUSARIUM OXYSPORUM F.SP. ALBEDINIS AND PERSPECTIVES OF GENETIC CONTROL. <u>Saïd</u> <u>Boudeffeur¹</u>, Hafida Khelafi², Mansour Reffis³ and Mohamed Kharsi¹. (1) National Institute of agricultural research of Algeria; (2) Laboratory of Plant Physiology and Plant Breeding, Algeria; (3) Management of agricultural Services, Algeria, Email: s.touat@voila.fr.

The date palm (*Phoenix dactylifera* L.) is a xerophilous tree that constitutes the fundamental element of the oasis ecosystem. It plays a vital role in economic terms, through the production of dates, and its by-products. It's regarded as the main crop in the Saharan regions. It has generally a very diverse gene pool. However, the development of this tree depends mainly on the lifting of several constraints, mainly drought, salinity and desertification, genetic erosion, and aging palms. Some fungal diseases can cause damage to the palm, such as the Bayoud devastating

disease, caused by a soil fungus: Fusarium oxysporum f.sp.albedinis, which is the most formidable scourge of the date palm. Researchers have showed that Bayoud disease killed more than 2/3 of the palm tree through a century in Morocco and about 3 millions in Algeria. This disease is still progressing on the ground in Algeria and threatens southeastern palm groves of Algeria, where Deglet Nour variety is popular, which produces nearly 75% of Algerian production. Chemical control has not always been successful. Several control methods against this disease have been proposed, but the use of resistant varieties remains the most promising alternative. In this context, 21 cultivars belonging to several southwestern palm groves of Algeria were selected to undergo tests by artificial inoculations in our experimental station. These cultivars were selected after several comprehensive surveys with farmers. Screening for a decade has revealed 2 resistant varieties; 4 tolerant and 15 sensitive.

F43

IN VITRO EVALUATION OF RESISTANT DATE PALM (*PHOENIX DACTYLIFERA* L.) CULIVARS AGAINST *FUSARIUM OXYSPORUM* F. SP. *ALBEDINIS*, THE CAUSAL AGENT OF BAYOUD. Hafida Khelafi¹, Saïd Boudeffeur² and S. Yakhou¹. (1) National Institute of Agronomic Researches of Algeria. Laboratory of Plant Physiology and Plant Breeding, Algeria; (2) National Institute of agricultural research of Algeria, Experimental station of Adrar, Algria,. Email: hkhelafi@hotmail.com

The bayoud, Fusarium-wilt of date palm (Fusarium oxysporum f sp. albedinis) remains the most serious disease for palm groves in North Africa. The use of resistant clones or cultivars is the most recommended way to fight against this scourge and repopulate the palm groves already devastated. In Algeria, the existence of a rich genetic diversity of date palm allows to maintain the palm groves despite the decline of a large number of palm trees due to the bayoud disease. This diversity can be evaluated for its behavior towards the parasite by the use of phytotoxic compounds secreted by the pathogen. In this context, embryogenic callus of 7 date palm cultivars were exposed to 9 concentrations of culture filtrate of the most aggressive strain of Fusarium oxysporum f sp albedinis. This test allowed us to classify the 7 cultivars in 3 groups according to the level of callus necrosis observed. This work is regarded as a necessary step for the evaluation of all date palm cultivars reaction towards the bayoud disease. The use of culture filtrate of Fusarium oxysporum f sp albedinis, as a screening tool, was an alternative to evaluate cultivars tested. This in vitro test can be used to make a varietal pre-screening by using the culture filtrate of the fungus.

F44

EFFECT OF SOIL BACTERIA ON THE FUNGAL PATHOGEN FUSARIUM OXYSPORUM F. SPALBEDINIS, THE CAUSAL AGENT OF BAYOUD DISEASE OF DATE PALM. Fadila Bessedik, Algerian National Institute for Agricultural Research. Laboratory of Plant Physiology and Improve, Algeria, Email: fadilabessedik@gmail.com.

Bayoud disease, caused by the fungus *Fusarium oxysporum* f.sp. *albedinis* (FOA), is at present the most serious disease of date palm ((*Phoenix dactyliferaL.*) plantations, especially the Deglt Nour variety. The use of microorganisms is a way of providing a biocontrol strategy against bayoud. The study of the effect of 80 bacterial strains was tested to determine their effects on the mycelial growth of *Fusarium oxysporum* f.sp. *albedinis* (Foa). Twenty one bacterial strains showed a high inhibition toward mycelial growth. Otherwise, the effect of phosphorus solubilizing and mobility of these antagonists was positive for all bacterial strains. The combination of these characters of bacterial strains is very interesting to implement a biocontrol approach against bayoud.

F45

CITRUS FRUIT DECCAY AND ITS CONTROL. <u>El-Sayed M. Embaby¹</u> and Laila F. Hagag². (1) Plant Pathology Department, National Research Centre, Cairo, Egypt; (2) Pomology Department, National Research Centre, Cairo, Egypt; Email: embaby.elsayed@yahoo.com

Four fungal species belonging to three genera were isolated and identified from citrus rotted fruit samples collected from two localities i.e. Beheira and Qalyoubia Governorates in Egypt. These are Alternaria citri, Botryodiblodia theobromae, Penicillium digitatum and Penicillium italicum. Hot water treatments at 45, 50, and 55 °C for 5 minutes were found able to significantly reduce spore viability% of all tested fungi, compared with untreated spores (control). The most effect was obtained with 55 °C treatment followed by 50 °C, whereas 45 °C treatment was less effective. All hot water treatments were found to protect the inoculated fruits and increased significantly the shelf life of Navel orange fruits for 30 days, compared with non-treated control. Hot water treatments were found to decrease significantly the fruit rot percent (disease incidence %) as well as disease severity (%) in inoculated fruits. No significant difference was observed between hot water treatments. All the three tested temperatures i.e. 45, 50, and 55 °C were found to reduce significantly all possible changes in the physical and chemical composition of navel orange citrus fruits. Hot water at 55 °C was the best treatment.

F46

PATHOGENICITY OF THREE FUNGI ISOLATED FROM CROWN ROT OF BANANA IN SEIYUN, HADHRAMOUT GOVERNORATE. Mohamed Othman Al-Amodi, Faculty of Applied Sciences, Hadhramout University, Seiyun, P.O. Box 9389, Yemen, Email: malamodi2010@gmail.com

Banana (Musa spp. Linn.) is one of the most important fruits in Yemen. Fruits of some banana have been are still facing the most destructive post-harvest disease i.e. crown rot. Main aims of the study were to isolate fungi and to evaluate their pathogenicity on banana fruits randomly collected from banana sold fruit stalls in Seivun, Hadhramout Governorate. Our results showed the occurrence of the fungi Colletotrichum musae, Chalara paradoxa and Fusarium sp. In a descending order. In a series of artificial inoculation by using spore suspensions and mycelial fungal transfers on young and healthy wounded or unwounded banana fruits fully grown but still green of the cultivar variety (dwarf Cavendish) in the laboratory, selected isolates of the mentioned three fungi were proven to be pathogenic. The results indicated that the isolates of Colletotrichum musae and Chalara paradoxa significantly ($p \le 0.05$) incited the most severe crown rot symptoms more than those caused by isolates of Fusarium spp. However, the isolates of Fusarium spp were less virulent by producing typical symptoms of crown rot. Colletotrichum musae and Chalara paradoxa cause more severe symptoms on wounded than those unwounded banana fruit stalks.

F47

INVENTORY AND DIAGNOSIS OF SOME PATHOLOGICAL SYNDROMES ON DATE PALM CAUSED BY FUSARIUM SPECIES IN IRAQ. Ismail Ibrahim Al Yasiri¹, Najat Adnan Saad², Ahmed Zuhair Ismail³ and Ahmed Rahim Nasser². (1) Faculty of Agriculture, University of Maysan, Iraq; (2) General of the Authority for Agricultural Research, Iraq; (3) General of the Authority for Plant Protection, Iraq, Email: ismail_alyaseri@yahoo.com.

It is known that the fungus Fusarium is involved in the majority of cases of date palm inflorescence rot. Survey results in all date palm groves in Iraq during the period 2005-2011 showed that the main causes of some important and serious pathological disorder that spread largely on date palm and caused death were species of the fungus Fusarium. It was proven that cases of yellowing and dry fronds and dates numbness are caused by some aggressive races and toxic metabolites (toxins) of the fungus Fusarium solani, which resides in the soil in the root zone and contributes to the weakness of palm, and make the trees susceptible to other pathogenic fungi such as Thielaviopsis paradoxa which causes the neck bending disease, as a result of cellulose analysis. Similarly, Fusarium proliferatum and the toxins produced by this fungus cause rapid death and dryness of date palm trees. The fungus moves through wood vessels in the stem and kills them preventing water and nutrients transmission which leads to deterioration of the infected palm trees within a short period, and the fungus is often more active in winter because of low temperatures.

F48

ISOLATION AND IDENTIFICATION OF ROOT-FUNGI (MYCORRHIZA) SYMBIOTIC WITH TOMATO IN THE SYRIAN COAST. Mohammad Imad Khrieba¹, Ibtissam Ghazal¹, Mohammad Fawaz Azmeh¹, Wafaa Choumane² and Sima Zangeneh³. (1) General Authority for biotechnology, Damascus, Syria; (2) Tishreen University, Department of Plant Protection, Lattakia, Syria; (3) Research Institute of Plant Pathology, Tehran, Iran, Email: imadkhrieba@gmail.com

The objective of this study was to identify some species of mycorrhizal fungi existing with tomato's roots in the Syrian coast. Samples were collected from five sites in two different regions, Lattakia (sites: Siano and ALbrjan) and Tartous (sites: Majdalon Elbahr, Mayaar Shaker and Hrysoon). Four samples of soil and tomato roots were collected from each site and mixed together to form a composite sample/site. Morphological characterization of isolated fungi was based on universally adopted taxonomic keys and the classification keys approved by the plant protection Research Institute of Iran. Six types of mycorrhizal fungi belonging to 5 species were identified in the different sites. Paraglomus laccaltum was present in one site (Siano), Septoglomus constrictum was isolated from 2 sites (Mayaar Shaker and Majdalon Elbahr), Claroideoglomus etunicatum was also isolated from 2 sites (Mayaar Shaker and Siano), Simiglomus hoi was present in 3 sites (Siano, Majdalon Elbahr and Albrjan), Glomus fasciculatum was present in four sites (Siano, Mayaar Shaker, Albrian and Hrysoon) and clarum was present in four Glomus sites (Hrysoon, Siano, Mayaar Shaker, and Majdalon Elbahr.

F49

FIELD STUDY: PANAMA DISEASE, CAUSED BY FUSARIUM OXYSPORIUM F.S. CUBENESE TROPICAL RACE 4, IN BANANA ORCHARDS SOUTH JORDAN VALLEY. <u>M. AlQasem</u>, N. Salem, Z. Naser, A. Tohubsum, K. AlSha'lan, A. Alwan, National Center for Agricultural Research and Extension, P.O.Box 639, Baqa'19381, Jordan, Email: mohdqasim@ncare.gov.jo

Banana planting is concentrated along the Jordan Rift Valley, especially at the south Ghores, with a total planted area exceeding 1633 Ha produced more than 41540 Tons in 2012. Banana is one of the fast and high income fruit plantation, it possess quiet good reputation in fruit trees economy of Jordan. During 2006, farmers at south Ghores areas reported welt symptoms on banana trees that were difficult to be controlled. Symptoms including severe wilting with bright yellow leaves that eventually collapsed around the pseudo-stem accompanied with reddish-brown discoloration of the xylem and plant collapses. Samples of infected pseudo-stems, roots and soils taking from infected orchards were locally examined to isolate the

causal agent(s). Laboratory results reveled that Fusarium oxysporium f.s. cubenese Tropical Race 4, the causal agent of Panama Disease, is the primary causal agent of the observed symptoms. Tropical Race 4 of F. oxysporium f.s. cubense identification was proven and a first record of this disease was published during 2013 in Plant Research cooperation with International. Wageningen, Netherland and Tropical Research & Education Center, Florida, USA. However, the causal agent was seen to coexist with the root knot nematode, *Meloidogyne javanica*, without clearly noticeable knots on the infected roots. Field visits were made to 40 randomly selected banana orchards at south Ghores (South Shonah, Karamah, and Ramah areas) where Panama disease was first recorded during 2014. Data collected from those orchards (resembling 90% of planted area) indicated that Panama disease symptoms is spreading to almost all visited farms and 5%-50% of banana trees showed Panama disease symptoms last growing season. Moreover, collected data indicated that high quantities of daily irrigated water is being applied, whereby each tree takes 60-90 Lt. of water daily compared to banana water requirements of about 20-30 Lt. per plant. This might give an explanation for the ecological existence of Tropical Race 4 in Jordan Valley areas which are generally known of its relatively high temperatures all year around.

F50

EFFECT OF SALICYLIC ACID AND ACETYL SALICYLIC ACID ON AUGMENTING SYSTEMATIC RESISTANCE OF BEAN PLANTS TO ALTERNARIA ALTERNATA. Najwa Basheer, Esam Dawood Sulaiman and Anfal Moayad. Department of Biology, Faculty of Science, Almosel University. Email: is_alr@yahoo.com

The effect of different concentrations of salicylic acid (SA) and acetyl salicylic acid (ASA) on mycelium growth of the fungus Alternaria alternata, the causal agent of bean leaf spot, was evaluated. The tested concentrations (1,3,5,10,20,30,60 mmol) resulted in significant suppression of mycelium growth with increasing concentration. The fungus was totally suppressed at concentration of 10 mmol ASA and 20 mmol SA. Moreover, addition of SA and ASA to Potato Sucrose Broth (PSB) resulted in total loss of fungal growth at 10 mmol ASA and 20 mmol SA. Because both acids are known for augmentative effect on plant natural defenses, a greenhouse study was conducted by soaking bean seeds in solution containing 3 and 5 mmol ASA and SA for 24 h followed by planting in an A. alternata contaminated soil. Results of the greenhouse experiment showed significant reduction in leaf spot incidence and severity. Treatment with both acids accompanied by weekly sprays of 10 mmol was more efficient that individual acid applications. Seed treatment with 5 mmol of acids with foliar applications was the best treatment as disease incidence and severity were reduced by 100% with improvement of plant qualities.

F51

SURVEY, IDENTIFICATION AND SYMBIONT ISOLATION OF MOST IMPORTANT LICHENS INFECTING FRUIT TREES IN SHARKIA GOVERNORATE, EGYPT. <u>Ali M. Koriem</u>, Faculty of Technology and Development, Zagazig University, Egypt, Email : ali.koriem @yahoo.com

The harmful effect of epiphytic lichens.as one of plant pathogens, upon higher plants especially tees has been proved at the recent years. In Egypt, survey and identification and symbiont isolation are very important to create more attention for studying lichens and their effect on fruit trees than they have so far received. In Sharkia Governorate, many orchards especially the neglected ones, lichens infect and cause harmful effect to fruit trees. Investigation of the collected lichen samples from different infected fruit trees in addition to lichen identified keys with coloured photographs identified three lichens genera (Xanthoria, Diploicia and Parmelia). Xanthoria parietina and X. steineri were abundant on citrus trees while D. canescens was found mostly on mango trees. Peach trees were mainly infected with P. incurva. The fungus of each lichen species was isolated by using either discharged spores from the ascocarps or by hyphal fragment. Micropipette technique was used for isolation the alga. Soil-extract medium was the best for fungal growth while maximum growth of the alga was observed in liquid bold's basal mineral medium. Freezing microtome and light microscope were used to show thallus and ascocarp structures of each lichen

F52

COLD TREATMENT FACILITIES IN JORDAN, Raida Awamleh, Plant Wealth Laboratories, Ministry of Agriculture, Amman, Jordan, Email: dr_raidaawamleh@yahoo.com

Jordan has used cold treatment as an effective phytosanitary measure for disinfestations of eggs and larvae of fruit fly of imported fruit fly host fruits from different countries for many years. Before, 2009 the custom authority was the only entity which owns facilities for cold treatment. In 2009, the phytosanitary authorities in Hashemite Kingdom of Jordan began to certify private local cold treatment facilities and in 2012 Jordan adopted one facility for citrus cold treatment in Egypt to facilitate the importation of fruits while continuing to provide protection against the introduction of fruit flies and to meet the challenges of the growing demand of agricultural products importation .In general, the infrastructure and technical specifications of certified facilities must meet the requirements of phytosanitary cold treatments and handling of agricultural products at the desired temperature which is mostly 1.5±.5 for 14-18 days. Technical committees from Ministry of Agriculture, Plant Protection and Phytosanitary Directorate were the competent authority to evaluate locations and determine whether the minimum requirements of certification are met with. Their technical reports are presented to and discussed by Plant Health Committee. Except the conditions which provided for each facility by the technical committees and approved by plant health committee, there is no formal instructions governing cold treatment procedures or certification of cold treatment facilities.

F53

ECO-FRIENDLY ROLE OF JUNIPERUS PROCERA AS SAFE ALTERNATIVE FOR CONTROLLING FUNGAL GROWTH AND THEIR SECONDARY METABOLITES T.M. Abdel Ghany, Saudi Arabia, Biology Department, Faculty of University, Science, Jazan Email: tabdelghany@yahoo.com

Radial growth A. flavus and F. oxysporum was recorded on medium amended with J. procera extract. It significantly reduced radial growth of target fungi at 150 and 200 mg, their inhibition% was 16.55, 48.54% for A. flavus, 48.64 and 59.86% for F. oxysporum, respectively compared to control. Addition of J. procera extract to Carbomar significantly reduced radial growth compared with using Carbomar alone. Productivity% of aflatoxins B2, aflatoxins B1, sterigmatocystin, cyclopiazonic acid and fusaric acid was reduced by100, 67.44, 96.28, 60.33 and 8.36%, respectively as a result of applied J. procera extract. J. procera extract significantly reduced the F. oxysporum colony-forming units (cfu) in the agricultural soil at 5 days. F. oxysporum populations at 100 and 200mg of J. procera extract were 25.33×103 and 21.33×103 cfu g-1, respectively. While application of J. procera extract with Carbomar strongly reduced F. oxysporum populations (9.33×103 cfu g-1). J. procera extract reduced the mean disease rating of wilt disease of R. sativus caused by F. oxysporum. Less content of chlorophyll a and b (3.56 and 1.65 mg/g fresh weight, respectively at P < 0.01) was detected in infected R. sativus than treated with J. procera extract or Carbomar.

F54

INTRA SPECIFIC HYBRIDIZATIONS OF THE BARLEY (HORDEUM VULGARE L), SOURCE OF RESISTANCE TO THE FOLIAR SCRATCH (PYRENOPHORA GRAMINEA S. ITO KURIBAY). Fazia Larbi-Boughrarou, Zouaoui Bouznad and Lila Mekliche. (1) Laboratory of Phytopathology and Molecular Biology, National Agronomic Higher School, Algiers, Algeria; (2) Laboratory of vegetable production. National Agronomic Higher School, Algiers, Algeria, Email: Faziaboughrarou @ yahoo.fr

Pyrénophora graminea the causal agent of leaf stripe, disease who talk very important damage every year on growing of barley in Algeria. During our test we have to compare the incidence of three isolates of *Pyrénophora graminea* about seven genotypes for morphological characters and yield composites. We have also to study morphological characters and the pathogenecity test of this three isolates. The results obtained showed the existence of variability between our three isolates for morphological characters and pathogenecity test. We could distinguish also that the seven barley genotypes used had a different resistance level.

F55

CHARACTERIZATION OF FUNGAL WATER TOLERANT TO HEAVY METALS. <u>Maha Rashed</u> <u>M. El Qasam</u>, Abdellaziz Taxenna and Salah Habi, Laboratoire de microbiologie appliquée, Faculté des sciences de la Nature et de la Vie, université Ferhat Abbas Sétif, Algérie, Email: mohsinmaha@yahoo.com

Heavy metal Water contamination is considered the most dangerous pollution such as mercury, lead, zinc, copper, and others. They are usually present in low concentrations within natural biological systems. However, these minerals are of great importance for many industries like batteries and plastic, This study is made for the purpose of knowing the extent of presence fungi resistance to heavy metals contaminated water along the valley Bousselam in the city of Setif, Algeria. Which is funded dam Ain zada and this latter in turn feeds several cities by drinking water (Sétif, Eleulma, Bordj bouariridj, Bogaa). The results of isolation on the solid media containing 2 ml of metal salts at Concentration of 1 mM (ZnSo4, Pb (NO3)2, Cdcl2) yielded different fungal isolates resistant to heavy-metal belonging to the genera: Aspergillus, Penicillium, Trichoderma, Fusarium, Mucor, Rhizopus, Curvularia, Rhizoctonia, Gonatobotrys.

F56

EFFECT OF ACETYL SALICYLIC ACID "ASPIRIN" ON THE GERMINATION OF CONIDIA OF SOME PATHOGENIC FUNGI AND THEIR HYPHAL GROWTH ON PDA IN LABORATORY CONDITIONS, AND ASSESS ITS EFFICIENCY IN STIMULATING SYSTEMIC ACOUIRED RESISTANCE AGAINST BROWN ROT DISEASE ON TOMATO PLANTS. Lina Al-Matroud, R. Al-Baghdadi, S. Al-Masri and S. Al-Chaabi, General Commission for Scientific Agricultural Research (GCSAR), Department of Plant Protection Research (Plant disease laboratory), P.O. Box 12573, Damascus, Syria, Email: linafaadel@hotmail.com

During 2011-2012, the efficiency of different concentrations of the compound of Acetyl salicylic acid (Aspirin) and varying extended exposure to prevent germination of conidia of some pathogenic fungi and their growth on PDA were tested in the laboratory and on the tomato plants under greenhouse conditions. Conidia of fungi *Verticillium dahlia* (isolated from olive trees), *Fusarium oxysporum* f.sp. *niveum* (isolated from

stem watermelon plants), F.o. f.sp. melonis (isolated from the stem muskmelon plants) lost their ability to germinate and grow on the medium PDA as a result of the treatment of suspensions their conidia, separately (4 \times 10 6 conidia/ml) with water aspirin concentration (1.5 mg/ml) for 30 minutes, was also prevented hyphal growth of fungus Rhizoctonia solani (isolated from the roots of Capsicum plants) under the same conditions. It was to prevent the germination of conidia of fungus Alternaria solani (isolated from potato leaves) during the same period by using a higher concentration of a substance aspirin (3mg/ml) or treated with aqueous solution of aspirin at concentration (1.5 mg/ml) for 24 hours, While the need to prevent germination of conidia of fungus Cladosporium fulvum (isolated from the leaves of tomatoes) treated with aqueous solution of aspirin at concentration (3 mg/ml) for 24 hours or treated with aqueous solution of aspirin at concentration (1.5 mg/ml) for 6 days. Efficiency of aspirin compound at concentration of 1.5 mg/ml in the activation of systemic acquired resistance to brown rot (C. fulvum) was estimated on a variety of tomatoes, " Magic " highly susceptible to disease, and the results showed that the effectiveness of all treatments with aspirin was close to the efficiency of comparative fungicide Pilcot (Imazalil 40%), either protective spraying (3 times, one day interval) then spraying the plants with pathogenic fungus inoculum in fourth day (disease index was 12.8%) or by therapeutic spraying (spray of plants with pathogenic fungus inoculum, then aspirin spraying at the beginning of disease symptoms (disease index reached 18.6%), While disease index reached 44.5% in the infected control and 21.2% in the treatment of comparative fungicide. These results refer to the possibility of the use of aspirin in IPM programs for some plant diseases, especially in protected agriculture.

F57

EVALUATION OF SUSCEPTIBILITY OF SOME SYRIAN COTTON CULTIVARS TO VERTICILLIUM WILT DISEASE INFECTION CAUSED BY VERTICILLIUM DAHLIAE KLEB. <u>Maymounh Al-Masri¹</u>, Rudinh Albaka¹, Khaled Al-Assas² and Taissir Abou Al Fadil¹.(1)General commission for sci. Agri. Research, Damascus, Douma, P.O. Box 113, Syria; (2)Plant Protection Dept., Faculty of Agriculture. Damascus University, Syria, Email: dr.maymonh-almasri@hotmail.com

Five Syrian cotton cultivars (Aleppo 33, Aleppo 90, Aleppo 188, Deir Ezzor 22, Raqqah 5) were evaluated for their susceptibility to V. dahliae (isolate V11) infection in an outdoor pot experiment during the growing season 2010. Results showed that all cultivars were damaged by *V. dahliae* infection, in different degrees. The average of infection rate ranged between 62.5- 100%. Cultivar Deir Ezzor 22 was the most infected and cultivar Raqqah 5 was the lesser one. Two groups of varieties were distinguished showing different levels of resistance. The first group where Raqqah 5 and

Aleppo 90 varieties showed less susceptibility to the fungus infection. The disease index of cross-section discoloration was 15 and 27.5, respectively, without any significant differences with the moderate resistance variety Paymaster 792 (37.5). By contrast, the second group comprising. varieties Deir Ezzor 22, Aleppo 33, and Aleppo 118 demonstrated higher susceptibility and recorded high degrees of stem discoloration 80, 65 and 57.5, respectively, without significant differences with the susceptible variety Deltapine 16 (72.5). Also, results of this study showed similarity in the values of cross and longitudinal stem section discoloration indices with leaf infection index, this means that disease investigation is possible from the stem and leaves as well.

F58

IDENTIFICATION AND CONTROL OF BASAL STEM AND ROOT ROT DISEASE OF SNAPDRAGON. <u>Nadeem A. Ramadan</u>, Biology Department, College of Science, University of Mosul, Iraq, Email : nadeem.ramadan53@yahoo.com

For the first time wilt, symptoms have been detected on the Snapdragon (Antirrhinum majus L) plants cultivated in the parks of Mosul University. The isolation of fungi from wilted plants on PDA medium revealed the presence of seven genera including; Alternaria, Aspergillus, Cladosporium, Fusarium, Macrophomina, Penicillium and Stemphyllium. Fusarium oxysporum was the most frequent fungi approached 36.0 x 102 Colony Forming Unit/gm soil. F. oxysporum reduced significantly the chlorophyll content of infected plants, and the percentage of its inhibition increased up to 81.88 in severe infections. The infection caused significance stunting of plants when plant height inhibited by 58.09% in dead plants. Antagonism ability of Trichoderma species as T.harzianum, T. viride, and T. reesei bio-resistance against F. oxysporum showed control efficiency of.1.666, 2.333, and 2.666. respectively.

F59

STUDY OF IN VITRO GROWTH AND AGGRESSIVITY OF SOME ISOLATES OF FUSARIUM SPP. CAUSAL AGENT OF ROOT ROT AND FUSARIUM HEAD BLIGHT OF WHEAT. Imane Laraba, Djazira Koudri and Houda Boureghda, Département de Botanique, Ecole Nationale Supérieure Agronomique (ENSA), El Harrach, Algiers, Algeria, Email: laraba.imen@yahoo.fr

Fusarium head blight (FHB) and root rot are serious fungal diseases of wheat caused by several species of *Fusarium* and *Microdochium nivale*. In addition to the huge yield losses, the contamination of the grains with mycotoxins is a serious problem to human and animal health. In this study a collection of *Fusarium* isolates was obtained from wheat collars and spikes exhibiting typical symptoms of FHB and root rot. Morphological identification led to distinguish tow species: *F. culmorum* and *F. graminearum*. The study of

the in vitro growth of Fusarium spp. isolates at different temperatures (10, 15, 20, 25, 30 and 35°C) showed that there is a difference for the optimum growth. It was found that the optimum growth is 25°C for all isolates of the species F. culmorum and F. graminearum except isolate FC 09-12 which has an optimum growth at 20°C. In addition, isolates belonging to the species F. culmorum have shown the highest growth rate at all temperatures tested. Pathogenicity test carried out by soil inoculation showed that all Fusarium isolates induced symptoms at the crown and roots, the symptoms observed are typical of crown and root rot. Furthermore, it was showed by this study that isolates obtained from the spike (FC 08-12, FC 09-12, FG 02-12 and FG 03-11) induced symptoms on the collar. Results of pathogenicity test on the basal part of the wheat have shown that there is a difference in the aggressiveness of the isolates tested; the highest disease index was conferred by FC 03-12 isolate (1, 88). However, it is important to indicate that for this set sample of F. graminearum and F. culmorum isolates there is no relationship between the origin of the isolate (spike or crown) and aggressiveness, but F. culmorum isolates are more aggressive than F. graminearum isolate.

F60

ISOLATE AND DIAGNOSE ASPERGILLUS SPECIESAND DETERMINE THE PRODUCT OF AFLATOXIN USE TUMERIC AND OLIVE OIL FOR CONTROL. <u>Faten Nouri and Mala</u> <u>Abedalrefai</u>,College of Science, Univ. of Mosul, Iraq, Email: nadeem.ramadan53@yahoo.com.

Ten isolates of the genus Aspergillus isolated and diagnosed from dried grapes (raisins, black and yellow raisin and raisin Brown oily). To confirm a diagnosis of Aspergillus species isolated from dried grapes (raisins) three differential media CYA and MEA and G25N and incubated in 5, 25 and 37 °C. The diagnosis showed that the most common Aspergillus niger (7 isolate) of his isolations grape fruits dried and three isolates of the Aspergillus flavus raisins black raisin Brown oily.Quality was revealed on the Aspergillus flavus isolates for the production of aflatoxins using Aspergillus flavus Parasiticus Agar (AFPA) in a 30-25 °C for a week, the three isolates showed vulnerability do produce aflatoxins. Alcoholic extract of turmeric showed the influence of inhibition on average diameters A. flavus and A. niger colonies isolated from fruits of black raisin Iraqi reached 86.6%,68.8% respectively in 4 mg/ml. effect mix turmeric leaf and olive oil, I have inhibited distinct from the effect of alcohol extract of turmeric for both species and because of the discouragement completely (100%).

F61

INTEGRATED DISEASE MANAGEMENT IN APPLE ORCHARDS CONVERTING TO ORGANIC PRODUCTION. <u>Krishna P. Singh</u>, Jithendra Kumar, Rajesh K. Prasad, Amitabh Singh and Dinesh Prasad. (1) Department of Plant Pathology, College of Agriculture, G. B. Pant University of Agriculture & Technology, Pantnagar; (2) Plant Pathology Research Laboratory, Uttarakhand University of Horticulture & Forestry, College of Forestry, Ranichauri; (3) Uttarakhand Organic Board, Dehradun, India, Email: kpsingh.gbpuat@gmail.com

Organic production of apple is increasing abroad but is still at very low levels in India. Orchard sanitation practices, collection and destruction of fallen leaves, pruning of diseased shoots/twigs or other plant parts play a vital role in pest and diseases control. Adopting scientific pruning practices scarification of dead/diseased parts during dormancy and wound dressing with protective and organic chemicals. Use of Bordeaux mixture, and paste help in the management of foliar, soil borne diseases, cankers and dieback disorder as well as are effective insecticide and plant nutrient. Selection of well-drained sites for establishment of new orchards and maintaining graft union above the ground level are important preventive measures for checking root rots and crown gall diseases. In a 13-year study, the effectiveness of cultural practices during over wintering period of apple as a management tactic for control of diseases were investigated on integrated and organic production of system. In Uttarakhand, fruit growers are increasingly interested in environmentally oriented organic systems. The main factor in creating such systems is the establishment of off-season cultural practices based on production technology. This study was conducted during 2000 to 2012 in apple orchard in Indian Himalayas deals with major diseases, effect of cultural practices in off season (last week of Nov. to 2nd week of February), and use of fungicides permitted in organic cultivation such as sulphur (elemental sulphur and lime sulphur) or copper (Bordeaux mixture and basic copper sulphate) on diseases in organically growing systems. It concentrates on the most severe disease, the apple scab caused by Venturia inaequalis (Cke.) Wint. (anamorph Spilocea pomi Fr.). The disease has already plagued apple cultivation in the States of Jammu & Kashmir and Himachal Pradesh, and has proved to be destructive in Uttarakhand hills, which happen to be the 3rd largest apple growing state of the country. The sanitation practices such as ploughing leaves under the soil in autumn or early spring were recommended. The potential ascospore dose values were higher in the organic managed orchards than in the integrated managed orchards. Results showed that, the diseases caused significantly more damage on trees where no management practices were taken up in comparison to the orchards following organic mode of disease control methods. The off-season practices affected mainly the incidence of diseases. In general, the off-season practices correlated with a lower level of damage in the organic growing system. The pathogens caused significantly more damage on trees in the organic production system, but acceptable disease control is achievable in organic orchards. Results are compared with both production systems, and their biological and practical implications are discussed

F62

STUDYOFANTAGONISMOFRGIZOBACTERIA(PGPR)AGAINSTLENTILWILTCAUSED BYFUSARIUM OXYSPORUM F.SP. LENTISVASUD & SRIN IN VITRO.MahabaGanam,Adnan Alnehlawi and Salah Alden khabaz.(1)General Commission of Sientific Agricultural Research,Plant protection Admenstration, Douma, Damascus,Syria;(2)Scientific Agricultural Research Center ofHama,Syria; Email: mahaba.2008@yahoo.com

96 soil samples were collected from growing area of crops and trees field in provinces of Daraa, Homs, Hama, Idleb, Tartous, Latakia and Qunaitera. 137 bacterial isolates (PGPR) were isolated from samples of rhizosphere soil of lentil, bean, groundnut, chickpea, pea, wheat, barley, cabbage, potato, carrot and parsley in addition to trees of grapes, almonds, fig, loquat. And cultured on (PDA, NA, King's B) and were chosen according to the shape of the bacterial colony. These were screened (in vitro) for inhibition of fungal growth of Fuarium oxysporum f.sp. lentis (FO8) the most virulence isolate of 18 isolates were obtained from infected lentil plants in provinces of Daraa, Hama, Aleppo, Alhasaka.. 42 isolates of bacteria was demonstrated the ability to inhibition the growing of fungal pathogen and range between 37.5-77.5 comparing with control test

F63

ROOT **ENDOPHYTES** COUPLED WITH NANOPARTICLES: A POTENTIAL TOOL FOR COMBATING COLLAR ROT DISEASE IN GROUNDNUT. Shaik Thahir Basha¹, M. Nagalakshmi Devamma² and N.P. Eswara Reddy³. (1) Microbiology Division, Department of Virology, Sri Venkateswara University, Tirupati-517502, Andhra Pradesh, India; (2) Department of Botany, Sri Venkateswara University, Tirupati-517502, Andhra Pradesh, India; (3) Department of Plant Pathology, S.V. Agricultural College, ANGRAU, Tirupati-517502. Email: India, thahirbashas@yahoo.com

Notable success on disease control using endophytes combining with compatible nanoparticles at low concentration is a rapid progressing area. Groundnut is a major legume and important oil seed crop in Andhra Pradesh, India is grown to the extent of 1.87 m.ha. With 1.64 m.t. production and with a productivity of 728 kg/ha respectively is severely affected with collar rot disease caused by *Aspergillus niger* hampering yield losses of over 25-30 per cent. Here, we report the combined application of talc based formulations of potential root endophytes coated with AgNps significantly arrested the collar rot disease besides increasing the yield attributes. The potential root endophyte TPT23 primarily confirmed the synthesis of silver nanoparticles by the change in color from pale yellow to brown and further characterized by UVvisible spectroscopy, SEM and XRD. The UV-vis spectrum revealed the biosynthesis of AgNPs by exhibiting the maximum plasmon absorption at 410-420 nm. SEM study confirmed the well dispersed AgNPs with a narrow distribution ranging from 60-100 nm in size. The robust root endophyte TPT23 was cloned and sequenced based on 16S rRNA analysis. The progress in developing RAPD markers and exploring the utility of novel root endophyte TPT23 in modern agriculture will be discussed.

F64

FIRST RECORD OF FUSARIUM OXYSPORUM WHICH CAUSE THE WILT ON COFFEE TREES IN YEMEN AND ITS CHEMICAL CONTROL. <u>Afef Mohammad Rageh Abdullah</u>, Plant Protection Research Laboratories. Agricultural Research and Extension Authority (AREA), Dhamar, Yemen, Email: dr_afef@yahoo.com

The coffee one of the main crops of Yemen and the most famous in the world as a result of its good quality, distinctive flavor and good taste. For the importance of economic and historical, and in order to improve production quantity and quality of the coffee, currently it has cared by Government, especially with the decline in the productivity of the crop to 400 kg/ha, compared to the average global up to 1.3 t/ha, and is attributed to the presence of many of the environmental, climate and Pathological problems, and because wilt is a dangerous disease and the most virulent on coffee trees in Yemen, which may be cause death of the wide range of coffee farms, so this study was suggested, and the results of the isolation on the Potato Dextrose Agar (PDA) from the roots of coffee and soil samples collected from the famous areas of the coffee cultivation in Yemen (Dhamar, Ibb, Sana'a and Taiz), was appeared the repeat of the presence wilt fungus Fusarium Oxysporum in all the samples studied. To reduce the activity and harms of fungus and in order to protect coffee trees from the infection, the number of materials, including specialized and traded among farmers was tested, and the results showed the superiority of the active ingredient (hydroxy quinoline sulfate)/50% on the inhibition of the growth of fungus on the PDA media in the laboratory

F65

THEBENEFITSOFINTERCROPPING(TOMATO AND DATURA)INTHEFIGHTAGAINST DISEASES.SamiraMorsli,SalaheddineDoumandji,AbdelkaderMorsli andSamiraSetbel. (1)DépartementAgronomique,FacultédesSciencesBiologiques etAgronomiques,UniversitédeMouloudMammeriTiziOuzou,Algérie;(2)DépartementdeZoologieAgricoleetForestière,EcoleSupérieurNationalAgronomique,ENSA,ElHarrachAlger,Algérie,Email:morsli16@yahoo.frHarrachAlger,

Intercropping combines small plants and tall plants. There is every reason to believe that intercropping can double production, our study is low on this assumption, during two years 2012 and 2013, experimental protocols were installed in two conjunction with Datura, in 2012 the presence of more than 44% of auxiliary on the culture of a Datura allows a reduction of insect pests on tomato culture that *Tuta* absoluta (Meyrick, 1917) (Lepidoptera: Gelechidae) is effective in very low notes on tomato and absent on datura, as the predatory bug Nesiocoris tenuis (Hymiptera: Miridae) was noted in with high densities, The present study has for objective to propose solutions based on biological agriculture interfaces between Datura Datura stramonuim and tomatoes Lycopercicum esculuntum Mill. without use the pesticides to combat various diseases tomatoes that are considered a threat to tomato production in Algeria.

F66

FUNGI COLONIZED THE ROOTS OF FOREST SEEDLINGS IN DUHOK NURSERIES, IRAQ. <u>Raed A. Haleem</u>, Khadija A. Saedo and Barin S. Shareef, Plant Protection Dept. of Faculty of Agriculture and Forestry, University of Duhok, Iraq, Email: raed.haleem@uod.ac

Sampling has been carried out in two main forest nurseries in Duhok province, Iraq (Malta nursery and Forestry Department Nursery, Faculty of Agriculture). Seven hosts were sampled during two seasons, winter (Nov.-Jan.) and spring (Feb.-April); include: Pine, Olive, Pistachio, Walnut, Robinia, Cypress and Italian Cypress. In Malta nursery, the most frequent fungi isolated during winter from the roots of Olive and Pine seedlings were Macrophomina phaseolina by 53.33% and 33.33% respectively. Rhizoctonia solani colonized the root of both Walnut (55.56%) and Italian cypress (39.05%). In spring, the prevalent fungus isolated from Olive roots was Trichoderma harzianum reached to 94.4% which may inhibit growing other fungi. Fusarium poae was isolated in high frequency (55.56%) from Robenia seedlings. In Forestry department nursery, Fusarium species were the dominant fungi in almost all seedlings types during winter. Robinia roots were colonized by Fusarium sp. and Macrophomina phaseolina reached to 53.89%, 37.78% respectively. Whereas Fusarium poae and F. oxysporum were prevalent on Walnut and Pine roots with isolation frequency reached 33.33%, 32.54%, respectively. In spring, the dominant and unique fungus isolated from Walnut roots was Macrophomina phaseolina (100%). Fusaroium spp. were isolated from Robinia and Cyprees by 69.44%, 38.89% respectively. Other genera were also isolated from different host but in low frequency such as Phoma, Verticillium, Aspergillus and Cylindrocarpon. These results indicated that the most common fungi colonized the roots of forest seedlings were Macrophomina phaseolina, Fusarium sp. and Rhizoctonia solani.

F67

THE FIRST RECORD OF THE UNCINULA NECATOR FUNGI ON VINEYARD IN AL-JABEL AL AKTHER REGION, LYBIA. <u>N.A. Mohamed and</u> <u>R.S. Yousif</u>, Plant Protection Department, Faculty of Agriculture, Omar Al Mukhtar University, Elbeida, Libya, Email: nwboshakoa@gmail.com

The present work explore and identify Uncinula necator as a new fungi record through field studies to twelve localities obtained varied altitude in grape trees at Al-jabel Al-kther region during 2010. The results pointed to Uncinula necator is responsible for powdery mildew disease. The microscopic analysis detailed that the average of conidiphora 48.16 µm and conidia spores was colorless, light, oval or form 31.95±3.84 µm and 15.65±1.77 µm. the hyphae was spetate, colorless 5.34 ± 0.7 µm thick. The highest infection recorded in Al-Bayda and Monsoura farms by 93 and 88%, respectively. According to pathogenicity, isolates were varied widely in virulence while the most virulence isolated from Al-Belangi district causes infection by 80 and 40%, respectively. The result proved that these was a positive correlation between fungus infection and chlorophyll quantity and sugar. In the contrary between infection and total phenols as well as resveratol. The result indicted that there was positive correlation between infection and reducing of chlorophyll, at the same time phenols was increased by infection, and the estimation in leaves, it was recorded as the high signification quantity with increased infection, while the sugars has the negative relationship with infection.

BACTERIAL DISEASES

B1

ISOLATION AND IDENTIFICATION OF ICE NUCLEATION ACTIVE BACTERIA **PSEUDOMONAS SYRINGAE** FROM DRY AGROSYSTEMS. Abd-Al Rahman Moukahel¹, Siham Asaad¹, Bakri Debbes², Cindy E. Morris³ and David C. Sands⁴. (1) International Center for the Agriculture Research in the Dry Areas (ICARDA), Terbol, Zahla, Lebanon; (2) Department of Plant Protection, Aleppo University, Aleppo, Syria; (3) INRA, UR0407 Pathologie Végétale, F-84143 Montfavet cedex, France; (4) Department of Plant Sciences and Plant Pathology, Montana State University, Bozeman, MT 59717-3150, USA, Email: s.asaad@cgiar.org

Pseudomonas syringae (*P.s.*) is a plant pathogen well known for its capacity to grow epiphytically on diverse plants and for its ice-nucleation activity. This study showed that large epiphytic populations of ice nucleation active (INA) bacteria could be established on a some wheat cultivars without causing disease. This approach led to the evaluation of

combinations of bacterial strains and wheat cultivars. 25 samples from leaves of cultivated bread wheat in ICARDA fields at Tel Hadya were studied for presence of P.s. on semi-selective medium. The biochemical characterizations and ice nucleation activity were studied together with the ability of the bacterium to be transmitted to seeds and its persistence on the seeds after storage. Results showed that only 14 leaf samples contained bacteria of the genus Pseudomonas, with only 5 isolates being the target bacterium *P.s.* after testing its biochemical characterizations and ice nucleation activity. Even though the study aimed to obtain nonpathogenic isolates, yet two out of five screened isolates did induce hypersensitive reaction. The remainingthree isolates did not induce hypersensitive reaction, indicating that they might be non-pathogens or only mildly pathogenic. Transmission of P. syringae from plants to their seeds was studied immediately after seed harvest and again after seed storage for three months. Results indicated that there are 12 strains out of the 25 tested that clearly showed bacterial transmission to the seeds under natural inoculation and only 6 isolates remained active after 3 months of storage.

B2

ENDOPHYTIC BACTERIA FROM WEEDS REDUCE VIRULENCE OF PECTOBACTERIUM SPP. AGENTS OF POTATO SOFT ROT. Djamila <u>Alim^{1,2}</u> and Zoulikha Krimi¹. (1) National Institute of Agricultural Research (INRAA), Station Mahdi Boualem Baraki, Algiers, Algeria; (2) Laboratory of Phytobacteriology, Department of Agricultural Sciences, Faculty of Agricultural Sciences and Veterinary, University Saad Dahlab Blida, Algeria, Email: alim-djamila@hotmail.com

This study was conducted to evaluate the antibacterial activity of endophytic isolates from five wild plants, to a collection of virulent strains of pectinolytic Erwinia carotovora. The hypersensitivity test on tobacco has allowed to identify the endophytic isolates with highest pathogenicity. Biochemical analysis of discriminant selected endophytes revealed the presence of 11 Gram-negative and 10 gram-positive isolates. The sequence analysis of 16S rDNA amplicons using the Blast program confirmed the grouping of thirteen endophytic isolates in three major genra; Bacillus spp., Pseudomonas spp. and Curtobacterium spp. Endophytic isolates from five plants were evaluated for their antibacterial activity against a collection of virulent strains of pectinolytic Pectobacterium spp. The in vitro antagonistic assay showed a strong antibacterial activity of the different endophytic isolates with an inhibition zone ranging from 20 mm to 45 mm, revealing highly active metabolites against most strains of Pectobacterium spp. The in vivo antagonism test performed on three potato varieties (Desiree, Spunta and Bartina) confirmed the results of the in vitro antibacterial activity. Indeed, dipping cubes of potato in virulent bacterial suspensions and then inoculating with endophytic strains of *Pectobacterium* spp. concurred with a net decrease and sometimes a complete absence of symptoms of soft rot on potato samples of different inoculated potato cultivars.

B3

CONTRIBUTION TO THE STUDY OF ETIOLOY **EPIDEMIOLOGY** AND OF BACTERIAL CANKER OF SWEET CHERRY (PRUNUS AVIUM) IN ALGERIA. Said Ammar Sadallah¹ and M. Benchabane². (1) Department of Agronomy, Faculty of Sciences, 20 August 1955 University, Skikda, Algeria; (2) Department of Agronomy, Faculty of Agro-Veterinary and Biological Sciences, Saad Dahlab University, Blida, Algeria, Email: Sadallah2s@hotmail.com

This work was carried out to study the etiology and the epidemiology of bacterial canker of sweet cherry tree (Prunus avium L.) in Algeria. Samples of diseased plant material with visible bacterial canker symptoms (cankers and gummosis on branches, with spoted leaves) were collected from cherry trees grown in Constantine and Khenchela locations (East Algeria) between 2009 and 2012. More than 50 Gram negative, fluorescent, oxidative bacterial strains were isolated from the margin of diseased tissue. All investigated strains were levan and HR positive, and oxidase, pectinase and arginin dihydrolase negative. Based on positive pathogenicity tests on green immature sweet cherry fruits cv. Napoleon and differential GATTa tests, the investigated strains were divided in two distinct groups: the first group consisted of strains with gelatin and aesculin positive, and tyrosinase and tartrate negative tests were classified as *Pseudomonas syringae* pv. syringae. The second group of strains found to be gelatin and aesculin negative and tyrosinase and tartrate positive results were identified as Pseudomonas syringae pv. morsprunorum. The results of the epidemiological study showed that the two pathovars of Pseudomonas syringae are present in cankers on shoots and branches as well as diseased and symptomless leaves and also on some weeds present in cherry orchards. Furthermore, bacterial populations were maximal during the cool and wet periods of the year and minimal during the dry and hot periods.

B4

IMPORTANCE OF THE AGROBACTERIUM TUMEFACIENS FROM ALMOND NURSERIES IN CHLEF REGION IN WESTERN ALGERIA. Benali Setti¹ and Mohamed Bencheikh². (1) Institut des Sciences Agronomiques, Université de Chlef, BP151, 02000- Algérie; (2) Institut des Sciences de la Nature et de la Vie, Université de Khemis Meliana, Khemis Meliana, Ain Defla, 44000 Algérie, email: bencheikdz@yahoo.fr

Crown gall is one of the destructive diseases and occurs worldwide. It is considered a disease of great economic importance in almond and other stone fruit tree nurseries due to the extensive losses it causes. Based on their morphological characteristics on MacConkey medium and YMA medium, 10 isolates were selected as colonies of these isolates after 48 h at 28°C were circular, convex with smooth, translucent and easily suspended in water. The bacterial cells were rod shaped with rounded ends and were either single or in pairs. The isolates were Gram negative, with optimum growth between 25 and 27°C. All strains were positive for mobility, catalase and oxydase. On the other hand, all these isolates oxidized the lactose to 3ketolactose. On the other hand, all Agrobacterium strains oxidized sucrose, D-mannitol, D-sorbitol, indol, inositol, Melibioze, D-galactose, L arabinose, rhamnose, amygdalin, lactose and glucose. Furthermore, the isolates also transformed arginin, lysin, ornithin, gelatin and starch. The pathogenic nature of the organism was confirmed by a bioassay on carrot disks. Additionally, Koch's postulates for all isolates were also fulfilled.

B5

IMPACT OF PLANT GROWTH PROMOTING BACTERIA AND SALICYLIC ACID ON FUSARIUM OXYSPORUM THE CAUSAL AGENT OF TOMATO WILT DISEASE. Ayad Qahtan Waheed, Haider Hamed Nawar, Balasem Ahmed Abbas and Majed Ibrahim Abdulla, Ministry of Science & Technology, Directorate of Agricultural Research-Baghdad, Iraq, Email: ayad_17043@yahoo.com

This study was conducted to evaluate the efficiency of two species of plant growth promoting subtilis bacteria (Bacillus and Pseudomonas *fluorescence*) and salicylic acid in inducing systematic resistance to wilt disease caused by Fusarium oxysporum under greenhouse conditions. The results of antagonistic activity of bacterial suspension of B. subtilis and P. fluorescence and salicylic acid (50, 100, 200) ppm against the pathogenic fungus (F. oxysporum) showed that most the tested treatments significantly reduced the radial growth rate of the pathogen and significantly increased the inhibition rate of pathogen growth as compared to the control treatment. The 200 ppm SA, 200ppm SA+ P. fluorescence, 200 ppm SA+ B. subtilis treatments produced the highest rate of pathogen growth (100%) , while the 50 ppm SAtreatment produced the lowest inhibition rate (8.56%). Results of tomato seeds treatment with bacterial suspension of B. subtilis and P. fluorescence and 220ppm concentration of salicylic acid showed that all the tested treatment significantly increased most of the tested growth parameters (percentage seed germination, seedling high, soft weight and dry weight of plant as compared to both control treatments (sterilized soil only and sterilized soil + pathogen), the sterilized soil + SA + B. subtilis treatment produced the highest significant increase of growth parameters (83.66%, 27.16 cm, 7.43 g/plant, 2.43 g/plant) as compared to control treatment (sterilized soil only) (72.16%, 20.86 cm, 4.53 g/plant, 1.36 g/plant, respectively). Also the results revealed that the treatment soil+ SA+*B*. *subtilis*+ pathogen significantly decreased the percentage of damping-off and wilt diseases (23.66%) as compared to the control treatment (sterilized soil + pathogen) (68.46%).

B6

CHARACTERIZATION AND BIOCONTROL CAPACITY OF STREPTOMYCES SP. ISOLATED FROM THE RHIZOSPHERE OF CALOBOTA COSS. DURIEU. SAHARAE & Mouloud Ghadbane^{1,2}, Daoud Harzallah¹, Hani Belhadj¹ and Laid Benderradji². (1) Laboratory of Applied Microbiology, Department of Microbiology, Faculty of Natural and Life Sciences, University Setif 1, Setif 19000, Algeria; (2) Laboratory of Plant Biotechnology, Department of Natural and Life Sciences, Faculty of Sciences, University of M'sila, P. Box 166, Chebilia, M'sila, 28000, Algeria, Email: mouloud_ghadbane@yahoo.fr

A total of 150 actinomycetes isolated from rhizosphere soils of Calobota saharae Coss. & Durieu, were tested in vitro for their antagonism against different pathogenic microorganisms. Among the isolates, four showed antagonisticability against both pathogenic bacteria and fungi. Those were selected, identified by phenotypic properties, and tested for their antimicrobial activity as well as their biocontrol potential against the wheat (Triticum aestivum L.) pathogenic fungus Fusarium culmorum. Cultural characteristic studies strongly suggested that these strains belong to the genus Streptomyces with chitinase, cellulase, phosphate solubilization, and produce indol acetic acid (IAA) properties. The inhibition was higher against fungi and Gram-positive bacteria, while Gramnegative bacteria were less inhibited. The growth of the plant-pathogenic fungus Fusarium culmorum was considerably inhibited in the presence of the strains 1A01, 2A06, 1B11 and 2B21. These studies revealed that the presence of the Streptomyces strains in the soil significantly promoted the growth of the wheat plants and decreased disease index. These results indicated that the Streptomyces strains isolated from the rhizosphere of C. saharae growing under arid conditions in south Algeria (Sahara) could be an interesting source for antimicrobial bioactive substances and as biocontrol agents.

B7

EFFECTS OF UREA FERTILIZERS AND VINE KILLING PERIODS ON POTATO SOFT ROT DISEASE. <u>Akram Hamdi Qasim</u>, Faisal Abdul-Rahman Al-Rifai and Nihal Fakhr Al-Din Hassan, Department of Biology, Department of Agricultural Research, Nenawa, Iraq, Email: mhm2agr@yahoo.com,

The effect of using three levels of urea fertilizers (0, 75, 150 Kg/donum) on growth of two potato cultivars Desriee and Sponta in the field whose tubers were infected with bacteria *Erwinia carotovora atroseptica* (Eca) showed an increase in hight of treated

plants with increased urea fertilizer concentration for both cultivars, as well as differences in the infection rate which increased with the increase of urea concentration to 26% and 16% for 150 kg/donum and 8.4% and 11.9% for 75 kg/donum, compared with 7.7% and 5.5% for Desiree and Sponta control treatments, respectively. In addition, there was a variation in the number and weight of healthy tubers, for the 75 kg urea/donum compared with control and was better than the higher concentrations of urea. When both varieties remained under ground for 5.10 and 15 days after removing shoot and foliage following the last irrigation showed an increase in number of infected tubers for the long period. Tuber infection rate was high after leaving the tubers for 15 days in field and reached 25.5% and 31.7% for Desire and Sponta cultivars, respectively, compared with 8.4% and 11.5% infection for the 5 and 10 days period for desire and 11.9% and 15.9% for Sponta, respectively. Although there were no difference between leaving tubers in the field for 5 and 10 days, with the exception of tuber weight which was high in 5 days and reached 691.4 and 644.4 gm/plant for Desiree and Sponta compared with 669.5 and 572.2 gm/plant for 10 days and 577.8 and 436.1 gm/ plant for 15 days for Desiree and Sponta, respectively.

B8

ISOLATION AND IDENTIFICATION OF Brenneria nigrifluens THE CAUSAL AGENT OF BARK CANKER DISEASE ON WALNUT IN IRAQ. <u>Emad M. Al-Maaroof</u> and Peshtwan S. Amin, Faculty of Agricultural Sciences, Sulaimani University, Sulaimania, Iraq, Email: ealmaaroof@yahoo.com

Walnut is traditionally an old important tree in kurdistan mountains, Iraq. Bark canker disease recently found in Sulaimania. Disease incidence reached 17.2% in Tawella. Many bacterial isolates were isolated and identified on the basis of standard morphological, biochemical characterization and API 20E system. 51.5% of the isolates identified as Brenneria nigrifluens and 36.3% as Pantoea spp. B. nigrifluens isolates formed single circular colonies with entire margins and creamy color on NA, while appeared as single colonies, circular with entire margin, and dark purple with green metallic sheen on EMB. Biochemical tests classified B. nigrifluens isolates into seven groups. Viteck GN system was further used to confirm the identification. High differences detected between the isolates in producing necrotic lesions on artificially inoculated walnut branches, while no symptoms appeared on detached leaves. Isolate numbers 22, 28 and 31 produced typical symptoms on two year old seedlings. All B. nigrifluens isolates showed absolute resistance to Erythromycin and Cephalexin, highly resistant to Ampicillin (94.1%), Vancomycin (76.4%), Rifampin (70.5%) and Amikacin (70.5%); moderate resistant to Penicillin (58.8%); moderately susceptibile to (41%) and Gentamicin Streptomycin (35%). Chloramphenicol, Tobramycin, and Tetracycline
showed high efficiency in bacterial growth inhibition. Minimum inhibitory and minimum bactericidal concentration activities of five chemicals against 17 bacterial isolates showed high efficiency of Kocide in killing 94.1% and inhibition of 100% of the isolates at 1/8 field dose, followed by Nordox which killed 70.6% and inhibited 76.4% of the isolates at 1/2 field dose and 1/4 field dose, respectively. In vivo studies confirmed the high efficacy of Kocide in disease control and restriction of vertical and horizontal expansion of the cankers followed by Nordox. No significant differences were detected between Champion, Courey and Melody pesticides.

B9

CURRENT STATUS OF THE FIRE BLIGHT DISEASE CAUSED BY *ERWINIA AMYLOVORA* **IN ALGERIA.** <u>N. Bakri¹</u> and S. Letfi Qrboa². (1) Station Regional Plant Protection Ohran, (2) Central Laboratory for the Diagnosis of Bacterial Diseases, Ministry of Agriculture and Agricultural Development, the National Institute of Plant Protection. Algeria, Email: oualid_siham@yahoo.fr

Fire blight is a bacterial disease caused by Erwinia amylovora, which infects pears, apples, quince and ornamental plants from Rosaceae family. This disease has spread through the Mediterranean countries and led to severe damage at the level of the trees as well as the fruit level. Fire blight disease is regarded as a quarantine pest according to regulatory framework of agricultural pests and the law on the protection of plants for controlling plants across the border. As fire blight samples were diagnosed at the National Institute for Plant Protection in Algeria in 2010, a campaign was launched by National Institute for Plant Protection (official representative of the Plant protection at national level) in cooperation with the Ministry of Agriculture and Rural Development and the concerned departments of the agricultural sector to identify the affected agricultural areas. By inspecting 2733 agricultural investments, 5080 cases of fire blight were recorded in 27 Algerian surveyed states. Because of the high losses in the fruit trees sector, decisions were issued to include the necessary measures to curb the spread of this disease involving the process of uprooting and burning of heavily infected trees. Trees that are in the beginning of the infection are placed under the control frames of the National Institute for Plant Protection together with the Department of Health plant Directorate agricultural interests for the application of the precautionary measures needed to reduce infection and prevent the spread of the disease to other areas.

VIRAL DISEASES

V1

IDENTIFICATION AND DETECTABILITY OF BROAD BEAN STAIN VIRUS IN FABA BEAN **SEEDS AND EFFECTS ON NODULATION.** <u>Sabry</u> <u>Younis Mahmoud¹ and Mamdouh Hussain Abd El-</u>Ghaffar². (1) Faculty of Agriculture, Agricultural Microbiology Department, Sohag University, Sohag, 82786, Egypt; (2) Department of Agricultural Microbiology, Ain Shams University, P.O. Box 68, Hadayek Shubra, 11241, Cairo, Egypt, Email: younisabry@gmail.com

During a survey for faba bean bean viruses, a virus was identified as Broad bean stain virus (BBSV), a member of the genus *Comovirus*. The virus was mechanically transmitted and also through seeds. The ultraviolet absorption spectrum of the purified virus showed a typical curve of nucleoprotein. The yield of purified virus was 0.61-0.63 mg/kg of infected tissue. Electron microscopy of purified preparations revealed the presence of isometric virus particles, 27 nm in diameter. The polyclonal antibodies against BBSV were produced and the antiserum titre of three bleedings was determined by indirect DAS-ELISA. Significant reduction of nodulation was achieved by virus inoculation on broad bean plants cv. Giza 402. It produced smaller, fewer nodules and reduced its leghaemoglobin content. As well as seed yield quality and quantity was strongly affected due to infection. When cells of root nodules in BBSV-infected faba bean plants were investigated by transmission electron microscopy, a decrease of number, volume of bacteroids in nodule cells and the space between the bacteroid and its membrane envelope (ME) were observed and compared with healthy cells. This difference was accompanied with the presence of BBSV particles in the root nodule cells. Seeds taken from these plants were tested for the presence of the virus by DAS-ELISA and symptoms development on the seedlings produced. There was a good correlation between ELISA detection of BBSV in tissue taken from single faba bean seeds and subsequent development of infected plants grown from the same seeds. BBSV was detected by ELISA in the cotyledons and developing axis of the embryo, but not in seed coat tissues. When mixtures of infected and healthy seeds in different ratios were tested, BBSV was detected in mixtures up to 1:100 (infected: healthy). The ELISA technique is reliable for selecting BBSV-free stocks of faba bean seeds.

V2

TWO NEW SQUASH GENOTYPES RESISTANT TO ZUCCHINI YELLOW MOSAIC VIRUS. <u>Abd</u> <u>Ul-Basit A. Al-Janabi</u>, Ali J. Abd, Sarab A. Al-Mykhtar, Basim M. Radi and Essam A. Sultan, Agriculture Research and Office, Ministry of Science and Technology, P.O. Box 765, Baghdad, Iraq.

Recently, Zucchini yellow mosaic virus (ZYMV) was reported as a limiting factor of squash production especially in spring and summer in most regions of the world. Resistant cultivars is the best method of virus diseases control. Some squash hybrids and cultivars were produced by self pollination for six successive generations. Two different types of ZYMV resistance were differentiated in two different genotypes. In the first genotype, mosaic symptoms were developed, but with no fruit color and shape variation, and accordingly fruits growth and development and their marketing value were slightly affected. In the second genotype, the dense hairy upper surface reduced the frequency of probing by aphid virus vectors, and that reduced virus incidence and increased the productivity period. These two genotypes were selected assources of ZYMV resistance. Number of genes that confer resistance and their heritability were determined in later. Other genotypes of different desired agronomic traits were also selected.

V3

EPIDEMIOLOGY AND DISTRIBUTION OF SOIL BORNE VIRUSES IN POTATO FIELDS, AND ARE NOT DISSEMINATED BY BIOLOGICAL VECTORS. <u>Hameed Hamoud Ali</u>, Department of Plant Protection, College Agriculture & Forestry, Mousel University, Iraq, Email: hameedkanoo@yahoo.com

During farm visits of potato fields in the area of Rashidiya, Nineveh province (Iraq), virus diseases symptoms were observed. Soil samples were collected from areas near the root zone of infected plants. *Tobacco mosaic virus* and *Potato virus X* were detected by using indicator plants and by DAS-ELISA test. No living vector was found in the soil samples tested.

V4

DIAGNOSIS OF NEW VIRUSES ON TOMATO CROP IN NINEWA PROVINCE BY ELISA AND BIOLOGICAL TESTS. Anahed W. Daham and <u>Nabel</u> <u>A. Kassim</u>, Plant Protection Department, College of Agriculture and Forestry, Mosul University, Iraq.

Five viruses were identified from tomato fields, namely Tomato mosaic virus (ToMV), Tomato spotted wilt virus (TSWV), Tomato bushy stunt virus (TBSV), Tomato yellow leaf curl virus (TYLCV), Tomato aspermy virus (TAV), in addition to Tomato fruit yellow ring virus (TFYRV) which was detected in imported tomato fruits. Diagnostic indicator plants were employed as well as the Double Antibody Sandwich ELISA technique in which monoclonal antibodies were used. This study is the first record fo the occurrence of TAV, TSWV, TBSV, and TFYRV in Iraq. A mixed infection with ToMV and TAV was recorded. The two viruses were separated by artificial inoculation of Nicotiana glutinosa which gave local lesions for ToMV and systemic symptoms for TAV. Both Myzus persicae (Sulzer.) and Acyrthosiphon gossypi (Mordv) failed in transmiting ToMV.

V5

SURVEY OF POTATO VIRUSES IN JORDAN. <u>Nida' M. Salem</u>, Akel Mansour and Noor Obida, Department of Plant Protection, Faculty of Agriculture, University of Jordan, Amman 11942, Jordan, Email: n.salem@ju.edu.jo

Potato viruses are known to cause serious diseases, and significantly reduce the yield and quality of potato crops. Therefore, field surveys were carried out in potato growing areas during the growing season 2012-2013 to evaluate the incidence of potato viruses in Jordan. A total of 1238 potato samples were collected from Jordan Valley, Wadi Araba, Mudawarra, Madaba, Zarga and Ar Ramtha. The Double-antibody sandwich enzyme linked immunosorbent assay (DAS-ELISA) tests indicated that about 56% of the collected samples (688 out of 1238) were found to be infected with one or more virus. Around 34% of the samples were virus infected by one virus, two (11%), three (5%) or more (6%). The survey results revealed the presence of Potato virus Y (PVY), Potato leaf roll virus (PLRV), Potato virus X (PVX), Potato virus A (PVA), Potato mop top virus (PMTV), Potato virus S (PVS) and Potato virus M (PVM). However, remarkable differences in incidence were observed between the different viruses as well as geographical locations. PVY was the dominant viral disease in potato fields since around 50% of the collected samples were found to be infected with PVY either in single or mixed infection. The PLRV occupied the second position with 16% infection followed by PVM, PMTV, PVA, PVX and PVS with 12, 6, 5.6, 5.6, and 4% infection, respectively. This is the first report of the presence of PMTV, PVS and PVM in Jordan.

V6

DETECTION OF SOIL BORNE VIRUSES ON SUGAR BEET USING MULTIPLEX RT-PCR AND OF POLYMYXA BETAE USING A SCANNING ELECTRON MICROSCOPE (SEM). Loubna S. Deibeh and <u>Ahmad M. Mouhanna</u>, Department of Plant Protection, Agriculture Faculty, Damascus University, Syria, Email: a.m.mouhanna@gmail.com

Polymyxa betae is considered the only vector of many viral diseases ,which caused more loss in root yield and reduction in proportion and quality of sugars. Viral diseases are caused by Beet necrotic vellow vein virus (BNYVV) and Beet Soil borne virus (BSBV). In addition, P. betae is the vector of Beet soil borne mosaic virus (BSBMV) and Beet virus O (BVO). A multiplex reverse transcription-PCR technique was used to detect several viruses in single sample based on using a combination of specific primers. So the purpose of this study was to simultaneously detect all viruses associated with P. betae Keskin. to economize costs and effort. Six soil samples were collected from sugar beet fields found infected with rhizomania in Syria and Lebanon. Soil samples were planted with the sensitive sugar beet cultivar Helma. After approximately ten weeks, plants grown in the greenhouse were harvested and checked under scanning electron microscope (SEM). The cross section of roots showed several cortex cells that contained spore clusters of P. betae using 6000 X magnification. Total RNA was extracted from roots

infected with *P. betae.* RT-PCR and Multiplex-PCR were carried out using specific primers for BNYVV, BSBV, BSBMV and BVQ. BNYVV was detected of in all samples, whereas BSBV was ected only in the soil sample from Lebanon.

V7

OCCURRENCE OF GRAPEVINE LEAFROLL ASSOCIATED VIRUSES IN ALGERIAN VINEYARDS. <u>Arezki Lehad</u>¹, Ines Soltani², Ilhem Selmi², Meriem Louanchi¹, Mouni Aitouada¹ and Naima Mahfoudhi² and Asma Najar². (1) Laboratoire de phytopathologie et Biologie Moléculaire, Ecole Nationale Supérieure d'Agronomie, Rue Hacen Badi, Belfort, El Harrach, 16000 Alger, Algérie; (2) Laboratoire de Protection des Végétaux, Institut National de la Recherche Agronomique de Tunisie, Rue Hedi Karray, 2049 Ariana, Tunisie.

Grapevines in central and western region of Algeria were surveyed for the prevalence of grapevine leafroll associated viruses. The field study and collection of samples were conducted in four major grapevine-growing areas. Samples collected from 584 vines were tested for Grapevine leafroll-associated virus 1, 2, 3, 5 and 6 (GLRaV-1, -2, -3, 5 and 6). According to diagnostic tests by ELISA, 325 of 584 samples (55.7%) were found to be infected. GLRaV-3 (47.8%) was found to be the most frequently encountered virus associated with leafroll disease of grapes, followed by GLRaV-2 (15.8%), GLRAV-1 (5.3%). Six samples were found positive for GLRaV-5 and only 2 for GLRaV-6. Positive samples were tested by RT-PCR in order to confirm their presence and some isolates of GLRaV-1, -2, -3 and -5 were sequenced.

V8

SURVEY OF TOMATO SPOTTED WILT VIRUS ON SOLANACEOUS CROPS AND ASSOCIATED WEEDS IN LATAKIA PROVINCE. Imad Ismail¹, Ensaf Akel² and <u>Mohamad Hussam Halabi³</u>. (1) Department of Plant Protection, Faculty of Agriculture, Tishreen University, Latakia, Syria; (2) General commission for Scientific Agricultural Research (GCSAR), Latakia, Syria; (3) Department of Plant Protection, Faculty of Agriculture, Tishreen University, Latakia, Syria; Email: wiltspoted@gmail.com

A survey of *Tomato spotted wilt virus* (TSWV, genus *Tospovirus*, family *Bunyaviridae*) on some *solanaceous* crops and associated reservoir weeds was conducted between March and November 2013. 983 field samples were collected (703 solanaceous crops, 280 associated weeds), and 218 greenhouse samples (190 solanaceous crops, 28 associated weeds). Tissue Blot Immunobinding Assay TBIA were performed to detect TSWV. Results of TBIA of tested samples showed the natural infection of TSWV in Latakia by 22.06%. Virus incidence in field crops was 8.82% on solanaceous crops and 62.5% on associated weeds and in greenhouse crops was 2.11% on solanaceous crops

and 85.71% on associated weeds. This is the first report in Syria of *Tomato spotted wilt virus* on tobacco, eggplant, and several weeds (*Cucurbita pepo, Malva* sp., *Sonchus* sp., *Amaranthus* sp., *Xanthium strumarium*, *Convolvolus arvensis*, *Inula viscosa*, *Portulaca oleracea*, *Chenopodium murale*, *Merculialis* sp. and *Alopecurus moysuroides*).

V9

IDENTIFICATION AND SEASONAL VARIATION OF VIRAL DISEASES OF FOOD LEGUMES AND CEREALS IN ETHIOPIA, MOROCCO AND UZBEKISTAN. <u>Safaa G. Kumari¹, Tebkew Damte²,</u> Saadia Lhaloui³, Zafar Ziyaev⁴, Adane Abraham², Berhanu Bekele², Seid A. Kemal⁵, Mustapha El-Bouhssini⁶.(1)International Center for Agriculture Research in the Dry Areas (ICARDA), Tunis, Tunisia; (2)Ethiopian Institute of Agricultural Research, Addis Ababa, Ethiopia; (3) INRA, Settat, Morocco; (4) Kashkadarya Scientific Research Institute of Grain Breeding and Seed Production, Beshkent 3km, Karshi, Uzbekistan; (5) ICARDA, Addis Ababa, Ethiopia; (6) ICARDA, Rabat, Morocco, Email: s.kumari@cgiar.org

Field surveys were conducted in Ethiopia, Morocco and Uzbekistan during 2012 and 2013 cropping seasons to monitor viral diseases of food legumes (faba bean, chickpea and lentil) and cereals (barley and wheat) to study the effect of climate variability/change and develop GIS based pest risk map for Central Asia and North Africa. Climate change may affect both host plant and insect-vector populations (e.g. aphids, beetles, leafhoppers), thereby affecting the spread of plant viruses. In these surveys, the viruses that are transmitted by insects were monitored. Surveyed fields coordinates were determined by a GPS instrument. All fields visited were randomly selected, and the types of viruses present and their incidence were determined on the basis of virus symptoms observed. In addition, 15-20 symptomatic samples were collected from each field for laboratory testing. From Uzbekistan, 674 chickpea, 164 barley and 631 wheat samples were collected from 74, 12 and 43 fields, respectively, located in Tashkent, Sirdarya, Jizzah, Samarkand and Surkhandarya regions. From Ethiopia, 462 faba bean, 19 lentil, 93 chickpea, 115 barley and 336 wheat samples were collected from 75, 4, 10, 13 and 34 fields, respectively, located in North Gondar and North Shewa of Amhara region and East Shewa of Oromia region. From Morocco, 178 faba bean, 48 chickpea, 31 lentil, 66 barley and 11 wheat samples were collected from 18, 6, 2, 5 and 3 fields located in Abda, Doukkala and Sais regions. All legume samples collected were tested by tissue blot immunoassay (TBIA) against the following 11 legume virus antibodies: Bean leafroll virus (BLRV), Chickpea chlorotic stunt virus (CpCSV), Beet western yellow virus (BWYV), Faba bean necrotic yellows virus (FBNYV), Bean vellow mosaic virus (BYMV), Pea seed-borne mosaic virus (PSbMV), Alfalfa mosaic virus (AMV), Cucumber mosaic virus (CMV), Broad bean

stain virus (BBSV), Broad bean mottle mosaic virus (BBMV), and Chickpea chlorotic dwarf virus (CpCDV). Cereal samples were tested for the presence of only two cereal viruses [Barley vellow dwarf virus (BYDV) and Barley vellow striate mosaic virus (BYSMV)]. Laboratory tests showed that, in chickpea fields in Uzbekistan, FBNYV was the most commonly (detected in 22% of tested samples), followed by BYMV (6%), BLRV (5%) and CpCSV (3%); whereas, BLRV (23%) and BYMV (22%) were most common in legume fields in Morocco, followed by CpCSV (13%) and BBMV (7%). In Ethiopia, only CpCSV was detected in legume samples at high incidence (55%) and FBNYV in a very low incidence (less than 1%). TBIA results of cereal samples revealed that BYDV was prevalent in all three countries, but most frequent in Morocco (54%) followed by Ethiopia (27%) and Uzbekistan (3%); whereas BYSMV was detected only in cereal samples collected from Uzbekistan (3%).

V10

SURVEY OF PEACH VIRUSES IN QAA REGION, LEBANON WITH OBERVATIONS ON OTHER MAJOR PHYTOSANITARY PROBLEMS. Elia Choueiri¹, Wassim Habib², Aahed Mehyiddinn³, Fouad Jreijiri¹, Samer Wakim¹ and Randa Massaad⁴. (1) Department of Plant Protection, Lebanese Agricultural Research Institute, Tal Amara, P.O. Box 287, Zahlé, Lebanon; (2) Laboratory of Mycology, Department of Plant Protection, Lebanese Agricultural Research Institute, Lebanon; (3) Faculty of Agriculture, Lebanese University, Beirut, Lebanon; (4) Department of Irrigation and Agrometeorology, Lebanese Agricultural Research Institute, Tal Amara, Lebanon, Email: echoueiri@lari.gov.lb

In Lebanon, peach is among the most important fruit trees production and the area planted with peach is around 3560 Ha. Considering the scarce knowledge on the sanitary status of newl large peach trees plantations in Qaa region in Bekaa valley, field surveys were carried out to assess the incidence of virus diseases in this area. To this aim, thirty commercial orchards were visited and studied in spring-summer 2013 through the Water and Livelihood Initiative Project. A total of 450 peach samples were collected randomly and tested by DAS-ELISA for Prunus necrotic ringspot virus (PNRSV), Prune dwarf virus (PDV), American plum line pattern virus (APLPV), Apple mosaic virus (ApMV), Plum pox virus (PPV), Tomato ringspot virus (ToRSV), Arabis mosaic virus (ArMV), Tobacco ringspot virus (TRSV), Strawberry latent ringspot virus (SLRSV), Cherry leafroll virus (CLRV), Raspberry ringspot virus (RpRSV) and Apple chlorotic leaf spot virus (ACLSV). Peach latent mosaic viroid (PLMVd) was identified by PCR. About 18.8% of the tested samples were infected by at least one virus. In particular, the prevailing virus was PNRSV (37.6% of infection), followed by ApMV (31.7%) and ACLSV and PDV (15.3%). Mixed infections were about 10.5%. None of the collected samples tested positive for PPV, SLRV, RpRSV, ToRSV, CLRV, ArMV, TRSV and APLPV indicating their probable absence in peach fields in Qaa area. PLMVd was identified only in 3 samples. Samples collected from plants showing symptoms indicative of diseases caused by fungal pathogens were analyzed. The fungi *Phytophthora* spp., *Wilsonomyces carpophilus, Sphaerotheca pannosa, Leucostoma cincta* and *Botryosphaeria* spp. were the main pathogens associated with the diseased plants. However, *Anarsia lineatella* and *Ceratitis capitata* were the most common insects causing main economical damage on peach fruit.

V11

TRANSMISSON OF WATERMELON MOSAIC VIRUS IN PUMPKIN SEEDS IN SYRIA. <u>M. Jamal</u> <u>Mando</u> and Faiz Ismail, Plant Pathology division, Plant Protection Administration, General Commission for Scientific Agricultural Research, Damascus, Syria, Email: jamalmando@gmail.com

This study was carried out to estimate the transmission possibility of the most important viruses affecting cucurbits in seeds of local pumpkin Cucurbita maxima Duchense in Syria. Seedlings of pumpkin were inoculated in the second true leaf stage with an isolate of each of Zucchini vellow mosaic virus (ZYMV), Watermelon mosaic virus (WMV) and Cucumber mosaic virus (CMV). Seeds of each fruit resulted from the inoculated plants were grown and the number of seedlings showing viral infection symptoms was calculated and these seedlings were tested by ELISA against the inoculated viruses. Serological test confirmed the infection of the inoculated pumpkin plants with the mentioned viruses and plants with a mixed infection were detected. Symptoms of mosaic, mottle and leaf curling were observed on pumpkin seedlings resulted from only WMV inoculated plants and its infection with WMV alone was confirmed using ELISA. Infection rate was between 4.2% and 9.4% with average of 7.25%. Serological test didn't show infection of these seedlings with ZYMV and CMV. To our knowledge, this is the first record of Watermelon mosaic virus transmission in Cucurbita maxima seeds in Syria.

V12

IDENTIFICATION OF SOURCES OF RESISTANCE TO THREE MAJOR LENTIL VIRUSES. <u>Ahmed Ekzayez¹</u>, Safaa G. Kumari¹, Joop van Leur² and Aya Kanawaty¹. (1) Virology Laboratory, International Center for Agricultural Research in the Dry Areas (ICARDA),Tunis, Tunisia; (2) New South Wales Department of Primary Industries (NSW DPI), Tamworth, Australia, Email: A.Ekzayez@cgiar.org

Lentil (*Lens culinaris* Medik.) is a highly valued food legume, well adapted to dryer and marginal environments of the Near East and South Asia. Viral diseases in these environments can have a major effect

on lentil yields. The use of genetically based resistance is the most economical and environmentally friendly way to control these potentially devastating diseases. In order to develop resistant varieties, breeding programs need access to diverse sources of parental material with high levels of virus resistance. A program has been initiated to evaluate a large germ plasm collection in order to identify resistance to three of the most important lentil viruses; Beet western yellows virus (BWYV), Chickpea chlorotic stunt virus (CpCSV) and Alfalfa mosaic virus (AMV). A selection of 300 lentil landraces, conserved in ICARDA gene bank and originating from 72 countries, was evaluated using artificial inoculation under field and greenhouse conditions. Field screening was done in batches of 100 accessions per year during a 3-year period (2010-2013) while all accessions were evaluated in the greenhouse during 2014. Selection was based on (i) incidence and severity of infection (0-3 scale), and (ii) virus concentration based on the intensity of reaction by Tissue blot immunoassay (TBIA). There was a moderate correlation between the greenhouse study and the field trials for BWYV and CpCSV (r = 0.37 and 0.31 respectively), and a high correlation for AMV (r = 0.84). Data were analysed to establish possible relationships of resistance with geographic origin and seed characteristics, such as pattern of testa and its color. High levels of AMV resistance were identified in 24 accessions, mostly originating from Europe. Resistance to CpCSV was identified in 22 lines originating from 15 countries. A cluster of CpCSV resistance appeared in 9 accessions originating from Iran, Pakistan, and Afghanistan. Only 6 accessions from 5 countries (2 from Nepal) showed a good level of resistance to BWYV. CpCSV resistance was positively associated with absence of pattern or dotted with black color pattern of testa. For BWYV, resistance positively associated with spotted, marbled, complex pattern of testa. No correlation was found between AMV resistance and seed traits. This study identified new sources of resistance to important virus disease in lentil and provided useful information that could assist further exploration of germ plasm collections for sources of genetic resistance.

V13

INFLUENCE OF PLANTING DATE ON THE INCIDENCE OF VIRUS DISEASES IN FABA BEAN CROPS IN NORTHERN TUNISIA. <u>Sana</u> <u>Timoumi^{1,2}</u>, Safaa G. Kumari¹, Ahmed Ekzayez¹ and Asma Najar². Virology Laboratory, International Center for Agricultural Research in the Dry Areas (ICARDA), Tunis, Tunisia; (2) Institut National de Recherches Agronomiques,(INRAT), Tunis, Tunisia, Email: sana_timoumi@hotmail.fr

A field survey was carried out during 2012/13 growing season to determine the effect of planting date (as one component of Integrated Pest Management) on the incidence of virus diseases that are transmitted by insects (aphids and sitona) at the main production faba bean areas in northern Tunisia (Cap-Bon, Beja, Jendouba, Bizerte, Fernana). The surveys covered 58 fields (30 fields planted early and 28 fields planted at optimum planting date/late planting date). A total of 7731 faba bean samples were collected randomly (4020 samples from fields planted early and 3711 samples from field planted at optimum date/late), in addition, 1102 faba bean samples with virus symptoms (mosaic, mottling, vellowing, stunting) were collected. All samples collected were tested by Tissue blot Immunoassay (TBIA) using the following four specific virus antibodies that are transmitted by insects: Broad bean mottle virus (BBMV), Bean yellow mosaic virus (BYMV), Faba bean necrotic yellows virus (FBNYV) and Chickpea chlorotic stunt virus (CpCSV). Field observations showed that early plantings have higher populations of insects (sitona and aphids), leading to higher virus infection (7.3%) compared with optimum planting date (3.4%). BBMV, FBNYV, CpCSV and BYMV were detected in all fields that were planted early, whereas BYMV and FBNYV were not detected in most of the fields that were planted in optimum date. BBMV was the most prevalent virus, it was detected in 4.4% and 1.9% in the fields planted early and normally, respectively, followed by CpCSV (2.5% and 1.4%), BYMV (0.7%, 0.2%) and FBNYV (0.6%, 0%). The % of virus diseases was higher in Fernana region compared with the other surveyed regions (9.3% in the early planting fields and 4.5% in normally planting fields), and the BBMV was the most prevalent virus in this region (6.9%, 3.2%), followed by BYMV (1.3%, 0.8%), FBNYV (0.9%, 0.3%) and CpCSV (0.5%, 0%) in the early planted fields and normally planted fields, respectively.

V14

STUDY OF THE FREQENCY OF TWO VIRUSES (PNRSV AND PPV) AND TWO VIROIDS (PLMVD AND HSVD) ON STONE FRUIT TREES IN SETIF AND MILA WILAYATES IN ALGERIA. Y. Abdi, O. Hammouchi and N. Rouag, Departemnt of agronomy, FSNV–UFAS Sétif -1, Algeria, Email: ayamina17@yahoo.fr

The study investigated the frequency of two viruses (PNRSV and PPV) and two viroids (PLMVd and HSVd) on five species of stone fruits, i.e plum, peach, almond, cherry and apricot in two wilayates: Setif and Mila. 286 samples were collected during the spring from 16 orchards and serologically analyzed by DAS- ELISA for the presence of PPV and PNRSV. The results showed that 13 samples out of 286 samples analysed were virus infected, giving a rate of general infection equal to 4.54%. The infection rate with PNRSV was around 2.79% while equivocal results on five samples infected with PPV (1.74%). 381 samples were collected during autumn from 13 orchards and tested by immunoprinting hybridazation technique to detect PLMVd and HSVd. The results revealed that 8

samples were infected with HSVd, suggesting a general infection rate of 2.09%.

V15

DETECTION OF SOME TOMATO VIRUSES IN GREEN HOUSES ALONG THE SYRIAN COAST. <u>Ensaf Akel¹</u>, Eshrak Ali¹ and Imad Ismail². (1) General Commission for Scientific Agricultural Research (GCSAR), Lattakia, Syria; (2) Faculty of Agriculture, Tishreen University, Lattakia, Syria, Email: ensafakel5n4a@gmail.com

The aim of this study was to evaluate viral infection rate on Tomato (Lycopersicum esculentum) along the Syrian costal region during 2007 growing season. Five hundred and eighteen samples with symptoms suggestive of virus infection (mosaic, vein clearing, mottle, yellowing, stunting, and leaf distortion) were collected and tested by Enzyme Linked Immunosorbent Assay (DAS-ELISA). Results of DAS-ELISA of tested samples showed the natural infection of tomato crop by Tomato ring spot virus (ToRSV), Tobacco mosaic virus (TMV), Potato Y virus (PVY) and Tomato Spotted wilt virus (TSWV), at the following rates: 2.58%, 2.24%, 1.89%, and 0.86%, respectively. No positive reaction for Cucumber mosaic virus (CMV), *Tomato yellow leaf curl virus (TYLCV), Tomato mosaic* virus (ToMV), Pepeno mosaic virus (PepMV) was obtained for any of the samples tested.

V16

SOME WEED HOSTS OF SWEET POTATO FEATHERY MOTTLE VIRUS IN SYRIA. Ensaf <u>Akel¹</u>, Salah Al-Chaabi² and Imad Ismail³. (1) General Commission for Scientific Agricultural Research (GCSAR), Lattakia, Syria; (2) GCSAR, Damascus, Syria; (3) Faculty of Agriculture, Tishreen University, Lattakia, Syria, Email: ensafakel5n4a@gmail.com

Survey was conducted in Syrian coastal area to identify natural weed hosts of Sweet potato feathery mottle virus. Eight hundred sixty eight individually selected samples representing fifty six species (forty five genus, twenty three families) were collected from ten fields related to fife regions (Zagrin, Sarsakia, Brgan, Ras Al-Aen, and Hreson) during 2007- 2008 growing seasons. All samples were tested for Sweet potato feathery mottle virus by using Tissue blot immunobinding assay and polyclonal antisera. Results showed that nineteen species naturally infected with Sweet potato feathery mottle virus (Amaranthus retroflexus L., Atriplex hastate L., Brasica oleracea var. capitata., Calendula officinalis L., Capsicum annum L., Chenopodium sp., Chenopodium hybridum L., Chenopodium polyspermum L., Chenopodium vulvaria L., Convolvulus arvensis L., Cucurbit maxima Dush., Heliotropium europaeum L., Ipomoea violacea L., Malva neglecta Wallr., Mentha arvensis L., Phaseolus lanatus L., Sinapis arvensis L., Spinacea oleracea L., Traxacum officinale Web) were belonging to twelve families. Most naturally, infected weed species with Sweet potato feathery mottle virus were found belonging to *Chenopodiaceae* and *Convolvulaceae* families. Except for *I. batatas* L. all infected weed species with SPFMV were recorded for the first time in Syria as natural hosts of SPFMV.

V17

DETECTION OF VIRUSES THAT INFECT TOMTO CROP IN OSEATA AREA NORTH EL-BEIDA CITY IN ELGABAL ALAKDAR, LYBIA. <u>Omar M. El-Sanousi</u>, Department of Plant Protection, Faculty of Agriculture, University of Omar AlMukhtar El-Beida, Libya, Email: omarelsanousi2@yahoo.com

This study covered tomato fields in Oseata area North El-Beida City in ElGabal Alahkdar. Collected samples that showed mosaic, yellowing, leaf curl and malformation symptoms were collected from several fields in this area and tested for the presence of viruses using several virus antiserafor Tomato mosaic virus (ToMV), Tobacco mosaic virus (TMV), Tomato ring spot virus (TRSV), Tomato spotted wilt virus (TSWV), Black ring spot virus (BRSV), Cucumber mosaic virus (CMV), Potato virus Y (PVY), Potato virus X (PVX) and Tobacco mosaic virus (TMV). By using DAS-ELISA test ,the results indicated the presence of ToMV, TRSV, and TSWV. TMV was not detected in these tests. However, when the samples were tested by direct antigen coating ELISA at the Virology Laboratory, Agricultural Botany Department, Faculty of Agriculture, University of Alexandria, Egypt showed the presence of CMV but not PVY, PVX and TMV.

V18

OCCURRENCE, YIELD LOSS AND RATE OF SEED TRANSMISSION OF FOUR SEED-BORNE VIRUSES IN SUDANESE FABA BEAN VARIETIES. Omaima M. Abdelgader¹, S.G. Kumari², Z. Bishaw³, M.A. Maher⁴, A.M. Adlan⁴ and N. Attar⁵. (1) National Seed Administration, Ministry of Agriculture, Khartoum, Sudan; (2) International Center for Agriculture Research in the Dry Areas (ICARDA), Tunis, Tunisia; (3) ICARDA, Addis Ababa, Ethiopia; (4) Agricultural Research Corporation, Wad Medani, (5) Aleppo, Sudan; ICARDA, Syria, Email: omaimaabdelgader@vahoo.com

Faba bean (*Vicia faba* L.) is the most important food legume crops in Sudan. It provides a major part of the daily diet for the population. There have been fluctuations in production area and yield due to many factors including virus diseases. In 2011 and 2012 cropping seasons, field surveys were carried out to determine the occurrence of seed-borne viruses in major faba bean production regions of Northern Sudan. During both surveys, symptomatic and random samples were collected, blotted on nitrocellulose membranes (NCM) and tested by Tissue blot immunoassay (TBIA) at the Virology Laboratory of the International Center for Agriculture Research in the Dry Area (ICARDA). Laboratory results showed that *Bean yellow mosaic*

virus (BYMV) was the most common (49.5% and 33.3% of symptomatic and random samples tested, respectively), followed by Pea seed-borne mosaic virus (PSbMV) (15.7% and 4.0%), Broad bean stain virus (BBSV) (12.5% and 10.9%) and Broad bean mottle virus (BBMV) (7.4% and 0%). Based on survey results, three field experiments were carried out during 2012/2013 (one experiment at Tel-Hadya, ICARDA and 2013/2014 (two Station, Aleppo, Syria), experiments at Shambat and Hudeiba ARC stations, Sudan) growing seasons to study the yield loss caused by these seed-borne viruses (BYMV, PSbMV, BBMV, BBSV). During the field experiment, seed-transmission rates of these viruses were also studied in four Sudanese faba bean varieties (BB7, SML, Damer, Turkey) and a Syrian local variety (ILB 1814). Plants were inoculated mechanically using Syrian virus isolates during 2012 and Sudanese virus isolates during 2013 at seedling, flowering and fruiting stages) using different infection levels (5, 25, 50 and 100%). All the harvested seeds from all treatments were germinated and more than 80,000 seedlings of faba bean were blotted on NCM to be tested by TBIA against the four seed-borne viruses to measure the seed transmission rates of these viruses using Sudanese faba bean varieties. Results showed that high yield loss occurred when plants were inoculated at seedling stage with 100% infection level. High % yield loss obtained due to infection with BBSV (76.9% at Hudeiba, 50% at Tel-Hadya and 39.3% at Shambat) followed by BBMV (64, 68, and 51%), BYMV (43, 46 and 53.7%) and PSbMV 46.5, 48.6 and 46.1%) at Hudeiba, Tel-Hadya and Shambat Stations, respectively. Results also showed that the high transmission rate of the virus via the seeds was when the plants were inoculated at seedling stage. Transmission rate from infected seeds to seedlings of BBSV was high (reached 9.4%) followed by BYMV (7.6%), BBMV (2.8%) and PSbMV (2.3%).

V19

STEM –PITTING OF CITRUS OUTBREAK IN EL-SHARKIA GOVERNORATE, EGYPT. <u>M.M.M.</u> <u>Atia.</u> Plant Pathology Department, Faculty of Agriculture, Zagazig University Zagazig, Egypt, Email usamaatia2@yahoo.com

Stem Pitting and/or Quick decline tristeza disease is an economically important graft-transmissible pathogen of citrus. The disease cause's major global declines in citrus production grown in the commercial citrus regions worldwide, where sensitive rootstocks predominate. This disease caused by an infectious filamentous closterovirus, *Citrus tristeza virus* (CTV), which is phloem limited and aphid vectored. The efficient CTV vector is the brown citrus aphid (*Toxoptera citricida* Kirkaldy) and other aphid species. There are many different strains of CTV, some are mild and may have no visible effect on citrus plants, while other strains can be severe and destructive. There are different strains of the virus, each producing a different

suite of symptoms on different citrus cultivars and rootstocks. Trees with severe CTV are generally stunted and have small fruits. Stem-pitting CTV can cause a bumpy or 'ropy' appearance on tree trunks and limbs of trees. Bark can be abnormally thickened. Under the bark, stem pitting ranges from deep to shallow pitting, and gumming. It can vary from a few small pits to many fine honeycomb-like pits. Most citrus species and cultivars are susceptible to CTV, but vary in reaction from resistant to tolerant or sensitive. Infected citrus were surveyed at different orchards located at el-sharkia governorate (el-mollak, ramsis and el-horria, el-salhi, elkattara, abu-nassar, abo-shallan and toret el-kassara). Samples were collected from the aforementioned locations and transferred to Plant Pathology Laboratory, Faculty Agriculture, Zagazig University. The external and internal symptoms were photographed as well as stem samples were stained to certify the infection. Typical disease symptoms were found on Valencia orange, naval orange, common mandarin and Clementine. Valencia orange was the most infected one followed by mandarin. Volkameriana rootstock was the most susceptible one compared to sour orange. Further studies will be done using ELISA, dot-blot immunological test and PCR to detect the CTV in the infected samples.

V20

COMPARATIVE REACTION OF DIFFERENT CITRUS VARIETIES TO INFECTION WITH CITRUS TRISTEZA VIRUS. <u>Hadjira Belkahla</u> and Fadhila Guettouche, University Saad Dahleb of Blida, Faculty of Science of Nature and Life, Department of Biotechnology, Virology laboratory, Algeria, Email: hbelkahla@yahoo.fr

The quick decline of citrus is caused by the most destructive virus of citrus, The Citrus tristeza virus (CTV), which is widespread in the world as a result of the movement of infected material, mainly from China Meyer trees. Transmission of the virus, in a semipersistent manner by several species of aphids, especially Toxoptera citricida and A. gossypii. Vigilance and systematic quarantine of agricultural products at the borders of the countries of North Africa is required to prevent the entry of the virus or its biological vectors. A harmonized control strategy of this virus and its vectors in the Mediterranean countries is urgently needed. In Algeria, serological tests have confirmed the presence of CTV in areas of Mitija Hadjout. The results of DAS-ELISA and DTBIA tests showed how the disease is progressing with time; from 4.65% in 2001 to 33% in 2011. Different potential vectors of CTV were identified, with Aphis gossypii being the most effective vector.

V21

EMERGING INVASIVE WHITEFLY-TRANSMITTED VIRUS DISEASES OF CUCURBIT CROPS IN THE MEDITERRANEAN **REGION: A CASE STUDY OF LEBANON.** <u>Yusuf</u> <u>Abou-Jawdah¹</u>, Hana Sobh, Peter Abrahamian, Jamil Samsatly and Maan Jawhari, Department of Agricultural Sciences, Faculty of Agricultural and Food Sciences, American University of Beirut, Beirut, Lebanon, Email: abujawyf@aub.edu.lb

During the past three decades, the incidence of whitefly- transmitted viruses, mainly geminiviruses and criniviruses, has increased tremendously due to the rapid expansion of whitefly populations related to many factors, such as climatic change and agricultural trade. Cucurbit production in Lebanon was severely affected from the introduction of four whitefly-transmitted viruses. Cucurbit yellow stunting disorder virus (CYSDV) (genus Crinivirus, family Closteroviridae) was first detected in 2000 and is widely spread. More recently, two begomoviruses (family Geminiviridae), Watermelon chlorotic stunt virus (WmCSV) and Squash leaf curl virus (SLCV), and a crinivirus, Cucurbit chlorotic yellows virus (CCYV) were introduced. SLCV induces severe leaf curl symptoms on squash and has become widely spread all over Lebanon, resulting in vield losses that may sometimes exceed 80% during the fall cropping season. WmCSV was only detected in South Lebanon, and caused severe yield losses to watermelon crops. CCYV was detected in greenhousegrown cucumber plants in single or mixed infections with CYSDV. Specific PCR (RT-PCR) and real-time PCR (RT-PCR) detection methods were developed for detection and quantification of SLCV and for simultaneous detection of CCYV and CYSDV. The effect of single or mixed virus infections on cucumber growth and yield were evaluated. Single infection by SLCV did not lead to any symptoms or yield reduction. CYSDV or CCYV infections led to development of characteristic vellowing symptoms. In single infections, CYSDV caused the highest reduction in height and yield that reached up to 60 percent, with some variation depending on season and variety. CCYV induced reduction in height (10-33%) and in fruit number (10-12%). Dual virus infections did not result in any significant growth or yield reduction over single infections. However, triple infections resulted in substantial reductions in plant height and yield quality as compared to single or dual infections. The implications of these observations on integrated disease management strategies will be discussed.

V22

OF APHID TYRANSMISSON ΡΟΤΑΤΟ **LEAFROLL** VIRUS (PLRV) THROUGH MEMBRANES. M. Hajali¹, H. Kawas² and Y. Abou-Ahmad³. (1) National Commission for Biotechnology (NCBT), Damascus, Syria; (2) Plant Protection Department, College of Agriculture, Damascus University, Damascus, Syria; (3) General Commission for Scientific Agricultural Research (GCSAR), Damascus, Syria, Email: mayyada.hajali@gmail.com

A Syrian isolate of Potato leaf roll virus (PLRV) (SP 25-12) was purified from Physalis foridana through extraction in potassium phosphate buffer and precipitation with polyethylene glycol followed by 2-3 cycles of differential centrifugation. The purified preparation of the Syrian PLRV isolate (SP 25-12) had a UV absorbance A260/A280 and A260/A240 ratios of 1.78 and 1.43, respectively. The average yield of virus was 0.284 mg per 100 g of infected tissue. Aphid transmission was done by using stretched Parafilm membranes containing 20% sucrose (w/v) with different concentration of purified Potato leafroll virus (PLRV) and fed to non viruliferous aphids, Myzus persicae (Sulz.) (Homoptera: Aphididae). In only two out of eight aphids placed on each P. floridana plant when they were fed on a suspension containing 10 µg/ml of virus led to infected plants with chlorotic leaves. Whereas, when five aphids placed on each plant fed on 50 µg/ml of purified virus produced higher infection rate (73%).

V23

PURIFICATION, ANTISERUM PRODUCTION AND DETECTION BY ELISA OF POTATO.LEAF ROLL (PLRV). <u>M. Hajali¹</u>, H. Kawas² and Y. Abou-Ahmad³. (1) National Commission for Biotechnology (NCBT), Damascus, Syria; (2) Plant Protection Department, College of Agriculture, Damascus University, Damascus, Syria; (3) General Commission for Scientific Agricultural Research (GCSAR), Damascus, Syria, Email: mayyada.hajali@gmail.com

Potato is one of the most important economic food crops and a major source of starch for human nutrition. It could be infected with a number of viral diseases, the most serious of which is *Potato leafroll virus* (PLRV, Polerovirus, *Luteoviridae*). PLRV is transmitted mostly by the vector *Myzus persicae*. This study aimed to produce a polyclonal antiserum for a local isolate of PLRV (SP 25-12), purified from infected leaf material. The amount of purified virus produced was 0.4 mg/500 g of infected *Physalis floridana* leaves. The partially purified virus was used as antigen to produce an antiserum through injection into rabbit. The antiserum produced will be used in ELISA test for further studies.

V24

SCREENING OF FABA BEAN CULTIVARS FOR RESISTANCE TO BYMV IN LIBYA. <u>Abdullah S.</u> <u>El-Ammari</u>¹, Omar M. El-Sanousi² and Fathi S. El-Mesmari². (1) Department of Plant Production, Faculty of Agriculture, University of Benfgazi, Benghazi, Libya; (2) Department of Plant Protection, Faculty of Agriculture, University of Omar Al-Mukhtar, El-Beida, Libya.

A total of ten broad bean cultivars were screened for resistance to infection with BYMV, under insect-proof green-house conditions. The experiment was carried out in a completely randomized design with 10 treatments and 7 replicates of each treatment. The seedlings of different cultivars were mechanically inoculated with a BYMV isolate, three weeks after planting. Disease index as a representative of disease intensity was calculated 8 weeks after inoculation. Two cultivars (El-Hwelia and Local-1) were found immune to BYMV infection. Their immunity was confirmed by back inoculation test. Another three cultivars (El-Ehjealat, Benghazi and.Local-2) showed some resistance, whereas the remaining five cultivars were susceptible to BYMV infection.

V25

COMPARATIVE ANALYSIS OF THE COAT PROTEIN-ENCODING RNA3 COMPONENT OF DIFFERENT MEDITERRANEAN ISOLATES OF CITRUS VARIEGATION VIRUS (CVV). <u>Raied</u> <u>Abou Kubaa</u>, Khaled Djelouah and Anna Maria D'Onghia, Department of Plant Protection, Mediterranean Agronomic Institute of Bari (MAIB), Via Ceglie 9, 70010 Valenzano (BA), Italy, Email: raedsir@hotmail.com

Citrus variegation virus (CVV), a definitive species of the genus *Ilarvirus*, family *Bromoviridae*, has a tripartite, positive-sense single-stranded RNA genome. CVV is the causal agent of infectious variegation, a disease occurring all over the world, and affecting a wide range of citrus species and cultivars. Latent infections under certain environmental conditions (high temperature) and graft combinations make field diagnosis difficult for this disease. CVV isolates collected previously from Turkey, Lebanon, Malta, Morocco and Italy and maintained at MAIB facilities were used in the present work. The studied isolates showed different symptoms on leaves such as variegation, crinkle and puckering, and they also induced fruit malformation. The part of RNA3 genome that contains the coat protein (CP) gene was molecularly characterized by RT-PCR and Single Strand Conformation Polymorphism (SSCP). PCR products were cloned and sequenced, and then the obtained sequences were analyzed and compared with others of the same RNA3 component that are available in the Gene bank. SSCP results showed different patterns among the examined isolates, while, low genetic complexity was revealed. The comparative analysis confirmed that RNA 3, which encodes the virus coat protein, is highly conserved in the studied isolates. Furthermore, no geographical correlation could be identified through the tested isolates.

V26

SCREENING CEREAL GENOTYPES FOR RESISTANCE TO BARLEY YELLOW DWARF VIRUS AT ICARDA. Safaa G. Kumari¹, <u>Nouran Attar²</u> and Ahmed Ekzayez¹. (1) International Center for Agriculture Research in the Dry Areas (ICARDA), Tunis, Tunisia; (2) ICARDA, Aleppo, Syria, Email: n.attar@cgiar.org

Barley yellow dwarf virus (BYDV, family Luteoviridae) is considered among the most economically important viruses affecting cereals worldwide. It is not surprising that BYDV is of global importance because it has a very wide host range in the Poaceae and can be spread efficiently by several aphid vectors that are prevalent globally. This virus is present in most countries where its vectors (Rhopalosiphum padi, Sitobion avenae, Metopolophium dirhodum, Rhopalosiphum maidis, Schizaphis graminum among others) are prevalent. Losses of around 10-20% due to natural infection have been reported in Algeria, Morocco and Tunisia. Genetic resistance is in general the most practical approach to reduce the losses caused by BYDV. At ICARDA, efficient and reliable methods were developed to permit screening of a large number of genotypes annually using artificial inoculation. The serological techniques available (Tissue blot immunoassay, TBIA) can easily differentiate tolerant and resistant materials. We used TBIA technique also to define further the mechanism of virus resistance, whether it is based on (i) the level of virus multiplication in the plant and (ii) rate of virus movement from the point of entry. Using these techniques, thousands of barley, bread and durum wheat genotypes were screened for their reaction to BYDV. Our studies, conducted on young seedlings, clearly showed that virus movement was much slower in resistant than in susceptible genotypes. This methodology will permit preliminary screening of a large number of genotypes in a limited glasshouse space. By screening cereal genetic resources, it was possible to identify several cereal lines resistant/tolerant to BYDV infection, which can be used by breeders in their improvement programs. Collaboration with barley breeders over the last ten years permitted the transfer of genes for BYDV resistance into the breeding material developed by the decentralized programs for specific countries and/or regions. This collaboration with breeders generated targeted genetic diversity useful for NARS partners and enhanced the capacity of introducing innovative techniques for a more rapid and reliable screening.

V27

SEROLOGICAL AND MOLECULAR CHARACTERIZATION OF WATERMELON MOSAIC VIRUS INFECTING WATERMELON IN RIYADH REGION, SAUDI ARABIA. Ibrahim M. Al-Shahwan, Mohammad A. Al-Saleh, Adyatma I. Santosa, Omer A. Abdalla and Mahmoud A. Amer, Plant Protection Department, College of Food and Agriculture Sciences, King Saud University, P.O. Box 2460, Riyadh 11451, Kingdom Saudi Arabia, Email: ialshahwan@yahoo.com

Samples were collected from watermelon plants showing virus-like symptoms in the Riyadh region. Testing these samples by ELISA test gave positive reaction to *Watermelon mosaic virus* (WMV)

antibody and negative reaction to ZYMV, PRSV, CMV, and SqMV antibodies. Specific bands of 825-bp were formed on agarose gel for the RT-PCR products using a pair of primer to amplify a fragment of WMV coat protein region. Samples from infected C. pepo, C. sativus, C. lanatus, N. benthamiana, and from WMV-RT PCR product gave positive Nucleic acid hybridization results by forming purple colored circles on nitrocellulose membrane; while healthy control from healthy C. pepo and sterile distilled water as a control gave negative results. The homology tree that was constructed from multiple sequence alignments of the Saudi Arabian isolates of WMV (WMV-SA) with other 18 strains of WMV from nine different countries showed that two WMV strains from Spain and two WMV strains from Iran had the highest similarity with WMV-SA (97.5%, 97.4%, 97.3% and 97.3% respectively). However, the WMV strain from Poland had the lowest similarity (93.9%). These studies identified and characterized WMV that was found infecting watermelon in Riyadh region using PCR as well as its phylogenetic relationship with other isolates of this virus from different countries.

V28

STRATEGIES TO MANAGE PLUM POX VIRUS TRANSMISSON IN PEACH ORCHARDS IN THE NIAGARA REGION OF CANADA. <u>Rana Samara¹</u>, Tom Lowery², Trish Vickers³, Lori Bittner⁴ and Neva Greig Lorne⁵. (1) Southern Crop Protection and Food Research Centre, Agriculture and Agri, Food Canada, 4902 Victoria Ave. N., Vineland Station, ON LOR 2E0, Canada; (2) Pacific Agri, Food Research Center, Agriculture and Agri, Food Research Center, Agriculture and Agri, Food Canada, Highway 97, Summerland, B.C. VOH 1Z0, Canada.

Plum pox virus (PPV) is the most devastating viral disease of stone fruit (Prunus spp.) worldwide. The disease is a member of the genus Potyvirus and family Potyviridae. PPV is spread both vegetatively and transmitted in a non-persistent manner by aphids. The Dideron strain (PPV-D), first detected in Canada in Ontario and Nova Scotia, led to the implementation of an eradication program in 2000 by the Canadian Food Inspection Agency (CFIA). Laboratory and field studies of the transmission of PPV by the green peach aphid, Myzus persicae (Sulzer), were carried out using foliar applications of horticultural mineral oils (HMO) and other novel insecticides. The residual activity of the HMO's on green peach aphid ability to transmit PPV was measured. Changes in aphids probing and feeding behaviors induced by HMO and antifeedant insecticide applications were also monitored using an electrical penetration graph (EPG) system.

V29

TEMPORAL AND SPACIAL DISTRIBUATION OF GRAPE FANLEAF VIRUS (GFLV) IN INFECTED PLANTS. <u>Abeer Abu Shirbi</u>¹ and Abdullah Al-Musa². (1) National Center for Agricultural Research and Extension P.O. Box 639, Baqa'19381, Jordan; (2) Plant Protection Department, Faculty of Agricultural, University of Amman, Amman, Jordan, Email: abeer@ncare.gov.jo

A field study for temporal and spacial distribution of GFLV was conducted in commercial vineyards (previously tested to be infected with GFLV). The selected orchards were in Jordan vally (Al-Shouneh Al-Shamaliah), semi-Ghour area (Moubes), and uplands area (Ajloun). Infected grapevines were selected and labeled in the field. To determine the distribution of viral antigens in grapevines during the year, samples were taken monthly for one year, starting April 2011, until March 2012. Plant samples from all parts of the infected plants (available parts), including dormant buds, breaking buds, bark, fruit, flower, tendril and root tissues, were tested serologically by using ELISA to detect viral antigens. The ELISA technique was standardized for measuring the concentration of the virus in different plant parts at the different developmental stages. Best conditions for the detection of GFLV in grapevine tissues at different seasons in the year have been determined. Leaves from different levels of shoots from the same vine were indexed, at various periods of the year, for the presence of GFLV. In general, the virus was detected in all leaves tested in the three different locations. The detection of GFLV in freshly shaved wood (bark) was possible over the period from November to June, but the detection from the roots was possible over the period from September to June. The highest concentration of the virus in the bark and the roots corresponded with the coldest period, during which there are no leaves on the vines in Jordan. The results showed that dormant buds, breaking buds, leaves during pre-flowering and setting fruit stages, are good sources for virus detection, where high virus concentration was present in these parts. In case of virus detection in fruits, virus concentration decreased as the fruits became more ripe, and the virus was undetectable at full ripening., Tendrils were a good tissue for virus detection when it was tender.

V30

MOLECULAR CHARACTERIZATION OF WATERMELON CHLOROTIC STUNT VIRUS INFECTING WATERMELON CROP IN SAUDI ARABIA. Hassan M. Ahmed, <u>Mohammed A. Al-Saleh</u>, Ibrahim M. Al-Shahwan, Ali M. Idris, Omer A. Abdalla, Mahmoud A. Amer. (1) Plant Protection Department, College of Food and Agriculture Sciences, King Saud Univer sity, P.O. Box 2460, Riyadh 11451,Saudi Arabia; (2) Center for Desert Agriculture, King Abdullah University of Science and Technology, Thuwal 23955-6900, Saudi Arabia.

During the spring of 2014, watermelon leaves exhibited yellowing, severe chlorotic mottling, with young leaves noticeably reduced in size, and plants were stunted. In contrast, the older leaves were distinctively green and normal in size, indicating the

approximate number of leaves that had developed normally prior to infection. The symptoms were reminiscent of Watermelon chlorotic stunt virus (WmCSV), a bipartite begomovirus previously reported in neighbouring countries. Ten samples were collected from three farms in the Leith region, Jeddah, Saudi Arabia and tested by enzyme-linked immunosorbent assay (ELISA) using specific polyclonal antibodies for important cucurbit viruses: Zucchini yellow mosaic virus (ZYMV), Watermelon mosaic virus (WMV), Cucumber green mottle mosaic virus (CGMMV), Cucumber mosaic virus (CMV), Tomato spotted wilt virus (TSWV), Squash mosaic virus (SqMV) and Watermelon chlorotic stunt virus (WmCSV). All samples collected from symptomatic watermelon plants gave positive reactions with WmCSV but not with any of the other antibodies mentioned above in DAS-ELISA assays. Positive ELISA samples were further confirmed by polymerase chain reaction (PCR) using two sets of specific primers for WmCSV DNA-A specific primers (WmCSVF-3' and WmCSVR-3') after total nucleic acids were extracted from these symptomatic plants to obtain a fragment with the expected size of 1110bp. To clone the full-length DNA-A and DNA-B components, nucleic acids were subjected to rolling circle amplification (RCA). The RCA products were cloned into pGEM7 using the unique sites, HindIII for DNA-A and EcoRI for DNA-B. Ten DNA-A clones and two DNA-B component clones were obtained and the inserts were completely sequenced. Sequence alignment of the ten genomic sequences of DNA-A with previously described WmCSV isolates available in Gene Bank, and pairwise comparisons using SDT software revealed that the cloned DNA-A components shared 99-100% nucleotide sequence identity with each other and 97-98% nucleotide identity with WmCSV isolates reported from Yemen [AJ012081], Jordan [EU561237], Iran [AJ245652] and Sudan [AJ245650]. Furthermore, the WmCSV DNA-B from Saudi Arabia shared 93-95% nucleotide identity with sequences of DNA-B of isolates from the same respective neighbouring countries [AJ012082, EU561236, AJ245653, AJ245651]. To our knowledge, this is the first report of WmCSV infection of watermelon in Saudi Arabia.

V31

CHARACTERIZATION OF NEAR -COMPLETE SEQUENCE OF GENOME **COLOMBIAN** SUGERCANE YELLOW LEAF VIRUS (SCYLV) **ISOLATE AND RELATIONSHIP WITH OTHER** LUTEROVIRIDAE MEMBERS. Youssef Abu <u>Ahmad^{1,2}</u>, Philippe Rott² and Monique Royer². (1) General Commission for Scientific Agricultural Research (GCSAR) Damascus-Al-Hijaz, Syria; (2) 2Cirad, UMR Agro.M-Cirad-Inra Biologie et Génétique des Interactions Plante-Parasite (BGPI), Montpellier Cedex 5, F-34398 France, E-mail: y_abuahmad@yahoo.com

Sugarcane yellow leaf virus (SCYLV; genus Polerovirus, family Luteoviridae) is a recombinant virus associated with sugarcane yellow leaf disease, and present a serious threat to sugarcane worldwide. In this study, the near-complete genome (5.757 nt) sequence of COL-YL1 isolate from Colombia, was cloned, sequenced and characterized and compared with 32 SCYLV and 30 species sequences belonging to Polerovirus, Luteovirus and Enamovirus genera of the family Luteoviridae available in the Gene Bank. It covered more than 98% of the complete genome and contained 6 open reading frames (ORFs 0-5). Phylogenetic analysis based on SCYLV complete/partial genome nucleotide or amino acid sequences of individual genes showed that COL-YL1 isolate was very similar to the Colombian (Cpopulation) available in the Gene Bank and can be designated as the COL genotype because they shared high level of nucleotide sequence identity (99.8-100%) and amino acid (100%) sequences of ORF3. The COL and Cuban (CUB) genotypes were closely related and shared 97.7-98.4%, 98.7%-99.1%; 99.1-99.4 in ORF0, ORF2, and ORF3 nt sequences, respectively, and can be designated CUB-COL genotype. Additionally, the COL-YL1 diverged from other genotypes by 4.4-15.1% nucleotide differences in complete genome, and 2.8-32.1%, 3.0-22.7%, 1.8-23.0% and 2.1-16.8% amino acid differences in ORF0, 1, RdRP, and RTD, respectively. The higher differences were found in ORF0 which might explain the difference in symptoms severity. Several anomalies were detected in the nucleotide sequence including unusual termination codons in the ORFs 0, 1, and 2 and two indels codons were also found in the intergenic UTR and ORF 5. Among all SCYLV genotypic isolates, the COL-YL1 isolate showed clear luteovirus-like capsid, with polerovirusand enamovirus-like polymerase.

V32

BARLEY YELLOW DWARF VIRUS (BYDV) IN TUNISIA: INCIDENCE AND DISTRIBUTION ON BARLEY CROPS AND MOLECULAR CHARACTERIZATION. <u>Asma Najar¹</u> and I.Hamdi². (1) National Institute of Agricultural Research of Tunisia, Rue Hedi Karray, 2049 Ariana, Tunisia; (2) Regional Research Center Of Sidi Bouzid, Tunisia, Email: asmanajara@yahoo.fr

Barley is an important and widely cultivated field crop in Tunisia where it actually covers an average area of 500-600 thousands ha mainly distributed in semi-arid and arid regions. It is reputed to be one of the main sources for human and animal feed. Agronomic potentials of the cultivated barley genotypes are fluctuating among crop seasons due to abiotic and biotic constraints. Among these, viral diseases are known to seriously reduce the potential of the most cultivars. In order to study the incidence of viral diseases and especially *Barley yellow dwarf virus* (BYDV) on barley crops, a field survey was conducted during April 2012 in the major barley growing areas in Tunisia (Kef, Kairouan, Zaghouan, Cap-Bon and Bizerte) to measure the incidence and distribution of this virus in the different regions. Thirty one fields were inspected. Around 150 random and 20 symptomatic samples were collected from each field. All samples were tested by tissue-blot immunoassay (TBIA). Virus incidence, mostly BYDV-PAV, varied among locations between 1.5% and 35% in randomly collected samples (1.5, 3.36, 13.97, 14.46 and 35%) in the above mentioned locations, respectively. Reverse transcription-PCR, cloning, sequencing and phylogenetic analysis of the coat protein from five isolates collected from Bizerte, Zaghouan and Cap-Bon regions were deposited in the GeneBank databases using the Clustal W (Ver.1.83) program and compared with 15 other isolates from the world. They showed that all sequences were grouped into two main clusters (A and B). All Tunisian PAVisolates: D12 (GeneBank Accession No KJ4622) from Bizerte, D24 (GeneBank Accession No KJ46222) and D23 (GeneBank Accession No KJ46220) from zaghouan, D34 (GeneBank Accession No KJ46223) and D35 (GeneBank Accession No KJ46224) from Cap Bon, belonged to cluster A, showing a high homology among them (98.8% and 99.8%) and also most closely related with PAV-0109 USA isolate (EF521828), with high nucleotide sequence homology (98%). Moreover, cluster B was very heterogeneous, and included all other BYDV-PAV isolates from Iran Japan, Australia, France, Pakistan and China and had 80-90% sequence homolgy with the five Tunisian PAV strains.

V33

ASSESMENT OF THE SANITARY STATUS OF A NATIONAL FRUIT TREE CROP REPOSITORY IN TUNISIA. Farah Ben Ammar¹, Dorsaf Yahiaoui², <u>Khaled Djelouah³</u>, Nebiha Metoui⁴, Fatma Okassi⁵, Amira Mougou⁶ and Ali Bou Baker⁷. (1) National Agronomic Institute of Tunisia, 43, Charles Nicolle Avenue 1082-Mahrajène, Tunisia; (2) Technical Center of Citriculture. N° 318, Zeouiet Jedidi, 8099 Béni Khalled, Tunisia; (3) Mediterranean Agronomic Institute of Bari. Via Ceglie 9, Valenzano 70010 Bari, Italy.

During the spring seasons of 2012 and 2013, the phytosanitary status of the national fruit tree rootstocks repository encompassing 20 apple rootstock species (MM106 and MM111) and 69 stone fruit rootstocks (Garnem, Cadaman, GF 577, GF 677, Myrobolan, SL 64, Mariana, GF 8-1 and Tetra) has been investigated. Through ELISA assays, apple rootstocks have been analyzed for the presence of *Apple mosaic virus* (ApMV) and *Apple chlorotic leaf spot virus* (ACLSV); while, beside the previous viruses, the stone fruit rootstocks, were also analyzed for three additional viruses including:(i) *Prunus necrotic ring spot virus* (PNRSV), (ii) *Prune dwarf virus* (PDV) and (iii) *Plum pox virus* (PPV); prior to be bio-indexed by inoculating herbaceous indicators *Chenopodium quinoa, C. muralé*

and Nicotiana rustica. The results obtained showed a high ApMV and ACLSV infection rate of the apple rootstocks, ranging between 80% and 100%. respectively. The infection rate of stone fruits rootstock species was different, where the plants were mostly infected with ACLSV virus (71%) and ApMV (60%), much lower was the PNRSV infection (2.8%). Interestingly, the stone fruit rootstock repository appeared to be free from both PPV and PDV. Furthermore, the comparative detection by mechanical transmission on specific herbaceous indicators showed that ACLSV have been almost replicated on Nicotiana rustica, C. murale and C. quinoa, enabling reliable detection method of the virus, even at low titer. The major outcome from this work is the assessment of the sanitary status of the rootstock budwood, which is the pillar for developing a successful national certification program.

NEMATODES

N1

EFFECT OF NEMATICIDES AND ORGANIC MANURES ON ROOT KNOT NEMATODE *MELOIDOGYNE ARENARIA* INFESTING PEANUT PLANT. <u>Moawad Mohamed Mohamed</u> <u>Mohamed</u>, Plant Pathology Dept., National Research Centre, Cairo, Egypt, Email: moawad bondok@yahoo.co.uk

The effect of organic manures viz. cattle and sheep applied at tow rates (15 ton/f and 10 ton/f as soil amendments and nematicides (Vydate at 3 L/f and carbofurdan at 10 kg/f were used for controlling root knot nematode *Meloidogyne arenaria* on peanut under field conditions in Egypt. All the tested organic manures and nematicides significantly (P \leq .o.05/0.01) reduced the population density of nematode at various degrees as indicated by number of galls, egg masses and J2 in soil as compared to control and increased the plant growth and yield of peanut.

N2

EVALUATE THE BIOTIC CULTURE SYSTEM USING BIONEMATICIDES AND BIOFERTILIZERS TO CONTROL HE ROOT LESION NEMATODE PRATYLENCHUS SPP. INFECTING POTAO CV. SPUNTA UNDER FIELD CONDITIONS. Hoda Hussein Amin Mohamed and Usama Samy Fathi Al-Kelany, Plant Pathology Department National Research Centre, Egypt, Email: hoda_amenn@yahoo.co.uk.

A field experiment was conducted to evaluae the potential of applying the biotic culture system using certain commercial bionematicides and biofertilizers in combination to control the root lesion nematode *Pratylenchus* spp. infecting potato cv Spunta under field conditions. The bioproducts under investigation were the three bionematicides Stanes Sting, Nemafree and the Stanes Symbion VAM Plus containing the bacteria *Bacillus subtilis*, *Serratia* spp. and the mycorrhiza *Glomus fasiculatum*, respectively and the two biofertilizers Microbien and Potassiomag containing the bacteria *Pseudomonus florescens* plus *Bacillus megaterium* and *Bacillus circulanes*, respectively. Obtained data showed that all treatments reduced *Pratylynchus* spp. populations both in soil and roots and enhanced potato plant growth criteria and yield production. The highest increase in potato production reached 30% over control obtained from the application of *Bacillus subtilis* plus Microbien and Potassiomag.

N3

EFFECT OF ROOT KNOT NEMATODE AND TWO – SPOTTED SPIDER MITE AND THEIR INTERACTION ON COMMON BEAN YIELD IN RELATION TO DATE OF PLANTING. A.M. Korayem, M.M.M. Mohamed, Hoda ElHussein and S.M. El-Ashry, Plant Pathology & Nematology Department, Pests & Plant Protection Department, Soil and Water Department, National Research Centre, Dokki, Egypt, Email: kor_asm@yahoo.com

Effect of root knot nematode, Meloidogyne arenaria and the two- spotted spider mite, Tetranychus uticae and their interaction was studied on common bean in the field at two seasons of planting. In the first season, Autumn- 2012, it was found: Relation between nematode initial population density and bean yield was significantly negative (r= 0.6). Damage threshold level (DT) was estimated by 3 $j_2/200g$ soil. Relation between common bean yield and root- gall index (GI) was negative and significant (r= 0.93& P=0.05). Relation between mite damage index (DI) and beam yield was significant and negative (r = 0.95). Relation between nematode root- gall index (G1) and damage index (DI) of spider mite was significant and positive (r= 0.89).For the second season (early Spring), it was found: Relation between nematode initial population density and bean yield was not significant. Damage threshold (DT) was estimated by 22 j₂/200g soil. Relation between bean vield and root- gall index was negative and significant (r=0.93). Relation between mite damage index (DI) and bean yield was not significant (r=0.19). Relation between nematode root- gall index (GI) and mite damage index (DI) was not significant.

N4

BIOFUMIGATION AS A PROMISING TOOL FOR BIOCONTROLLING PLANT PARASITIC NEMATODES. <u>Mahmoud M.A.Youssef</u>, Plant Pathology Department, Nematology Laboratory, National Research Centre, Dokki, Post code 12622, Cairo, Egypt, Email: myoussef_2003@yahoo.com

Biofumigation was defined as a process that occurs when volatile compounds with pesticidal properties are released during decomposition of plant materials or animal products. Cruciferous plants belonging to *Brassica* spp. contain glucosinolate

compounds. A number of toxic products (e.g. thiocyanate, isothiocyanate) are known to be released from these compounds during decomposition. Indian or Caliente Mustards have been bred specifically for biofumigation and green manuring. The naturally occurring biofumigant gas (ITC) is produced by the plants when plant cells are damaged by crushing or chopping and compounds come into contact with an enzyme called myrosinase in the presence of water and produces D-glucose, isothiocyanate (bio- fumigant) and niitrite Broccoli and cabbage belonging to Brassica species have been tested for their ability to suppress root knot nematode, Meloidogyne incognita. Fewer studies have been conducted on the use of non-brassicas as possible suppressors of soil plant pathogens as melon and tomato to manage root knot nematode *M. incognita*. At soil temperatures around 25 °C, broccoli is more effective than melon and tomato. Certain factors as carbon/nitrogen ratio, soil temperature, plant residue, soil depth and moisture proved to affect biofumigation process.

N5

MEDICINAL PLANTS AQUEOUS EXTRACTS AS POTENT SOURCE ON ROOT KNOT Α NEMATODE **MELOIDOGYNE INCOGNITA INFECTING EGGPLANT.** Mahmoud M.A. Youssef, Wafaa M.A. El-Nagdi and Mona G. Dawood. (1) Plant Pathology Department, Nematology Laboratory. National Research Centre, Dokki, Post Code 12622, Cairo, Egypt; (2) Department of Botany, National Research Centre, Dokki, Post Code 12622, Cairo, Egypt, Email: myoussef 2003@yahoo.com

In this experiment, two medicinal plant rhizomes as aqueous extracts were used for controlling root knot nematode *Meloidogyne.incognita* infecting eggplant (Solanum melongena) cv. Baladi under screen house conditions. The tested plants ginger (Zingiber officinale) and curcuma (Curcuma aromatic) were tested and treated as soil drench at concentrations of 10, 5 and 2.5%. All the tested materials showed nematicidal and nematode- hatching inhibitory activity as they significantly (p≤0.05) decreased nematode criteria in roots and soil of eggplant including the number of galls and egg masses and hatched juveniles on roots and number of juveniles in soil compared to untreated plants, and reduction differed according to treatment. In other words, there were a positive correlation between the tested concentrations and the percentages reduction in nematode parameters. The plant growth parameters as length of shoots, fresh and dry weights of shoots and roots were positively increased with increasing of the tested concentrations. At the same trend, the percentages soluble carbohydrates, proteins, phenolic and carotenoid contents increased and were positively correlated with all tested concentrations.

N6

BIOLOGICAL CONTROL OF ROOT KNOT **MELOIDOGYN NEMATODE INCOGNITA** EGGPLANT BY INFECTING THE RHIZOBACTERIUM **BACILLUS SUBTILIS** UNDER GREENHOUSE CONDITIONS. Hoda Hussein Amin Mohamed, Susan A. Hasabo and Usamy Samy Fathy El Kelany, Plant Pathology Department, National Research Centre, Dokki, Giza, Egypt, Email: usamasamy nrc@yahoo.com

Greenhouse experiment was conducted to evaluate the application of the rhizobacterium *Bacillus subtilis* using three method of application [Soil drench with bacterium solution at concentration of 2×10^6 before with and after nematode inoculation, dip seedling in the same concentration for 10 minutes with and before nematode inoculation, foliar spraying with the same bacterium concentration before with and after nematode inoculation]. Obtained data should that all treatments decrease number of *M. incognita* in soil and roots with different rates. The more effective method in reducing *M. incognita* in soil drench with bacterium solution one week before nematode inoculation.

N7

PAECILOMYCES SPP. FIELD EVALUATION ON ROOT KNOT NEMATODE (*MELOIDOGYNE* JAVANICA) MANAGEMENT PROTECTED CUCUMBER CULTIVATIONS. Mohmad Al Qasem, Mustafa A. Tohubsum and A. AlJa'bai, National Center for Agricultural Research and Extension, P.O. Box 639, Baqa'19381, Jordan, Email:mohdqasim@ncare.gov.jo

The efficiency of two nematophagus fungi isolates (Paecilomyces lilacinus and P. variotii) were field evaluatedas a management tool against root knot nematode, RKN, (Meloidogyne javanica) attacking protected cucumber planted at Baq'a area. An artificial inoculation (20 gm sterile wheat grains loaded with 2.5×10⁶ CFU/gm) of fungal bio-agents was added manually to each transplant inside plastic house with a known history of RKN infection. Treatments were replicated three times and were randomly distributed within planting rows; a chemical treatment using Oxamyl (50ml/20Lt) and water irrigated as control treatment were used in comparison. Results at the end of the season indicated that a good effect for biological control of RKN infections exists at field conditions; P. lilacinus treatments were more effective than P. variotii in decreasing numbers of the second stage juveniles (J2); average numbers were 27 and 218 J2/100 cc soil respectively. Moreover, root galling indexes GI (at a scale from 0-10) were 2 and 4.7, respectively, compared to 485 and 874 J2/100 cc soil and GI of 7.3 for both non-treated control and the chemical control treatments, respectively, with no significant differences existed between them. The total cucumber production was higher but not significant in Oxamyl, P. variotii, P. lilacinus treatments with an accumulative production of 475, 420 and 390 kg, respectively compared to 335 kg for the control untreated treatment. However, Oxamyl and *P. lilacinus* treatments were able to decrease the number of dead plants at the end of season significantly compared to the control and *P. variotii* treatments.

N8

EVALUATIONOFPLANTEXTRACTFERTILIZERPRODUCTAGAINSTPEACHROOTKNOTNEMATODE(MELOIDOGYNEJAVANICA)ANDCITRUSNEMATODE(TYLENCHULUSSEMIPENETRANS).Mohamd AlQasem and A. Jadallah, National Center for AgriculturalResearch and Extension, P.O. Box 639, Baqa'19381,Jordan, Email:mohdqasim@ncare.gov.jo

A plant extract product registered as plant fertilizer (Nemaky) was evaluated under field condition to know its effect on Root Knot (RKN) and Citrus Nematodes populations. Nemaky product consists of natural plant extracts from Thymus vulgaris, Sesamum indicum and sesame, in addition to amino acids from plant origin. RKN infected peach trees (GF 677) were irrigated with 0.1% diluted solution (equivalent to 10 L/H) of the product at Mafraq Area. At another location, Jordan Valley, Kraimeh area, citrus nematode infected trees (Pitter lemon) were irrigated with 0.25% diluted solution (equivalent to 20 L/H) of the product. Soil and root samples were taken before treatment and after 14, 28 and 45 days of treatment from both treated and untreated infected trees. Data indicated that there was a good suppressive effect on the second stage juveniles (J2) of RKN numbers in the soil of infected peach trees, whereby 60% significant decrease of J2 from initial populations was noticed. Moreover, the suppressive effect lasted for 30 days of treatment and was also noticed in J2 population of the citrus nematode in treated infected trees; by which, J2 counts was significantly decreased by 55% compared to its initial counts after 21 days of treatment. Furthermore, a significant increase in J2 populations at the infected untreated citrus trees was clearly observed.

N9

PLANT PARASITIC NEMATODE ASSOCIATED WITH WILD OLIVE TREES IN ALJABEL ALAKTHER REGION, LIBYA. A.M. Najah, <u>Mohamed A. M. Adam</u> and Mahumoud A. Ehwati, Plant Protection Department, Faculty of Agriculture, Omar Al Mukhtar University, P.O. Box 919, Elbeida, Libya, Email: M_A_M_ADAM@yahoo.com

A survey was conducted in Aljabel Alakther region of Libya to determine the frequency and abundance of plant-parasitic nematodes associated with wild olive trees. In 2014, more than 56 soil samples were collected from in this region.. Nematodes were extracted by Flotation and sieving, identified to genus, and quantified. seven genera of plant-parasitic nematodes were identified. Tylenchus spp. In 55% of the sample followed by *Helicotylenchus* spp. 48% and *Tylenchorhynchus* spp. 25%. Other genera were Aphelenchos spp., Paratylenchus spp., Pratylenchus spp. and Xiphinema sp. The digger nematode species was identify as X. pachtaicum using morphology and morphometrics of adult females.

N10

STUDY OF POPULATION DYNAMIC FOR LESION NEMATODES *PRATYLENCHUS* SPP. IN PEANUT RHIZOSPHER DURINGGROWING SEASON IN SOME SYRIAN GOVERNORATES. <u>Sobhia Al-Arabi¹</u>, H. Kalil² and T. Abou Al Fadil¹. (1) General commission for Sci. Agri. Research, Damascus, Douma, P.O. Box 113, Syria; (2) Plant Protection Dept. Faculty of Agriculture, Albaath University, Homs, Syria, Email: sobhia_alarabi@hotmail.com

The population dynamics of lesion nematode (Pratylenchus spp.) in Peanut rhizospher were investigated in four Syrian governorates (Homs, Hama, Latakia and Tartaus). During the two growing seasons 2009 and 2010. A difference between the means of initial population density (Pi) was noticed in all studded fields, a negative correlation was observed between reproduction rate and the mean of initial population density (r=-0.38), and a positive strong correlation with the final population density (r=0.97). The mean of population density of this nematode was inhomogeneous in all studded regions, the top of population density was in July and August of the two growing season 2009 and 2010, respectively, A significant difference with the date of sampling during the two season was recorded the correlation between accumulated daily temperatures (DD5) and the mean of population density ranged moderate(r=-0.2,between weak and r = -0.6) respectively, except for Latakia governorate in 2009, in this season the correlation was positive and strong(r=0.85).

N11

THE EFFECT OF SOME LOCAL ISOLATES OF THE FUNGUS TRICHODERMA IN SOME **GROWTH AND INFECTION INDICATORS OF** TOMATO PLANT WHICH INFECTED WITH ROOT KNOT NEMATODE IN SEMI-FIELD CONDITIONS. Rami Kassam, Nada Allouf and Maysa Yaziji, Diseases laboratory, Agriculture College, Tishreen University, Lattakia, Syria, Email: Ramikassam1982@yahoo.com

Root-knot nematodes are considered the major and dangerous pests that threaten tomato and other vegetables, whether in the fields or in greenhouses along the Syrian coast. This pest causes a decrease in growth indicators of the plant such as plant height, the quantity and quality of fruits in addition to the dry and wet weight of the plant. Several isolates of the fungus *Trichoderma* were obtained from some greenhouse's soils along the Syrian coast, which proved pathogenic effect against nematodes under laboratory conditions, but the next step was the applying the strongest local isolates in pots planted with tomato seedlings and infected by 4,000 J2 Nematode, Then growth indicators (the length of the shoot, root length, fresh and dry weight of shoot, root and fruit, number of leaves, fruits and flowers) and infection indicators (the number of Knot, the number of egg masses) were took after 30, 60 and 90 days of experiment's beginning, the results showed that the seventh isolation which belong T. harzianum type was prevail over of the rest of the studied isolates and control in the in infection and growth indicators after 30 days, while results showed isolation that the Third which belong T_{\cdot} longibrachiatum was get over on the rest of the studied isolates and control after 60 and 90 days of experiment's beginning, they found significant differences between the three studied isolates, compared with the control in all the above-mentioned indicators by Duncan test 5%. This gives a promising future application to apply the two isolations together to integrate the act of the two types against nematodes and to improve the plant growth all over the growth season of the plant.

N12

SOIL TEMPERATURE AND HATCHING OF CEREAL CYST NEMATODE HETERODERA AVENAE FROM TIARET AND OUED SMAR, ALGERIA. Jamal Samaha, Research Laboratory Nematode, National Institute of Plant Protection, El Harrach, Algeria, Email: nemaalg01@yahoo.fr

A study of the influence of soil temperature on hatching of *Heterodera avenae* over two successive years revealed emergence of 27 and 42% of juveniles for populations of Dahmouni (Tiaret) and Oued Smar (Alger) respectively. Emergence occurred during the winter period, starting in October or November and ending in April. The data indicate that temperatures from 11 to 20°C are suitable for hatching, with an optimum of 14.5°C for the populations studies. These populations have hatching patterns typical of the southern European ecotype of *H. avenae* with winter emergence of juveniles and a summer-autumn diapause

N13

SURVEY OF NEMATODES ASSOCIATED WITH BERLUY AND FLUE-CURED TOBACCO IN THE SYRIAN COAST. <u>Mai Kaser Ali</u> and Nada Allouf, Department of Plant Protection, Faculty of Agriculture-Tishreen University Lattakia, Syria, Email: maia85@hotmail.com

This study was conducted in Tobacco fields in The Syrian Coast, and in the laboratory of environmental protection/Higher Institute for Environmental Research – Tishreen University between 2011-2013. The fields survey was conducted along The Syrian Coast (Lattakia,Jableh, and Tartous) in the period between August and early October of 2011 season. During this time, samples were taken from 12 villages divided among 32 fields. The mix soil samples were transported to the laboratory to isolate and extract the nematodes. The nematodes were counted under microscope to determine the population densities and its frequency, in addition to identify the genus. After isolating Nematodes from soil, Thirty genera of nematodes were identified. They belong to 7orders and 22 families, and divided into five groups according to their feeding habits. Plant Prasitic Nematodes Group: includes 11 genera Aglenchus, Aphelenchus, Psilenchus, Meloidogyne Pratvlenchus. spp, Helicotylenchus, Ditylenchus, Rotylenchus, Trichodorus, Tylenchorhynchus, Tylenchus, Bacterial Feeding Nematodes Group :includes 13 genera Acrobeles, Acrobeloides, Cephalobus, Chiloplachus, Diplogaster, Eucephalobus, Monhystera, Ostella, Panagrobillus, Panagrolaimus, Plectus, Rhabditis, Tylocephalus. Plectus, Monhystera. Hyphal Feeding Nematodes Group; includes one genus; Aphelenchus. Omnivorous Nematodes Group includes 4 genera; Dorylaimus, Eudorylaimus, Prodorylaimus, Oxydorus, Predators Nematodes Group includes one genera; Nygolimus. Two hundred and five samples from the infected roots from the studied fields were taken. The results indicated that the degree of infestation was high (fifth degree) to Flue-cured tobacco, and fourth degree to the Burley tobacco. There were three species of Meloidogyne, M. javanica, it was the most frequency, followed by *M.incognita*. In some root samples, these species were present together. M. arenaria was recorded for the first time associated with flue cured tobacco in the Syrian coast, appeared in three sites in less frequency. In some root samples, It was present with M. incognita together.

N14

EFFECT OF PLANT MINERAL NUTRITION ON TOMATO PLANT INFECTED WITH MELOIDOGYNE INCOGNITA UNDER GREENHOUSE CONDITIONS. A.G. El-Sherif, S.B. Gad and S.M. Saadoon, Nematology Res. Unit, Agric. Zoology Dept., Faculty of Agriculture, Mansoura University, Egypt, Email: ahelsherif@mans.edu.eg

Tomato (Solanum lycopersicum L.) is one of the most important vegetable plants in the world. Rootknot nematodes (Meloidogyne incognita) causing problems in all growing tomato areas in Egypt. The use of such mineral nutrients is the most environmentally successful method for limiting root-knot nematode damage. In this study seven plant mineral nutrients i.e. calcium sulphate, zinc sulphate, magnesium sulphate, iron sulphate, potassium sulphate N.P.K (20:20:20) and urea (5g/pot each) separately were evaluated comparing with oxamyl on root-knot nematode (1000 second stage juveniles/pot each) infecting tomato plant cv. Castle e Rock under greenhouse conditions (19±3°C). Calcium sulphate showed the maximum values in improving total plant fresh weight (65.0%), plant length (80.2%), shoot dry weight (97.2%) and number of leaves per plant (24.2%), with the highest reduction percentage in nematode population density that averaged 92.3%, followed by that of urea application (85.5%), respectively. Rates of nematode build-up under the stress of seven mineral nutrients and oxamyl were adversely affected. Such rates ranged between 0.1 to 1.8 vs 4.2 for nematode alone. Namely, calcium sulphate treatment had reasonable lower value of reproduction, (0.3) while, that of zinc sulphate had the highest one (1.8), whereas oxamyl recorded a lowest rate (0.1), respectively. Oxamyl as a systemic nematicide ranked second to calcium sulphate in suppressing nematode population density (88.7%), and ranked first in diminishing galls and eggmasses numbers with values of 88.2 and 100.0%, respectively.

N15

PRELIMINARY SURVEY ON NEMATOFAUNA OLIVE (OLEA EUROPAEA L.) IN ALGERIA. <u>S.</u> <u>Sellami</u>, M. Mihoub, S. Abdelwahab, F. Elksel and M. Belhamra, (1) Department of BotanyEcole Nationale Supérieure Agronomique El Harrach, Algiers; (2) University of Science and Technology Houari Boumedienne, Algiers, Email: s.sellami@hotmail.com.

Surveys conducted during 2010-2012 in olive areas south and north of Algeria as well as in orchards that nurseries have revealed the presence of 14 genera of plant-parasitic nematodes which four are considered to be dangerous on this culture. Among endoparasites, Pratylenchus spp. detected in the majority of the sampled areas are represented with greater frequency, Meloidogyne spp are also present in some areas. The *Helicotylenchus* spp are present with a high frequency in almost all surveyed sites. Among ectoparasites, only Xiphinema spp are feared because of transmission of viral diseases, other types less dangerous are poorly represented; densities vary taxa identified areas surveyed. Pratylenchus excepted the and Helicotylenchus the others taxa were the first report in Algeria.

N16

PARALLEL SEQUENCING OF H. SCHACHTII TRANSCRIPTOME REVEALED POINEER EFFECTORS. PUTATIVE Samer Habash, Abdelnaser Elashry and Florian M.W. Grundler, INRES Molecular Phytomedicine, University Bonn, Karlrobert-Kreiten-Str.13, 53115 Bonn, Germany, Email: samer@uni-bonn.de

The beet cyst nematode, *Heterodera schachtii*, is considered one of the parasites that limit sugar beet production. The suppression of such an effect required a better understanding of the interaction of this parasite with its host. This cyst nematode and upon its penetration, invasion and multiplication inside the roots of its host injects protein effectors. These proteins effectors are needed to suppress plant defence mechanisms and also to initiate and maintain its feeding site inside the root. In our study, we aimed to investigate such nematode protein effectors. Our results showed that by comparing the obtained transcriptome of a local German isolate of H. schachtii with those already

available nematode expressed sequence tags (ESTs) from NEMBASE4, we were able to identify nearly 500 putative secretory proteins specific to plant-parasitic nematodes (PPSP). The annotation of the identified PSPs showed enrichment in certain gene ontologies such as metabolic and catalytic activities in addition to growth regulation function. The PPSPs of interest were validated by cloning and sequencing. Out of the 500 P-PSP, six candidates were selected to be investigated for expression changes within their post-infective developmental stages in comparison with pre-infective second stage juveniles of the German isolate of the sugar beet cyst nematode. Five of the tested candidates showed up regulation in the post-infective nematode developmental stages ranging from 2 up to 20-fold change. The unregulated PPSPs were localized within the nematodes using in situ hybridization on which four were expressed within the esophageal glands thus supporting their nature as putative effectors.

N17

ISOLATION OF NEW ENTOMOPATHOGENIC NEMATODES (EPNs) FROM DIFFERENT GOVERNORATES AND THEIR PRODUCTION AND SURVIVAL PARAMETERS IN EGYPT. <u>A.S.</u> <u>Abdel-Razek¹</u>, M.A. Foda², M.A. Hussein¹ and I.E. Shehata¹. (1) National Research Centre, Department of Plant Protection, Cairo, Egypt; (2) Al-Azhar University, Faculty of Science, Department of Zoology, Cairo, Egypt, Email: abdelrazek820@yahoo.com

Field surveys were carried out during the period from 2011-2012 at Giza, Behera, Alexandria, Sohag, Oulupeia, El-Sadat city, Sharquia, Bani-swif, North Sinai (El- Aresh city) and South Sinai (Ras-Seder city), Tanta, Fayoum and Suez. Four isolates were isolated from 593 samples. Based on morph metric characters, three strains were found to belong to Heterorhabditidae. These isolates were isolated from Belbies city (Sharquia) and identified as *H. indica* (IB), Kefor El-Nile (El-Fayoum) and identified as H. bacteriophora (4). The last strain was isolated from Ras-Seder city (South Sinai) and identified as H. brevicadus (1) this species was considered as the first record in Egypt. One Steinernematide strain coded by (5) isolated from Ras-Seder city (South Sinai) and identified as S. carpocapsae. All isolates were produced by invivo method using G. mellonella and the reproductive rate of *H. bacteriophora* (4) was the highest 60.4 ×103±668 IJs/larva followed by S. glaserii (Sg), S.carpocapsea (5), H. brevicadus (1) and H. indica (IB). Effects of the temperature and the storage periods on survival of the isolated strains showed that survival of Steinernemtidae isolates (5) & (Sg) isolates was higher than Heterorhabditae isolates (4), (1) & (IB) after storage at 15°C. The tested isolates were listed according to storage at 15° C as follows 5 >Sg > 4 > 1 >IB. While, according to tolerance of room temperature after 6 weeks storage the tested isolates were listed as follows: 4 > IB > 1 > Sg > 5.

N18

THE EFFECT OF THREE PLANT EXTRACTS OF *INULA VISCOSA, SINAPIS ARVENSIS,* AND *ARTEMISIA HERBA HALBA* AGAINST SECOND –**STAGE LARVAE OF** *MELOIDOGYNE.* Ghania <u>Tail¹,</u> Dhaouya Nebih² and Amina Rym Adour². (1) Department of Populations and Organisms Biology, Faculty of Natural and Life Sciences, University of Blida, Algeria; (2) Biotechnology Department, Faculty of Natural and Life Sciences, University of Blida, Algeria, Email: ghaniatail@yahoo.fr

Agronomic issues due to the different genera of nematodes are globally known in vegetable farming. Species of these genera are highly polyphagous and are a phytosanitary issue of great magnitude .For agricultural, environmental and economic improvement purposes, we tested and evaluated the effect of root parts of three plants: Inula viscosa, Sinapis arvensis and Artemisia herba halba and an alga: Cystoceira crinita in vitro on the the second larval instar (L2) of Meloidogyne. Cystoceira crinita proved to be more effective with a 100% mortality rate and a low revitalization which is comparable to Oxamyl. On the other hand, the aqueous extract of the roots of the three plants revealed a lower mortality rate which is more reversible than that of the algae. The results showed that this macroalgae has a nematocid effects relevant to these toxic compounds compared to the plant extracts which showed a nematostatic effect.

N19

EFFECT OF BIOFUMIGATION ON ROOT KNOT NEMATODE *MELOIDOGYNE* **SP. UNDER PROTECTED CULTIVATION**. <u>Khalifa</u> H. Dabaj, and Mahmoud Ayad Mesbah, Plant Protection Department, Faculty of Agriculture, Tripoli University, Tripoli, Libya, Email: dabajhk@uahoo.com.

Biofumigation with sheep manure, cabbage, radish and sorghum (7.5t/h) and solarization were evaluated individually and in combination for the control of root knot nematode Meloidogyne incognita on eggplant transplanting in a polyethylene sac containing 2 kg naturally infested soil (2800 eggs+ second stage juveniles/sac) in walking tunnel (360m²). Results showed that soil treatments with solarization and combination of solarization and biofumigation raised soil temperature at 10 and 30 cm depths. The minimum soil temperature recorded were 41.3°C and 37.2°C at both depths respectively in tarped treatments, and 38.7°C and 35.9°C in untarped soil at both depths, respectively. The maximum soil temperature in tarped treatments were 51.7°C and 46.3°C at both depths respectively, while in untarped soil, temperature was 47.2°C and 43.2°C at both depths respectively. Biofumigation and solarization individually or in combination decreased nematode population density in soil, meanwhile, decreased plant infection with root knot nematode and decreased final population of Meloidogyne sp. in comparison with control treatment. Plant growth was enhanced and increased average number of flowers, consequently, yield increased in comparison with control treatment. Biofumigation with sheep manure + solarization, biofumigation with radish + solarization and solarization, increased yields by 168.1%, 154.2% and 135% respectically in comparison with control treatment. All treatments were significantly different to control at (P=0.05).

N20

ECO-FRIENDLYMANAGEMENTOFMELOIDOGYNEINCOGNITAINFECTINGEGGPLANTUNDERGREENHOUSECONDITIONS.A.G.El-Sherif, S.B.Gad and S.M.Saadoon,Nematology Res.Unit, Agric.Zoology Dept.,Fac.ofAgric.,MansouraUniv.,Egypt,elsherifmohammed@yahoo.comEmail:Email:Email:

The impact of magnetic iron, Bacillus thuringiensis (B.t) and dry leaf powder of moringa singly or integrated with its half dose each together as dual or triple treatments comparing with oxamyl on adjusting Meloidogyne incognita infecting eggplant cv. Black Long was investigated under greenhouse conditions (19±3°C). Results revealed that all tested treatments significantly ameliorated eggplant growth criteria and reduced tested nematode parameters as well. Among the single tested materials, moringa powder achieved maximum increments of plant growth criteria that averaged 104.6 57.5, 93.8, 100.0 and 70.0% for plant length, number of branches, total plant fresh weight, number of flowers and shoot dry weight, respectively. It also accomplished the highest percentage reduction of final nematode population(87.4%), number of galls (78.2%), and eggmasses (85.4%), followed by magnetic iron with values of 87.4, 78.2 and 85.4%; respectively. The dual application of $\frac{1}{2}(\text{moringa} + \text{magnetic})$ iron)} overwhelmed other tested integrated materials in improving tested plant growth criteria with values of 124.8, 89.7, 141.0, 136.0 and 143.3%, respectively, whereas the triple one gave the least values in this respect. However, the triple treatment {1/2(moringa + magnetic iron + B.t)} ranked first in diminishing nematode criteria, followed by the double treatment $\{\frac{1}{2}(\text{moringa} + \text{magnetic iron})\}$ in this respect. Meanwhile, treatments containing either {1/2(moringa + B.t) or $\{\frac{1}{2}(\text{magnetic iron} + B.t)\}$ showed low values for nematode parameters. Nematode reproduction factor (RF) under the stress of magnetic iron, (B.t) and moringa powder solely or mixed at its half dose each were adversely affected. Such rates ranged between 0.19 to 0.34 vs 2.24 for nematode alone, where the triple treatment had the lowest value (0.19), showed the highest one (0.34) and oxamyl had the lower value (0.16) in this respect.

N21

EFFICACY OF GARLIC CLOVE AND OIL AQUEOUS EXTRACTS AGAINST ROOT-KNOT NEMATODE, *MELOIDOGYNE INCOGNITA* **INFECTING EGGPLANT.** <u>Wafaa M.A. El-Nagdi¹,</u> M.M.A. Youssef¹ and Mona G. Dawood². (1) Plant Pathology Department, Nematology Laboratory, National Research Centre, Dokki, Post Code12622, Cairo, Egypt; (2) Department of Botany, National Research Centre,Dokki, Post Code 12622, Cairo, Egypt; Email: wafaaelnagdi@yahoo.com

A screen house experiment to control root knot nematode, M.incognita infecting eggplant (Solanum melongena) with aqueous extracts of garlic (Allium sativum) mashed clove and oil was conducted. The plant materials were diluted with distilled water at concentrations of 2.500, 1.250 and 0.625% and were soil drenched in each plot. Results showed that the botanical extracts showed nematicidal and nematodehatching inhibitory activity as they significantly (p≤0.05) reduced nematode criteria including number of galls, egg masses and hatched juveniles on roots of eggplant and number of juveniles in soil at harvest stage compared to untreated plants. In general, lower concentrations of the tested materials caused higher percentages reduction of the mentioned nematode criteria. Vice versa, increase in length of shoots, fresh and dry weights of shoots and roots occurred by higher concentration of each material followed by those occurred by moderate and lower ones. The percentages soluble carbohydrates, proteins, phenolic and carotenoid contents increased at all tested concentrations compared to those of untreated plants, but without relation among increases and concentrations.

N22

THE IMPACT OF ROTATIONS ON THE INFESTATION OF CEREAL CULTURES BY CYST NEMATODE. <u>Abderrahim Khenioui¹</u>, Miloud Hammache² and Djamal Smaha³. (1) Ecole Nationale Supérieure Agronomique, El Harrach, Algiers, Algeria; (2) Ecole Nationale Supérieure Agronomique, Algeria; (3) Institut Nationale de la Protection des Végétaux, El Harrach, Algiers, Algeria, Email: a khenioui@hotmail.com

Nematological analysis of samples taken from ten plots in four municipalities in the wilaya of Mila, where there is no use of treatments that can affect cyst nematodes, revealed the presence of cereal cyst nematodes (genus: *Heterodera*) in all the plots studied. The presence of potato cyst nematodes (PCN; Globodera) is reported for the first time in the plots of two municipalities studied; Oued Endja and Chelghoum Laid. The study plots in the communes of Mila and Grarem Gouga are free of *Globodera*. The study revealed the effect of the performed rotation on the plots infestation by *Heterodera* and *Globodera* nematodes. We revealed that the most effectual rotation used by farmers is that includes cereals, potato and fallow. Three types of rotation are shown: the first is that of monoculture (cereal/cereal), the second is about (cereal/fallow) and the third includes the potatoes and it is in the order (cereal/potato/fallow). The lowest percentage of the full cysts is registered in the third type (44.69%). In spite of fallow year in the second type, percentages was too high (we could register 78.14% of full cysts) The third type is still the most effective on the percentage of filled cysts compared to void cysts. The significant effect of the bioclimatic and agropedological characteristics is clearly observed on the distribution of nematodes in the region depending to the area (mountains, high plateaus and intermediate zone).

N23

EFFICIENCY OF SOME PLANT EXTRACTS AGAINST MACROPHOMINA SPP. AND ROOT KNOT NEMATODE *MELOIDOGYNE JAVANICA* **ON EGGPLANT.** <u>B.G. Antoon</u>, O.K. Ruma and A.S. Sadik, Plant Protection Research Center, Agricultural Research Office, Abu-Ghraib, Baghdad, Iraq, Email: basimanematod@yahoo.com

Several experiments were conducted in pots inside lath-house of Plant Protection Research Center, Abu-Ghraib, Baghdad, on eggplant seedlings, using 3 concentrations (1, 0.5 and 0.25 g/pot) for each of the four plant extracts powder are carnation; Handal; Hanna and Mina dendritic. The powders was added to the soil during planting against the fungus Macrophomina and root-knot nematode Meloidogyne javanica separately, also using the recommended pesticides are Benlate at rate 1 g/m², Rugby at rate 6 cm³/l. Results were obtained 60 days from day of contamination and the addition of the plant extracts. It was found that the powder of Carnation using its three concentrations very effective against the fungus and root knot nematode followed by Handal powder especially the 1g/pot concentration. While there was no effect of both plant extracts of Hanna and Mina dendritic powders on both the fungus and nematode, because there was no significant differences between the treated and untreated plants with both plant extracts such as plant height, dry plant and root weights.

N24

STUDY THE EFFECTS OF BIOCHEMICAL FOR THE BIOFERTILIZED AND POTASSIUM ON THE INTERACTIONS BETWEEN THE ROOT KNOT NEMATODE *MELOIDOGYNE INCOGNITA* AND THE FUUNGUS *FUSARIUM OXYSPORUM F.SP. LYCOPERSICI* ON THE TOMATO PLANTS. Asma S. Wanius, <u>Mahmoud E.M. Ehwaeti</u>, Mohammad A. Mousa and Azea Aldain M. Uounis, Department of Plant Protection, Faculty of Agriculture, University of Omar AlMukhtar El-Beida, Libya, Email: goody3cot@googlEmail.com

In this study, analysis of some biochemical compounds in plants had shown that all the fertilization treatments increase the phenolic compound, and the highest level was recorded in the plant that received Halex with potassium compared to any of them alone or with unfertilized plants. Roots content of lignin was increased in the biofertilized-treated plants that infected with M. incognita (0.812 mg/g of root tissue) compared to unfertilized plants infected with M. incognita (0.594 mg/g of root tissue). This was different from nematode infected plants that received potassium where the lignin was decreased. Whereas increased in the fusariuminoculated plants compared to unfertilized plants that inoculated with fungi alone (0.193 mg/g of root tissue). The activity of the Peroxidase was decreased in all the fertilized-treatments infected plants but only in the biofertlized plants was increased. Whereas potassium fertilization gave increase in the nematodes-inoculated plants. Also the activity of the polyphenol oxidase was increased in Fusarium-inoculated plants. Moreover in the plant that received Hallex and potassium (127.15 unit/g of plant tissue) compared to unfertilized plants (108.9 unite/g of plant tissue). The plant chlorophyll (A and B) content also was increased by all the fertilized treatments and the highest was in the biofertilized-plants (340.66 µg/g of leave tissue) compared to unfertilized plants (248.79 µg/g of leave tissue). The analysis of nitrogen and potassium in the plant has shown that the percentage of the nitrogen was increased in the plant inoculated with fusarium and nematodes together (8.411%) compared to plants without inoculation (6.002%) whereas decreased in plants that inoculated with any one of this pathogen alone. The percentage of potassium was decreased in all the inoculation treatments. Whereas in the fertilization treatments only the biofertilization treatment increased the nitrogen, percentage (80.085%) compared to unfertilized plants (6.206%). In contrast the nitrogen percentage was decreased in the plant received potassium (2%) compared to unfertilized plants. Moreover, there was no effect for the fertilization treatments on the potassium concentration in plant tissue.

N25

SCREENING CERTAIN SUGER BEET CULTIVARS TO THE SUGER BEET CYST NEMATODE, HETERODERA SCHACHTII IN SYRIA. Asma Haidar¹, Khaled Al-Assas² and Ahmed A.M. Dawabah³. (1) Biological Control Research and Studies Centre, Agriculture College, Damascus University, P.O. Box 30621, Syria; (2) Plant Protection Department, Agriculture College, Damascus University, Syria; (3): Plant Protection Department, College of Food and Agriculture Sciences, King Saud University, Saudi Arabia, Email: esraaha77@yahoo.com

Sugar beet cyst nematode, *Heterodera* schachtii Schmidt is one of the most dangerous agricultural pests on the sugar beet, *Beta vulgaris* L., plants all over the world, where it causes great losses of the sugar beet yield might be reached up to 80%. These great losses in the sugar beet yield could be reduced by decreasing the nematode population densities in the soil

by the integrating of different control methods, including the resistant cultivars. Consequently, screening plant cultivars for resistance to nematodes is of great importance. So, a greenhouse pot experiment was carried-out during the season 2013/2014 to evaluate the susceptibility and/or resistance of 14 sugar beet cultivars, recommended by the Syrian Ministry of Agriculture, to the sugar beet cyst nematode, H. schachtii. All the tested cultivars were imported from Belgium, Germany and/or France. They included ten Mono-embryonic cultivars (Colombia, Dita, Franca, Ghazira Ga, Rifle, Rizor, Semper, Sophia and Vero), and another four poly-embryonic cultivars (Mezzano Poly A, Polybleg, Rida and SM 1390). Seeds of the tested cultivars were planted in clean plastic pots containing autoclaved soil. Four replicates (pots) were used for each cultivar. One week after germination, plants were thinned to one seedling/pot, and inoculated with H. schachtii @ 5000 eggs+J2/pot. At the end of the experiment, plants were re-potted, and the roots were washed with a gentle stream of tap water. Fresh weights of shoot and root systems were determined, then number of white cysts per root system was also determined. Cysts in the soil were also extracted using Fenwick funnel method, then were crushed to liberate eggs and J2s, and the number of eggs + J2/pot soil were calculated. Finally, number of eggs + J2 in the roots and soil of each pot (Pf) were calculated to determine the nematode reproduction factor (RF) where; RF= Pf/Pi. Results showed that cv. "Rifle" had the highest fresh weight (55.13 g), while cv. "Rida" had the highest fresh weight (45.96 g), compared to the other cultivars. The reaction of the tested sugar beet cultivars to H. schachtii was generally variable. The cv. "Colombia" was the most resistant and poorly supported the nematode reproduction (Rf= 0.75), while the cv. "Rizor" was the highly susceptible and highly supported the nematode reproduction (Rf= 21.78).

N26

SURVEY OF SUGER BEET CYST NEMATODE, *HETERODERA SCHACHTII*, **IN SYRIA**. Asma Haidar¹, <u>Khaled Al-Assas²</u> and Ahmed A.M. Dawabah³. (1) Biological Control Research and Studies Centre, Agriculture College, Damascus University, Syria; (2) Plant Protection Department, Agriculture College, Damascus University, Syria; (3) Plant Protection Department, College of Food and Agriculture Sciences, King Saud University, P.O. Box 30621, Saudi Arabia, Email: khaledalass@hotmail.com

Sugar beet, *Beta vulgaris* L., is the second important crop (after sugar cane) in sugar production all over the world, where it provides about 40% of the world sugar production. In Syria, Sugar beet is the third important crop after wheat and cotton, and is the only source of sugar production in the country. Unfortunately, this crop is exposed in all its growth stages to a large number of pathological and physiological stresses, including the attack with certain

species of plant-parasitic nematodes. Of these species, the sugar beet cyst nematode, H. schachtii, is considered the most important, as it causes yield losses up to 80% of the total sugar beet yield. A field survey of this nematode was undertaken in the Syrian sugar beet fields during two years (2009 and 2010). The survey included 58 fields selected randomly in the Syrian governorates, where sugar beet is grown in Autumn as follows: Hems (19), Hemat (12), Dair Al-Zoor (5), Edleb (11) and Aleppo (11 fields). In the 2010 growing season, a total of 120 field were surveyed also in Autumn as follows: Dair Al-Zoor (28), Al-Regah (17), Hemat (29), Hems (8),Edleb (23)and Aleppo (15 fields). Nematode cysts were extracted from the soil samples using the modified Fenwick can apparatus, and the number of cysts (empty and containing eggs) were counted and expressed as the mean number of cysts/200 g soil for each. The numbers of eggs and second-stage juveniles (J2) were also counted and expressed as the mean number of eggs + J2/200 g soil. The percentage of the H. schachtiicontaminated sugar beet field was also calculated in each governorate. Results showed that the highest nematode infestation in the Syrian sugar beet fields in 2009 was recorded in Hems governorate (78.95%), followed by Hemat (66.67%), Aleppo (63.64%), Dair Al-Zoor (60%) and Edleb (36.36%). The total nematode infestation of sugar beet field in Syria during this season was 63.79%. In the 2010 growing season, the highest nematode infestation was recorded in Edleb governorate (56.52%), followed by Hems (50%), Aleppo (46.67%), Hemat (44.83%), Dair Al-Zoor (39.29%) and Al-Ragha (5.88%). The total nematode infestation of sugar beet field in Syria during that season was 40.83%.

N27

MANAGEMENT OF THE CITRUS NEMATODE (*TYLENCHULUS SEMIPENETRANS*) IN SAUDI ARABIA. <u>Fahad Abdullah Al-Yahya</u>, Plant Protection Department, College of Food and Agricultural Science, King Saud University, P.O. Box 2460, Riyadh 11451, Kingdom of Saudi Arabia, Email: fayahya@ksu.edu.sa

Citrus is one of the economically important crops in Saudi Arabia, where the total citrus production exceeds 100 thousand tons/year. Unfortunately, citrus trees in the Kingdom are attacked with several plant diseases, including the slow decline disease which is caused by the citrus nematode, T. semipentrans. Generally, the citrus nematode is considered among the nematode pests of the economic importance in the Kingdom. The primary reports conclude that the fruit vield losses caused by this nematode might reach up to 70% in certain areas. Especially that the symptoms of this disease appear after a relatively long time of the disease incidence (5-6 years). The symptoms on the shoots are; general weakness, yellowing and early fall of leaves, and dryness and death of the peripheral branches, which start usually from upper and gradually extend to the lower ones (Die-back). Symptoms on the root system are; dwarfing of the roots which might also turn to brownish in color. The epidermis and cortex layers may separate easily away from the vascular tissues. A proposed management program of the slow decline disease in the Kingdom will be presented.

N28

USE OF NUTRITIONAL SUPPLEMENTS FOR ROOT-KNOT THE MANAGEMENT OF NEMATODE (MELOIDOGYNE **INCOGNITA**) **INFECTING POTATO.** Amjad Shahzad Gondal¹, Nazir Javed², Sajid Aleem Khan² and Muhammad Shahid³. (1) Department of Plant Pathology, PMAS Arid Agriculture University Rawalpindi, Pakistan; (2) Department of Plant Pathology, University of Agriculture Faisalabad, Pakistan; (3) Plant Pathology Research Institute, Faisalabad, Pakistan, Email: amjadshahzad@live.com

Range of synthetic chemicals has been discriminately used as the major control measure against plant pathogens. Environmental pollution, degradation, insecticide resistance development and other agronomic concerns have prompted scientists to seek alternative disease management strategies. Present in-vitro studies were conducted to evaluate the efficacy of nutritional supplements including micro-power, humic acid and plant protectors containing benzoic acid against rootknot nematode (Meloidogyne incognita) infection on susceptible potato cultivar. Each treatment applied as single or in combined form significantly reduced the number of galls and egg masses and promoted overall plant growth as compared to un-amended control. Application of aqueous solution of 4% plant protector + 4% micro-power + 2% humic acid endorsed the number of leaves, root and shoot development, tuber weight and decreased the root weight with minimum number of females, root galls and egg masses. Nematodes fecundity was recorded as the highest in control treatment resulting in poor plant growth and development of higher number of galls and egg masses. The significantly lower number of galls and egg masses and enhanced plant growth in the case combined application of plant protector 4%, micro power 4% and humic acid 2% indicated this treatment to be superior.

N29

EVALUATION OF SILVER NANOPARTICLE APPLICATIONS ON APPLICATIONS ON INFESTATION OF ROOTKNOT NEMATODE ON TOMATO. Luma Al-Banna¹, Nida' Salem¹, Akl Awwad², <u>Wafa Khrfan¹</u>, Samer Habash³, Mariam Al Zgoul¹ and Batool Alaqtash¹. (1) Department of Plant Protection, Faculty of Agriculture, The University of Jordan, Amman 11942, Jordan; (2) Royal Scientific Society,El Hassan Science, City Amman, 11941, Jordan; (3) Institute of Molecular Phytomedicine, University of Bonn,Bonn 53115 Germany, Email: khrfan.w@gmail.com

The use of silver nanoparticles(AgNPs) in agriculture has been recently increased Several studies

showed that AgNPs have antimicrobial activities. Thus we aimed in this study to evaluate the efficacy of well characterized biosynthesized AgNPs on infestation of root-knot nematode (RKN) on tomato. Both in vitro and pot experiments in a growth chamber condition were conducted to investigate such an effect. The in vitro studies showed that a total inhibition of hatching of the second stage juveniles of the RKN *M. incognita* when egg masses were exposed to 10, 50, 100, or 200 ppm AgNPs. The growth chamber study included the application of AgNPs by soaking the roots of the tomato transplants or by drenching the soil (pre or simultaneously with transplanting and RKN inoculation) using 100 and 200 ppm of the nanoparticles. Results revealed that the simultaneous soil drenching with either 100 or 200 ppm of AgNPs was the most effective application method in suppressing root galling. Whereas the soaking of the roots and the soil drenching two days prior to transplanting and RKN inoculation were not effective. On contrast, the AgNPs reduced the plant parameters such as plant height, foliage and root weights compared to the non-treated plants. The reduction in plant parameters increased when the concentration was increased and being higher when the AgNPs were added simultaneously with transplanting in the absence of RKN. However, when AgNPs (pre and simultaneously) were added to pots inoculated with RKN, the plant parameters were higher than those inoculated with RKN alone.

N30

THE TOXIC EFFECT OF AQUEOUS EXTRACTS OF BRASSICA OLERACEA L. AND BRASSICA OLERACEA VAR BOTRYTIS ON CITRUS NEMATODE (T. SEMIPENETRANS). Dhaouya Hadj-Sadok Nebih¹ and Ibtissam Sid, Université Blida, Faculté des Sciences de la Nature et de la Vie, departement des Biotechnologie, Algeria, Email: nebihdhaouia@yahoo.fr

The objective of this study was to evaluate in vitro the toxicity of crop residues of two Brassicaceae, The cauliflower "*Brassica oleracea var botrytis*" and green cabbage "*Brassica oleracea* L. coming from leaves, roots and the mixture (roots and leaves) were tested in vitro on Citrus nematode "*Tylenchulus semipenetrans*. Free forms of nematode are exposed in six different doses of each type of extract (20, 40, 60, 80, 100, 120 g/l) for a time of 24, 48 and 72 hours. The results revealed a nematicide effect of the two *Brassicacae* on free forms of *T. semipenetrans*. However, the biocidal effect varies significantly depending on the organs tested, concentrations and immersion time. The aqueous extract from the leaves showed a higher toxicity than those from roots.

N31

NEW	APPROACH	(NEW	CHEM	IISTRY,	NEW
MODE	C OF	ACTIO	DN,	DIFFE	RENT
FORM	ULATION,	CH	IEMIC A	AL	AND

BIOLOGICAL SEED TRATMENTS, TOLERANT VARIETIES) FOR NEMATODE MANAGMENT. <u>Saad L. Hafez</u> and Mahesh P. Pudasaini, University of Idaho, Parma Research and Extension Center, 29603 U of I Lane, Parma, Idaho 83660, USA, Email: shafez@uidaho.edu

New approach using non-chemicals and new emerging chemistries have been evaluated for nematode management on several crops under field conditions. Experiments were conducted to determine the efficacy of new nematicides such as Movento, Nimitz (MCW-2) and several numbered compounds on major nematode species associated with potato, sugar beet and onion in Idaho. Efficacy of seed treatment with chemical and biological agents, response of tolerant sugar beet varieties, in-row and broadcast fumigation of Telone II at reduced rate in-strip, and a combination of tolerant beet varieties with low rate of Telone were also tested against beet cyst nematode in Idaho. Potatoes, sugar beets or onions were planted in a silt loam field infested with Columbia root-knot, beet cyst and lesion nematode at damaging level, respectively. Treatments were replicated five or six times in a randomized complete block design. Movento was initiated at sufficient foliage and repeated every 2 weeks. Nimitz was applied preand post-plant. Within one hour of applications, all plots were disked twice to incorporate Nimitz to a depth of 4-6 inches. Numbered compounds were sprayed at 1-2" or 6-8" bands in furrow at planting, at 6 inch plant height, and chemigated at first irrigation and monthly intervals. For sugar beet experiments, Telone II was shanked to a depth of 12 inches. Temik 15G @ 20 at plant and 13 lb/A at post-plant was applied. Nematode tolerant and susceptible (Hillshog 9036RR) sugar beet varieties were sown for these trials. Sugar beet seeds treated with chemicals such as Poncho or Fluopyrum or biological agents such Pasteuria or Bacillus (Votivo) were planted. After harvest, potato, sugar beet, and onion yield was determined. Infected potato yield was also determined. The results demonstrated that the fall application of Vapam followed by Movento at 56 and 70 days after planting, or pre-plant application of Nimitz, or a low rate application of systemic numbered compound at 6" tall plant and chemigated 60 days after planting appear to be promising treatment for Columbia root-knot nematode on potatoes in Idaho. Movento applied at 14 and 28 days after emergence and numbered compound applied at planting increased beet yield by 12 to 36%. Two applications of Movento and numbered compound sprayed at pre-plant increased onion yield by 12 to 14%. Sugar beet yield was significantly increased in all tolerant varieties as compared to susceptible variety. Final viable cysts were increased by four fold in susceptible variety while there were no increases in tolerant varieties. The beet yield was significantly increased in both in-row and broadcast application of Telone as compared to untreated control and Temik. All the rates of Telone in-row had significantly higher beet yield as compared to broadcast applications. Beet yield was increased in susceptible variety on fumigated plots compared to non-fumigated plots. Tolerant varieties had higher yield in fumigated plots compared to nonfumigated plots. Beet yield was also higher in seed treated with chemical or biological agents as compared to non-treated seed. In conclusion, no standalone treatment or a single application can control nematodes. Multiple applications in combination with new chemicals appeared to be promising alternatives for nematode management.

N32

PATHENOGENICITY OF LESION NAMATODES (PRATYLENCHUS PENETRANS AND P. NEGLECTUS) AND THEIR INTERACTION WITH FUNGUS (VERTICILLIUM 89AHLIA)ON MINT. Saad L. Hafez and Mahesh P. Pudasaini, University of Idaho, Parma Research and Extension Center,29603 U of I Lane, Parma, Idaho 83660, USA, Email: shafez@uidaho.edu

An experiment was conducted to study the pathogenicity of root lesion nematodes (Pratylenchus penetrans and P. neglectus) and their interaction with fungus (Verticillium dahlia) on mint. Treatments included no nematode, no fungus, either species alone, or combination of nematode and fungus. Each treatment had five replications spread on the greenhouse bench in random complete blocks. One six-week old mint plant was transplanted into 1500 cc pot filled with sand and soil mix (1:1 by v/v) with 10 percent peat moss. Inoculations were done with 20 micro-sclerotia of V. dahlia or 4 nematodes per cc of soil. Mint was allowed to grow until flowering stage (about 10 weeks), and cut at soil level and allowed to regrow again. Mint was cut four times and top dry weight was recorded each time. Data demonstrates that in all cuts fungus or nematodes significantly and progressively decreased the mint hay dry yield as compared to control check. Interactive effect of V. dahlia and lesion nematodes appears to be an additive on mint hay yield. V. dahlia alone caused 44% damage in mint hay yield. Root lesion nematode P. neglectus seems pathogenic to mint. A 23% and 46% reduction on mint hay were caused by P. neglectus alone or in combination with V. dahlia, respectively. P. penetrans alone caused 44% yield reduction of mint hay while combination of P. penetrans and V. dahlia killed almost all plants. Population of P. penetrans increased by 41 fold, indicating that mint is an excellent host for P. penetrans.

N33

STUDY OF THE DIVERSITY OF PLANT SPECIES OF FUNGI (PARASITIC AND PREDATORY) NEMATODE TO ROOT KNOT (MELOIDOGYNE SP.) ACCORDING TO THE SOME FACTORS OF SOIL. Karima Sabri and Miloud Hamache, National School of Agronomy, El DZ-16200, Harrach, Algiers, Algeria, Email: sabri karima@hotmail.fr

Study of the diversity of plant species of fungi (parasitic and predatory) Nematode to root-knot (Meloidogyne sp.) in two areas (Staoueli and Bordj el Kiffan) in the algerian Sahel according to different soil and soil depth (10 cm) allowed us to classify 12 Type: Arthorobotrys dactyloïdes, A. musiformis, A. oligospora, Dactylaria brochopaga, Dactylella leptrospora, D. ellipsospora, Myzocytium, Rhopalomyces elegans, Triposporina aphomopaga, Stylopage cephalode, Harposporium anguillulae, and H. bysmatosporum. We have noticed that these plant species of fungi are in a variety evolution, and the most visible type is A. *musiformis*, and this appearing regard to several factors (organic matter, the effect of pesticides anti-nematode, soil type, soil depth).

N34

FUNGAL ASSOCIATION OF SUGAR BEET CYST NEMATODE, HETERODERA SCHACHTII IN SYRIA. Asma Haidar¹, Khaled Al-Assas², <u>Ahmed A.</u> <u>M. Dawabah³</u> and Mariam Al-Abdelkader². (1) Biological Control Research and Studies Centre, Agriculture College, Damascus University, Syria; (2)Plant Protection Department, Agriculture College, Damascus University,Syria; (3) Plant Protection Department,College of Food and Agriculture Sciences, King Saud University, P.O. Box 2460, Riyadh 11451, Saudi Arabia, Email: dawabah@yahoo.com

Sugar beet cyst nematode, Heterodera schachtii Schmidt is the most dangerous pest attacking sugar beet, Beta vulgaris L., in its growing regions all over the world, especially the regions that cultivate sugar beet long years ago. Biological control measures are considered among the most recent and best control measures in controlling this nematode in general. Consequently, a field survey was carried-out in the Syrian sugar beet fields in 2010 to determine the fungal association of sugar beet cyst nematode, H. schachtii. The study included 41 sugar beet fields in four governorates; Al-Raqah (4), Hemat (20), Hems (10) and Aleppo (7 fields). Nematode cysts were extracted using the modified Fenwick can apparatus. Fungi were isolated from the eggs and second-stage juveniles (J₂) on agar media (100 eggs + J_2 /replicate). Fungi that showed predacious or parasitic behavior or that formed spores, Knobs, rings or nets were then purified on Potato dextrose agar media. These fungi were finally identified on morphological basis. Results showed the presence of Verticillium chlamydosporium in 27 out of 41 samples (65.85%). The other recorded fungi included; Alternaria sp., Arthrobotrys sp., Aspergillus sp., Fusarium sp., Gloicladium sp., Paecilomyces sp., Sclerotium sp. and Trichoderma sp. with different frequency of occurrence in the surveyed samples.

N35

STUDY OF THE BEHAVIOR OF VARIETIES OF CUCURBITS AND SOLANACEOUS CROPS TOWARDS A POPULATION OF *MELOIDOGYNE*

INCOGNITA UNDER GREENHOUSE IN ALGERIA. <u>M. Hammache¹</u>, S. Doumandji¹, K. Sabri², W. Hamroune³, D. Smaha⁴ and A. Mokabli⁵. (1) Ecole Nationale Supérieure Agronomique, (2) Institut d'agronomie, Univ. de Blida, (3) Station Régionale de Protection des Végétaux de Constantine, (4) Institut de protection des Végétaux d'El Harrach, (5) Institut de Sciences de la nature et de la terre, Univ. de Kh. Miliana, Algeria.

Resistance tests were performed on varieties of cucurbit (cucumber and melon variety Marketer and charantais) and Solanaceae (tomato variety Neptune and Narita) in greenhouse pots with sterilized soil. The inoculum of Meloidogyne incognita was 3000 J2 per pot for all transplants. The vigour index, the index of Wales and the final population were used to evaluate the degree of the resistance from the different varieties. The saved settings to compare their degree of resistance to root-knot nematodes are the strength index, the index of Wales and the final population. Results indicate that cucurbits are more sensitive to root-knot nematodes than the solanaceous crops. Melon (Variety Charantais) exhibits a vigour index of 2.5 in inoculated plants and 3.1 for non-inoculated plants. Tomato varieties exhibits strength index of 4 and 3.9 for the varieties Narita and Neptune, respectively, with an average index of 3.9 in the controls. The strength index have shown a soft decrease for a part infested if we compare it with an other part which is considered not infested. The variety of melon charantais gives us un index strength 2.5 in inoculated plants and 3.1 for non-inoculated. The tomato varieties yielded indices strength 4 narita and 3.9 neptune with an average index of 3.9 in controls. Gall rating indexes (IG.) recorded on the four varieties were 0.5 for Marketer, 2.5 for Charantais, 0.5 for Neptune and 0.6 for Narita. The final population obtained at the end of the crop cycle was 62 for Charantais, 20 for Marketer, 60 for Narita and 49 for Neptune. The final population obtained at the end of the crop cycle is 62 por charantais and 20 marketer. For solanacius varieties, it is 60 for narita and 49 for neptune. In this case, the varieties tested were all found multiplier Meloidogyne incognita in controlled conditions.

WEEDS

W1

2,4-D TOLERANT WEEDS IN JORDAN. <u>Barakat</u> <u>Abu Irmaileh</u>¹, Maha Syouf² and Sawsan Al Fakhori². (1) Department of Plant Protection, Faculty of Agriculture, University of Jordan, Amman 11942, Jordan; (2) National Centre for Agricultural Research and Extension (NCARE), Amman, Jordan, Email: Barakat@ju.edu.jo

The herbicide 2,4-D was applied as post emergence in two field sites. The treatments included the following rates: 1- check (water without herbicide), 2- the same rate used by the farmer, 3- triple the rate used by the farmer, 4- six times the rate used by the farmer, and 5- twelve times the rate used by the farmer. The treatments were arranged in a completely randomized block design. Soil samples were collected from a field where the herbicide was annually applied and from a field where the herbicide was never applied, then placed in pots in the greenhouse. The herbicide was applied as post emergence to weeds at the rates described above. The results indicated that the following weeds tolerated the rate used by the farmer: Cerastium dicotomum, Vaccaria pyramidata, Silene conoidea ,Silene crassipes, Asperula arvensis, Polygonum aviculare, Bifora testiculata, Anthemis sp, Convoluvlus altheoides, Convolvulus arvensis, Consolida rigida, Scandix pecten-veneris, Tordylium aegyptiacum. The weeds that tolerated 12 times the rate used by the farmer inculded Cerastium dicotomum, Vaccaria pyramidata, Silene conoidea. Weeds survival rate was 26% in the fields sprayed with 2,4-D for the past 40 years, compared to 6% in the field sprayed for the first time.

W2

THE HOST RANGE OF WATERHYACINTH WEEVIL **NEOCHETINA EICHHORNIAE** (WARNER) & **NEOCHETINA BRUCHI** (HUSTACHE) UNDER THE LAB CONDITIONS. Ahmed J. M. Al-Shammary¹ and Hamza K. Al-Zubaidy². (1) Integrated Pest Control Centre, Directorate of Agricultural Research, Ministry of Science & Technology, P.O. Box 765, Baghdad, Iraq; (2) College of Agricultures, University of Baghdad, Baghdad, Iraq, Email: ahmedalshammary90@yahoo.com

Host range of the two weevils *N. bruchi* and *N. eichhorniae* (Coleoptera: Curculionidae) was tested on seventeen plant species of different families. The results showed that *N. bruchi* feeding, oviposition, hatching and pupation activities were positive only on the waterhyacinth plants, while they were negative on the other seventeen tested plants with very limited feeding on beet, lettuce and mallow plants with limited oviposition of eggs which did not hatch. Host range of *N. eichhorniae* was only limited to waterhyacinth.

W3

HERBICIDE TOLERANT *LOLIUM RIGIDUM* IN **TUNISIA.** <u>M. El-Khomasi¹</u>, Th. Swisi², A. El-Bousalmy¹, N. Balbahry¹ and O. El-Khriji¹. (1) National Institute for field Crops, P.O. Box 120 Bousalem 8170, Tunisia; (2) National Institute for Agricultural sciences in Tunisia, 43 Nicole street, 1082 Tunis, Tunisia, Email: kh_messad@yahoo.fr

Recently, the problem of herbicide tolerant weeds is under research in Tunisia. Herbicide tolerant *Lolium rigidum* reduced wheat yield by 30%. Research projects are underway in order to determine the extent of herbicides resistant *Lolium rigidum* spread, and means for the tolerant weed management. Field work included collection of the tolerant weed seeds, and questionnaires

directed to farmers suffering from this problem. Field demonstrations on the tolerant weed management were also established. Results showed the tolerant weed spots were found in high wheat yielding areas in Kenzert, northern Paia and Jandouba. Most of the collected samples form the weed was tolerant to ACCase inhibitors. The spread of tolerant weed to ALSinhibitors was very much less than those tolerant to ACCase-inhibitors. The completed questionnaires suggested that the spread of the tolerant Lolium rigidum resulted from poor application of proper management. The results also indicated that it was possible to manage the tolerant weed by integrating plowing, delayed planting and rotating application of herbicide from different chemical groups which control the weed by 30, 40, and 80%, respectively.

W4

THE SPREAD OF WINTER WEEDS GRAIN CROPS IN THE REGION OF HIGH PLATEAU IN SETIF, ALGERIA. <u>Adel Nadjib Chaker</u>, Meriem Hani, Habiba Boukhabti, Saliha Dahamna and Mohamed Fenni, Laboratoire de Valorisation des Ressources Biologiques, Faculty of Natural and Life Sciences, Setif University 1-19000, Algeria, Email: chakeran@yahoo.fr

Worldwide, cereals are considered the essential source of food for human nutrition. The spread of weeds in cereal fields is one of the biggest problems that face farmers. The study investigated winter weeds in grain crops in the region of high plateaus in Setif, East Algeria. The morphological characters of weed seeds and fruits were described. 7 plants from each species were collected in order to calculate the number of fruits per plant. The average seed production from each fruit was calculated from 10 fruits taken from each plant, and the mean seeds number in each plant or species was determined. Large differences in medial means of the number of fruits in each species studied which ranged from 0 to more than 200 fruits per plant, and between 1 to more than 500 seeds per plant according to the species. However, the results allowed to reassemble the species in five groups by average production of seeds.

W5

ALLELOPATHIC POTENTIAL OF SONCHUS SPP. RESIDUES IN GERMINATION AND GROWTH OF TWO WHEAT AND BARLEY SPECIES. Janan A. Saeed, Department of Biology College of Science, University of Mosul, Iraqi, Email: jansaeed@yahoo.com

Laboratory and glasshouse experiments indicated the allelopathic effect of *Sonchus* spp. The weed residues reduced germination and growth of two wheat and barley species (Abo-Graib and Rayhan) treated with the aqueous extracts at concentrations of 2, 4, 6% (w:v) as compared with distilled water (control). The inhibition increased with increased concentration. The glasshouse experiments showed reduction in germination and growth of wheat and barley species grown in the soil containing *Sonchus* residues that were added at the rateof 2, 4 and 6% (w:w dry soil). Highest reduction in seed germination reached 30% in barley treated with the 6% application as compared with the control(soil without residues), whereas reduction in shoot and root length was 25.7 and 34.2%, respectively. The dry weight reduction reached 80 and 70.3%, respectively, and was accompanied with reduction in the leaf area. Wheat and barley species differed in their response to the allelopathic effect of *Sonchus* residues.

W6

ALLELOPATHIC EFFECT OF **SORGHUM BICOLOR RESIDUE ON SEED GERMINATION** AND SEEDLINGS GROWTH OF TRITICUM AESTIVUM AND SILVER NIGHTSHADE, SOLANUM ELAEAGNIFOLIUM. Fatima Omer, Ghassan Ibrahim and Anwar Al-Mmouemar, Plant Protection Department, Faculty of Agriculture, Damascus University, Damascus, Syria, Email: weeddam@yahoo.com.

The plant, *Sorghum bicolor* produces sorgoleone, an allelopathic compound secreted from sorghum roots. The effect of aqueous extracts of *Sorghum bicolor* from leaves, stems, seeds, roots and boiled seeds at the concentrations of 50 and 100 g/liter water were tested on two plant species, wheat and silver nightshade under laboratory conditions. The effect of powdered sorghum parts (leaves, stems, seeds and roots) at 50 and 100 g powder/1 kg soil were also tested on the same species. The results showed that sorghum extracts and powders decreased germination and seedling length significantly. Wet and dry weights of wheat were also reduced significantly as compared to the control.

W7

SURVEY OF WEED FLORA IN THREE CITRUS GROVES IN SKADEDA REGION, ALGERIA. Zobeida Sobhi, Algeria.

The diversity of weeds in three groves of citrus in the region of Skikda were evaluated. These orchards contained two weeds, *Oxalis cernua* and *Sinapis arvensis*, abundantly. The results of 41 surveys revealed 57 weed species belonging to 24 plant families, including 21 weed species from Poaceae, Fabaceae, Apiaceae and Asteraceae with 49.12% frequency. Biological species analysis indicated that annual weeds were dominant with 75%, biennials 19% and perennials were extremely low at 0.26%.

W8

VALORISATION OF HYDRO METHANOLIC EXTRACT FROM DIFFERENT PARTS OF ARISARUM VULGARE. <u>H. Kadri</u>, F. Zeghad, S.E. Djilani and A. Djilani, LSBO, Badji Mokhtar University, Annaba 23000, Algeria, Email: kadri.chemestry@yahoo.fr; kadri_hadjer@yahoo.com

Arisarum vulgare is generally known as a toxic plant but it has some medicinal uses. Plant collected

from the north-east of Algeria, were phytochemically screened, and the total phenolic and flavonoid compounds were measured in its hydrated ethanol extract. In addition, the antioxidant capacity of the different parts of this plant were evaluated by ABTS (2,2'-azino-bis(3-ethylbenzothiazoline-6-sulfonic) and DPPH (2,2-diphenyl-1-picrylhydrazyl) tests expressed by vitamin C Equivalent antioxidant capacity (VCEAC). The VCEAC values were 0.3472 g and 0.2768 g of VCEAC/100 g of dry weight as determined by ABTS and DPPH tests, respectively. The total phenolic and total flavonoid contents were 2.138 g of Gallic acid equivalent/100 g of dry weight, and 7.126 g of Quercetin equivalent/100 g of dry weight, respectively. A direct correlation between phenolic compounds and antioxidant activity was observed (R2=0.95). According to the results obtained, it was evident that Arisarum vulgare possess a considerable antioxidant and antiradicalaire capacity. Accordingly, the antioxidant properties might increase the therapeutic value of this toxic plant.

W9

ALLELOPATHY EFFECTS OF WILD MUSTARD (*BRASSICA TOURNEFORTII* GOUAN) ON SEED GERMINATION AND GROWTH OF BARLEY AND CABBAGE. <u>Aidae Sasy Khalefa Al Mogdam</u> and Abealhamed Ben Hameda, Al-Jabel Al-Gharby University, Faculty of Education, Libya, Email: aydasassi@ymail.com

This study was conducted to investigate the allelopathic effects of wild mustard (Brassica tournefortii Gouan) on seed germination and seedling growth of barley (Hordeum vulgare) and cabbage (Brassica oleracea). The effect was tested by different laboratory and field experiments. It was found that the wild mustard, as extracts or a powder, had an inhibitory effects on seed germination and seedling growth of mentioned plants both in laboratory and in the field. Higher concentrations of mustard extract completely stopped germination of tested plants. Seed germination of cabbage was completely inhibited by 5, 7.5 and 10% by the extract of wild mustard. Increasing the concentration of aqueous extract of wild mustard significantly increased the inhibitory effects on seed germination and seedling growthof tested plants. In the field it was found that mustard applied as a powder or decayed residues had an inhibitory effect on seed germination and seedling growth of tested plants. The inhibitory effect of mustard powder on barley and cabbage seed germination and seedling growth was more pronounced in the laboratory than in the field, possibly because of the dilution by rain water.

W10 EFFECT OF BACTERIAL ISOLATES FILTRATES AND INDOLE ACETIC ACID ON *PHELIPANCHE RAMOSA* (L.) POMEL **DEVELOPMENT STAGES.** A.G. Osman¹, <u>A.M.E.</u> <u>Rugheim²</u>, M.M. Hassan¹, A.I. Ali³, I.S. Mohamed⁴, M.E. Abdelgani¹ and A.G.T. Babiker⁴. (1) Environment and Natural Resources and Desertification Research Institute, National Centre for Research, Sudan; (2) Faculty of Agriculture, Omdurman Islamic University; (3) Sudan Academy of Sciences (SAS), College of Agricultural Studies, Sudan University of Science and Technology, Sudan, Email: arugheim@gmail.com

Series of laboratory experiments were conducted to study the efficacy of bacterial filtrates alone or in combination with indole acetic acid (IAA) on Phelipanche ramosa germination and haustorium initiation. All experiments were conducted at the Biopesticides and Bio-fertilizers Department, Environment, Natural Resources and Desertification Research Institute (ENDRI), National Centre for Research (NCR), Khartoum, Sudan. Filtrates of two soil borne bacterial isolates (ISO5M and ISO22M) were tested. Treatments were arranged in a RCD with four replicates. The results showed that the filtrate of isolate ISO22M was the most inhibitory, it reduced germination by 25-27% as compared to the corresponding control, followed by the combination of the filtrate of isolate ISO22M plus IAA which inhibited germination by 13-18%, however this combination reduced haustorium formation by 39-55% as compared to the control.

W11

THE ECONOMIC VIABILITY OF INTEGRATED WEED MANAGEMENT (IWM) IN ONION.

(*ALLIUM CEPA* L.). <u>Abbas A. Bawazir¹</u> and Omar S. Bin Shuaib². (1) Nasser's faculty for Agricultural Sciences, Aden University, Yemen; (2) El- Kod Agricultural Research Station, Southern Coast, Yemen, E-mail: abbawazir@hotmail.com

To evaluate the economic viability of integrated weed management (IWM) in onion, a simple economic analysis was conducted for revenues, net return and cost/benefit ratio by using onion bulb yield. Treatments consisted of crop density (high 408163 plants/ha and low 190474 plants/ha), four methods of nitrogen fertilization (unfertilized control, broadcast on soil surface, banded 10cm deep on the top of crop row, and spray on crop foliage), and four treatments of weed control (untreated control, oxyflourfen (goal 10%) 0.5 kg/ha, Pendimethalin (stomp 45%) 1.0 kg/ha + hand weeding 45 days after transplanting (d.a.t.) and hand weeding twice 30 and 60 days after transplanting. Results indicated that planting with high and adequate density of crop with banded nitrogen fertilizer and suitable and fitted weed control as an integrated weed management produced better crop yield with a reduced total cost, which resulted in an increase in the cost/benefit ratio 1/8. It was concluded that complete influence of the integrated weed management occurred gradually with continuous adoption of IWM which gradually reduced weed spread and decreased inputs (fertilizers and pesticides), with increased bulb yield and higher economic returns.

W12

ALLELOPATHIC POTENTIAL OF FARSETIA AEGYPTIA LEAF EXTRACT AS NATURAL HERBICIDE FOR WEED MANAGEMENT AND ITS MECHANISM OF ACTION. <u>Hamed M. El-</u> Shora and Ahmed M. Abd El-Gawad, Botany Department, Faculty of Science, Mansoura University, Egypt, Email: shorem@yahoo.com

The present study aimed to evaluate the allelopathic potential of Farsetia aegyptia leaf extract on germination and other biochemical criteria of wheat and associated weeds such as Brassica nigra, Portulaca oleracea Chenopodium album, and Avena fatu. The aqueous extract of Farsetia leaf inhibited seed germination of weeds and wheat at various rates compared with the control. The degree of inhibition increased with the incremental increase of extracts concentration. The activities of the enzymes that are involved in glycolysis, tricarboxylic acid cycle and the assimilation of ammonia: phosphofructokinase (EC 2.7.1.11), glucose-6-phosphate dehydrogenase (EC: 1.1.1.49), succinate dehydrogenase (EC 1.3.99.1), alanine--pyruvate transaminase (EC 2.6.1.18), alanine dehydrogenase (EC 1.4.1.1), glutamate dehydrogenase (EC 1.4.1.2) and glutamine synthetase (EC: 6.3.1.2) were reduced by the treatment. The treatment with Farsetia extract resulted in reducing the contents of nucleic acids, photosynthetic pigments and protein as well as reducing photosystem II activity in plants. Exposure of the tested plants to the aqueous extract of Farsetia induced oxidative stress through enhanced generation of reactive oxygen species (ROS): H2O2, hydroxyl radical (OH-) and superoxide radical (O2.-) which were accompanied by the change in the antioxidant enzymes including superoxide dismutase (SOD), ascorbate peroxidase (APX) and catalase (CAT). Lipid peroxidation and protein oxidation were enhanced by Farsetia extract. Results from this experiment showed that Farsetia extract can potentially serve as an alternative herbicide against the common weeds associated with wheat with little negative effect on the wheat crop plants.

W13

BIOFUMIGATION AS AN ALTERNATIVE TOOL TO METHYL BROMIDE FOR WEED MANAGEMENT IN CABBAGE. Mustapha Haidar and <u>Ali Haydar</u>, Department of Agricultural Sciences, Faculty of Agricultural and Food Sciences, American University of Beirut, Beirut, Lebanon, Email: mhaidar@aub.edu.lb

Field studies were conducted in Lebanon to investigate the effect of solarization with/without cover crop green manure (CCGM) on weed population in subsequent planting of cabbage. Cover crops (alfalfa, barley, clover, lathyrus and vetch) or crushed olive pulp

were planted/added in 18 m² plots 75 days prior to planting cabbage. Crops and crushed olive pulps were ploughed under, and then half the plots in each treatment were solarized (Biofumigation) by covering each plot with a clear polyethylene sheet for 40 days. Solarization. with or without biofumigation. significantly reduced weed population in subsequent cabbage planting as compared to nonsolarized CCGM or to the control. Solarization and biofumigation significantly increased fresh weight of cabbage as compared to the control and to nonsolarized CCGM treatments. Optimal weed control was observed in plots that were bio-fumigated with clover as a CCGM.

W14

SOLANUM ELAEAGNIFOLIUM AND ABUTILON THEOPHRASTI: NEW INVASIVE WEEDS IN LEBANON. <u>Alia Sabra</u> and Mustapha Haidar, Department of Agricultural Sciences, Faculty of Agricultural and Food Sciences, American University of Beirut, Beirut, Lebanon, Email: mhaidar@aub.edu.lb

A primary surveillance of invasive weeds was carried out with the use of a Global Positioning System (GPS) in the Beq'aa and the North provinces along the Lebanese-Syrian borderline between 2011 and 2012. The assessment hinged on the province, region (mountain and coastal), environment (agricultural and non-agricultural) and crop type. In July 2011, the presence of Abutilon theophrasti weed was detected in Baalbek (North of Beq'aa). Outcomes during November 2012, showed introduction of Solanum elaeagnifolium (Silver nightshade) to the Northern Beq'aa specifically in the Cazas of Baalbek and Hermel. This is the first documentation of the presence of these types of invasive weeds in Lebanon and the search is still on going to cover other provinces. A comprehensive plan of management, treatment and prevention to reduce the proportion of damage that could influence farmers and pastoralists will follow.

W15

WEED SEED BANK DENSITY IN SEVEN-YEAR-OLD CONSERVATION NO-TILL SYSTEM. Walaa Siblani and Mustapha Haidar, Department of Agricultural Sciences, Faculty of Agricultural and Food Sciences, American University of Beirut, Beirut, Lebanon, Email: mhaidar@aub.edu.lb

Knowledge of soil seed banks of weeds is becoming imperative in designing weed management strategies. Such information helps in the design of better weed control strategies in no-till agricultural systems. The present work was performed during spring 2014 at the Agriculture and Research Center (AREC) of the American University of Beirut to assess the size of the weed seed bank in seven-year-old conservation no-till fields. Soil samples were collected from established till and no-till fields at a depth of 0-5 cm. Transient and persistent weed seeds bank were evaluated. Results suggest that weed seed banks in no till fields are larger than in conventional tilled fields. The no-till fields contained almost double the density of monocot and dicot weed seeds than the till fields. Results provide concrete evidence that the weed seed bank at a depth between 0-5cm in no-till systems is greater than in till systems. Ongoing work that builds on present results will help gain knowledge pertaining to weed seed bank dynamics in no-till systems compared with conventionally tilled systems.

W16

EFFECT OF SILVERLEAF NIGHTSHADE (SOLANUM **ELAEAGNIFOLUM** CAV.) GERMINATION AND **EXTRACTS** ON GROWTH OF SEEDLING WHEAT. Nada Mohammad Ied Albarni¹. Anwar Al-Mouemar². Ghassan Ibrahim² and Abdulrahman Alrached². (1) General Commission for Scientific Agricultural Research (GCSAR), Administration of Natural Resources Research, Alhalboni, Damascus, Syria; (2) Faculty of Agriculture, Damascus University, Damascus, Syria, Email: albarninada@hotmail.com

Silver leaf nightshade (Solanum elaeagnifolum Cav.) is a serious invasive weed, threatening crops in Syria. In the laboratory, the effect of aqueous extracts and isopropanol extracts of plant parts of S. elaeagnifolum at maturity stage were tested on germination and seedling growth of two wheat species (sativum and durum). Results showed that silver leaf nightshade extracts played a negative significant role on evaluated properties. Germination of grains of the two wheat varieties was reduced with increase in average germination time. Radicle and coleoptile length of wheat seedling were decreased with clear appearance of phytotoxicity, as well as decreased chlorophyll content in wheat leaves, 21 days old. This effect increased with increasing concentration and differed according to plant part, type of extract, wheat varieties and tested concentration. Results indicated that the two tested wheat varieties responded differently to the allelopathic effect of S. elaeagnifolum extracts, with a greater sensitivity shown by durum wheat. In conclusion, extracts of leaf nightshade silver contains allelochemicals that may contribute to its invasiveness and extreme competitiveness.

W17

ARBUSCULAR MYCORRHIZAL FUNGI (AMF) **BACILLUS MEGATHERIUM**, AND Α PHOSPHORUS SOLUBILIZING BACTERIA (BMP) FOR CONTROL OF THE ROOT PARASITIC WEED STRIGA HERMONTHICA (DEL.) BENTH ON SORGHUM. Suha Hassan Ahmed¹, Abdel Gabar El Tayeb Babiker² and Migdam Elsheikh Abdelgani². (1) Environment and Natural Resources Research Institute, the National Centre for Research, Khartoum, Sudan; (2) College of Agricultural Studies, Department of Plant Protection, Sudan University of Science and Technology, Khartoum, Sudan, Email: hashimsuha@yahoo.com

The root parasitic weed Striga hermonthica, family Scrophulariaceae, is a serious constraint to cereal production in Sub-Saharan Africa, where total vield losses are often encountered. The parasite germination is host-derived triggered by the compounds, strigolactones. Production of strigolactones is upregulated by phosphorus deficiency and down regulated by mycorrhizal infection. The present investigation was undertaken at the College of Agricultural Studies, Sudan University of Science and Technology during July-October 2013 to study the effects of a Glomus sp., a mycorrhizal fungus isolated from onion, alone and in combinations with Bacillus megatherium var phosphaticum, a phosphorus solubilizing bacterium, and a phosphorus fertilizer (P2O5) on Striga incidence and sorghum growth. Sorghum (cv. Wad Ahmed) planted in pots, was inoculated with Glomus alone and in a combination with the bacterium. Some of the treatments received P2O5 at 67.7 kg ha-1. Unrestricted Striga parasitism reduced sorghum height by 48.1% and dry weight by 73%. Glomus sp., alone, reduced Striga emergence by 89.19%, improved sorghum height by52.9% and sorghum dry weight by 80.09%. The bacterium, alone, reduced Striga emergence by61.9%, increased sorghum height and dry weight by 40.12% and 61.80%, respectively. The combinations Glomus sp. and the bacterium further reduced Striga emergence by 93.24% and increased sorghum height and dry weight by 53.8% and 79.2-%, respectively. Supplementation of the combination Glomus sp. and the bacterium with phosphorus decreased Striga infestation by 87.4%, increased sorghum height by 50.7% and dry weight by 78.4%, Treatments comprising of a mycorrhizal component, invariably, effected dry matter accumulation comparable to the Striga free control. The results obtained suggest that the combination of mycorrhiza and the phosphorus solubilizing bacteria, B. megatherium, is a promising candidate for further studies for the combat of S. hemonthica in low-input farming in Sub-Saharan Africa.

W18

BIOREMEDIATION OF SOME HERBICIDES USING WHITE ROT FUNGUS "PHANEROCHAETE CHRYSOSPORIUM. Basel Natsheh¹, Adli Younis², Mahrashan Elmokadem², Mohamed Al-Nawaw² and Mazen Salman¹. (1) Palestine Technical University-Kadoorie, West Bank, Palestine; (2) Ain Shams University, Egypt, Email: salman_mazen@daad-alumni.de

The objective of this research was to explore the possibility of utilizing the white mold fungus *Phanerochaete chrysosporium* for degrading pesticide residues and to study the favorable conditions for its growth (temperature, salinity, pH) on nutrient medium, fungus tolerance to added herbicides (glyphosate, 2,4-d, and oxyflorfen), and fungal production of the enzyme

laccase for degrading pesticide residues. The fungus was isolated from Palestinian soil using the nutrient medium MEA. The results obtained indicated that the favorable temperature for fungal growth was 39°C, at which the fungus was grew at the rate of 16.5 mm/day. The fungus was grown in a medium at pH 6.5 and maximum salinity of 3 ds/m at 39°C when the herbicides oxyflorfen added at varying concentrations, glyphosate and 2,4-d at less than 1 mg/ml, the fungal growth was reduced by the higher herbicide concentration. The results of the Gyacol test showed that the fungus produced the enzyme laccase. This result indicated that the fungus can tolerate chemical pollutents and able to degrade them leading to reduced pollution of the environment.

W19

HOST RANGE OF FIELD DODDER (CUSCUTA CAMPESTRIS YUNCKER) AND ITS IMPACT ON ONION (ALLIUM CEPA L.) CULTIVARS GROWN IN THE GEZIRA STATE, SUDAN. Mohamed Saeed Zaroug¹, <u>Eldur Balla Zahran²</u>, Abbasher Awad Abbasher¹ and Eltahir Ahmed Abed Aliem¹. (1) Faculty of Agricultural Sciences, University of Gezira, P.O. Box 20, Wad Medani, Sudan; (2) Faculty of Agriculture, University of Elzaiem AlAzhari, P.O. Box 1432, Khartoum Bahari, Sudan, Email: edurzahran@gmail.com

During 2009 a high incidence of field dodder was observed for the first time in fields sown with onion in the Gezira Scheme, Sudan. The objectives of this research were to determine the natural host range, and to evaluate the effects of field dodder infection on 3 different cultivars of onion, namely, local red, yellow, and white as well as to confirm the susceptibility of onion to field dodder parasitism. Surveys were conducted in onion and other vegetables growing fields to determine the natural host range of field dodder. In addition, two seasons (2010-2011) experiments were conducted in the demonstration farm of the Faculty of Agriculture and Natural Resources, University of Gezira, Sudan to study the impact of field dodder on three onion cultivars using complete randomized block design with 4 replicates. The effect of dodder on the onion bulb fresh weight, bulb diameter and number of bulbs m-2 were assessed. Field dodder was noticed parasitizing 19 plant species belonging to 12 families. Among the most affected hosts there were 5 vegetable crops and one fruit tree crop. Field dodder significantly reduced onion bulb fresh weight, bulb diameter and number of bulbs m⁻² of the 3 onion cultivars by 47.4-57.7%, 33-44% and 29- 52%, respectively. These findings confirmed the susceptibility of onion to field dodder infestation. In conclusion, field dodder is a nonspecific parasite that attacks a wide range of host species and could be considered as a troublesome parasitic weed on onion in Gezira State.

W20

THE EFFICACY OF SOME HERBICIDES AGAINST BROOMRAPE (OROBANCHE SPP.) AND SOME MAIN WEEDS IN FOOD LEGUMES (LENTILS, CHICKPEAS, BEANS) FIELDS AND THE SENSITIVITY OF THESE CROPS TO HERBICIDES. Antoine Shomar¹, Naiem El-Husein², Khaled El Shamaa¹ and Bassam Bavaa³. (1)International Center for Agricultural Research in the Dry Areas (ICARDA), Aleppo, Syria; (2) General Commission for Scientific Agriculture Research, Aleppo Center, Aleppo, Syria, (3) Department of Plant Protection, Faculty of Agriculture, Aleppo University, Aleppo, Syria, Email: a.shomar@cgiar.org

To identify the best practices for weed control, ICARDA researchers have developed appropriate chemical methods for controlling Orobanche. The most effective chemicals, doses, and application dates were identified for lentil, Vicia spp., Lathyrus spp., and faba bean. This study was conducted in 2011/12 cropping season in food legumes fields (lentil, chickpea, and broad bean), and the herbicides used were selected based on the results of an earlier experiment (screening herbicides on legume crops during 2010/11 growing season) which identified four promising herbicides: Imazethapyr, Pendimethalin, Imazapic, and Aclonefin. The main objective was to determine the efficacy of the mixture imazethapyr and pendimethalin, which was applied as pre-emergence treatment, followed by imazethapyr applied as a post-emergence treatment when the crop was at 10-15 cm high. Results revealed the efficiency of some herbicides against broomrapes in the three crops, where imazethapyr treatment was clearly superior as compared to the standard treatment used at ICARDA (two post emergence applications of Imazapic). Results also showed differences in the sensitivity of the crops to the herbicides used; faba bean was the most tolerant, and lentil was the most affected. Yield results indicated the superiority of hand weeding treatment as compared with other treatments used in lentil and chickpea. In addition, chemicals treatments were better than the untreated control. The situation was different in faba bean and reflected different results, the high dose of the mixture imazethapyr and pendimethalin treatments which was followed by application of imazethapyr or application of aclonifen, gave relatively better yield than hand weeding treatment Weed control results showed a good efficiency of the pendimethalin treatment, which was effective in reducing weeds density in addition to being efficient in controlling dodder.

W21

SURVEY AND DIAGNOSIS OF BROOMRAPE TYPES IN NINEVEH PROVINCE AND ITS CONTROL IN TOMATO. Ali Kareem Al-Taae¹, Huda Hazem Al-Taae¹, <u>Thyiab Ahmed Qasem²</u>, Saad Mahmoud Khudair³, JassemYahya Zaki¹ and Ali Hammoud Thanon¹. (1) Plant Protection Department, College of Agriculture & Forestry, Mosul University, Iraq; (2) Faculty of Agriculture, Tel Afar, Iraq; (3) Nineveh Directorate of Agriculture, Iraq, Email: drthiab@yahoo.com

The study focused on evaluating the status of broomrape genus Orobanche in the Nineveh province, as there is no detailed information about the races in northern Iraq. For this purpose, a field survey was conducted to identify the different species of broomrape. The results showed that the broomrape species in Nineveh province is O. aegyptiaca Pers. (Egyptian broomrape). It was found that tomato plant is a plant of choice for the broomrape which have different forms; long- branched and non- branched and short types of both branched and non-branched. Broomrape infestation in the province of Nineveh is an alarming threat to the future of tomato production. Glyphosate with three concentrations was tested to evaluate its efficiency in controlling the tomato broomrape. The herbicides significantly reduced the broomrape parasitizing tomato plants without visible injury on the plants even when three sprays were applied at a concentration of 300 ppm. The results showed the superiority of using 3 sprays of 300 ppm on other treatments to reduce parasitism rate from 100% to 1.67%.

W22

THE RESPONSE OF SOME MONOCOTYLEDONEOUS PLANT SPECIES TO THE PARASITISM OF FIELD DODDER (CUSCUTA **CAMPESTRIS** YUNCKER). Awad Fageer¹ and Farah Samia Mohamed Ibrahim². (1) Faculty of Education, Department of Biology, University Sirt. Libya, of Sirt, Email: awadhfarah@gmail.com; (2) Department of Science, Faculty of Education, University of Holy Ouraan and Islamic Studies, Omdurman, Sudan. Email: samiafarah78@yahoo.com

The response of six plant species belonging to three monocotyledonous families, to the parasitism of field dodder (Cuscuta campestris Yuncker) was studied anatomically under the compound light microscope. The studied plant species were: Bermuda grass, sorghum, wheat and maize (family Poaceae), onion (Family Liliaceae) and ginger (family Zingibraceae). In this study, members of the family Poaceae were found to be resistant, while onion (Liliaceae) and ginger (Zingibraceae) were found to be susceptible to field dodder. In the studied plant species, the haustorium of the parasite exhibited different developmental stages that varied from initiation of haustorium primordia (i.e. initials) only, to the formation of functional endophytes connected to the host tissues. This variation in the response of the studied host plants may be attributed to their compatibility or incompatibility to the parasitism of field dodder. The results of this study indicated that when different plant species are parasitized by the same parasite they evolve defence mechanisms which differ from one host to anther.

W23

SELECTIVE CONTROL OF PHELIPANCHE AEGYPTIACA IN POTATO WITH SUB-LETHAL DOSES OF GLYPHOSATE. Elie Shdeed, <u>Ali</u> <u>Mroweh</u> and Mustapha Haidar, Department of Agricultural Sciences, Faculty of Agricultural and Food Sciences, American University of Beirut, Beirut, Lebanon, Email: mhaidar@aub.edu.lb

Greenhouse and field experiments were conducted during 2009-2010 at the greenhouse area of the Faculty of Agriculture and Food Sciences (FAFS) and Agriculture and Research Centre (AREC) of the American University of Beirut, to examine Phelipanche aegyptiaca control with sub-lethal doses of glyphosate and on the yield and quality of potatoes such as size, knobbiness and cracking of tubers. Glyphosate was applied as post emergence at 60, 80, and 100 g ai/ha. Each rate was tested for single and sequential application at 20, 40, and 60 days after potato emergence. Results indicated that glyphosate at all the tested rates (single or sequential applications) significantly reduced Phelipanche infestation and shoot number compared to the control. All tested rates except for glyphosate at 100g ai/ha (2-3 applications) were selective in potato and had no negative effect on potato biomass and yield as compared to the control.

W24

OROBANCHE RAMOSA CONTROL IN POTATO WITH FLURIDONE. <u>Mustapha Haidar</u>, Hadi Jaafar, Farah Abi Mosleh Ninette Karam and Anthony Ghandour, Department of Agricultural Sciences, Faculty of Agricultural and Food Sciences, American University of Beirut, Beirut, Lebanon, Email: mhaidar@aub.edu.lb

Field studies were conducted to evaluate the efficacy of fluridone (Pestanal^R) for Orobanche ramosa control, and the tolerance of potato cultivar, to single or repeated foliar applications of fluridone during 2012 and 2013 growing seasons. Fluridone was applied post emergenceat concentration of 1, 5, 10, 20 and 30 µM. Each rate was tested for single and sequential application at 20 and 35 days after potato emergence . Results indicated that fluridone at all the tested rates (single or sequential applications) significantly reduced Orobanche infestation and shoot number compared to the control. Fluridone at 10 µM reduced Orobanche infestation by 99% when applied twice (20 and 35 days after potato emergence. All tested rates except for fluridone at 30 µM (single or two applications) were selective in potato and had no negative effect on potato biomass and yield as compared to the control.

W25

SURVEY AND EVALUATION OF THE SITUATION OF BROOMRAPE (OROBANCHE CRENATA FORSK.) IN FABA BEAN IN NORTHERN STATE OF SUDAN. <u>Kamal A. M.</u> <u>Bedry</u> and E.S. Mohamed, National Centre for Research Sudan, Email: Kamal.Bedry6@gmail.com

In the past, Orobanche crenata Forsk. was not common on faba bean in Sudan, but recently it has been reported in Merowe area in Northern Sudan. The parasite is a serious constraint to legume production, especially faba bean. The distinguished fast spread of O. crenata clearly points to that faba bean production is threatened. O. crenata annual survey was carried out during 2003/04 and 2004/05 seasons at Merowe and El Debba localities to determine the scope of broomrape infestation of the faba bean crop, study the farmers behaviour, raise public awareness of the parasite in folk agriculture and discuss the dangers of the weed and a future strategy for stopping O. crenata dispersal by creation of necessary legislative measures. Orobanche occurred in 10-100% of the surveyed faba bean field in Merowe and El Debba localities during 2003/04-2004/05. The parasite O. crenata in faba bean started to spread upstream from the original infestation at El Debeiba in Merowe area up to Hamdab and downstream up to Tengasi in El Debba locality. The highest frequency, uniformity and density were found in Abu Rannat and El Dehassery and the lowest in Gushabi. During the surveys, more than fifty farmers were interviewed. The results of the interview and farmer's response to the questionnaire revealed that farmers were aware of the effect of O. crenata on faba bean, but malpractices and ignorance about the seriousness of the problem were very common among farmers. Infested fields were grazed immediately after harvest, and unfermented composts were used, no crop rotation was followed and mono-cropping of faba bean is a normal practice. In addition limited number of tractors and harvesters were moved for long distances and used in faba bean fields. Source of faba bean seeds was mainly uncertified seeds from the market. The uprooted broomrape plants were thrown around the field.

CHEMICAL PESTICIDES

P1

FIELD EFFICACY OF BIO-RATIONAL AND CHEMICAL INSECTICIDES AGAINST DUBAS BUG OMMATISSUS LYBICUS DE BERG IN THE SPRING **GENERATION** IN HADRAMOUT **PROVINCE**, YEMEN. Salem Mohammed Bashomaila¹, I.J. Al-Jboory² and Abdulla Omer Madi³. (1) AREA, Mukalla, Mukalla.Hadramout, P.O. Box 8073, Yemen; (2) University of Baghdad, Iraq; (3) Agriculture Department, Mukalla, Yemen, Email: smbashomaila@gmail.com

Dubas bug, *Ommatissus lybicus* De berg (Homoptera: Tropiduchidae) represent the most economic important pest on date palm in Yemen, especially in the eastern coastal area (Coast Hadramout, Shabwa and Al-Mahra). National campaigns are carried out annually by using ground application of

conventional chemical pesticides, many of which are effective but simultaneously kill beneficial insects such as pests' parasites and predators, in addition to bees. The cost, availability, health hazards and environmental risks impose serious limitations on the use of conventional chemicals. Therefore, an alternative approach is urgently needed for controlling this devastating pest. One possible solution is the use of natural bio-rational insecticides that could be safe, sustainable, eco-friendly and effective control measure and to achieve this approach, field efficacy was conducted by using Matrixine 2.4, applied at the rate of 2.5ml/l water and Fytomax N1% at the rate of 3ml/l in spring of 2014 using HV sprayer in Valley Asd Aljabel along the coast of Hadramout at locations with severely infested palms where no pesticides were used for several years. The dominant individuals present at the experiment sits were the fourth nymphal instars and adult stages. Comparisons were made with the chemical insecticides Desirin250EC (Deltamethrin) and Lambdachem 5% EC at rate of 1 ml/l. The results obtained were statistically analyzed. Observations made one day, one week and two weeks after application of Matrixine revealed that the control level of nymphs and adult was 93.5%, 91.6%; 96.5%, 87.8% and 97.5%, 90.8%, respectively. With Fytomax N, efficacy on nymphs and adults after one day, one week and two weeks was 88.5%, 92.0%; 98.5%, 63.8% and 95.0%, 66.0%, respectively. No significant difference was observed on dubas bug population decline following the application of Matrixine and chemical insecticides Desirin and Lambdachem in the treated area This outstanding performance encouraged us to recommend the inclusion of Matrixine 2.4 in Dubas bug national control campaign in Yemen as a green bio-rational solution.

P2

USING OF THYMOL FOR PRESERVATION OF FRUITS FOR EXPORT FROM SPOILAGE UNTIL THEIR USE BY CONSUMERS. <u>Maha A. Al-Rijabo</u>, Department of Biology, College of Science, Mosul University, Iraq, Email: mahaalrejaboo @yahoo.com

Isolates of Fusarium graminearum and Penicillium nalgiovense were collected from imported and spoiled fruits of grapes as well as orange and grapefruits purchased from local markets. The effect of thymol on the growth of the two species was checked. Complete inhibition of growth was achieved at concentration 0.5 mg/ml in growth medium for Fusarium graminearum and 1.5 mg/ml in growth medium for Penicillium nalgiovense. Since thymol is known to become become mutagenic at high concentrations, safety issues should be considered when it is used for the preservation of fruits. In case of citrus fruits, where the rind is peeled, the use of thymol during packaging, storage and export of these fruits is usually safe.

P3

EVALUATION OF SOME BOTANICAL OILS AGAINST THRIPS TABACI LINEMAN IN ONION FIELDS IN EGYPT. Ayman Al Shhawi, <u>Hamed Abd</u> <u>AlDaem</u> and Majdi Ahmad, Protection Research Institute, 7- Nady El-said street, Dokki, Giza (12618), Egypt, Email: hamedagri@yahoo.com

The experimental trials were implemented in onion fields in Sirs El-Lian Research Station, Monufia Governorate during the two onion seasons of 2012 and 2013. Five plant oils including Ricinus communis, Lupinus termis, Majorana hortansis, Cinnamomum camphora and Pimpinella anisum were advantageously used to evaluate their protective efficiency against Thrips tabaci. The efficiency of these products was recorded on the basis of reduction in the pest population 3, 7 and 11 days after treatment of the tested products. It was found that the highest reduction occurred by using Majorana hortansis oil. The corresponding reduction rate 3, 7 and 11 days after treatment and the mean reduction values were 93.30, 94.78, 85.8 and 91.30% during the onion 2012 growing season and 95.42, 96.19, 92.22 and 94.61 during the onion 2013 growing season. The highest efficacy of the tested products was noticed at 7 days post treatment with the exception of Cinnamomum camphora in which the highest efficacy was recorded at 3 days post treatment. Generally, the efficacy of the tested plant oils could be arranged in a descending order when evaluated three days after application as follows: Majorana hortansis, Lupinus termis, Ricinus communis, Pimpinella anisum and Cinnamomum camphora at 94.36, 92.49, 50.03, 44.45 and 33.08%, respectively, in the two seasons. It was noticed that the efficiency of the tested insecticidal alternatives against the pest was higher during the 2013 than the 2012 season.

P4

TOXICOLOGICAL, BIOLOGICAL AND BIOCHEMICAL **EFFECTS** OF CERTAIN **INSECTICIDES** AND INSECT GROWTH **REGULATORS ON THE BLACK CUTWORM,** AGROTIS IPSILON (HUF.) AND ALBINO RAT. Shaimaa M. Farag¹, Hossam H. Osman² and Ashraf El Barakati³. (1) Entomology Department, Faculty of Science, Ain Shams University, Egypt; (2) Anatomy Department, College medicine, El Teaf University. Saudi Arabia; (3) Anatomy Department, College of medicine, El Teaf University, Saudi Arabia, Email: shaimaa.mahmoudfarag@yahoo.com

The insecticidal, biological and biochemical effects of a bacterial methomyl (Lannate 90% SP) and an insect growth regulator Flufenoxuron was evaluated on 4th larval instars of *Agrotis ipsilon* (Huf.) (Lepidoptera: Noctuidae) and on albino rat. The results clearly showed that methomyl was more toxic than flufenuxuron against the 4th larval instar according to LC_{50} values. The duration of the subsequent instars, from the initial treated one was longer when *Agrotis*

ipsilon 4th instars larvae were treated with either methomyl or flufenoxuron. Percentage of larvae entering the pupal stage was nearly half the value of the control (i.e. approximately 50%) when either insecticides was tested. Furthermore, percentage of adult emergence was significantly affected. Several morphological malformations were induced in the subsequent larval instars as well as formed pupae and to a lesser extent in enclosed moths following treatment with either methomyl or flufenoxuron. The percentage of their occurrence was higher when the latter chemical was used. Animals treated orally with 1/4 LD50 of each compound showed that there was a significant more increase of ALT, AST, blood urea and creatinine in the methomyl treatment than in the flufunoxuron and control treatments. The results indicated that methomyl is more toxic than flufenoxuron on Agrotis ipsilon and albino rats. Accordingly, the usage of. Flufenoxuron (IGRs) is recommended because it is less toxic and safer to the environment.

P5

Degradation of Cypermethrin residues in tomato fruits, soil and water in the Libyan Desert. Salah Albangaya¹, fdayel Alawami² and <u>Abdelkareem Amer</u>². (1) The Higher College for Agricultural Technology, Almarj. (2) Department of Plant Protection. Faculty of Agriculture. Omar Almokhtar University. Albaida, Libya. E-mail: Dr.AbdelkrimAmer@gmail.com

Pesticides are regarded the main method in plant protection practices in almost all parts of Libya especially, in the isolated desert areas such as Ojella Oasis which is considered a major tomato planting area in Libya. Cypermethrin is an important insecticide and is the most commonly used in such areas. The current study followed the degradation of Cypermethrin residues in tomato fruits of the variety Red Bool Peto 111, soil and water in tomato fields. The insecticide was applied at the recommended field rate of (200 ml/1000 1/ha). Samples of tomato fruits, soil and water were collected daily for 20 days from the treated area. Residues of Cypermethrin were determined for each sample and residue degradation curves were generated for the fruit, soil and water samples. Results showed that the concentration of this compound in tomato fruit started at 0.06 ppm which is less that the maximum residue limit and ended with a concentration of 0.005 ppm. Mean degradation at the end of the study was 91.6%. However, concentration in soil started at 2.44 ppm and ended at 0.21 ppm with degradation mean of 99.1%. In water, the initial concentration was 1.061 ppm and the ending was 0.024 ppm with degradation mean of 97.8%.

P6

RESIDUES OF ORGANOCHLORINE INSECTICIDES IN FISHES IN CENTRAL SUDAN. <u>Rawda Y. EL Habieb</u>, Agricultural Research Corporation, P.O. Box 126, Wad Medani, Sudan.

Thirty fish specimens belonging to four different species of economic importance were collected from Gezira area (central Sudan). From each fish triplicate samples of muscle tissues were removed for analysis. These samples were analyzed for the residues of the persistent organochlorine insecticides, DDT, TDE, DDE, Lindane, Heptachlorepoxide, and Dieldrin. The method described by de Fauber Maunder et al (1964) was used for the extraction and clean-up of the samples. The extracts were analyzed by gas-liquid chromatography (GLC) using electron capture detector. Only Dichlorodiphenyl ethylene (DDE), a metabolite of DDT, was found in 40% of the samples ranging from 0.0186 to 0.1043 ppm. In all cases the species, Hydrocyon forskalii (Cuv.) had the highest residue levels.

P7

USING ORGANIC INSECTICIDE FYTOMAX N AND DISMATE PE FOR CONTROLLING *EPHESTIA* SPP. IN DATES ORCHARDS AND WAREHOUSES IN IRAQ. A.A. Hamed¹, I.J. Al-Jboory², Sh.M. Al-Zaidi³ and <u>A.A. Al-Taweel¹</u>. (1) Ministry of Science and Technology, Directorate of Agricultural Research, Integrated Pest Control Center, Baghdad, Iraq; (2) Consultant, P.O. Box 17399, Amman, 11193, Jordan; (3) Russell IPM Ltd. UK

The results of this investigation illustrated that using the organic insecticide Fytomax N (Azadirachtin 1% neem oil) in the date palm orchards reduced the average percentage of infested dates to 1.5% in comparison with 17.4% in the untreated control orchards. Furthermore, the results also showed that using Dismate PE as a mating disruption agent in the dates warehouses reduced the average percentage of infested dates to 0.9% in comparison with 17.3% for the untreated control warehouses. This result was confirmed by using pheromone traps which illustrated that the mean number of insect captured by pheromone traps in the treated warehouses with Dismate PE was 6.3 insect/trap/two weeks in comparison with 49.8 insect/trap/two weeks for untreated control warehouses.

P8

NON-TARGET EFFECT OF BAVISTIN AND GLYPHOSATE ON THE POPULATION OF *GLOMUS MOSSAE* ON MUNG BEAN. <u>Hadi Mahdi</u> <u>Aboud¹</u>, R.A. Zeid² and R.A. Abd-Aljabar³ (1) Directorate of Agriculture Research, Bagdad, Iraq; (2) College of sciences, Al Mustanseia University, Iraq; (3) College of Science, Tikrit University, Iraq, Email: hadimahdiaboud@yahoo.com

The results of the effect of the fungicide Bavistin and herbicide Glyphosate at recommended and two fold the recommended dose on the population of mycorhizal fungus *Glomus mossae* on mung bean crop revealed that both pesticides significantly inhibited the population of *G. mossae* as manifested by the reduction of mean number of spores, incidence of infection and root colonization intensity. At the recommended dose, Bavistin induced significant reduction in the number of spores/1gm soil, infection incidence and root colonization intensity of 6, 20% and 0.15, respectively. When the two fold dose was used the same traits reached 3, 20% and 0.05, respectively. When Glyphosate was used, the same traits reached 10, 20% and 0.2 at the recommended dose and 6, 20% and 0.1 at the two fold dose, respectively.

P9

EFFECT OF BELTANOL ON VIABILITY OF BEAUVERIA BASSIANA (BALS.) VUILL. AND IT'S EFFICACY AGAINST DUBAS BUG OMMATISSUS LYBICUS DE BERG. <u>Hussein</u> Magtoff Diwan, Hyder Hameed Newar, Majed Ibrahim Abd-Allah and Hussein Nayma Keshmer. Department of Biological Control of Plant Pathogens, Center of Integrated Control, Directorate of Agricultural Research, Ministry of Science & Technology, Baghdad, Iraq.

The aim of this study was to assess the effect of fungicide Beltanol at different concentrations (155, 312.5 and 625ppm/ml) on the viability of the entomopathogenic fungus Beauveria bassiana at 30±1 $^{\circ}$ C and 35 ±1 $^{\circ}$ C and 48 hours exposure. This study also aimed to evaluate the effect of this fungicide (Beltanol) on the efficiency of *B. bassiana* in infecting the date palm Dubas bug Ommatissus lybicus three days after treatment under laboratory conditions. The results showed superiority of viability of B. bassiana spores (P=0.05) in the control treatment (3160 and 3007 x 103) colony/L) at 30 ± 1 and $35\pm1C^{\circ}$, respectively, compared to the viability of the other treatments in which the spores were exposed to different concentrations of Beltanol at the same temperatures, while the spores revealed more viability (1587 x103 colony/L colony/ml) after exposing them to 155ppm/ml at 30±1 C° in comparing with the other treatments that their spores exposed to higher concentrations, in which the spores totally lost their viability of the fungus showed highest (P < 0.05) efficacy percent (100%) against the date palm dubas insects O. lybicus after exposure to 155 ppm/ml of Beltanol at $30\pm1C^{\circ}$ under laboratory conditions in the laboratory in comparison with the all treatments in which the spores were exposed to increasing concentrations at the same temperature, whereas the spores (after their exposure to 312.5 ppm/ml of Beltanol) showed higher efficacy against insects (94.3%), in comparison with other treatments, except for the control treatment (91.7%) which did not significantly differ from it. But in the treatment that used only distilled water, the death rate of insect was low (35.7%). The results of this study may be useful in formulating spores of the B. bassiana isolate (x6) with Beltanol (at 155 or 312.5 ppm/ml) to control the dubas bug of date palm.

P10

EFFECT OF EXPOSURE PERIOD AND CONCENTRATION OF THREE TYPES OF ABRASIVE DUST ON KILLING OF LARVA AND ADULTS OF KHAPRA BEETLE TROGODERMA GRANARIUM EVERTS. <u>Nabil M. Almallah</u> and Ahmed M. Aljanabi, Plant Protection Department, College of Agriculture & Forestry, Mosul University, Iraq, Email: Nbl mstf@vahoo.com

The laboratory experiments were conducted to study the effect of exposure period and concentration of bbrasive dust (Silica gel, limestone and gypsum) on the mortality of larva and adults of Trogoderma granarium Everts. (Coleoptera: Dermestidae) under laboratory conditions (25±5C° and 65±5% R.H) in the College of Agriculture and Forestry, Mosul University, during 2013. The results showed that the killing rate was clearly increased with increased concentration. The Silica gel exhibited high effectiveness in comparison with limestone and gypsum which revealed after two week of treatment had higher average values of larva and adults killing which reached 60 and 70.33%, respectively at the concentration of 70g/kg. Whereas, the values of treatment by limestone and gypsum reached 33.33, 60% and 26.66, 40%, respectively, at the same concentration. These results reflected on LC50 values of the abrasive dust which indicated that the adults had more susceptibility than larval stage in their response for used dusts whose LC50 values reached two weeks after treatment 42.53, 58.88 and 101 ppm for silica gel, limestone and gypsum, respectively. These last results reflected too on the values of relative efficiency and relative susceptibility of the two insect stages (larva and adults) and higher values were recorded in Silica gel two weeks after adults treatment which reached 422.34 for relative efficiency and 1.0 for relative susceptibility compared with gypsum which gave lower values on larval stage, which reached 100 for relative efficiency and 0.226 for relative susceptibility.

P11

IMPACT OF PESTICIDES ON BIOCENOTIC ENTOMOLOGICAL CORTEGE AUXILIARY PARAMETERS ASSOCIATED WITH CITRUS IN THE REGION OF THE MITIDJA, ALGERIA. Djillali Mohmad Mahdjoubi¹, Fahema Wattar², Ateqa Ben Remah³, Omar Khldi³ and Belal Kerdy⁴. (1) Faculty of Natural Sciences and Life Sciences and Earth and the universe, the Department of the Environment, May 8, 1945 University of Guelma, Algeria; (2) Faculty of Natural Sciences and Life and Earth Sciences, University of Bouira, Algeria; (3) Saad Dahlab University, Department of Agricultural Sciences, Blida, Algeria; (4) University Mohammed Sharif Aides, Institute of Agricultural Sciences and Veterinary Medicine, Department of Agriculture, market Ahras, Algeria, Email: djillalimahdjoubi@gmail.com

The population census was conducted in order to understand the diversity present in the field, to find

species of agronomic interest or save our entomological wealth. The collection also aimed to identify existing populations, especially local species. It is a living process that illustrates the current process of acclimatization and domestication of useful species. To exploit the variability of species in terms of increasingly intensive plant health programs, one must know such diversity. The priority was to describe and make an inventory for all entomological species. Sampling was conducted in orchards located at 20, 30, 40 and 50 Km of Algiers in Mitidja, which is a citrus region. Different sampling methods were used: light traps, pheromone traps and also mowing and tapping. Ecological indices were used to interpret some variations; the diversity index, Jaccard, and analysis of variance. 98 insect species were inventoried, including 12 beneficial species belonging to the order Coleoptera, Hymenoptera and Neuroptera. The other species were pests, some are very serious, others are less so.

P12

EFFECT OF SPRAYING WITH SOME PLANT EXTRACTS ON GROWTH AND YIELD OF FABA BEAN. <u>Abdulraheem S. Mohammed</u>, A. Abdulraheem A. Yahya and O. Kalid, College of Agriculture and Forestry, Mosul University, Potato and Tomato Cultivation Development Program Station, Mosul, Iraq, Email: dr_albedri53@yahoo.com

A field study was conducted at potato and tomato cultivation development program station, Mosul, Iraq during the 2013-2014 growing season to study the effect of spraying with some plants extracts : Fenugreek seeds, licorise roots and nettle leaves on two faba bean cultivars: Aquadalce and Sciadola Verdec. Plants were sprayed twice with 25 gm/l: the first at 3-5 true leaf stage, and the second two weeks later. Results revealed that plant extracts affected positively the growth and yield. Results showed that Aquadalce cultivar gave the highest values in most of the studied parameters.

P13

EFFICIENCY OF SOME INSECTICIDES IN CONTROLLING BLACK PARLATORIA SCALE, *PARLATORIA ZIZIPHI* (HOMOPTERA: **DIASPIDIDAE) IN CITRUS ORCHARDS.** S.M. Faskha¹, <u>M.E.S. El-Zemaity²</u>, S.M.A. Dahroug² and H.E. Sakr². (1) Agricultural Scientific Research Centre, Tartous, Syria; (2) Plant Protection Department, Faculty Agriculture, Ain Shams University, Shoubra El-Kheima, Cairo, Egypt, Email: mselzemaity@hotmail.com

The toxicity of four insecticides (KZ oil 95% EC, Aqua Roash 5% EW, Achook 0.15% EC, Actara 25% WG.) against different stages of black parlatoria scale, *Parlatoria ziziphi* were tested under laboratory conditions using the leaf-dipping method. The data obtained indicated that Achook was the highest toxic insecticide against nymphs, females and males, followed by Actara, Aqua Rosh and KZ oil. On the other hand,

the field evaluation results showed that the highest nymphal mortality of 94.61% was recorded for Actara, two weeks after the second application. Whereas, mortality was 81.92% with Achook after one week, 78.47% by KZ oil after one month and 66.63% by Aqua Rosh two weeks after the second application. In addition, Actara provided significant reduction in female population (86.4%), one month after the second application. However, Achook, KZ oil and Aqua Rosh provided 81.73, 74.78 and 56.8% female population reduction, two weeks after the second application. respectively. As for the effectiveness of the tested insecticides against males, the data obtained indicated that the highest reduction rates were at two weeks after the second application. Such reduction rates were 81.55, 71.98, 67.55 and 63.12% for Actara, KZ oil, Agua Rosh and Achook, respectively.

P14

MONITORING OF METHOMYL, OXAMYL AND CARBOSULFAN PESTICIDES RESIDUES IN LOCAL TOMATOES AND IMPORTED TOMATO JUICE AND STUDING THE EFFECT OF **OZONATION, UV-RADIATION** AND HEAT TREATMENT ON THESE PESTICIDES **RESIDUES IN TOMATO JUICE.** Asma Mohammad Shaderma¹, Maher Mahmoud Al-Dabbas² and Tawfig Mustafa Al- Antary³. (1) Ministry of Agriculture, Directorate of Plant Wealth Laboratories, Department of Pesticides Formulation Analysis, Jordan; (2) Faculty of Agriculture, Department of Nutrition and Food Technology, University of Jordan, Jordan; (3) Faculty of Agriculture, Department of Plant Protection, University of Jordan, Jordan, Email: asmashaderma@vahoo.com

This study was conducted to monitor methomyl, oxamyl and carbosulfan carbamate pesticides residues in tomato fruits grown in the Jordan Valley during the period from January to May, 2012, and in imported tomato juice from June to September, 2012. Additionally, the effect of ozonation at 0.4 ppm, UVradiation at 254 nm and heat treatment above 100 °C on methomyl, oxamyl and carbosulfan residues of spiked tomato juice was studied. The results of analysis for 60 samples of tomato fruits and 91 samples of imported tomato juice showed that methomyl residues were found in 90% of the collected tomato fruits samples and in 56% of the collected tomato juice samples, but oxamyl residues were found in less than 20% of the collected tomato fruit samples, and its residues were not detected in any of tomato juice samples. Carbosulfan residues were not found in any of the collected tomato fruits and juice samples. Ozonation at 0.4 ppm was found to be the most effective treatment. Complete degradation of methomyl was achieved after 15 min, but for oxamyl and carbosulfan were achieved after 30 min, while the reduction percentages of methomyl, oxamyl and carbosulfan after UV-radiation treatment for 30 min were 19.59%, 16.82% and 2.16%, respectively. On the other hand, heat treatment above 100 °C for 30 min led to reduction percentages of 72.63%, 88.66% and 100%, respectively. However, the reduction percentages of the studied carbamate residues were increased with increasing time of exposure.

P15

EFFECTIVENESS OF SOME PESTICIDES AGAINST CACOPSYLLA PYRICOLA (F.) AND IMPACT ON ITS PREDATOR *ANTHOCORIS NEMORALIS* (F.) IN PEAR ORCHARD. Wajeeh Kasses¹, Randa Abu-Tara² and <u>Bassam Oudeh³</u>. (1) Faculty of Agriculture, Damascus University, Syria; (2) Faculty of Science, Damascus University, Syria; (3) GCSAR, Agricultural Scientific Research Center at Homs, Syria, Email: B_oudeh@hotmail.com.

Efficacy of some insecticides (Amitraz, and Abamectin) and plant extracts (Melia azedarach L., Schinus molle L.) were tested against Cacopsylla pyricola F. (Hemiptera: Psyllidae) and impact on its predator Anthocoris nemoralis (F.) (Heteroptera: Anthocoridae) in a pear orchard in Mokhtaria Research Station, Agricultural Research Center in Homs during 2011and 2012 growing seasons. The results showed that average mortality of C. pyricola eggs three days after spraying insecticides (Amitraz, Abamectin, Mazedarach, S. molle) were 48, 88, 89 and 79% and on nymphs were 66, 91, 81 and 74% and on adults were 39, 52, 61and 61%, respectively. M. azedarach extract was the most efficient in controlling eggs and adults and Abamectin was the most efficient in controlling nymphs. S. molle extract was highly efficient on all C. pyricola stages, while Amitraz was the least efficient in controlling C. pyricola stages. Average mortality of A. nemoralis nymphs three days after spraying of the above mentioned insecticides were 63, 55, 15 and 16% and on A. nemoralis adults were 17, 19, 7 and 8%, respectively. The insecticides Amitraz and Abamectin were slightly toxic on nymphs with no toxicity on adults, whereas M. azedarach and S. molle extracts were not toxic on nymphs and adults according to IOBC (International Organization for Biological and Integrated Control). The average mortality caused by the above insecticides on C. pyricola eggs in twenty one days was reduced by 45, 78, 69 and 54% and on nymphs by 43, 81, 56, and 49% and on adults by 34, 35, 50, and 53%, respectively. The efficiency of Abamectin remained the highest for the control C. pyricola stages (eggs and nymphs), and less on adults, whereas plant extracts were the most efficient in killing adults. The toxicity of the above insecticides in twenty one days on A. nemoralis nymphs were 10, 13, 3 and 1% and on adults were 6, 12, 1 and 0%, respectively. Insecticides were the most toxic on nymphs and adults of A. nemoralis compared with plant extracts. Accordingly, plant extracts may serve as a component in integrated pest management in pear orchards to replace synthetic insecticides, as it has high efficacy and at the same time it is environmentally safer with no toxicity on A. nemoralis.

P16

THE EFFECT OF INTERACTION BETWEEN MOISTURE STRESS, FUNGICIDAL DRESSING AND BACTERIAL INOCULATION ON SOME PHYSIOLOGICAL AND QUANTITATIVE VEGETATATIVE CHARACTERS OF LENTIL. Bushra K. Al-Amaary, College of Science, University of Mosul, Iraq, Email: nadeem.ramadan53@yahoo.com

A study was conducted on lentil seeds dusted with the fungicide Vitavax used at the concentration of 2g/kg of seeds. Seeds were planted in 30 cm in diameter pots with 10 seeds/pot. Pots were filled with soil treated with bacterial inoculant at the rate of 2g/kg of seeds. 20 days after sowing, plants were thinned to 5 plants/pot and aterted to 50% and 75% field capacity. Results indicated that the bacterial inoculant significantly increased foliage growth and yield. Dusting with vitavax significantly increased dry weight of foliage, roots fresh weight, number of leaves.

P17

EFFICACY OF SOME INSECTICIDES AGAINST THE TOMATO LEAF MINER (*TUTA ABSOLUTA* **MEYRICK**). <u>Ahmed A. Sallam¹</u>, Mahmoud A. Soliman² and Mohamed A. Khodary². (1) Plant Protection Department, Faculty of Agriculture, Sohag University, Egypt; (2) Plant Protection Department, Faculty of Agriculture, Qena, South Valley University, Egypt, Email: ahmed.sallam3@agr.sohag.edu.eg

Eight insecticides were selected in the present study (chloropyriphose, methomyl, lambada cyhalothrine, imidacolpyrid, abamectin, chlorfenapyr, chlorantraniliprole, and emamectin benzoate) representing different classes or types with different modes of action to evaluate their toxicity against the tomato leaf miner, Tuta absoluta (Lepidoptera: Gelechiidae) under laboratory and field conditions. Data clearly indicated that the order of efficiency of the tested insecticides was the same at both LC_{50} and LC_{90} levels. The efficacy of the tested insecticides arranged in descending order are as follows: abamectin. chlorfenapyr, chlorantraniliprole, methomyl, emamectin benzoate, chlorpyrifos, lambada cyhalothrin, and imidacloprid. Data obtained from field trials were similar to laboratory results. The results indicated that all the tested insecticides had significantly affected the insect population reduction of infestation rate with T. absoluta in tomato open field. The average reduction rate of infestation was affected by the tested insecticides and part of plant (leafs & fruits) affected. Based on the results obtained, the use of abamectin, chlorfenapyr, and chlorantraniliprole to control this insect is recommended.

P18

EFFICACY SOME BIOCIDES, CHEMICAL INSECTIIDES AND PLANT EXTRACTS TO CONTROL PRAYS OLEAE BERN. E. A. Mehrez¹, <u>M.Y. Ibrahim¹ and M.Z. Mehmalgy². (1) GCSAR.</u> Agricultural Scientific Research Center at Homs, Department of Plant Protection Research; (2) Department of Plant Protection, Faculty of Agriculture, Damascus University, Syria. Email: mohamedkozii@yahoo.com

The efficacy of some biocides (Bacillus thuringensis and *Beuveria* bassiana), chemical insecticides (Fenoxycarb, Diazenon, Cypermethrin and Dimethoate) and plant extracts (Melia azedruach L. and Schinus mole L.) was evaluated for controlling Prays oleae larvae at Sheen site. Homs governorate, during 2008 season. Results revealed that efficacy of chemical insecticides and *M. azedruach* extract gave the highest mortality rate two weeks after treatment and was 75.4% for Diazenon followed by Cypermethrin (60.42%), M. azedruach extract (59.47%) and Dimethoate (58.18%). While, the LC50 range was 33.44- 47.66% for the biocides. Up to three weeks after treatment, the efficacy rate reached 53.57 and 54.76% for Fenoxycarb and Diazenon, respectively. Efficacy rate increased gradually by increasing the period of exposure after treatment for biocides and Fenoxycarb from 30.1 and 36.87% after one week to 35.36 and 53.57% after three weeks, respectively. Whereas the efficacy rate of chemical insecticides (Diazenon) decreased from 75.4% 2 weeks after treatment to 54.76% 3 weeks after treatment.

P19

EFFICACY OF **INSECTICIDES** AND BOTANICAL EXTRACTS AGAINST MYZUS PERSICAE (SULZER), ON SWEET PEPPER, CAPSICUM ANNUUM L. UNDER PROTECTED **ENVIROMENT IN INDIA.** Omkar Gavkare¹ and Surjeet Kumar². (1) Department of Entomology, CSK Himachal Pradesh Krishi Vishvavidyalaya, Palampur, Himachal Pradesh, India; (2) Department of Entomology, Dr YS Parmar University of Horticulture and Forestry, Nauni, Solan, Himachal Pradesh, India, Email: omkargavkare@yahoo.com

Studies on bio-efficacy of insecticides against the aphid Myzus persicae (Sulzer) on Capsicum annuum were carried out during 2011. The results showed that different treatments, comprising of six chemical insecticides, three botanicals and one mineral oil (tea spray oil), were evaluated for their efficacy against M. persicae on C. annuum under protected environment. Among chemical insecticides, the highest reduction rate in aphid population over control was observed in case of thiamethoxam (0.005%) followed by imidacloprid (0.005%), acetamiprid (0.02%), fipronil (0.01%), acetamiprid (0.01%) and lambda cyhalothrin (0.005%), whereas, the lowest reduction rate was recorded in case of malathion (0.05%). Among botanicals, the Eupatorium based treatment, SHE-2 (0.5%) was found to be the most effective. The imidacloprid neonicotinoids, (0.005%)and thiamethoxam (0.005%) were the most effective treatments in reducing the aphid population of *M*. *persicae* on *C. annuum* under protected environment.

P20

EFFECT OF IRRIGATION WATER SOURCES AND PLANTING DATE ON PESTICIDE RESIDUES AND CHEMICAL COMPOSITION OF SUGAR BEET <u>Shehata E.M. Shalaby¹</u>, Gehan Y. Abdou¹ and Ibrahim M. El-Metwally². (1) Pests & Plant Protection Department, (2) Botany Department, National Research Centre, Dokki, Cairo, Egypt, Email: sh_shalabynrc@yahoo.com.

Sugar beet (Beta vulgaris L.) is a one of the most important crops in Egypt. It has been recently introduced in order to boost sugar production for between production minimizing the gap and consumption. This investigation aimed to study the influence of irrigation water sources and planting dates on pesticide residues, chemical composition and productivity of sugar beet. A significant increase in the yield (weight of tubers and shoot)was obtained in soils irrigated with drainage water, followed by those irrigated with normal irrigation water compared to those irrigated with mixed water (normal + drainage water). A significant increase in sugar content was obtained in soils irrigated with normal irrigation water followed by those irrigated with mixed water compared to those irrigated with drainage water. Some pesticide residues were detected in tubers and shoots and was influenced by the sources of irrigation water. The presence of many heavy metals was detected in drainage and mixed water.

P21

EVALUATION OF THE EFFICIENCY OF SOME PESTICIDES AND CHEMICAL FERTILIZERS IN THE FIGHT AGAINST ONION THRIPS IN ONION FIELDS AND CHARACTERISTICS OF ONION GROWTH AND YIELD. <u>Najeeb Ahmed</u> <u>Mohsen Salam</u>, Plant Protection Department, Faculty of Agricultural Sciences Nasser, University of Aden, Yamen, Email: najeebcurd2007@yahoo.com

A field experiment was conducted in a private farm south of Nasser College of Agricultural Sciences, University of Aden farm during the 2013-2014 growing season. Three pesticides were selected; Angio 247 Sc. Mrkzmalq (Lambda Cyhalothrin + Thiamethoxan) emulsion at a rate of 20 ml/100 L of water, and pesticide Match 50 g emulsion (Lufenuron) used at the rate of 200 ml/100 L of water and a naturalextract Alnimbasidin EC (0.03% Azadirachtin)) and two fertilizers, urea 46% applied at a rate of 100 kgN/ha in two installments 25 and 55 days after sowing, and foliar fertilizer Mkroagrk applied at a rate of 400 g/100 L of waterapplied in three sprays every 15 days. The experiment included seven treatments including the control replicated three times in a randomized complete block design. Results were analyzed by using genestat-5 program. The results obtained showed the effectiveness of pesticides in significantly reducing population density of onion thrips
compared to the control. The pesticide Angio was significantly better than Match and Nmbisadan after the three sprays associated with the peak of the onion thrips population, where thrips density after the first spray was 6.87, 5.62, 3.37 thrips/plant, for the three pesticides, respectively, and after the second spray 8.25, 9.12, 5.37 thrips/plant, respectively, and after the third spray was 5.75, 5.05, 4.1 thrips/plant, respectively. The results also showed that urea fertilization together with pesticides significant increased plant height and number and weight of green leaves. The use of pesticides Angio, Match, Numeibsidin led to the production of 32.4, 27.3, 30.4 t/ha, respectively, whereas the bulb diameter, weight and size were not significantly differentamong the treatments.

P22

STUDY OF NATURAL DEGREDATION OF CYPERMETHRIN RESIDUE IN TOMATO FRUITS, SOIL, AND WATER AT THE DESERT ENVIROMENT OF OWJALA OAISIS. Ifdial Omer Elawam, Ali Abdielsaed, Abdolkarem Amer and Omar Almukhtar University, Elbada, Libya, Email: ifdial_1956@yahoo.com

The study was conducted toassess natural degradation of cypermethrin insecticide in soil, water and tomato fruits under the environmental conditions of Owjala oasis. The results obtained showed that the concentration of the insecticide in the tomato fruits in the first day was 0.06 ppm, which is less than the maximum limits according to the codex (2008) and the degradation rate reached 91.6% of the initial amount at the end of study. The concentration of the insecticide in the water was semi-stable at 1.061 ppm and reached in the middle of the study to 0.35 ppm and degraded at a rate of 67% of its initial level. Pesticide degradation recorded at the end of the study was 97.8%. The initial concentration of the insecticide in the soil was higher than that in wateror in tomato fruits and reached 2.44 ppm, however degradation was fast in the soil and reached in the initial three days 32.4% to become at the end of the study 99.1%, with a concentration of 0.021 ppm. The degradation after two weeks in the soil was 93% of the initial value. Pesticide degradation was faster in soil than in water or in tomato fruits.

P23

LUNA®, A NEW OUTSTANDING FUNGICIDE FOR EFFECTIVE CONTROL OF PROBLEMATIC DISEASES, ESPECIALLY IN HORTICULTURAL, ANNUAL AND PERENNIAL CROPS. M. Elsherif, G. Labourdette and D. Steiger, Bayer CropScience AG, EMEA Development Alfred-Nobel-Str. 50, 40789 Monheim, GermanyBayer SAS, Bayer CropScience, 14-20 Impasse P. Baizet, FR-69009 Lyon, France, Email: mohamed.elsherif@bayer.com

Luna® (Fluopyram) is the latest outstanding fungicide discovered by Bayer CropScience. Luna is effective against a broad spectrum of difficult to control

diseases caused by fungal pathogens belonging to the Ascomycota/Deuteromycota, such as powdery mildew, leaf spots, black sigatoka, scab, Botrytis fruit rots, Sclerotinia and Monilia diseases on economically vegetables. field crops. fruits important and ornamentals. The active ingredient fluopyram belongs to the new chemical class of Pyridil-ethylamides and its mode of action is a Succinate Dehydrogenase Inhibitor (SDHI). Applied as a foliar spary, fluopyram is acting locally systemic taken up by the leaves and then translaminar movement distributed bv within. Fluopyram is active at low rates (75g to 100g a.i./ha) against Powdery mildew species and Sigatoka, while 250g ai/ha is needed to give a good control of the diseases caused by Sclerotinia fungi.Field applied Luna also delivers control of latent diseases, which may symptoms post-harvest in store under express unfavorable conditions. This resulted in many trials in a significantly improved quality of stored produce and a longer shelf-life. Therefore, both the growers and the food chain industry can gain value from this innovation. Different Luna product solutions are proposed targeting different crop and disease scenarios combining the advantages of other Bayer CropScience fungicides. Luna Privilege is the straight fluopyram product mostly dedicated to the control of *Botrytis* spp. in various crops. Luna Sensation® is a mixture of fluopyram and Trifloxystrobin, Luna Experience® is a mixture of fluopyram and Tebuconazole. Luna Tranquility® combines fluopyram and Pyrimethanil, which gives a highly consistent protection of rose cut flowers against Botrytis cinerea. Fluopyram applied at recommended use rates causes no adverse effects to ecosystems and non-target organisms. It shows very good crop safety, is non- hazardous for humans and mammals. Fluopyram products are currently approved in more than 50 countries, covering more than 70 crops. Numerous of global MRLs and Import Tolerances are already available. This paper summarizes the field performance of fluopyram against key diseases on a range of important crops and the use in IPM programs.

P24

SIVANTO PRIME® - THE FIRST SYNTHETIC IPM COMPATIBLE INSECTICIDE OF THE NEW CHEMICAL CLASS **BUTENOLIDE** FOR EFFECTIVE CONTROL OF SUCKING AND OTHER KEY PESTS ON VEGETABLES, TREE FRUIT, VINE AND OTHER ANNUAL AND PERENNIAL CROPS. M. Elsherif, Χ. van Waetermeulen, J.F. Niebes and P. Duvert, Bayer CropScience AG, EMEA Development, Alfred-Nobel-Str. 50, 40789 Monheim, Germany.*Bayer S.A.S., Bayer CropScience, 14-20 Impasse P. Baizet, FR-69009 Lyon,EMAIL: mohamed.elsherif@bayer.com

Sivanto Prime® (flupyradifurone) is a potent insecticide recently discovered by Bayer CropScience. Its development is inspired by the natural alkaloid stemofoline, which was isolated from the roots of the

plant species Stemona japonica (often used in biological medicines) and delivered the lead structure for this new Butenolide chemical class. Flupyradifurone is a systemic insecticide applied as foliar spray or soil drench, taken up by the leaves or the roots. It can be translocated from the roots acropetally in the xylem and is additionally distributed by translaminar movement within leaves. Flupvradifurone is characterized by its strong efficacy against sucking pests (both adult and immature development stages) including aphids, hoppers, soft scales and allows very good crop safety on a wide range of crops such as vegetables, fruit, grapes, citrus, cotton, cocoa, coffee.Flupyradifurone acts as an agonist on the insect nicotinic acetylcholine receptors like other IRAC group 4 insecticides, but is chemically different to other compounds in this group. This makes Flupyradifurone a meaningful tool for resistance management to control pests which have developed metabolic resistance to neonicotinoids, such as B.tabaci, and as rotation partner with products of different chemistries and mode of action, such as ketoenols (Movento, Oberon). The excellent safety profile of Flupyradifurone for honey and bumblebees and most beneficial insects allows not only a wide flexible application window, (including spraying during the flowering) but also can be a good fit in Integrated Pest Management (IPM) programs. Flupyradifurone applied at recommended use rates causes no adverse effects to the eco-systems, is non- hazardous for humans and mammals. It has been submitted for registration in many countries. The field performance of Flupyradifurone on key pest targets on indicator crops are presented in this paper.

PLANT EXTRACRS

EX1

THE INHIBITION EFFECT FOR GROWTH OF THE FUNGUS RHIZOCTONIA SOLANI BY USING ALCOHOLIC EXTRACT FOR SOME PLANTS. <u>Maha A. Al-Rijabo</u>, Department of Biology, College of Science, Mosul University, Iraq, Email: mahaalrejaboo@yahoo.com

The fungus *Rhizoctonia solani* was isolated from rice; this fungus causes many diseases for plant and crops damage. To control this fungus by safe method and don't causing any damage to environment, animal and human we prefer using the alcoholic extract of some plants. The effect of alcoholic extract for leaves of *Cassia* spp., *Salvia officinalis* and *Achillea millefolium* was tested by using four concentrations for each extract 5, 10, 15, 20 mg/ml there results were compared with antifungal *Trichoderma harzianum* and *Trichoderma viride* it noticed that these extracts have high inhibiting effect against this fungus. The percentage of inhibition were 100% for all extracts and all concentrations that used in this study except the concentration 5 mg/ml of alcoholic extract for the leaf of *Cassia* spp. the percentage of inhibition was 90.3% this prove that alcoholic extract of the leaves have high ability for inhibition similar to biocontrol agent that used.

EX2

EVALUATE THE EFFICIENCY OF DEKKERA **BRUXELLENSIS YEAST. POMEGRANATE PEEL** POWDER, VAPOR GARD WAX AND TWO AND FUNGICIDES SWITCH тесто IN INCREASE THE STORAGE ABILITY OF GRAPES AND TO PROTECT IT FROM **INFECTION WITH SOME PATHOGENS.** Saba B. Al-Juboory, Kamil S. Juber, and Adnan I. Al-Samarrae, Plant Protection Dept., College of Agriculture, University of Baghdad, Baghdad, Iraq, Email: s aljuboory@yahoo.com

This experiment was carried out to evaluate the efficiency of spraying grapes on field by two fungicides (Switch and Tecto) and to study the effect of some storage treatments (Dekkera bruxellensis yeast, pomegranate Peel powder and Vapor gard wax) to increase the storage ability of grapes and to protect it from infection with some pathogens after 15, 30, 45 and 60 days of storage. The results showed the effectiveness of all treatments in reducing the percentage of fungus existence for all main fungi isolated (A. niger, A. alternata, R. stolonifer, P. glabrum, M. racemosus, A. flavus) with percentages ranged between 0.0-50.0, 0.0-86.7, 0.0-55.7, 0.0-30.0, 0.0-45.0 and 0.0-20.0%, respectively, comparison with the control treatment in which the percentages of the existence of fungi above are 2.7, 9.0, 56.5, 45.0, 40.0, 10.0%, respectively. In addition, five minor species of fungi was isolated Helminthosporium including Fusarium equiset, elutinum, Pseudobotrytis sp., Stemphylium botryosum, Ulocladium atrum with existence percentages ranged between 0.0-30.0%. While the presence of main and minor fungi were disappeared completely (0.0%) in pesticide treatments (Switch, Switch + Tecto, Wax + Switch and Wax + Switch + Tecto) until end the storage period. In addition it gave the lowest percentage of the damage as the rate was 3.50, 4.30, 7.43 and 8.50%, respectively, after 60 days of storage comparing with the control treatment as the rate was 100% after 15 dyes of storage.

EX3

EVALUATIONTHEEFFICACYOFKLUYVEROMYCESMARXIANUSANDSALICYLIC ACID FOR CONTROLLING GREENMOLD ON ORANGE.Nahida M. Saleh and Nadia H.Selman,AgricultureCollege,Baghdad,Iraq,Email: alnahida@yahoo.com

This study has been conducted to evaluate the efficacy of the yeast *Kluyveromyces marxianus* and salicylic acid separately or in combination against green mold of orange fruits caused by *Penicillium digitatum*. *K. marxianus* showed high efficacy as a biological agent

against P. digitatum on PDA with 100% inhibition at 10^6 cells/ml. In addition, salicylic acid in both concentrations 1000 and 500 ppm inhibited P.digitatum growth at 94.3%, compared to 0.0% in control. K. *marxianus* suspension at 10^6 cells/ml and its filtrate inhibited spores germination of *P. digitatum* completely. The percentage of spores germination in liquid PDB containing 100 ppm salicylic acid was found to be 2.3%. compared to 96.6% in control. The average lengths of germ tube in the yeast suspension, yeast filtrate and salicylic acid were found 0.0, 0.0 and 11.2 um respectively compared to 21.2 µm in control. A combination of K. marxianus and salicylic acid showed higher efficiency in controlling green mold on wounded orange fruits, where it has completely prevented the disease incidence after three days of incubation at 25 ± 2 with yeast or salicylic acid separately. Fruits treatment with combination of salicylic acid and K. marxianus 24 hours before inoculation with P.digitatum has been found more efficient than salicylic acid and K. marxianus individually in stimulating resistance in the fruits.The activity of peroxidase (POD) in fruits peel was 5883 unit/ s/ mg after 96 hours of treatment, while the activity of peroxidase reached in salicylic acid or K. marxianus to 5132 and 4544 units/s/mg respectively, compared with 3193 and 3380 units/s/mg in control treatments (with pathogen or without pathogen) respectively.

EX4

IN VITRO ANTIFUNGAL ACTIVITIES OF ESSENTIAL OIL ARTEMISIA ABSINTHIUM Fatima Bouchenak, Abdelbaki Lmegharbi, Samir Mahdi and Fatima Benrebiha, Laboratory of Mycology, Department of Biotechnology, Faculty of Science and life, University Saad Dahlab, BP 780, Soumaa, Blida, Algeria, Email: bouchenakfatima@yahoo.fr

The essential oil composition of the leaf of Artemisia absinthium from region of Cherchell (The south of Algeria) was investigated by GC, GC-MS. 27 constituents were identified correspond to 84.63% of the total oil. The major components are Thujone (60,82%), Chamazulènel (16,62%), p-cymène (4.29%) and 2carène (4.25%). The antimicrobial activity of oil was tested in vitro by two methods (agar diffusion and micro dilution) on three plant pathogenic fungi. This oil has been tested for antimicrobial activity against three pathogenic fungi (Botrytis cinerea, Fusarium culmorum and Helminthosporium sp.). The study of activity was evaluated by two methods of diffusion in gelose and the minimum inhibitory concentration MIC. This oil exhibited an interesting antimicrobien activity. A preliminary study showed that this oil presented high toxicity against this fungi. These results, although preliminary show a good antifungal activity, to limit and inhibit stop the development of those pathogen agent.

EX5

ASSESSMENT OF **POWDERY MILDEW** DISEASE **SPHAEROTHECA** PANNOSA ON AND **EVALUATE** ROSES PLANTS **EFFECTIVENESS** OF SOME **PLANTS** EXTRACTS TO COMBACT IN LYBIA. Farhat Ali Abozachar¹ and Salah Saeed Al-Amari². (1) Department of Plant Protection, a river of industrial investment, Sirte, Libya; (2) Department of Botany, Faculty of Science, University of Benghazi, P. B 2757, Benghazi, Libya, Email: farhatabouzkhar@gmail.com

Crop of roses have been exposed to the infection caused by several plant diseases one of major disease caused bv powdery mildew fungus Sphaerotheca pannosa. A filed survey study was conducted on this nurse Al-kardabia farm, which is located in the city of Sirte, the coastal Libyan. Fourteen species plant were tested during the infection conditions.the results showed that, a highest rate of infection was given for c.v Moana of about 78%, in contrast c.v Diana with lowest rate of 14% surprisingly, there were no symptoms of the varieties c.v Hanibale and Tiniki, in addition, the results of the laboratory to test the effect of ten cool water extracts that belongs to different families' of plant in the field of the study area the plants leaves lye Mesembrayanthemum crystallinum, Eucalyptus calmadulensis, Rosmainbs offininalis, Acacia cyanophylla, Pinus pinea and orange peels acid (Citruss inensis) on spore germination conidial to fungi Sphaerotheca pannosa that caused powdery mildew. The average of germination percentage were 2,2,10,3,5,5%, respectively. While no germination of plants with leaf extracts were recorded, for example garlic Allium sativum, leaves, Retama raetam, olive Olea eurpae compound and sodium bicarbonate and fungicide benlet, although there was some germs conidial of germination on Alshall extract of Artemisia monosperma but in a deformed image.as the untreated germs have grown spores grown naturally with a germination percentage of 20%. To combat the powdery mildew disease on roses some of the plant extracts were selected such as, garlic, Alshall, broom, olive and compound sodium bicarbonate with a concentrations of 2.5 0.5, 7.5 g/L. benlet concentrations of 1, 1.5/2 g/L, to sum up, the results of the statistics analyses indicate that there was no differences between the transaction and the evidence was given when the third treatment was added. Therefore, the average percentage of the powdery disease was 11.01, 11.49, 13.41, 15.62, 16.33, 19.80 for Treatments, as fungicide benlet and sodium bicarbonate, Alshall, olive, broom, garlic respectively, compared to the control (77.70%) these treatment have stimulated plants to produce new leaves, but if we add that the addition of these transactions add a fourth transaction. there will be some bad effects on the large leaves (e.g. toxic).

EX6

IMPACT OF THE EXTRACT OF DAPHNE GNIDIUM ON THE DEVELOPMENT OF PYRENOPHORA TERES F.TERES OF THE BARLEY. K. Taibi, F. Bentata, M. Labhilili, H. Tahiri, F.E. Faris El Alaoui and A. El Aissami. (1) Faculty of Science of Rabat, Mohammed V University Agdal, Rabat, Morocco; (2) National Institute of Agronomic Research Rabat, Morocco, Email: ktaibi1@gmail.com

Pyrenophora teres f. teres is the agent responsible for the Net blotch, an important disease on barley in Morocco. With an aim of establishing a natural fight plan against this pathogen, five isolates, originated from five Moroccan areas are exposed. Indeed, isolates BF1, BF2, BF3, BF4 and BF5 are coming respectively from Chaouia, Zemmour - Zaer, Gharb, Rif and Tadla and the antagonist is an aqueous extract of the medicinal plant Daphne gnidium. The results of the confrontation in -vitro showed that D. gnidium held a great antifungal activity. Thus, the direct confrontation of the five isolates with the extract of D. gnidium involved a total inhibition of the mycelial growth of the pathogen. Also, the transfer of these isolates of P. teres f. teres on PDA only showed that the inhibition is irreversible. Consequently, the action of D. gnidium against P. teres f.teres is fungicidal. These results will be useful in the sight of development of a biological fight against the principal pathogens of cereals.

EX7

EFFECT OF SOME COMPONENTS OF NEEM TREE ON BLACK ROT DISEASE OF ONION CROP DURING STORAGE. Amani Ahamed Kardesh and Ali Khamis Rowaished, Department of Plant Protection, Faculty of Agriculture, University of Aden, P.O. Box 260, Crater Aden, Yemen, Email: Rowaishedak @hotmail.com

Black Rot Disease in Onion crop caused by Aspergillus niger cause severe loss reached 20-70% in Yemen. The effect of some parts of Neem tree such as (green leaves, small branches, flowers and seeds was studied to decrease the percentages of loss during storage period. The experiment has been conducted during two agricultural seasons (2010-2011 and 2011-2012) at Food Research and post-harvest center – Aden with three treatments (1) Using green parts of leaves, small branches, flowers and seeds (2) Using all parts as powdered (3) Using neem oil. The experiment has been designed in four replicates for each treatments during three periods of storage (one month- two months- three months) Percentage of loss due to disease infection during the storage periods and the weight of loss were estimated. The results indicated that all treatments were successful in decrease the loss and inhibition of fugus rot during two seasons. The best treatment was neem oil treatment followed by the powered parts of neem and finally complete parts with percentage of (16,11-21,94-(23,25) for the first season and (16,64 - 21,94 - 22,64)for the second season respectively in comparison to the

control which gave high percentage of loss (28,26%) for the first season and (27,70) for the second season. All treatments had significant effect on storage periods in both agricultural seasons. The results recommended that parts of Neem tree can be lay down or putting around the onion bags in the store to protect onion from loss causing by fungi.

EX8

EFFECT OF ETHANOLIC AND METHANOLIC EXTRACTS OF EX VITRO, IN VITRO AND CALLUS OF RUTA GRAVEOLENS L. AGAINST BACTERIAL AND FUNGAL SPECIES. Shifaa Abbas¹, Zakaria Al-Ajlouni¹, Mohamad Shatnawi² and Ibrahim Al-Makhadmeh¹. (1) Jordan University of Science and Technology, Jordan; (2) Al-Balqa'a Applied University, Jordan, Email: shifaaabbas@yahoo.com

A rapid and efficient, in vitro propagation protocol by enhanced multiple shoot proliferation and root formation from node cultures of Ruta graveolens was established. MS medium containing IBA, IAA, 2,4-D and NAA at the concentrations of 0.0, 0.4, 0.8, 1.2, 1.6, 1.8 and 2.0 mg/l were evaluated for their effects on adventitious root induction. Results revealed that the highest number of new root of 1.6 was occurred on MS medium with 0.4 mg/l IBA. Moreover, it gave the highest number and length of roots per explants. Crude extracts of callus, in vitro and ex vitro of R. graveolens were extracted by different solvents like methanol and ethanol. The in vitro culture that extract by ethanol was contained the maximum metabolites content compared to callus and ex vitro cultures. Antimicrobial activity of different extract types and volume (40 or 80 µL) was studied using agar-well diffusion assay against five bacterial species of three gram positive bacteria (Staphylococcus aureus, Bacillus cereus, Micrococcus latus) and two gram negative (Escherichia coli, Salmonella typhmurim), and four fungal species were included in this study of Alternaria solani, sclerotinia sclerotiorum, Fusarium oxosporium, and Verticillium dahlia. Results showed that all Rue tested extracts at different volume shown antimicrobial activities against all tested bacterial species and did not show antifungal activity against Alternaria solani, Sclerotinia sclerotiorum and Verticillium dahlia except Fusarium oxosporium.

EX9

IMPACT OF SOME PLANTS EXTRACTS ON THE WHEAT FUNGAL PATHOGEN *SEPTORIA TRITICI.* F. Bentata, M. Labhilili, I. Maafa, A. El Jaouadi, F.E. Faris El Alaoui, F. Bentourtou, J. Bouarda, N. Essouaadi, J. Ibijbijen, M. Nachit and A. El Aissami. (1) National Institute of Agronomic Research Rabat, Morocco; (2) Faculty of Science of Rabat, Mohammed V University, Agdal, Rabat, Morocco; (3) University Ibn Tofail, Faculty of Science, Kenitra, Morocco; (4) University Moulay Ismall, Faculty of Science, Meknes, Morocco; (5)The International Center for Agricultural Research in the Dry Areas (ICARDA), Rabat, Morocco, Email: bentataiav@yahoo.fr

Septoria leaf blotch (SLB) caused by Septoria *tritici* is an important disease on wheat in Morocco. To avoid the use of chemical products, some medicinal plants that exert strong antifungal properties could be used as a promising alternative source for antifungal treatment with respect to their natural origin. This work aims to study the possibility of a natural control using aqueous extracts of Allium sativum. Allium roseum and Oxalis pes-caprae against this fungal pathogen. An isolate (E1) originated from Gharb is exposed to the different extracts. The direct confrontation in vitro showed that there is no antifungal activity of the O. pescaprae and the A. roseum extracts against Septoria tritici isolate. While, the A. sativum extract, showed significant antifungal activity, with a total inhibition of the mycelia growth of the pathogen at the concentration of 80g/l for the aqueous extracts. These results will be useful in the sight of development of a biological fight against the principal pathogens of wheat.

EX10

THE EFFECT OF ACACIA STENOPHYLLA SEED COAT POWDER AND EXTRACTS ON GROWTH OF MACROPHOMINA PHASEOLINA ANDCHARCOAL ROT INCIDENCEIN COMMON BEAN IN RIHVER NILE STATE (SUDAN). Z.O. Deyab¹, W.S. Suluman², N.H.H. Bashir³ and Y.F. Abdalla³. (1) Faculty of Agriculture, Wadi El Neel University, Sudan; (2) Hudieba Research Station, Sudan; (3) University of Gezira, Sudan, Email: deyabzeinab@gmail.com

Charcoal rot cause Macrophomina Phaseolina is one of the important of common bean this Study was carried-out at Hudeiba Research station to investigate the potentialities of some natural products (Acaica stenophylla seed coat powder and extracts) in the management of charcoal rot. Growth of the fungus was also significantly reduced when treated with powder of Acacia stenophylla seed coat, (SCP) or extracts obtained from different quantities of the powder. The fungus was completely inhibited when treated with 2g or more of the seed coat powder or its extracts, compared to 9 cm in control plates. The chemical analysis indicated the presence of four chemical groups in the SCP, viz triterpens, flavonoids, saponins and tannins. Presence of saponins in chloroform extract of SCP was evidenced by colour reaction with VS reagent in the visible light in 6 out of 8 zones appeared on chromatogram when petroleum ether 60% and acety lactate 40% was used. SCP of Acacia stenophylla was effective as the fungicide benomyl in reducing disease incidence. However, in season 2001/2002, its effectiveness surpassed that of the fungicide as it caused 33% reduction in incidence, compared to 29.2% caused by benomy.

EX11

EFFECT OF NEEM POWDER ON GROWTH OF *MACROPHOMIN A PHASEOLINA* AND **CHARCOAL ROT INCIDENCE IN COMMON BEAN.** Z.O. Deyab¹, W.S. Suluman², N.H.H. Bashir³ and Y.F. Abdalla³. (1) Faculty of Agriculture, Wadi El neel University, Sudan; (2) Hudieba Research Station, Sudan; (3) University of Gezira, Sudan, Email: deyabzeinab@gmail.com

Powder of neem seed and leaves (NSP and NLP) significantly reduced the myceial growth of the fungus. Maximum reduction was brought about by 4 or 5g of NSP. The average diameter of the colony recorded in case of two weights was nearly 3.3 cm compared to 7.2 cm in the control. In non- sterilized soil, NLP reduced the disease incidence by 44.2% and 38% in season. 2001/o2 and 2002/o3 respectively as compared to the control. However, the reductions in disease incidence were significantly lower in sterilized soil. They respectively 18.6% in 2002103 and 22% in seasons 2003/04. NLP was followed by the neem seed kernel powder (NSKP) in its effect on disease incidence. Benomyl at 2g/kg seeds was the most effective treatment. Reduction brought about the fungicide amounted to 83.4% and 45.8% in non- sterilized and sterilized soils respectively. Disease incidence increased with the added amount of the powder from each of the parts used n case of the non- sterilized soil, but the reverse was obtained when the soil was sterilized.

EX12

EFFECT OF ROOT POWDER OF THE SOAPROOT GYPSOPHILLA STRUTHIUM L. AGAINST OF INSECTS STORED DATES ORYZAEPHILUS SURINAMENSIS L. AND TRIBOLIUM CONFUSUM DUV. M.A. Mostafa, Faculty of Science, Mousl University, Iraq, Email: mabid2005@yahoo.com

The study was conducted under laboratory conditions to evaluate the effect of root powder of *Gypsophilla struthium* L. to mortality and repellent of *Oryzaephilus surinamensis* L. and *Tribolium confusum* Duv. Which infesting stored dates. The root powder showed 100% mortality on adult and larvae *O. surinamensis* at a concentration of 4% after 21 and 10 days of treatment respectively, the same concentration caused 70% mortality on adult of *T. confusum*. The root powder, also, reduced the productivity of adult and showed repellent effect on both species of beetles at 2 and 4% concentrations.

EX13

BIOEFFICACY OF DIFFERENT WEEDS EXTRACT AGAINST RED PUMPKIN BEETLE (*AULACOPHORA FOVEICOLLIS*) AND FRUIT FLY BACTROCERA CUCURBITAE) IN BITTER GOURD. Hussain Ali^{1,2} and Sajjad Ahmad². (1) Department of Plant Protection, College of food & Agriculture Sciences, King Saud Uni Riyadh KSA; (2) Entomology Section, Agricultural Research Institute Turban Peshawar, Pakistan; (3) Department of Entomology, The University of Agriculture Peshawar Pakistan, Email: hussaintanha@yahoo.com

Bitter gourd (Momordica charantia L.) is considered one of the major vegetable in Pakistan, having many nutritional benefits. The crop is attacked by many insects/pests but among them Red Pumpkin Beetle (Aulacophora foveicollis) and Fruit Fly (Bactrocera cucurbitae) are very important. Three varieties were sown in RCBD split plot arrangement and four treatments were applied. Varieties were Ambika, Rama crishna and Phuja. The applied treatments were Parthenium plant extract, Eucalyptus leaves extract, Neem seed crude extract, Chemical (Methomyl as a standard) and check for comparison. The minimum adult beetle population was observed in these treatments, however maximum population was observed in the check plot. Minimum percent damage of red pumpkin beetle was found in Methomyl and Parthenium extract treated plots. Maximum was found in the check plot. The Methomyl and Neem seed crude extract showed significant results in controlling fruit flies population. Fruit fly population was found high in the check plot. Minimum fruit fly percent damage was recorded in the plots treated with Methomyl and Neem seed crude extract as compared to check.

EX14

PHYTOCHEMICAL ANALYSIS OF DIFFERENT EXTRACTS FROM LEAVES AND SEEDS OF GRAPEFRUIT (CITRUS PARADISI MACFAD.). Amal Elsayed Edriss and Abdalla Abdelrahim Satti, Environment, Natural Resources and Desertification Research Institute, National Centre for Research, P.O. Box 6096, Khartoum, Sudan, Email: apbc.92@gmail.com

Grapefruit (Citrus paradisi) is a subtropical fruit tree grown in various countries including the Sudan. Variable parts of this tree represent important sources of natural active materials exploited in folk medicine. So, it was hypothesized that the plant may contain valuable secondary metabolites for pests' control. Hence, a laboratory study was conducted to analyze the phytochemical constituents of three extracts (water, ethanol and petroleum ether) prepared from leaves and seeds of C. paradisi, as a prerequisite step for bioassays. Eight chemical groups were tested in these extracts via standard chemical analytical means utilizing the necessary reagents. The results of water extracts showed saponins and flavones in leaves, amino acids and flavonoids in seeds, and alkaloids in both parts. Ethanol extracts reflected nearly similar results as the previous extract regarding the amino acids, alkaloids and flavones, but added sterols in the two parts. On the other hand, petroleum ether extracts revealed mainly sterols in both leaves and seeds plus triterpenes in the former part. In general, the quantitative ranking of the obtained chemicals put alkaloids and sterols in the top (66.7%), followed by amino acids (50.0%) and flavones (33.3%) in the middle, and lastly saponins, flavonoids and triterpenes as the lowest groups (16.7%). Accordingly, the leaves and seeds of *C. paradisi* were considered to be rich in alkaloids and sterols, and with moderate levels in the other tested compounds, but seemed to be devoid of tannins.

EX15

ACTIVITIES OF OCIMUM BASILICUM L. EXTRACTS AS LARVICIDES AGAINST THE MOSQUITO ANOPHELES ARABIENSIS PATTON. Amal Elsayed Edriss and Abdalla Abdelrahim Satti, Environment, Natural Resources and Desertification Research Institute, National Centre for Research, P.O. Box 6096, Khartoum, Sudan, Email: apbc.92@gmail.com

Anopheline mosquitoes are significant vectors of malaria disease in most tropical countries worldwide. Among such dreadful insects, Anopheles arabiensis (Diptera: Culicidae) is the major species associated with malaria transmission in Sudan. However, one of the approaches for controlling mosquito borne diseases is the interruption of disease transmission either through proper mosquito control or by avoiding mosquito bites. Plant products of potential mosquitocidal or repellent actions are thought to play an important role in this aspect. This laboratory study was proposed to evaluate some extracts (water, ethanol and petroleum ether) prepared from leaves and seeds of Ocimum basilicum, as natural mosquito larvicides. The treatments were bioassayed for knockdown and residual effects at different intervals against the 4th instar larvae of An. Arabiensis, as compared with two standard insecticides (Malathion 50% EC and Abate 50% EC). The results showed that the highest doses of petroleum ether (0.5%) and water (10%) extracts of leaves manifested the best significant knockdown effects at 24h, 48h and 72h post treatments, compared with the untreated control. The effects of these dosage rates (65.8% and 63.3% mortality, respectively) were also comparable with those of the two insecticides (90%) at the latter interval. Regarding the residual effects, leaves petroleum ether extract at 0.5% performed significantly as the most potent of all botanicals after three days (52.6% mortality) and seven days (39.2%), but came next in order to the two insecticides (76 - 90%). Thereafter, high reduction in activities was observed in all treatments. Based on the studied materials, the leaves petroleum ether extract was proved to be the best component of O. basilicum that should be emphasized in future research as mosquito larvicides.

EX16

THE IMPACT OF NATURAL POWDERS ON
INSECT BEETLE AKHABRA (ALCABRA)TROGODERM GRANARIUM TO PROTECT
MAIZE SEEDS DURING STORAGE.Ali Abdulla
Baoum, Food Research & Post-harvest Technology

Centre, Aden, Agricultural Research & Extension Authority (AREA), Yemen, Email: baoumali@gmail.com

This experiment carried out during the seasons 2009/2010 and 2010/2011 in the laboratories of Food Research & Post-harvest Technology Centre. So the seeds of maize variety Kenja 13 where they were mixing the seeds of maize with some natural powders as a method to protect them from insect beetle Akhabra (Alcabra) Trogoderm granarium during the period Storage lasted 10 months. The results have been obtained, explained through experience varying effect of powders used, where the best powder Almariamrh Neem at a rate of 15 g/kg seeds compared to the control difference significant 5%, accompanied this effect with the germination percentage of high seed treatment powder Almariamrh after a period of storage. The results also showed that the other powders also outperformed compared to the control, and these powders had less impact on the infestation is sand powder.A summary, the data of this study, it is possible to use these natural powders to protect maize seeds. So the first natural powder is Almariamrh powder (Neem Powder) could be used as natural pesticide against damage of insect beetle Alcabra (Akhabra).

EX17

A TEST OF THE OF SOME PLANT OILS EFFICIENCY IN CONTROLLING RICE WEEVIL SITOPHILUS ORYZAE (L.) AND KHAPRA BEETLE TROGODERMA GRANARIUM EVERTS. Nada Sabeeh Othman, Plant Protection Department, College of Agriculture and Forestry, University of Mosul, Iraq, Email: nadaaltayar@yahoo.com

This study was done to evaluate the efficiency of the following plant oils, Carrot oil Dacus carota L., Mustard oil Brassica nigra L., Fennel oil Foeniculum vulgare Miller, mastic oil Pistacia atlantica Desf at the concentratios 1, 3, 5% to control Rice weevil Sitophilus oryzae (L.) and Khapra beetle Trogoderma granarium Everts. It was found that carrot and mustard oils at the concentration 5% recorded the highest death averages to be 76.67 and 66.66% respectively. The other three concentrations 1, 3 and 5% for Fennel oil recorded the lowest death averages to be 3.33, 66.66 and 6.66, respectively. The relative efficiency recorded an average of 3125% when carrot oil was used. Compared with oils of mustard, fennel and mastic which recorded to be 208, 100 and 138%, respectively. The results showed that Khapra beetle recorded the highest averages in death rates to be 50.00 and 56.67% respectively, at 3 and 5% in Carrot oil. The lowest averages recorded at the concentration of 1% of both Fennel and Mastic oils in death rate to be 16.67% for both of them. While the relative efficiency of Carrot oil to be 2142%, compared with oils of mustard, fennel and mastic, which recorded to be 1.600, 100 and 111%, respectively.

EX18

THEEFFECTIVENESSOFNUMBEROFPLANTSPOWDERSAGAINSTDERMESTIDBEETLEPOPULATIONSTROGODERMAGRANARIUMEVERTS.RiadAhmedAl-IraqiandZahraaEzzedineDalalBashi.DepartmentofLifeSciences, College of Science, University of Mosul, Iraq.Email:riyadaliraqi@yahoo.com

This study was conducted to evaluate the effectiveness of five types of plants powders: Rue, mustard, nutmeg, ginger and thyme, on the development and evolution of dermestid beetle. Wheat grains were mixed of with three concentrations of each powder on which insect cultured for a period of four months under normal storage conditions. Mustard powder showed more influence on the growth of the rest of the powders on dermestid beetle. As average total number of phases after four months of storage reached to 144.33 individuals and weight loss in grain 5.70% in contrast to the comparative reaching total number of 881 individuals and loss weight 30.66%. Observed an increase in the influence of plants powders with an increased focus on use of powders.

EX19

INSECTICIDAL ACTIVITY OF PLANT EXTRACTS AGAINST SCHISTOCERCA GREGARIA (FORSKAL 1775). Mouhouche Fazia and I. Radjai, Ecole Nationale Supérieure Agronomique El-Harrach Alger, Email: fmouhouc@gmail.com

Locust Schistoceca gregaria (Cyrtacantharidinae, Acrididae) has been known for millennia, it is a serious pest. The fight is necessary because in the absence of any intervention by the first frequency of invasions is high. The use of plant extracts feature acridicides effects and offers some potential as an alternative control to ensure the safety of human and environmental insofar as these substances may reduce or replace some chemical insecticides toxic used in anti locust. Thus the aim of this work is to study the effect of ethanol extracts acridicide two plant species : Cistus ladaniferus and Cistus monpeliensis on behavior and mortality of Schistocerca gregaria. The determination of such effects is achieved by spraying on plant extracts L5 larvae and imagoes from emerging. Mortality of larvae (L5) locust reached 93.33% for Cistus ladaniferus, against 53.33% for Cistus monspeliensis. The treatment also affects the phenomenon of moulting.

EX20

COMPARISON OF BIO-EFFICIENCY OF CAPSICUM EXTRACT, *PROFENOFOS* AND THEIR MIXTURE ON SOME BIOCHEMICAL AND HISTOLOGICAL ASPECTS OF *SPODOPTERA LITTORALIS* AND ALBINO RAT. Hanan H. Osman¹, Ashraf Al-Brakati² and Hossam H. Osman^{2.3}. (1) Department of cotton leaf worm R. Plant Protection R. Institute, A. R. C, Egypt; (2)Department of Anatomy Taif University, College of Medicine, KSA; (3)Department of Anatomy, College of Medicine, Aalazhar University, Egypt.

The present work was conducted on the plant extract of capsicum extract. Profenofos (selecron) and a mixture of them and sprayed on the leaves of cotton for use against 4th instar larvae of cotton leaf worm under the laboratory and semi field circumstances. We determined LC_{50} both of them, the results showed that the potency of *Profenofos* and capsicum extract after 24 hour on treatment while the mixture was more toxic of them. The present results proved that there is a synergistic effect of capsicum extract when combined with Profenofos that was achieved by measuring Cotoxicity factor. It was also noted that the mixture is the highest damage to the insect by inhibiting the growth and enzymes cholinesterase alpha-, beta esterase on sixth instars larva. These results were parallel with the histological changes in the insect and the destruction of the walls of some cells of the body when compared with Profenofos. This research was conducted to treatment of albino rat with Profenofosand mixture. The results showed that the mixture caused biochemical and histological changes on the liver and kidney of rat less than rats exposed to insecticide only. The Aim of the present work is to study the biochemical and histological mode of action of capsicum extract as a synergist in combination with insecticides. We conclude that the mixture of plant extract and insecticides increased the effectiveness of the insecticide on the insect and reduce its adverse effect on humans so we recommend adding plant extract to reduce the side effects of insecticides that affect the vital organs in the human and animal.

EX21

A NEW AND EFFECTIVE APPROACH TO CONTROL DATE PALM DUBAS BUG *OMMATISSUS LYBICUS* DE BERGEVIN IN IRAQ. Amal S. Abdul Razaq¹, Abbas F. Mustafa¹, Nedal Y. Ghani² and Shihab A. Abbas¹. (1) Plant Protection Directorate, Ministry of Agriculture, Iraq; (2) Baghdad Agriculture Directorate, Baghdad, Iraq, Email: amal2004s2000@yahoo.com

The Dubas bug *Ommatissus lybicus* De Bergevin (Homoptera: Tropiduchidae) is considered as an important and dangerous pest on date palm varieties and their field in Iraq and many other countries in the region. Several insecticides synthetic were used as ground or Aerial application. The Ministry of Agriculture adopted a new approach introducing botanical insecticides with reduced risk to human and the environment such as Azadiractine and Oxymatrine. Oxymatrine 2.4% ULV was the most promising when applied at the rate of 1L/Donum (1ha=4 Donum) as Aerial Spry against nymph stage over an area of 5000 Donum in Baghdad region during the spring of 2012. An experimental trial was also conducted to test the effect on the egg stage of the dubas bug in Karbala over an area of 1000 Donum during July of the same year. Results showed that efficiency of oxymatrine on dubas as nymph was 77, 92, and 93% after 1, 5, 7 days of treatment and was59, 87, and 88% respectively against egg stage.Oxymatrine 2.4% ULV can offer an opportunity to hit two life stage of the pest which could lead to an effective control and it can be recommended as an effective and safe alternative for the control of dubas bug in Iraq.

EX22

STUDY OF THE EFFECT OF THREE BIOPESTICIDES FEW PARAMETERS BIOPHYSIOLOGICAL OF THE MIGRATORY LOCUST. F. Outtar, J. Mahjoubi, F.Z. Bisaad, Fazia Mouhouche and B. Doumandji-Mitiche, Algeria, Email: outtar25@yahoo.fr

Our work is based on the use of three biopesticides, an entomopathogenic fungus Metarhizium anisopliae var acridum, a disruptor growth the Triflumuron (T.F.M.) and the henna extract Lawsonia inermis on the L5 larvae and the male and female of Locusta migratoria. For that, we tested their effect on morphology, and the development of the L5 larvae, like their action on the reproduction of the adult. Lastly we tested the effect from these three biopesticides on hemolymphatic proteins of the L5 larvae, in the plan quantitative and qualitative. The results obtained show us that the three biopesticides involved morphological deformations in the L5 larvae, even also which they do not allow the passage of the L5 stage at the stage imago in the treated insects. Finally we can also notice that the three biopesticides caused a disturbance of the reproductive behavior and also of deteriorations on the level of the proteinemy of Locusta migratoria.

EX23

LABORATORY EVALUATION OF THE FUMIGANTACTION OF THE SUDANESE, THE CHINESE AND THE EGYPTIAN GARLIC OILSAGAINST CALLOSOBRUCHUS MACULATES L. Hayat Mohmed Ahmed Hamid and Azhari Omer Abdelbagi, Department of Crop Protection, Faculty of Agriculture, University of Khartoum, Sudan, Email: hayathamid37@yahoo.com

Laboratory experiments were conducted in the Department of Crop Protection, Faculty of Agriculture, University of Khartoum, Shambat, to evaluate the efficacy of three types of garlic oils; Sudanese (local), Chinese and Egyptian on the cowpea beetle *Callosobruchus maculatus* (Coleoptera: Bruchidae). Volatile oils from Sudanese and Chinese garlic were obtained by steam distillation and soxhlet extraction using ethanol correspondingly, whereas Egyptian (ready-made) garlic oil was bought from a perfumery at Omdurman market. The oils were tested at concentrations of 0.01%, 0.1%, 1%, 5% and 10%, at exposure periods ranging from 24 to 72hrs.The results showed that, the volatile oils of the three garlic cultivars caused significant mortality to the test insect. The results indicated that both sexes are sensitive to oil fumigation with males generally more sensitive than females. The effects were time and dose dependant. The respective 48hrs median lethal doses (LD_{50}) for male and female were; 27 and 2727ppm for the Sudanese oil 9 and 2512ppm for the Chinese oil and 97 and 417ppm for the Egyptian garlic oil. The median lethal times (LT_{50}) at the concentration 10% for male and female were 7.29 and 13.43 hrs for the Sudanese oil, 8.4 and 8.8 hrs for the Chinese oil and 11.04 and 11.72 hrs for the Egyptian garlic oil correspondingly.

EX24

EFFECT OF ETHANOL EXTRACT, AQUEOUS EXTRACT, AND DRY POWDER OF NERIUM OLEANDER L. ON ADULTS MORTALITY OF TRIBOLIUM CASTANEUM (HERBST), (COLEOPTERA: TENEBRIONIDAE). Mohamed Izzat Al Ghannoum and Batool Abdullah Karso, Plant Protection Department, Faculty of Agriculture and Forestry, University of Duhok, Iraq, Email: mighannoum@yahoo.com

The red flour beetle Tribolium castaneum, is an important pest of grain store agricultural products in most warm regions of the world, where they feed on infected grain, flour, causing a decrease in the viscosity dough made from injured flour and earned a distinct smell undesirable which result of the discharge gas produced by, as well as contaminating her waste and excuvium, and dead insects. This pest also attack peanuts, coffee, spices, vegetables and dried fruits, and tobacco where feeding on its embryos. Grain stored pests usually controlled chemically with insecticides in many different ways by contact or fumigation. Due to the importance of this pest, and its big damage on grain stored a result of feeding, and the fact that pesticides affect human health, and find out vegetarian alternatives, the use of extracts and the powders of some plants became one of the biological control methods to control this pest. The objectives of this study are: (1) The attractiveness and repellency effect of alcoholic, aquatic extract and dry powder of Nerium oleander with different concentrations using a chemical run out Chemotropometer, (2)The effect of% mortality on adult Tribolium castaneum, and calculate the value of the LC^{50} for each extract, (3) The dynamic effect of plant extracts on adult insect and compare it with dry powder.

EX25

THE FIRST RECORD TO TOMATO LEAF MINER, TUTA ABSOLUTA (POVOLNY) AT HOMS GOVERNATE, SYRIA. M.Y. Ibrahim, E.A. Mehrez, M. S. Edrees, B.I. Aodie and A.R. Al-Masrey, Agricultural Scientific Research Center at Homs and Jucia AlKhrap, Syria, Email: mohamedkozii@yahoo.com

This study was carried out in four regions of Homs Governorate during the 2010 season to conduct the first record of tomato leaf miner. Tuta absoluta (Povolny). Monitor the seasonal activity of the population tomato leaf miner. T.absoluta during the 2010 season at Homs Governorate by using sex pheromone traps. The results revealed that activity tomato leaf miner. T. absoluta record in the fourth week of June and began to injury on tomatoes to tomatoes and continued to increasing until it reached as follows: The first peak occurred in the first week of july 750 and 764 males moth/trap/week) for the Research Center and Sheen Region, respectively, and the second peak occurred in the fourth week of july (620 and 490 male moths/trap/week) for the Research Center and Sheen Region, respectively, as for the tomatoes late plantation in the Jucia- Alkharap and Al- Mekhtaria regions was recorded period of july and gradually reached to the highest census in the first and second week of August an average (680 and 1180 male moths/trap/week) to the Jucia-Alkharap and Al-Mekhtaria regions, respectively. The results showed that the activity of field generation was obtained during the 2010 season on tomatoes as follows: The first generation was starting from the fourth week of June to the third week of the July and duration (5 weeks) and The second generation, start of the third week of July to the third week of August and duration (5 weeks). The results obtained revealed that damage- score for tomato leaf miner during 2010 season was from 31.55 to 47.38% in the first week of August, thus reaching a maximum figure by the end of the season to 95%, while the percentage of apparent damage (Damage - Score) estimated for this season from 11.80 to 24.88%. Three plant extracts were valuated against tomato leaf miner, results showed that Melia azedarach L. extracts gave the highest effective percentage (84.48%) followed Allium sativum L. (71.98%) and Capsicum annumm L. (61.54%) after 10 days of treatment. Percentage of efficacy increased gradually by increasing the period of exposure after treatment for plant extracts from 15.40% after one day to 84.48% after 10 days of M.azedarach, as well as to A.sativum extract (from 28.99 to 71.98%) while the C.annumm extract increased from 29.53 to 61.45%).

EX26

EFFICIENCY OF SOME PLANT UMBELLIFERA EXTRACTS AGAINST THE LESSER GRAIN BORER, RHIZOPERTHA DOMINICA FAB. <u>M.Y.</u> <u>Ibrahim</u> and Gh. Al-Waffy, Agricultural Scientific Research Center at Homs, Syria, Email: mohamedkozii@yahoo.com

Efficacy of some plant Umbellifera extracts (Aniseed, *Pimpinella anisum* L.; Coriander, *Coriandrum sativum* L.; Fennel, *Foeinculum vulgare* Miller.; Dill, *Anethum graveolens* L.; Cummin, *Cuminum cyminum* L. and Caraway, *Carum carir* L. at 0.5, 1 and 2% concentrations (v:w) with wheat grains to protections of the lesser grain borer, Rhizopertha dominica Fab., Were

evaluated under laboratory conditions during 2006-2007. Ethanol extract of Dill and Fennel seeds at 2% concentration gave the highest percentage of mortality (100%) after 5 days of treatment, followed with Dill (87.62%) at 1% concert., and Cummin (83.56%) at 2% concert., while the lowest percentages 14.1 and 14.33% observed with Caraway and Coriander, were respectively. Mortality percentage of R. dominica increased gradually by increasing the period of exposure to plant extracts treated with the different tested extracts. Up to 13 days of treatment the mortality percentages reached (100%) for Dill and Fennel at 2% concert., followed by Cummin (93.21%) and Fennel at 1% concert. (72.29%), while the lowest percentages of mortality (17.73 and 19.69%), were obtained when ethanol extracts of Coriander and Caraway seeds were tested, respectively.

EX27

EFFICACYOFPLANTEXTRACTOXYMATRINEADNBIO-INSECTICIDEABAMECTININTHECONTROLOFABAMECTININTHECONDITIONS.SelanBOLLWORMEARIASINSULANA(BOISD)INTHELABORATORYCONDITIONS.SelanH.Sagur and AhmadM.Tarek,TechnicalInstitute,Sewaira,Iraq,TechnicalCollege,Mesaib,Iraq,ahmadtarek2001@yahoo.comWorkKarlandaraKarlandara

Different concentrations of plant extract Oxymatrine and the bio-insecticide Abamectin have been selected to test their efficacy on eggs hatching and larvae development of spiny boll worm Earias insulana (Boisd) (Lepidoptrts: Phalaenidae). Oxymatrine showed a little impact on the percentage of eggs hatchability in an average percentage of 95.4, 94.4, 88.6% when using the concentrations of 0.1, 0.3 and 0.5 ml/l respectively. Abamectin on the contrary showed a significant reduction in the egg hatchability rates of 70.4, 53.6, 14.2% when using concentrations of 0.015, 0.30, 0.50 ml/l of water respectively. While a mortality in the new hatched larvae resulted from treated with Abamectine at the concentration of 0.50 ml/l was higher 74.66% than Oxymatrine which was 29.9% at the highest concentration of 0.5ml/l.Oxymatrine induced a high mortality in the first instar larvae of 79.5% when treated with 0.5 ml/l after 24 hours, on the contrary of oxymatrin the Abamectin showed less mortality of 21.8% after 24 hours of treatment. The last larval instar revealed more tolerance for both products used, while the Oxymatrin caused a mortality of 56.82% after one day of treatment with 0.5 ml/l compared to Abamectin which exhibited a mortality of 83.0%.

EX28

ESSENTIAL OILS TOXICITY AGAINST EGGS OF THE COEPEA WEEVIL CALLOSOBRUCHUS MACULATUS. Faten Titouhi and Jouda Mediouni Ben Jemâa. (1) Laboratory of Biotechnology Applied to Agriculture, INRAT, Tunia; (2) National Institute of

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In Tunisia, food legumes are a basic component in traditional farming systems. In recent vears, considerable efforts have been made to improve their yield and productivity. However, various difficulties still hinder the development of these crops. In this respect, insect pests are real problems in fields and after harvest during storage. They generate very significant quantitative and qualitative losses. The cowpea weevil Callosobruchus maculatus (Fabricius, 1775) (Coleoptera: Chrysomelidae) is among the most important insect pest during storage of dried legumes in Tunisia. Current control program is based on the use of synthetic insecticides. The harmful effects of these insecticides on the environment and human health lead to the research of alternatives. Thus, control using plant extracts mainly essential oils has proven its effectiveness against numerous insects. In this regards, fumigant toxicity of essential oils was investigated against adults and different developmental stages of insect pest worldwide. However, few data was available on essential oils activity against insect pests' eggs. Consequently, in this work, we carried out bioassays using essential oils extracted from three plants namely Rosmarinus officinalis L. (Lamiaceae), Prunus laurocerasus (Rosaceae), and Artemisia absinthium (Asteraceae) against eggs of C. maculates. Results showed that the three oils reduced significantly adult emergence compared to control.

EX29

THE EVALUATION OF THE BIOINSECTICIDE EFFECT OF AQUEOUS OF TOXIC PLANT ON **SAHRAN TERMITES** TYPE ANACANTHOTHERMES OCHRACEUS. Kheira Mahmoudi¹, Younes Bourmita², Adelkrim Cherity¹ and M. Didi Ould El-Hadi³. (1) Laboratoire de Phytochimie et Synthèse Organique (LPSO) Université de Bechar, Bechar 08000, Algérie; (2) Department of geniuses processes and environment section of Biology, University Dr. Yahia Fares Medea Medea 026000, Algeria; (3) Laboratory of ecosystem protection in arid and semi-arid Kasdi Merbeh University of Ouargla, Algeria, Email: kheira.mahmoudi05@yahoo.fr

Among, termites are the most troublesome pests of wooden structures, trees and plants agricultural crops, causing billions of dollars damage annually throughout the world. Most popular and widely used prevention measure to reduce the infestation of termites is use of synthetics termiticides. These are very harmful for our environment and the results are not sustainable. For this reason the current researches are directed towards the biological control through the use of natural substances, which are less harmful and more rational weapon. The main objectives of this study were to evaluate the bioinsecticide effect of aqueous extracts of toxic plant of Southwest of Algeria: *Hyoscyamus muticus* on Saharan termites type *Anacanthothermes*

ochraceus. The toxicity test again termites attack was performed by two tests, test by direct contact application in the laboratory, and test of plantation or preservative treatments in the infestation area. The phytochemical screening based on test of coloration and precipitation was undertaken by aqueous extract of the leaves, flowers and stems of plant, the phytochemical screening showed the presence of saponins, flavonoids, steroids, sterols and unsaturated terpenes and alkaloids in all parts of the plant used and toxic the presence of unsaturated sterols, cardinolides and tannins in some parts. This study shows that the parts of aqueous extracts of the plants tested have exercised a power bioinsecticide important treated individuals, this activity can be allocated to the bioactive substances of different plant parts.

EX30

ANTI-INSECT ACTIVITY OF THE ALKALOIDS EXTRACTS OF CYTISUS TRIFLORUS L'HÉRIT. Fatma Acheuk, Karima Ait Kaci, Hamida Merzougui, Karima Oudah and Fethia Fazouane, Département de Biologie, Faculté des Sciences, Université de Boumerdès, Algérie, Email: fatma.acheuk@yahoo.fr

Assessment of insecticides potential of the alkaloids extract of Cytisus triflorus from leaves and fruits on *Aphis fabae* was made by contact and ingestion. Five doses were tested on wingless adults: 1.56, 3.12, 6.25, 12.5, and 25 mg/ml. The results obtained showed that all extracts were toxic to adults of *A. fabae* at high doses. The action of both extracts was better by contact application than by feeding. Fruit alkaloids extracts were the most toxic against *A. fabae* adult than the leaves extract with DL50 value of 2.25 mg/ml. These results indicated that *C. triflorus* may be a promising naturally occurring agent for insect control.

INTEGRATED PEST MANAGEMENT

IPM1

MANAGEMENT OF SOME ECONOMIC OLIVE PESTS WITH EMPHASIS ON THEIR BIOLOGICAL CONTROL IN EGYPT. Ahmed El Henawy¹, Ahmed El-Heneidy² and Khaled Djelouah¹. (1) International Centre for Advanced Mediterranean Agronomic Studies (CIHEAM), MAI-Bari, Italy; (2) Department of Biological Control, Plant Protection Research Institute, Agricultural Research Center, Giza, Egypt, Email: aheneidy@link.net

The Mediterranean basin is the largest olive production area worldwide. More than 125 arthropod species attack olive plants and cause yield and qualitative losses. This study was aimed to survey the most economic olive insect pests in Egypt and to evaluate the role of bio-control agents in reducing their populations in olive orchards. During the period February–July 2012, a survey was carried out at two

olive orchards in two different agro-ecosystems (Middle Egypt and Coastal region). Samples were collected weekly in both orchards and number of individual pests and rate of infestation/sample/date/site/leaf (shoot) was counted and recorded: whereas, parasitoid species found associated with the pests were identified and their parasitism rate was estimated. The survey revealed the presence of five insect species; Euphyllura straminea, Phloeotribus scarabaeoides, Saissetia oleae, Prays oleae and Palpita unionalis on leaves and shoots of the surveyed olive trees. The month of May showed the highest populations of the five pest species. Six hymenopteran parasitoid species, 4 primary and 2 secondary species, associated with the first 3 pests, were recorded. Agricultural practices showed great impact on reducing the insect pests' populations in the surveyed Egyptian olive orchards.

IPM2

EVALUATING THE EFFICIENCY OF STICKY TRAPS TO MONITOR FLY ONION MAGGOT, *DELIA ALLIARIA* FONSECA IN NURSERY AND FIELD. <u>Feryal B. Hermize</u> and Hameed H. Mahmood, Department of Plant protection, College of Agriculture, University of Baghdad, Iraq, Email: feryalbahjat @yahoo.com

This study was conducted in the fields of the College Agriculture, University of Baghdad for monitoring onion maggot adults Delia alliaria fonseca (Diptera: Anthomyiidae) and evaluate the efficiency of three color traps (white, blue and yellow) in capturing adults of onion fly maggot in the nursery and field. Onion maggot is considered as an economic pest on Allium in many parts of the world and can cause economic losses ranged between 20-60% to onion and garlic. Results of this study showed that Delia alliaria represent a serious pest in Iraq. It was found that white sticky traps are more efficient in capturing adults of onion flies in the nursery reaching 1.83, 2.61 of females and males/week, respectively, followed by the light Blue sticky traps with 1.42 1.89 of females and males, respectively. The lowest numbers 0.52 and 1.41/week for females and males were observed using the yellow sticky traps. The sex ratio (females:males) was 41:59, 44:56 and 73:27 for the three types of traps, respectively, suggesting that more males were trapped. In the field, the results showed the superiority of the white sticky traps also in capturing the highest numbers of onion flies, which were 9.47 and 10.59 for females and males, respectively, followed by 7.27 and 7.97 in the light blue sticky traps, whereas the lowest numbers were 5.01 and 5.58 in the yellow sticky traps, respectively. The sex ratio was also in favor of males in all types of sticky traps, which were 41:59, 48:52 and 47:53 for the white, blue and yellow traps, respectively. It was concluded from the study that the white sticky traps were more efficient in capturing the adults of onion maggot flies Delia alliaria.

IPM3

INSECTICIDAL ACTIVITY OF FIVE ESSENTIAL OILS OF ALGERIAN MEDICINAL PLANTS ON POTATO APHID, *MYZUS PERSICAE*. Sakina Hakimi¹ and <u>Mazen Ateyyat</u>². (1) Department of Biology and Animal Physiology, Faculty of Life and Natural Sciences, University Ferhat Abbas, Sétif, Algeria; (2) Department of Plant Production and Protection, Faculty of Agricultural Technology, Al-Balqa' Applied University, Al-Salt, 19117, Jordan, Email: atyyeat@bau.edu.jo

Essential plant oils and their constituents have been previously proven to possess potential insecticidal and repellent activities against many types of insects. The interest in these essential oils is intensely increasing over time due to health and environmental concerns related to synthetic insecticides. The present study was conducted to determine the insecticidal activity of essential oils from pine, Pinus sylvestri; pennyroyal, Mentha pulegium; rosemary, Rosmarinus officinalis; lavender, Lavanda officinalis; and phoenician juniper, Juniperus phoenicea on the peach-potato aphid, Myzus persicae (Homoptera: Aphididae). Essential Oils were extracted from the leaves of these plants using a standard protocol and three different concentrations (100, 1000, and10,000 ppm) were prepared by dissolving the oil extract in 0.01 (v/v) dimethyl sulfoxide (DMSO) solution. DMSO and Actara® (Thiamethoxam) were employed as negative and positive controls, respectively. The experiment was conducted in petri dishes with Potter Spray Tower (Burkard Scientific Ltd). Mortalities were recorded 24, 48 ad 72 hr after treatment. Results revealed that Juniperus phoenicea at the highest concentration (10,000 ppm) was as toxic as Actara after 72 hr of treatment. Even though Rosmarinus officinali showed to be as toxic as Actara after 48 hr of treatment at the highest concentration, but its efficacy did not increase against the pest compared to the insecticide.

IPM4

INTEGRATED MANAGEMENT OF DATE PALM PESTS IN THE STATE OF QATAR WITH EMPHASIS ON RED PALM WEEVIL (*RHYNCOPHPORUS FERRUGIENUS* OLIVIER). Emad Hussain Al-Turaihi, Agricultural Affairs Department, Ministry of Environment, P.O. Box 1966, Doha, Qatar, Email: Emadhussain30@yahoo.com

Date palm (*Phoenix dactylifera* L.) is one of the most important fruit trees in the State of Qatar. The total number of date palm is 581336 trees and the total of cultivated area is 2365 hectars which produced 20696 tons of dates in 2011. The plantation of date palm in Qatar is facing several constrains including harsh climate, with high temperature during long summer, unfertile rocky soil and scarcity of water. Qatar is categorized among the arid zone climates around the world that are signified with very low rainfall. Date palm trees are subject to attack by many pests and

diseases which cause yearly losses in dates production. The importance of these pests varied from one year to another and from one area to another. These pests were as follows according to their economic importance: red palm weevil (Rhvncophporus ferrugienus Olivier), fruit stalk borer (Oryctes elegans Prell), long-horned stem borer (Jebusaea hammerschmiditii Reiche.), black scorch (Thielaviopsis paradoxa Hohn.), false smut (Graphiola phoenicis Poit.) and leaf spots. Red palm weevil was introduced into the country in 1989 through importation of palm trees, and then spread quickly all over the country and became a devastating insect on date palm. This study will present the main methods used to control these pests with focus on red palm weevil. Additionally, the study will present the current methods used to control the pests including agricultural quarantine practices. plant legislations, pheromone/kairomone traps, light traps, chemical pesticides and advanced technology for early detection of red palm weevil. By using these techniques, the infestation rate with red palm weevil was gradually reduced reaching less than 0.5% in 2012.

IPM5

POTENTIAL OF PHEROMONE BAITING TRAPS FOR MONITORING TOMATO BORER (TUTA ABSOLUTA MEYRICK). Emad Hussain Al-Turaihi, Agricultural Affairs Department, Ministry of Environment, P.O. Box 1966, Doha, Qatar, Email: emadhussain30@yahoo.com

Tomato is an important and popular vegetable in the State of Qatar. The total area of cultivation is 288 hectares in open fields and 14.4 hectares in protected areas. The production of tomatoes in 2011 was 8640 tons in open fields and 2021 tons in protected areas. In addition, Oatar imports a huge quantity of tomatoes from outside the country that reached 43215 tons in 2011. Generally, tomato cultivation in Qatar did not suffer any problems caused by insects or diseases until 2011, when tomato borer or South American tomato moth (Tuta absoluta Meyrick 1917, Lepidoptera: Gelechiidae) was introduced into the country. Tomato borer was recorded for the first time in the State of Qatar in February 2011 at Al-Khor, an area located in the north of the country. The infestation was observed on polyethelene-house tomato plants grown in two neighboring farms and currently posing a serious threat to tomato production. Tuta absoluta control is a major challenge due to its rapid capacityin developing resistance against conventional insecticides. This study will present in details the program implemented for monitoring Tuta absoluta in Qatar by using water, light and pheromone traps. Moreover, the study will present the results of the implemented control program in the country which included public awareness campaigns, agricultural practices, plant quarantine measures and the use of selected chemical pesticides.

IPM6

TESTING DIFFERENT PACKAGES OF INTEGRATED CONTROL METHODS FOR THE MANAGEMENT OF THE RED SCALE INSECT *AONIDIELLA AURANTII* (MASK) ON PAPAYA **CROP IN YEMEN**. Saeed A. Ba-Angood¹ and Nuha S.Hariri². (1) Department of Plant Protection, Nassir's College of Agric., Univ. of Aden, Yamen. (2) Department of Plant Protection, El Kod Research Station. Yamen. Email: baangood@yemen.net.ye

The Red Scale insect Aonidiella aurantii (Mask) causes serious damage which affects the economic quantity and quality production of fruit trees, particularly papaya in Yemen. Different packages of integrated control methods were evaluated in a field trial conducted at El Kod Agricultural Research Station during the period from 4/4/2010 - 4/11/2010, and repeated on 2/4/2011- 2/11/2011. The results have shown that the first package constituted of cleaning the field from weeds, collecting falling leaves and fruits + releasing the coccinellid predator Chilocorus distigma (400 adult/plot) gave the lowest mean number of scale insects $(0.1/cm^2)$, six weeks after the beginning of the trial on papaya fruits in both years compared with the non-treated control. The mean number of scale insects in the control increased to reach 8.8/cm² in 2010 trial and 8.0/cm² in 2011 trial. The same results were obtained on the mean number of scale insects on the stem of papaya trees, where after six weeks from the beginning of the trial, the mean number of scale insects was $0.1/cm^2$ in response to the use of first package mentioned above followed by the second package constituted of cleaning the field from weeds + applying Neemex insecticide, which gave a mean of $0.7/\text{cm}^2$. The means of these treatments were statistically different from the control which gave a mean of 7.6 insects/ cm^2 and 7.4 insects/cm² in both years. The same results were obtained also on the mean number of scale insects on the papava leaves. Six weeks after the beginning of the trial, the results showed that the first package gave a mean number of scale insects of 0.1/cm², in both experiments, whereas the mean number in the control reached a mean of 4.4 insects/cm² and 7.9 insects/cm² in both years, and the differences were statistically significant. The results also showed that the first package gave the highest mean yield of 37.4 ton/ha and 39.5 ton/ha for both years as compared with the control which gave a mean yield of 15.1 ton/ha and 14.3 ton/ha in both 2010 and 2011 trials.

IPM7

EFFECT OF USING PHEROMONE TRAPS AND PESTICIDES IN CONTROLLING THE TOMATO LEAFMINER TUTA ABSOLUTA (MEYRICK) AT ZUMMAR IN IRAQ. <u>Haitham M. Algalal</u>, Plant Protection Department, Faculty of Agricultural and Forestry, Al Moussel University, Iraq, Email: d.haitham@yahoo.com.

A study to test the effect of using pheromone traps and pesticides, individually or combined, on the infestation rate with the tomato leafminer, Tuta absoluta (Meyrick) (Gelechiidae:Lepidoptera) in tomato fields was conducted at Zummar village. Iraq during the summer season of 2013. The tutasan red plastic pan traps, at a density of 8 traps/donum (as mass-trapping) combined with the application of insecticides (Spinosad, Abamictin. Azadrachtin and Lufeneron) during flowering and fruiting stages, compared with the application of either mass trapping or pesticides and a non-treated control were evaluated. The results showed that mean fruits infestation rate was lowest(53.41%) in the pesticides treated plots , followed by the plots treated with pesticides and pheromone traps (58.46%) and both were significantly better than the traps alone (83.33%) and the control (76.66%) treatments. Spinosad showed a significant decrease in fruits infestation rate and number of live larvae among the tested pesticides.

IPM8

EFFICACY OF CERANOCK ATTRACT AND KILL SYSTEM AS A CONTROL METHOD OF MEDITERRANEAN FRUIT FLY, CERATITIS CAPITATA IN CITRUS ORCHARDS IN IRAQ. Mohammed Z. Khalaf¹, <u>Hussein F. M. Ali Alrubeai</u>¹ and Shakir Al-Zaidi². (1) Agricultural Research Directorate, Ministry of Science & Technology, Baghdad, Iraq; (2) Russell IPM Ltd., United Kingdom, Email: halrubeai@yahoo.com.

Field experiments were conducted using Ceranock bait station, "attract and kill" system to combat Mediterranean fruit fly, Ceratitis capitata, in Baghdad and Wasit provinces citrus orchards during 2013 season. Experiments were executed in six citrus orchards, three in each location of mixed citrus varieties with an area of 1 ha each. Two orchards in each location were specified for Ceranock traps, while the third orchard was left as a control treatment. Delta and McPhail traps were used to monitor Medfly population density in treated and control orchards. Results indicated that Medfly activity and presence in citrus orchards started during the first week of October, which coincided with the beginning of fruit yellowing. The results in the control orchards indicated that Medfly population density in Waset orchards was more than in Baghdad orchards. The results also showed that using Ceranock traps reduced population density to 52 and 73% in Baghdad orchards and to 56 and 67% in Wasit orchards. The percentages of fruit injuries in the control orchards were increased with the advancement of fruits maturity, and reached 35 and 56% in mandarin and 21 and 32% in orange fruits in Baghdad and Wasit, respectively. Whereas it reached 3 and 4% in mandarin orchards supplied with Ceranock traps and to 4 and 5% in orange treated orchards in Baghdad and Wasit, respectively. The results of this study demonstrated clearly the efficacy of Ceranock bait station, "attract and kill" system, as a control measure for Medfly in citrus orchards.

IPM9

THE INTEGRATED CONTROL AGAINST TOMATO LEAF MINER TUTA ABSOLUTA MEYRICK BY THE USE OF BIOPESTICIDES. Gacemi Abdelhamid¹, Guenaoui Yamina² and Mosbah Benhenni¹. (1) National institute of agronomic research of Algeria Experimental Station of Hmadna, Algeria; (2) Department of Agronomics sciences, University Abdelhamid Ibn Badis of Mostaganem, Algeria, Email: abdelhamid gacemi@yahoo.fr

This work aimed to study safe measures to control the tomato leaf miner *Tuta absoluta* Meyrick (Lepidoptera: Gelechiidae), the most important pest of tomato in Algeria. It causes considerable damage since its introduction in 2008. The experimental work has focused on integrated control in the field with biopesticides such as Emamectin benzoate and Spinosad that showed a high efficiency on larval stages. In the laboratory, a comparison between the efficacy of Emamectin benzoate and Spinosad against larval stages of *T.absoluta* was established. The results obtained showed that both Emamectin benzoate and Spinosad proved highly effective on the larvae of *T.absoluta*. Emamectin caused a complete mortality of all the treated larvae, whereas Spinosad killed more than 94%.

IPM10

EFFECT OF BIOLOGICAL COMPLEX ON PEAR PSILLID *CACOPSYLLA PYRICOLA* (F.) IN HOMS **PROVINCE, SYRIA.** Wajeeh Kasses¹, Randa Abu-Tara² and <u>Bassam Oudeh³</u>. (1) Faculty of Agriculture, Damascus University, Syria; (2) Faculty of Science, Damascus University, Syria; (3) GCSAR, Agricultural Scientific Research Center at Homs, Syria, Email: B_oudeh@hotmail.com

Integrated pest management program of the pear psyllid Cacopsylla pyricola (F.) (Hemiptera: Psyllidae) was evaluated on resistant Red- Bartlette cultivar in Mokhtaria Research Station, Agricultural Research Center in Homs during 2011 and 2012 seasons. The winter oil was used at the beginning of the growing season when average number of adults reached the economic threshold of one insect/10 beats by the beating tray, and the insect growth regulator Diflubenzuron to control nymphs of the second generation of the pest post bloom, and the extract Melia azedarach L. plant + summer oil during the growing season when average number of nymphs reached economic threshold of 0.3 nymphs/leaf, while summer oil was sprayed after harvest when the average number of adults reached economic threshold of linsect/10 beats. The results showed that average mortality of pear psyllid eggs three days after spray (winter oil, Diflubenzuron, M. azedarach extract+ summer oil) on Red-Bartlette cultivar were 69, 58, 98 and 85% and on nymphs were 65, 88, 91 and 76% and on adults were 60,

57, 80 and 56%, respectively, with efficacy slightly decreased 21 days later and reached 69, 72, 88 and 56% on eggs and 49, 87, 82 and 58% on nymphs and 54, 46, 72 and 47% on adults, respectively. M. azedarach + summer oil were the most efficient in controling eggs and adults, whereas Diflubenzuron was the most efficient in controling nymphs. Included in this program natural enemies associated with the pest especially the predator Anthocoris nemoralis (F.) and parasite Trechnites psyllae R. and several cultural practices (pruning, balance fertilization, regular irrigation and washing honeydew by water + detergentas necessary). The infestation of fruits and yield losses in tested integrated pest management program were 1.96 and 1.91%, respectively, as compared with 6.85 and 6.35%, respectively, for the control (classic insecticides). The results of economic evaluation indicated that the average cost was 2.55 Syrian pounds/kgand was less that of the control (2.87 Syrian pounds/kg), suggesting that this program was more economic and safer for natural enemies than using the classical insecticides and less polluting to the environment.

IPM11

EVALUATION OF SOME CONTROL TECHNIQUES AGAINST MED FLY *CERATITIS CAPITATA* **AND ITS USE IN IPM PROGRAMS.** <u>Nassir A.O. Al-Jamali¹, Adel K. Al-Rubai² and Aid N.</u> Al-Zubaid². (1) Agriculture College Karbala University, Iraq; (2) Al-Musaib Technical College, Iraq, Email: nassir_aljamali@yahoo.com

Citrus trees are among the most economically important fruit trees in the world, occupying the first position in international trade. The citrus productivity in Iraq was very low because of many factors, one of them is infestation with Med fly Ceratitis capitata (Tephritidae:Diptera), which was introduced to Iraq recently and caused great damagein citrus fruits production. In order to reduce losses caused by the medfly, this study aimed to evaluate some of control measures against C. capitata. This study was conducted in citrus orchards at Imam region/Babylon province, 100 km south of Baghdad, Iraq during 2010. The study results revealed significant effect of the following control measures: cultivation, covering the fruits with bags, bait traps, pheromone traps and pesticides in reducing fruits infestationrate that reached 1.97, 0.33, 1.41, 1.41 and 0.00%, respectively, compared with 3.16, 2.72, 2.22, 1.36 and 1.45%, respectively, for the control treatment (only water). The results also showed that using all the above mentioned measures combined had significant effect in reducing the fruits infestation ratethat reached 0.38% compared with 2.45% in the control treatment. It can be concluded that using the above mentioned measure combined with suitable timing in IPM programs can significantly reduce the losses caused by the medfly without negative effects on the environment.

IPM12

EVALUATION OF TWO TYPES OF IMPORTED TRAPS FOR MASS-TRAPPING THE CUCRBIT FRUIT FLY DACUS CILIATUS (LOEW) IN THREE CUCUMBER VARIETIES. <u>Awad Jasim</u> <u>Aljubory</u> and Safaa Zakaria Baker, Department of Plant Protection, College of Agriculture, Tikrit University, Salah Addin, Iraq, Email: awad_jasim@yahoo.com

A field study was carried out in Allam–Salah-Addin to evaluate two types of imported traps (Ceranock system and Macphil – Femilure) for Mass– trapping the cucurbit fruit fly *Dacus ciliates* (Loew) in three varieties of cucumber. The results showed the superiority of Macphil-Femilure traps over Ceranock system in Mass–trapping of cucurbit fruit fly as the reduction rate in the population of the insect was 67.86% in the Macphil–Femilure field trap and 39.09% in the field of Ceranock system, and fruit infestation rate decreased to 42.17% in the cucumber fields supplied with Macphil- Femilure traps and to 58.63% in the fields supplied with Ceranock system.

IPM13

A PRELIMINARY STUDY INTEGRATED PEST MANAGEMENT OF TOMATO LEAF MINER, *TUTA ABSOLUTA* MEYRICK (LEPIDOPTERA: GELECHIIDAE), IN SYRIA. <u>Randah Abu Tara</u>, Sammer Assaf, Bassam Audeh, Ahmad Khalil, Na'el Abdullah, Mahmood Zu'aby, Majedah Mefleh, Basemah Qaswat, Amal Saidawi, Muhammad Ibrahim. Faculty of Science, Damascus University, Syria. Email: randaaboutara@hotmail.com

The susceptibility of some tomato cultivars to tomato leaf miner was test during 2011 season for 20 introduced cultivar (Sagea, Costoluto Genovese, H11 Montego F1, Pakmor Vff, Seyhan F1, Sima F1, Magesto F1, Nasmeh F1, Oody F1, Magic F1, Galina F1, Noujoum F1, Birce F1, Sali F1, Bravia F1, Ostora F1, Semar F1, Fletcher F1 Bss815, Banyas and Nisreen F1) and two local cultivars, Karazy and Jardy. The cultivar H11 Montego F1 was the most resistant with infestation percent of 20.81% and an injury level of 5.81%. Next cultivars in resistance were Karazy, Fletcher F1 Bss815, and Jardy with infestation percent of 22.28, 27.45, 28.73% and injury level of 6.67, 9.49, and 8.95% respectively. While the cultivar Pakmor Vff was the most susceptible with infestation percent and injury level of 70.28% and 26.27% respectively. However, the rest of the cultivar were moderately susceptible with an infestation rate of 33.82% to 46.33% and injury level of 9.51 to 15.0. Therefore, the cultivars H11 Montego F1, Karazy and Jardy may be used in IPM programs of this pest. In addition, three plant extracts were tested against the tomato leaf miner larvae; Melia azedarach L. fruits, Capsicum frutescens L. (pepper) and Allium sativum L. (garlic). Efficacy percentages were evaluated at 1, 5 and 10 days after spraying and were found to be 84.48%, 61.54%, and 71.98%, respectively. Many natural enemies were collected during the season of 2010 and 2011, which can be used in IPM programs. These were; two parasitic wasps, *abrobracon hebetor*, *Habrobracon nigricans*, and a predatory bug *Nesidiocoris tenuis*. The following fungi were isolated from the larvae: *Aspergillus* sp., *Alternaria* sp., *Cladosporium* sp. and Verticillium sp..

IPM14

ACRIDID (ORTHOPTERA) HARVESTING AND MASS-CULTURE, AN ALTERNATIVE APPROACH OF CROP PROTECTION AND PEST MANAGEMENT. <u>Amlan</u> Das, Entomology Laboratory, Department of Zoology, University of Calcutta,35 Ballugunj Circular Road, Kolkata, 700019, West Bengal, India, Email: dasamlan@yahoo.co.in

Insects by far outnumber any other animal on earth, both in number of species and individuals. Grasshoppers and locusts (Orthoptera : Acrididae) which have high reproductive potential, occur in solitary or swarms, are often treated as agricultural crop pests since decades. But from 'entomophagy' point, they are good examples of 'nutritional source' and have been included in the diet of almost every culture with any history of food-insect use. Around 35 genera of edible species are known worldwide from Acrididae which are rich in protein, fat (and thus, energy) and important source of vitamins and minerals. In most of the instances they are dried and frequently stored or sold in the village markets of developing countries. There has been increased interest by scientists and governments in some countries in recent years in harvesting of some pest species as food or use it as protein rich feedsupplement to livestock. Our research aimed to develop a feasible 'Acridid mass culture farm', and to meet this goal we have successfully cultured 9 Acridid species pests from India. Out of nine, four species Hieroglyphus banian (Fab.), Acrida exaltata (Walk.), Spathosternim pr. prasiniferum (Walk.) and Oxya fuscovittata (Mars.) were selected for 'mass-culture' based on their higher fecundity-fertilityand rapid growth rates. lower mortality and higher protein values. The nutritional values of these selected minilivestocks are comparable to any widely used animal-protein source. By harvesting of Acridid and its use as substitute source of protein rich diet or in formulation of animal feed supplement will reduce insecticidal use in croplands. This alternative approach of insect pest management will ensure crop protection from adverse effects of pesticides.

IPM15

EFFICACY OF COLORED STICKY TRAPS AND INSECTICIDES FOR THE CONTROL OF PEAR PSYLLID, CACOPSYLLA PYRICOLA FÖRSTER, IN EGYPT. Atef Mahmoud Mohamed Sayed¹, Stefano Civolani², Sayed Ali Ahmed³ and Abdalla M. M. El-Adawy³. (1) Plant Protection Research Institute, Agricultural Research Center, Egypt; (2) Department of Biology and Evolution, University of Ferrara, Ferrara, Italy; (3) Faculty of Environmental Agricultural Sciences, Suez Canal University, El-Arish, Egypt, Email: atef.mahmoud1@gmail.com

Field studies were conducted at two different sites to compare the efficacy of various colored sticky traps and different insecticides against the pear psyllid. Cacopsylla pyricola (Hemiptera: Psyllidae), as components to improve the management of this pest. Results showed significantly higher number of C. pyricola adult catches in green and yellow traps, in comparison to orange, white, blue and black traps. Significant differences were detected among the insecticides tested for their efficacy to control C. pyricola in field trials in 2010 and 2011. The highest efficacy was observed for Acetamiprid (91.7%), followed by Phenthoate (88.6%), Clorphyrifos (82.8%), Diazinon (82.6%), and Profenos (81.9%). Moderate efficacy was recorded for mineral oil (74.6%), Malathion (74.5%), and Spinosad (73.7%), whereas the lowest efficacy was observed for Abamectin (67.3%) and Pyrimiphos (65.9%). The results of this study will be employed in the integrated pest management of C. pyricola in Egypt.

IPM16

EFFECT OF DATE FRUITS QUANTITY ON THE **NUMBERS** OF RED PALM WEEVIL, RHYNCHOPHORUS FERRUGINEUS (OLIVIER), CAPTURED IN AGGREGATION PHERMONE **TRAPS.** Ahmad Hussen Al-Saoud¹ and Azia Ajlan². (1) Bani Yas Agriculture Research and Experiments Station, Abu Dhabi, UAE; (2) Department of Arid Land Agriculture, College of Agricultural and Food Sciences, King Faisal University, P.O. Box 55009, Hofuf, Alhasa 31982. Saudi Arabia. Email: alsaoudahmad@hotmail.com

Red palm weevil (RPW), Rhynchophorus ferrugineus (Olivier) (Coleoptera: Curculionidae), is controlled using integrated pest management (IPM), which depends on the aggregation pheromone traps. Field trials were conducted in three date palm plantations in Al Rahba, Abu Dhabi, UAE, from June 1, 2010 to May 31, 2011 using three treatments (350g, 450 g and 550 g of dates) with six replications.. Data collected from 18 traps indicated that the highest catch of RPW adults was in March and April 2011 with an average of 93.3 and 70.8 weevils/trap, respectively, while the lowest catch was in September 2010 with an average of 5.5 weevils/trap. The total number of captured weevils was 6147 of which 2067 were males and 4080 were females, with sex ratio of 1:2. The data obtained suggested that there are significant differences between the 3 treatments. The traps baited with 450 g of dates recorded the highest catch with 2230 weevils, followed by 350 g of dates with 2037 weevils, whereas using 550 g of dates/trap caught the lowest number (1880 weevils). Consequently, using aggregation pheromone traps of RPW with 450 g of dates as bait using black bucket traps gave the best results. More investigations are needed to improve the effectiveness of this technique.

IPM17

PRELIMINARY EVALUATION OF ZONATRAC MALE AND CERANOCK FEMALE ATTRACT AND KILL STRATEGIES FOR THE CONTROL OF MIXED POPULATIONS OF BACTROCERA ZONATA AND CERATITIS CAPITATA ON MANGO IN EGYPT. Ramy Aljazzar¹, Nayem <u>Hassan²</u>, Khaled Djelouah¹ and Ahmed El-Heneidy³. (1) International Centre for Advanced Mediterranean Agronomic Studies (CIHEAM), MAI-Bari Italy; (2) Head of Research and Development, Russell IPM Ltd., UK; (3) Department of Biological Control, Plant Protection Research Institute, Agricultural Research Center, Egypt, Email: nayem@russellipm.net

Two bait-based male and female attract and kill systems, Zonatrac and Ceranock, were compliantly used for the control of a mixed population of the Medfly *Ceratitis capitata* (Wiedemann) and peach fruit fly *Bactrocera zonata* (Saunders) on mango crop in Egypt during the period June–Sptember, 2013. The selected treatments were carried out in a mango orchard in Al-Sharqiyah. Both techniques applied for 8 weeks before fruit color change were successful in substantially reducing mango infestation. Fruit damage assessment revealed an infestation rates of 4.92 and 3.28%, respectively, in the two treatment plots, as opposed to the 27.87% infestation in an untreated mango control plot.

IPM18

DIAGNOSIS OF WIREWORM AGRIOTES SPP. INFESTED POTATO TUBERS IN THE MIDDLE OF IRAQ BY USING PHERMONE AND LIGHT TRAPS. <u>Feryal H. Sadik</u> and Redha S. Al Jorany, Department of Plant Protection, College of Agriculture, University of Baghdad, Iraq, Email: feryalhasony@yahoo.com

Field studies were carried out in the middle of Iraq during 2009-2012 to detect and diagnose the species of the genus Agriotes spp. (Coleoptra: Elateridae) that infest potato tubers (Solanum tubersum) by using adults pheromone and light traps. The results showed that there were five species of Agriotes infesting potato tubers in spring and autumn cultivations. These species were Agriotes brevis (Candeze), Agriotes lineatus L., Agriotes obscurus L., Agriotes sputator L., Agriotes ustulatus (Schaller), whereas the results of light traps showed that there were two species only of Agriotes spp. (A. obscurus and A. sputator). Adults had one activity period that begins from middle of March to the beginning of August, while the larvae had two activity periods, the first begins in the spring season from the middle of February and continues to the end of June. The second activity period begins in the fall season from September until the end of December.

IPM19

DISEASE MANAGEMENT OF ORGANIC TOMATO UNDER GREENHOUSE CONDITIONS IN THE JORDAN VALLEY. Akel Mansour¹, <u>Luma</u> <u>Al-Banna¹</u>, Nida' Salem¹ and Nihad Alsmairat². (1) Department of Plant Protection, Faculty of Agriculture, The University of Jordan Amman 11942, Jordan; (2) Department of Horticulture and Crop Science, Faculty of Agriculture, The University of Jordan, Amman 11942, Jordan, Email: lalbanna@ju.edu.jo

Production of organic tomato under greenhouse conditions has significantly increased in the last few years. Although greenhouse systems provide the option of off-season production and expansion of markets over traditional outdoor field systems, such systems also pose unique challenges with regard to pest management. A study was conducted in the Jordan Valley during the fall of 2011/2012 to evaluate the effects of integrated pest management (IPM) that combines different preventive and control measures, on diseases and pests of tomato grown under greenhouse conditions. The experiment of three farming consisted systems; organic, conventional and IPM farming systems. The plant pests and diseases were monitored in all treatments. Results showed that organic farming was as effective as both IPM and conventional farming systems in suppressing pests and diseases. Moreover, the powdery mildew, early blight and the Tomato ring spot virus (ToRSV) incidences were lower in organic tomato plants than both conventional and IPM growing systems. No significant differences between the three systems were found in plant height, width, circumference, number of flowers/cluster, number of clusters/plant, fruit yield, shoot dry weight and root dry weight. Furthermore, several quality parameters of tomato fruits such as dry weight, lycopene content and pH were found to be significantly higher in the organic tomatoes.

BIOLOGICAL CONTROL

BC1

BIOLOGICAL CONTROL OF OKRA DAMPING OFF USING THE BIO-PESTICIDES: PSEUDOMONAS FLUORESCENS AND BACILLUS

SUBTILIS. Najwa Basheer and Abeer Ahmad

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The current study evaluated the effect of two bacterial biological control agents namely: *Pseudomonas fluorescens* and *Bacillus subtilis* on growth of the fungal pathogens *Macrophomina phaseolina*, *Rhizoctonia solani* and *Fusariun solani* causing okra damping off and root rot. Results showed that both products significantly reduced diameters of the fungal pathogens colonies and their percentage of growth. The highest growth suppression was observed when the fungal pathogens were treated with the bacterium, *P. fluorescens*. In a greenhouse trial, the two bacterial products resulted in significantly lower percentage of okra damping off particularly, when *P*. *fluorescens* was used against *F. solani* as the percentage of damping off reached 17.79%. Moreover, okra plants treated with the two bacterial products showed increased shoot and root growth compared to the control. The dry weight of the treated plants also increased and reached 0.016 g in the *P. fluorescens* treatment against *F. solani*. Seeds treated with both bacterial products showed significantly increased activity of peroxidase enzymes compared to untreated seeds planted in soil contaminated with the pathogens above. The highest peroxidase activity was recorded with seeds treated with *P. fluorescens* and planted in soils contaminated with *M. phaseolina*.

BC2

EFFECT OF SOME BIOPESTICIDE AND INDIAN (*BRASSICA JUNCEA*)**EXTRACTS IN EARLY BLIGHT DISEASE OF TOMATO CAUSED BY** *ALTERNARIA SOLANI JONES AND GREUT* (**ELLIS AND MARTIN**). <u>Mohammed Amer</u> Fayyadh¹, Essam Husain Aldoghi² and Ailla Jwad Abd¹. (1) Plant protection Department, College of Agriculture, University of Basrah, Iraq; (2) Horticuluture and Garden Engineering Dept, College of Agriculture, University of Basrah, Iraq, Email: muamer2010@yahoo.com

This study was carried out in plant protection Labs, Agriculture College, University of Basrah during 2012-2013 to study the effect of some Biopesticide and extracts of Indian mustard Brassica juncea on early blight of Tomato plants caused by Alternaria solani. Laboratory study showed that Siliqua pericarps were more effective in inhibition the growth of A.solani as percentage of inhibition reached 69.4% compared with 37 and 30.7 for seeds and leaves extracts respectively. It is also showed that Fytomax (2.5 ml/L) inhibited the growth of A.solani in percentage of 75% while there is no clear effect observeed for Bion and Biaclean compounds on growth of the fungus.Results of field experiment revealed that Siliqua pericarps extracts reduced the disease severity to 14% compared with 56% for control treatment ,it is also showed that all treatments used were reduced disease severity and improve the growth and yield parameters for Tomato plants ,Results of phenolic compound detection by Gas chromatography Mass Spectrophotometry showed presence of several compound such as Isothiocynaic and 3-butenyl ester in different parts of indian mustard ,it was believed that these compound have a role in inhibition the growth of the pathogenic fungus and reduced disease severity

BC3

EFFECT OF THE NEMATOPHAGOUS FUNGI *ARTHROBOTRYS OLIGOSPORA* **FRESEN ON NEMATODES INFECTING LIMA PLANT.** <u>Suad</u> Abdel Gamiel Mohamed¹ and El Nour El Amin Abdel Rahman². (1) Agricultural Research Corporation, Plant Pathology Program, Sudan; (2) Faculty of Eng. and Tech., University of Gezira, Sudan, Email: suadgamiel@yahoo.com

Nematophagous fungi are the fungi which attack nematodes, many of them are plant pathogens. These fungi have worldwide distribution and have been reported from many countries including Sudan. This study was carried out to search for nematophagous fungi in Gezira soil and their capability to attack nematodes. Random samples collected from Gezira soil grown with lemon plants were placed on Corn Meal Ajar media (CMA) for the growth of the fungi and nematodes. Using Digital Microscope many types of trapping nematodes were observed, such as those with adhesive nets, adhesive knob and presence of fungal spores inside the dead body of the nematode. The samples were labeled, and kept in laboratory for further study in the glass house. The fungus has been identified as Arthrobotrys oligospora. The study investigated the capability of this fungus to attack and destroy nematodes. The nematophagous fungus A.oligospora was found to attack the nematode Xiphenema sp. and had been seen capturing it by adhesive net and had been held at two points and sometimes at several points. Growing of lemon plants on soil artificially infested with Xephenema sp. nematodes and treated with different concentrations of the fungus A. oligospora inocula $(10^5, 10^4 \text{ and } 10^3)$ significantly increased the number of lemon plant leaves, stem length, root length and also increased the fresh and dry root weight compared to the same soil without fungal inoculation. So, Nematophagous fungi, if given more attention may be useful as biological control which can decrease cost of nematicides and conserve the ecosystem.

BC4

IN-VIVO CONTROL OF TOMATOES *FUSARIUM* **SPP. WILT USING PLANT EXTRACTS.** <u>Amal</u> <u>Sidawi</u>, Firas Azzam, Ahmad Abdalaziz, Tony Talab and Isa Kassab, General Commission for Scientific Agricultural Research, P.O. Box 113, Damascus, Douma, Syria, Email: nadiaamal1986@yahoo.com

Fungal suspensions were prapaired from Fusarium solani, Fusarium oxysporum isolated from the roots, stems, and rhizosphare of tomatos wilt plants. We Used methanol extracts of the following plants in pots: figs (Ficus carica L.) leaf powder extract, myrtle leaf extract (Myrtus communis L.), and marigolds (Tagetes patula Linn.) stems, leaves, floures, and roots extracts sepperetly in our experiments in pots. The results showes that both 6% marigolds' stems and 6% marigolds' leaves' extract separately infected with F. solani isolated from tomatoes roots significantly reduced the tomatos diseased plants, and activated the growth of the tomatoes ' roots and stems comparing with the control. 6% marigolds' stems and 6% marigolds leaves extract separately infected with F. oxysporum isolated from tomatoes' stems significantly reduced the tomatos diseased plants comparing with control, and activated the growth of the tomatoes stems. Moreover only 6% marigolds stems extract infected with *F. oxysporum* activated the growth of the tomatoes roots. 6% marigolds stems and 6% marigolds leaves extract separately infected with *F. solani* isolated from rhizosphare reduced the tomatoes diseased plants comparing with control and activated the growth of the tomatoes.

BC5

BIOLOGICAL CONTROL OF FUSARIUM ROOT ROT DISEASE ON STRAWBERRY PLANT. <u>Huda</u> <u>Hazim Wafi Al-Taae</u>, Plant Protection Department, College of Agric. & Forestry, Mosul Univ., Iraq, EMAIL: htaae@yahoo.com

The results of field survey which was conducted in greenhouses subsidiaries (the Plant Protection Department and the Department of Horticulture and plant cultivation Nineveh) in the province of Nineveh- Iraq showed the presence of many pathogens, especially fungal infections on strawberry plants, and most frequently with the pathogenic fungus Fusarium solani, followed by Fusarium oxysporium in three plastic houses mentioned. The incidence varied in Fusarium root rot in field survey of the three sites where the highest occured in the greenhouse of the plant cultivation of Nineveh and reached 65%. This study is the first study of the most important diseases of strawberry in Nineveh. In the during of bio-test to many biocides fungal and bacterial in diameter growth of F. solani In vitro. Superiority, noted that the concentration of (100 mg active ingredient/l L)was sufficient to inhibit growth, Bio-resistant contain the active ingredient represented (T.h) Trichoderma harzianum, while there was no significant difference between bacterial biocides in the percentage of inhibition growth of pathogenic fungus. Test showed the effect of several biocides containing bacterial and fungal in the control of Fusarium root rot disease, in the greenhouse of the Plant Protection Department, observed a difference in the rate and severity infect of strawberry plants, between the biocides fungal and bacterial it's used, the bacterial biocide Psudomonas fluorescens superiority than the other Biocides and did not differ significantly from fungal biocide (T.h) Trichoderma harzianum. Through this study the impact of biocides on several characters for strawberry plants did not differ biocides fungal and bacterial among themselves in terms of their impact on the Improvement character of strawberry plants.

BC6

BIOLOGICAL CONTROL OF FUSARIUM WILT OF CHIKPE. Ali Kareem Al-Taae and <u>Saleh Ahmed</u> <u>Eesa AlJobory.</u> Plant Protection Department, College of Agric. & Forestry, Mosul University, Iraq, Email: saleheng@ymail.com

Fusarium wilt (Fusarium oxysporum f. sp. ciceris (Padwick) Matuo and K. Sato) is one of the major yield limiting factors of chickpea (Cicer arietinum L.). For eco-friendly and sustainable management of the disease we evaluated several bioontrolagents including Trichoderma viridae, T. harzianum Bicont-T, Bacillus pumilus, Pseudomonas fluorescens and B. subtilis as well as a chemical fungicide against the pathogen F.oxysporum f. sp. ciceris. The isolates of Trichoderma species were evaluated against the pathogen in dual culture. The isolates inhibited maximum mycelial growth of the pathogen. Through the results of control of Fusarium wilt disease using some bio-control agent. Vitavax the two biocontrol agent T. viridae and P. fluorescens were the best in reducing the disease incidence to 21.67 and 23.33%, respectively, compared with 60% in the control. Comparison of the treatments at the level of the winning recipes showed that the two previous biocontrol agents increase the all characteristics and components compared to the other treatments.

BC7

BIOLOGICAL CONTROL OF *NATTRASSIA MANGIFERAE* WITH *TRICHODERMA VIRIDE*. <u>Wafa Nori¹</u> and Hashim El Atta². (1) University of Kordofan, Faculty of Natural resources and environmental studies, Department of Forestry and Range, El Obeid, Sudan; (2) Department of Plant Production, Faculty of Food Science and Agriculture, King Saud University, Riyadh, Saudi Arabia, Email: waffanori@gmail.com

The aim of this research was to study the antagonistic effect of Trichoderma viride on Nattrassia mangiferae in vivo and in vitro. Pure cultures of T. viride and N. mangiferae were obtained by inoculation on sterile PDA and incubated at room temperature for one week. Also a pure culture of T. viride on liquid medium was prepared and incubated at room temperature for one month. The tested seedlings were Ficus nitida and Ficus bengamina. The tested seedlings which were pre-inoculated with T. viride failed to develop any symptoms, although they were inoculated with N. mangiferae; however seedlings which were not pre-inoculated with T. viride and later received inoculations, developed the characteristic symptoms of wilt. Following one week from inoculation, the leaves developed chlorotic and necrotic foliage. A mortality of 100% has occurred in F. bengammina and 75% mortality in F. nitida seedlings. Comparatively, absolutely no mortality was recorded in seedlings of both species of trees which were pre-inoculated with T. viride. On re-isolation from seedlings that received both T. viride and N. mangiferae inoculum successively, T. viride was the dominant fungus re-isolated and found in 75% of all samples. N. mangiferae ranked next and reisolated from only 20% of all samples, the remaining 5% constituted a variety of other microorganisms. Nevertheless, N. mangiferae was the dominant species in samples taken from seedlings that were inoculated with it alone i.e. not previously inoculated with *T. virid*.

BC8

COMPARISON OF THE EFFECTIVENESS OF BIOLOGICAL AND CHEMICAL CONTROL AGAINST BOTRYTIS CINEREA PERS.: AGENT OF GREY MOLD ON GRAPEVINE. Kawther Dernane and Abdel Hamid Traikia, Département de Botanique,Ecole Nationale Supérieure Agronomique (ENSA), El Harrach, Algiers, Algeria, Email: kawtherdernane@yahoo.fr

Botrytis cinerea is a pathogen fungi responsible of grey mold on grapes, it causes serious damages on vineyard all over the word. The current work is based upon in vitro use of two means of control: biological control by the study of the antagonist's effect of two species of Trichoderma genera: T. longibrachiatum (T4) and *T. atroviride* (Ta13), in addition to chemical control by studying the efficiency of fungicide (Switch) on mycelial growth. The study was on nine strains of the pathogen agent Botrytis cinerea which was isolated from grapes and branches (That show typical symptoms of the disease). The results showed that the biological controlwas more efficient regardless of the application of the antagonist agent. It was noticeable that (Ta13) isolate showed the best results with 95.23% of mycelial growth reduction for direct confrontation and 57.32% for distant confrontation. The percentage reduction in growth Supreme confront direct was 98.89% and have been recorded at the duo (Ta13*BCV16). The lower was 79.25% and recorded when confronting isolate I3 with T4, with regard to the confrontation remote, the lower the percentage of growth equal to 40.05% recorded when confronting isolate I3 with T4 the highest proportion equal to 78.60% and was recorded at I6 cope with isolate Ta13. The results of Switch efficiency essay on mycelial growth showed weak resistance with a highest inhibition rate of 100% was noticed on the two isolates BCV 16 and BCV 19.The lowest rate equals to 81.1% recorded at the isolate I3.

BC9

BIOLOGICAL AND PHYSICAL CONTROL METHODS OF GREEN MOLDS DISEASE CAUSED BY TRICHODERMA HARZIANUM ON EDIBLE AGARICUS BISPORUS. Abdullah Abdulkareem Hassan_and Muqdad Saleh Aldarrajy, College of Agriculture, Tikrit University, Iraq, Email: alhayatmd@gmail.com

The experiment was carried out in Mushroom farm in College of Agriculture, Tikrit University for the isolation and identification of Trichoderma spp associated with *Agaricus bisporus* and for determination of their pathogenicity and some control methods. Tichoderma spp isolates were isolated from fermented compost from various regions in Iraq in addition to isolation from some soil samples. 19 Trichoderma isolates were identified distributed within four species,

12 isolates related to T. harzianum, 3 isolates related to T. viride, 3 isolates related to T.atroviride and one isolate related to T. longbrachitum The T6 isolate showed which related to Trichoderma harzianum maximum inhibition of A. bisporus mycelium percentage was (73%) while the minimum infection was 20% by T19. Some disease control methods were recognized, the biological control by Pseudomonuas fluorescence was the best treatment reduced for the pathogen effect. Resulting in 1.73% (infection%) with B.E 80.16%. pH at 8.5 and 80% compost moisture were the best condition for reduction of pathogen effect resulting in (3.52 and 25.7%) with B.E 64.61 and 13077%, respectively. compared to 67.73% and B.E 8.75% in control, Among three A.bisporus strains, the brown strain was the more resistance for green mold disease in which there was no any infection percentage with B.E 86.39% compared to 67.73% (infection%) and 8,75 B.E in B62 strains. The chitinase and *B.glucannase* activity in A.bisporus were (0.0023 and 0.03 unit/ml and 0.0129 and 0.04 unit/ml, respectively while these activities increased to 0.12 and 0.4 unit/ml in present of both fungi, A.bisporus and T6, respectivity. The increase in enzymes activity may be due to antagonistic activity of T6 and overlaing growth on A.bisporus.

BC10

INFLUENCE OF **INOCULATION** WITH **FUNGUS** MOSSEAE. **MYCORRHIZA** *G*. TRICHODERMA FUNGUS T. HARZIANUM AND **INTERACTION IN NUMBER OF CHARACTER GROWTH OF PEA PLANT AND RESISTANCE R.SOLANI.** Abedul Kareem Erabi alkurtany and Sarah Hashim Obeid, Tel: 009647706682046, Email: alkurtany@yahoo.com

Factorial experiment was conducted in pots to study the effects of the inoculation of Mycorrhiza funus mosseae, Trichoderma fungus T.harzianum, *G*. Rhizoctonia fungus R.s olani and their interaction on the Mycorrhiza infection ratio of root, shoot part dry weight, phosphorus concentration in the green part and disease severity of R. solani. The results revelled that the inoculation treatment of G. mosseae was more significantly increased on without inoculation in Mycorrhiza infection ratio of root, shoot part dry weight and phosphorus concentration in the green part by percentage were 200, 46 and 50% for the three, respectively. The results showed that the inoculation treatment of T. harzianum was significantly increased on without inoculation in Mycorrhiza infection ratio of shoot part dry weight and phosphorus root, concentration in the green part by percentage were 30, 42 and 36% for the three respectively. As for the inoculation treatment of R.solani was negative and caused a decrease in the Mycorrhiza infection ratio of shoot part dry weight and phosphorus root. concentration in the green part compared without inoculation treatment of R.solani, with value without inoculation treatment of R.solani (48.75%, 21.22 gm

plants⁻¹, 0.28%) while inoculation treatment of *R.solani* (26.25%, 15.7822 gm plants⁻¹, 0.17%) for the three respectively. The results also showed that the interaction between G. mosseae and T. harzianum significant increased on the dual inoculation compard without alone treatment in shoot part dry weight of value combined inoculation of *M*. and *T*. (25.72 gm plants $^{-1}$) while treatment inoculation of M. without T. (18.3272 gm plants⁻¹) and treatment inoculation T. without M. (17.813272 gm plants⁻¹). The results showed interaction inoculation of T. and R. more with M. and R. in shoot part dry weight, phosphorus concentration in the green part, of to be inoculation T.and R.(20.07,0.21 gm plants⁻ ¹) and inoculation of M.and R. (18.91,0.19 gm plants⁻¹). The combined inoculation of M. and T. without R. showed maximum increases in Mycorrhiza infection ratio of root, shoot part dry weight and phosphorus concentration in the green part, while combined inoculation R. without M. and T. low concentration, of inoculation M. and T. without R. (75%, 27.52 gm plants-¹, 0.37%), but inoculation of R. without M. and T. $(10\%, 9.08 \text{ gm plants}^{-1}, 0.13\%)$ for the three respectively. The effect inoculation of R. without M. and T. maximum increases in disease severity of to be 0.75, while combined inoculation of M., T. and R. reduction in disease severity of to be 0.2.

BC11

OF **ANTIMICROBIAL** STUDY AND ANTIFUNGAL ACTIVITIES OF TWO MEDICINAL PLANTS GROWING WILD IN THE **GHARB** REGION (CHENOPODIUM AND **AMBROSIOIDES** L. ROSMARINUS OFFICINALIS L.). Tormal Djassinra, Mammad Kribii Zineb Abderahim and Ounine Khadija, (1) Laboratoire de microbiologie appliquée, Faculté des Sciences, Université Ibn Tofail, , 14000, Kénitra-Maroc; (2) Laboratoire des Procédés de Séparation, Faculté des Sciences, Université Ibn Tofail, B.P 133, 14000, Kénitra-Maroc, Email: ningadoum@gmail.com

This Work is interested in valorization of two medicinal herbs pushing in a spontaneous state in the region of Gharb Chenopodium ambrosioides L. and Rosmarinus officinalis L. by the study of their activities antimicrobic and antifungal. The antimicrobic activity was studied with respect to three bacterial strains (Xanthomonas fragariae, Pseudomonas aeruginosa and Staphylocoques aureus) and two stocks fungi (Fusarium and Botrytis cinerea). Essential Oils of these two plants are equipped with a very important inhibiting effect on Xanthomonas fragariae and Pseudomonas aeruginosa whereas they do not have any effect on Staphilococca aureus. Moreover, the H.E of the two plants carry on an antifungal activity. Indeed, the H.E of Chenopodium is very effective on the two fungi stocks that of R. officinalis, Fusarium and Botrytis cinerea with zones of inhibition of 32 mm and 37 mm, respectively.

BC12

BIOLOGICAL CONTROL AGAINST *STAGONOSPORA NODORUM* **BLOTCH OF DURUM WHEAT.** <u>I. Maafa</u>, F. Bentata, M. Labhilili, A. El Jaouadi, J. Ibijbijen, M. Nachit and A. El Aissami. (1) Faculty of Science of Rabat, Mohammed V University, Agdal, Rabat, Morocco; (2) National Institute of Agronomic Research Rabat, Morocco; (3) University Moulay IsmaÏl, Faculty of Science, Meknes, Morocco; (4) The International Center for Agricultural Research in the Dry Areas (ICARDA), Rabat, Morocco, Email: maafa.ilyass@gmail.com

Stagonospora nodorum is the agent responsible of Stagonospora nodorum blotch (SNB), an important disease on durum wheat in Morocco. With an aim of studying the possibility of biological control against this pathogen, through the use of five antagonistic fungi, two isolates, Sn1 and Sn2 are exposed. Indeed, the two isolates are respectively originated from Gharb and Zaer and the antagonists are Trichoderma harzianum, Trichoderma viride, Talaromyces flavus, Acremonium terricola and Acremonium roseum. The results of the direct confrontation in vitro showed that all antagonists could inhibit the mycelia growth of the two pathogenic isolates, with 84.24% and 70.87% as the higher percentages of reduction of diameter growth given respectively by T. Harzianum and T. Viride. Followed by Talaromyces flavus with 52.43% and then both of the Acremonium species gave the percentage of reduction of diameter growth which does not exceed 38%. The inhibition is less important with the remote confrontation comparing to the direct confrontation. These results will be useful in the sight of development of a biological fight against the Stagonospora nodorum blotch of wheat.

BC13

IN-VITRO EVALUATION OF POTENTIAL ANTAGONISM OF SELECTED BIOCONTROL AGENTS AGAINST MACROPHOMINA PHASEOLINA (TASSI) GOID. <u>Sajjad Hyder</u>, Shahbaz Talib Sahi and Abdul Hannan, Department of Plant Pathology University of Agriculture Faisalabad, Pakistan, Email: sajjad1614@yahoo.com

Macrophomina phaseolina (Tassi) Goid is a devastating soil-borne pathogen having wide host range causing significant yield losses. Bio-control agents are preferred to noxious chemical control as these are ecofriendly and non-hazardous to human health. Keeping in these facts, selected biological view agents (Trichoderma harzianum, Penicillium digitatum, Aspergillus niger and Aspergillus flavus) were selected to test their antagonistic activity against M. phaseolina (Tassi) Goid in dual culture technique. Percentage zone inhibition of pathogenic fungi was recorded when compared against untreated control. P. digitatum resulted in significant zone percentage inhibition (72.3%) followed by A. flavus (52.3%), T. harzianum (48%) and A. niger (35.4%). Application of environment friendly antagonistic microbes is best alternative to health hazardous chemical formulations.

BC14

BIOCONTROL OF PLANT PATHOGENS, SCOPE AND LIMITATIONS. <u>Amjad Shahzad Gondal,</u> Department of Plant Pathology, PMAS Arid Agriculture University Rawalpindi, Pakistan, Email: amjadshahzad@live.com

Plant diseases need to be controlled to maintain the quality and supply of food. Different methodologies may be adopted to prevent, alleviate or control plant diseases. Together with agronomic and cultural practices, farmers rely on the use of noxious chemical and fertilizers to get better yield of the produce. Environmental degradation, insecticide resistance, resource losses, and agronomic concerns, have prompted a growing interest in alternate disease management strategies. Bio-control of plant pathogens being eco-friendly and cost effective can contribute significantly to the improvements in crop productivity. Using Bio-control agents as insecticides have almost no harmful effects on humans and environment. It leads to the inability of pests to develop resistance. However, bio-control occasionally shows variable results in field conditions. Limitations involving research necessary in seeking a biological control solutions to an agricultural problem is often demanding in scientific and technical terms. To adequately practice bio-control of plant diseases, firm understanding of the host population, pests along with their natural enemies, and their behavioral ecology is necessary as the pest population will continue to exist at a level determined by the host properties, natural enemies and habitat they occupy. The effectiveness of bio control agents must always be considered relative to man's economic threshold.

BC15

BIOLOGICAL CONTROL OF VERTICILLIUM WILT DISEASE OF OLIVE IN NURSERY CONDITIONS. Thaer Yaseen, Raied Abou Kubaa and Anna Maria D'Onghia, Integrated Pest Management of Mediterranean fruit and vegetable crops from Centre International de Hautes Etudes Agronomiques Méditerranéennes (CIHEAM)/Mediterranean Agronomic Institute, Via Ceglie 9, 70010 Valenzano (BA), Italy, Email: y.thaer@iamb.it

Tow antagonistic commercial bio-products namely Bio-Arc® 6% (Bacillus megaterium) and Bio-Zeid® 2.5% (Trichoderma album) were used in this study to evaluate their effect on vegetative parameters of olive plantlets and on the inoculum density of Verticillium dahliae microsclerotia in nursery growing media, under nursery conditions. Trials were carried out on both 8-month old self-rooted and 18-month old grafted olive plantlets of cv Leccino. The bio-products were added to the growing media (20% sand, 45% peat moss, 20% pomice, 15% perlite, macro and microelements) seven days before transplanting. Plantlets were inoculated by dipping the roots in a conidial suspension $(4 \times 10^6 \text{ CFU/ml-1})$ of the pathogen un-inoculated plantlets were used as controls. Real-time PCR assessed inoculum density of *V. dahliae* and the incidence of infected olive plantlets, after 15 months. Plant height, fresh weight, and root weight were also determined. All grafted olive plantlets and inoculated with *V. dahliae* treated or not with bio-product showed wilting symptoms leading to death. Bio-products efficacy was more evident on self-rooted plantles. The bio-control agents also increased the plant growth parameters. Nevertheless, Real-time PCR results indicated that all the tested bio-products reduced, significantly, inoculum density of *V. dahliae* in the growing media and the incidence of infected roots.

BC16

EXPERIMENTAL EVIDENCE OF SOME BIOLOGICAL CONTROL AGENTS AGAINST THE DIFFERENT STAGES OF THE DESERT LOCUST, SCHISTOCERCA GREGARIA IN EGYPT. M.M. Sabbour, National Research Centre, Dokki, Giza, Egypt, Email: sabbourm9@yahoo.com

Two isolates of Beauveria bassiana were evaluated against Desert Locust, Schistocerca gregaria under laboratory and field conditions. Results showed that, under laboratory conditions the number of egg hatched were significantly decreased after treatments with different *B. bassiana* concentrations. When the locust larvae were treated with B. bassiana, the LC50 was 145, 177, 208, 225 and 287 spores/ml of 1st, 2nd, 3rd, 4th and 5th larval instars. The adult treatments showed that the *B*. bassiana treatment caused a higher mortality among the desert locust. Field experiments were conducted on Bahaira Oasis and revealed the grasshopper Schistocerca gregaria (Orthoptera: Acrididae) during 2011, 2012 and 2013. In the places treated with the fungus B. bassiana , there was significantly low infestation with the pests in maize fields

BC17

EFFECT OF ADULT NUTRITION ON SOME BIOLOGICAL PARAMETERS OF THE GREEN LACEWING CHRYSOPERLA CARNEA STEPHENS (NEUROPTERA: CHRYSOPIDAE). Salwa S.M. Abdel-Samad, Plant Protection Research Institute Agric. Res. Center, Giza, Egypt, Email: salwa_ssss@yahoo.com

Effect of different adult diets on development of green lacewing *Chrysoperla carnea* Stephens (Neuroptera : Chrysopidae) was studied. Four adult diets namely: (A) honey distilled water, (B) pollen grains added to honey distilled water, (C)royal jelly added to honey distilled water. (D) royal jelly and pollen grains added to honey distilled water. Diet D gave the best results for egg hatching (89.3%), larval survival rate (92.6%), pupal survival rate (95.1%), adult emergence (98.1%) and overall developmental period (egg- adult) (77%). Again, diet D gave the optimum results as a minimum pre-ovipositional period (3.6 days), a long ovipositional period (14 days) and the shortest total developmental duration (19.3 days). Highest values of Ro(the net reproductive rate), r m (the intrinsic rate of natural increase) and e rm (the finite rate of increase) were obtained when the predator was fed on diet D. Rate of survival ((Lx) and maximum ovipositional rate/female/day(Mx) were high by using diet D. Sex ratio devorated towards females by using treatment D.

BC18

BIOLOGICAL CHARACTERISTICS OF THE APHID PARASITOID SPECIES, DIAERETIELLA RAPAE M'INTOSH. <u>Salwa Abdel-Samad</u> and Ahmed H. El-Heneidy, Plant Protection Research Institute, Agricultural Research Center, Giza, Egypt, Email: salwa_ssss@yahoo.com

Diaeretiella rapae M'Intosh (Hymenoptera: Braconidae) is a cosmopolitan solitary endoparasitoid of adult and immature stages of several species of aphids, commonly associated with the aphids infesting cruciferous crops. Life cycle of D. rapae when parasitized the bird cherry-oat aphid, Rhopalosiphum padi L. was studied under the laboratory conditions (25±2°C and 65±5% RH). Durations of immature stages averaged 18.9±3.35, 134.4±22.78, 127.3±6.91 and 280.6±9.84 hours (11.69 days) for egg, larval, pupal and total duration of immature stages, respectively. Mating behavior of *D. rapae* adults showed that the premating period averaged 82.7±14.9 minutes (fed adults) and 117.2±12.1 min (unfed adults), while the mating period lasted the averages of 0.36±0.15 min (fed) and 0.41±0.15 min (unfed). Ovipositional periods were; 45.6±12.5 minutes (fed) and 63.9±13.3 min (unfed); 0.79±0.22 min (fed) and 0.81±0.20 min (unfed) and 677.7±101.5 min (fed) and 351.3±61.95 min (unfed), for preovipositional, ovipositional and postovipositional periods, respectively. Average number of eggs deposited by one female reached 218 ± 14.4 eggs/ 31.4 ± 2.7 hosts (6.96±0.31 eggs/aphid). D. rapae females and males lived the averages of 4.06±0.65 (fed) and 2.62±0.43 days (unfed), and 2.98±0.49 (fed) and 1.94±0.32 days 2.62±0.43 days (unfed), and 2.98±0.49 (fed) and 1.94±0.32 days (unfed), respectively. Sex ratio was 1.93:1 in favor of females.

BC19

MANAGEMENT OF SOME ECONOMIC OLIVE PESTS WITH EMPHASIS ON THEIR BIOLOGICAL CONTROL IN EGYPT. Ahmed El Henawy¹, Ahmed El-Heneidy² and Khaled Djelouah¹. (1) International Centre for Advanced Mediterranean Agronomic Studies (CIHEAM), MAI-Bari, Italy; (2) Department of Biological Control, Plant Prot. Res. Institute, Agricultural Res. Center, 7 Nadi El-SaiD street, Dokki, Giza, Egypt, Email: aheneidy@link.net

The Mediterranean basin is the largest olive production area worldwide. More than 125 arthropod

species attack olive plants and cause quantitative and qualitative losses of yield. This study was aimed to survey the most economic olive insect pests in Egypt and to evaluate the role of bio-control agents in reducing their populations in olive orchards. During the period February-July 2012, a survey was carried out at two olive orchards at two different agro-ecosystems (Middle Egypt and Coastal region). Samples were collected weekly in both orchards and number of pests' individuals and rate of infestation/sample/date/site/leaf (shoot) was counted and recorded: whereas, parasitoid species found associated with the pests were identified and their percentages of parasitism were estimated. The survey revealed the presence of five insect species; Euphyllura straminea, Phloeotribus scarabaeoides, Saissetia oleae, Prays oleae and Palpita unionalis on leaves and shoots of the surveyed olive trees. The month of May showed the highest populations of the five pest species; therefore, six hymenopteran parasitoid species, 4 primary and 2 secondary species, associated with the first 3 pests, were recorded. Agricultural practices showed great impact on reducing the insect pests' populations in the surveyed Egyptian olive orchards.

BC20

EFFECTS OF SOME BIOPESTICIDES ON POPULATION DENSITY AND DAMAGE CAUSED BY THE ONION THRIPS, *THRIPS TABACI* LINDEMAN ON ONION CROP IN IRAQ. <u>Hameed H. Al-Karboli¹</u> and Hussein A. Al-Anbaki². (1) Plant Protection Dept., College of Agriculture, Abu-Ghraib, Baghdad, Iraq, (2) Department of Horticulture, University of Diayala, Diayala Province, Iraq, Email: alkarbolihameed@yahoo.com

Oinon thrips, Thrips tabaci Lindeman, is an economic pest, causes losses ranging between (18-60%) on onion, and has increased importance because of its resistance to chemical insecticides and its ability to transfer viral diseases. A field experiment was conducted in the growing season of 2010/2011 at the college of Agriculture in Abu-Ghraib, to evaluate the effectiveness of some local isolates of the entomopathogenic fungus, Beauveria bassiana, bioinsecticide (Spinosad), the IGR (Trigard) against the infestation by the onion thrips and compared with application of Dozer. Results showed that the different treatments significantly reduced the population density of the onion thrips compared to the control treatment. Application of Spinosad and BSA3 isolate were superior over other treatments, BSA1 isolate and Trigard, Relative efficacy of these treatments were, 45.10, 44.08, 4.07 and 29.69% for spinosad, BSA3 Trigard and BSA1 isolate, respectivety. The relative efficacy of the insecticide Dozer was 63.46%. All treatments caused a significant increase in bulbs weight from the control treatment, bulbs weight were increased by 37.01%, 28.03%, 25.02% for the treatments of, Spinosad, BSA3, and Dozer respectively. Also Spinosad and Trigard treatment has increased the percentage of the first class

onion bulbs (Grade 1) by 75% and 63.88% respectively. The possibility of using these biopesticides, Spinosad and BSA3 isolate especially with the recent trends towards organic farming as safe alternatives to chemical pesticides used to control onion thrips is also discussed.

BC21

PRODUCTIONOFABIO-FORMULAFROMBACTERIABACILLUSSUBTILISTOSTIMULATETHERESISTANCEOFTOMATOPLANTSAGAINSTTOMATOYELLOWLEAFCURLVIRUS.MaazAbdel-WahabAlProtectionDepartment,FacultyofAgriculture,TikritUniversity,Iraq,Email:maadhdft@hotmail.com

A bio-form powder formulation was produced which includes a bacterium inoculum of alocal isolate from the soil after passing several stages, from isolation to purification, and then multiplied in a bio-fermenter with a final product ground to a fine powder. The product was used as a seed dip and also to waterplants after germination, followed by a foliar spray to virus-infected tomato plants at the at the fifth true leaf stage. Stimulated plant virus-resistance was measured by the level of virus concentration, peroxidase enzyme activity and chlorophyll content and leaf are. All treatments gave significant differences compared to the control treatment, with seed dipping followed watering the plants after germination being the best treatment.

BC22

FEEDING EFFICIENCY OF *CHRYSOPERLA CARNEA* **ON DIFFERENT HOSTS.** J.M. Mari, M.A. Rustamani and S.M. Nizamani, Department of Entomology, Sindh Agriculture University Tando Jam, Pakistan, Email: Pakistanjanmarree@gmail.com

A study on the feeding efficiency of Chrysoperla carnea on different hosts was carried out in the laboratory of Plant Protection, Sindh Agriculture University, Tando Jam. The mean feeding percent per day of 1st, 2nd and 3rd instar larvae of *C. carnea* was 28.5, 56 and 87.5 percent eggs of S. cerealella, 29.25, 62.25 and 89.5 eggs of E. insulana, 24.25, 63 and 86.25 eggs of H. armigera and 29.25, 59 and 90.5 eggs of P. gossypiella. The regression analysis indicated that the predatory efficiency of larval instars increased with increasing rate of (30.125X and 29.5X) and $r^2=0.99$ which indicated that there was 99 percent variation in the predatory efficiency of predator per day. A positive and highly significant correlation was observed between per day efficiency (r=0.99). It also indicated that the third instar was most voracious feeder. It was concluded that the predator can be reared on all the five hosts. Therefore, S. cerealella eggs are the preffered food for rearing the predator because of its availability round the year. Due to pollution hazards on environment, massrearing techniques of predators/parasites are extremely important for biological control of insect pests. The farming community of vicinity should be advised to use the selective insecticide to diminish the only required insect pest.

BC23

RECOGNITION OF TWO BIOCONTROL AGENTS THEIR LABORATORY AND EVALUATION FOR CONTROLLING LEOPARD MOTH, ZEUZERA PYRINA AND RED PALM WEEVIL, RHYNCHOPHORUS FERRUGINEUS IN EGYPT. Ahmed Merghem, Wood borers and Termites Department, Plant Protection Research Institute, ARC, Dokki. Giza. Egypt, Email: ahmedmerghem@yahoo.com

The present study aimed to explore the presence of the natural enemies of wood-boring pests attacking date palm trees and apple trees in Ismailia and Qalubeia governorates, respectively. This aim was further supplied with the laboratory evaluation experiments of the gained biocontrol agents against their natural target borers. Two species of the natural enemies were detected. They were the aphid lion, Chrysoperla carnea (Neuroptera: Chrysopidae) which was recorded attacking the leopard moth, Zeuzera pyrina (Lepidoptera: Cossidae) and the green muscardine fungus, Metarrhizium anisopliae (Hypocreales: Clavicipitaceae) which was recorded infecting Red palm weevil (RPW), Rhynchophorus ferrugineus (Coleoptera: Curculionidae) stages. Laboratory trials with 10^{11} spores/ml of *M. anisopliae* and release of the larval instars of C. carnea were undertaken against RPW stages and Z. pyrina stages, respectively. Laboratory tests revealed the susceptibility of RPW stages to the infection with *M. anisopliae* spores resulting in an average mortality of 63.4 and 45.9% for larval and adult stages, respectively. On the other hand the three instars of C. carnea showed predation rates against Z. pyrina stages resulting in 81.3, 87.4 and 47.3% for the egg mortality, respectively while the larval mortality was 41.6, 47.8 and 38.9%, respectively. The obtained results showed the possibility for the usage of these two natural enemies to control the two borers stages in the laboratory.

BC24

BIOLOGICAL CONTROL OF POTATO TUBER MOTH, PHTHORIMAEA OPERCULELLA BYENTOMOPATHOGENIC NEMATODE, STEINERNEMA CARPOCAPSAE. M.E. Sweelam, M.O. Kolaib, M.I. Shadeed and <u>M.A. Abolfadel</u>. (1) Dept. Econ. Ent. and Agric. Zool. Faculty of Agric. Minufiya University, Shebin El-Kom, Egypt; (2) Plant protection Research Institute, Giza, Egypt, Email: abuelfadel@yahoo.com

This research was conducted to study the potential effect of different doses of the entomopathogenic nematode, *Steinernema carpocapsae* in the biological control of the potato tuber moth, *Phthorimaea operculella* Zeller under laboratory conditions. Different stages of the potato tuber moth

(larvae, pupae, adults) were exposed to five doses of the nematode (500, 1000, 1500, 2000, 2500 IJS). Mortality of insect stages was checked along 5 days for all concentrations, and percentage of mortality was calculated for each insect stage at different concentrations. Results reported that the S. carpocapsae nematode greatly controlled the larvae of the potato tuber moth along the five days of the exposure of larvae to nematodes, where it gave 74% as mean of mortality percentages at 2000 infective juvenile individuals per 10 larvae. Regarding the pupal stage, nematode did not have any effect (0% mortality) at all concentrations of nematode. In addition, it did not satisfactorily control the adult stage of the potato tuber moth, where it gave 16% as mean of mortality percentages at all doses. It concluded could be that the use of the entomopathogenic nematode Steinernema carpocapsae in the control of potato tuber moth stages gave the best mortality percentages.

BC25

THE PREDATION EFFICACY OF SCYMNUS SYRIACUS MARSEUL AGAINST STAGES OF COTTON APHID APHIS GOSSYPII GLOVER ON COTTON. Sindab S. J. Al-Dahwy¹, Abdul-Sattar A. Ali² and Saleh H.Sameer¹. (1) Department of Plant Protection, Coll. Agric, Baghdad Univ, Iraq; (2) Department of Plant Protection, Faculty of Agirculture, Al-Anbar University, Iraq, Email: sindab_aldahwi@yahoo.com

Several laboratory experiments were undertaken to investigate the feeding efficacy of the predator Scymnus syriacus Marseul on different stages of Aphis gossypii Glover when fed on cotton. Results indicated that the predator larvae consumed an average of 468.5 and 378.9 individuals of aphid nymphs and adults when fed on each alone. The consumption rates of nymphs and adults by the female predator adults were, 3836.0 and 2844.3 individuals respectively. However the number of preys varied according to the development stage of female life span. Consumption rate was higher during oviposition period compared to preoviposition and post oviposition periods. Male consumption was lower than that of the female. The mean numbers of aphid nymphs and adults consumed during the life span of male were 1848.9 and 1265.2 individuals/male. The feasibility of this predator as a natural enemy for aphid species on cotton was discussed.

BC26

FEEDING PREFERENCE AND THE INFLUENCE OF OREY STAGE BEMISIA TABASI (GENN.) ON SOME BIOLOGICAL CHARACTERS OF THE PREDATOR *CLITOSTETHUS ARCUATUS* (**ROSSI) ON COTTON.** <u>Sindab S. J. Al-Dahwy¹,</u> Abdul-Sattar A. Ali² and Saleh H. Sameer¹. (1) Department of Plant Protection, Faculty of Agirculture, Baghdad University, Iraq; (2) Department of Plant Protection, Faculty of Agirculture, Al-Anbar University, Iraq, Email: sindab_aldahwi@yahoo.com

Several laboratory experiments were conducted to evaluate the feeding preference and the influence of prev stages of the white fly Bemisia tabasi (Genn). (Aleyrodidae:Homoptera) on some biological aspects of predator Clitostethus arcuatus (Rossi) the (Coccinellidae: Coleoptera). The consumption time required by predator stages for each white fly stage was calculated too. Results showed that predator larvae preferred white fly egg for feeding and development. The number of preys was decreases with their size increase and was increase with the increase of the developmental stages of the predator. Females of the predator preferred the first nymphal stage (crawlers) fallowed by egg and the subsequent nymphals stage while the adult stage of the white fly was the least preferred host. The adult males preferred the egg stage followed by the subsequent nymphal stage and finally the adult stage of white fly. The best predator larvae performance was obtained when fed on diet of mixed stage of the prey. The shortest life span for larval and pupal stages combined and the highest survival rate were 15 days and 88.9% recorded for predator larvae fed on mixed diet of egg and nymphs, while the longest life span and lowest survival rates were 17.7 days and 85.7% recorded for individuals fed on white fly egg alone. Results also indicated that time of prey consumption was reduced as predator stage increase in size and was increase with the progress of white fly development stage. The longest adult longevity and female fecundity were obtained when the predator fed on food of all white fly satages.

BC27

COMPARATIVE BIOLOGY OF **ELEVEN** TRICHOGRAMMA SPP. ON EGGS OF AFRICAN BOLLWORM UNDER LABORATORY CONDITION. Sara Kehail¹, Hayder Abdelgader² and Zimmermann¹. (1) Agricultural Olaf Research Corporation, Crop Protection Research Centre, Entomology Section, P.O. Box 126, Wad Medani, Sudan; (2) JKI, Institute for Biological Control, Darmstadt, Germany, Email: saraagric@yahoo.com

Helicoverpa armigera is considered as one of the most serious insect pests' world wide. Controlling by biological agents has shown promising results. *Trichogramma* spp. have been successfully used in biological control programs against *Helicoverpa* spp. and other lepidopterans. A laboratory study was carried out to test the effect of temperature, as it is one of the main environmental factors affecting the biological response of *Trichogramma* spp. The study was conducted at laboratory of Julius Kühn-Institut, Darmstadt, Germany. Eleven *Trichogramma* spp. exposed to *H. armigera* eggs at 25 °C, RH (70–80%) and light photoperiod 16 h/day to assess their level of parasitism, emergence rate and sex ratio. Analysis of variance (ANOVA) were used. The results showed that a significant difference between the means of different *Trichogramma* species. Parasitism level was lower for *T. cacoeciae*, *T. lutea* and *T. bournieri* while the other tested *Trichogramma* showed nearly more than 20 eggs were parasitized per female. The mean number of individuals emerged per single parasitized host eggs of *H. armigera* was more than one adult for all the tested *Trichogramma* species, ranged from 1.10 for *T. bourarachae* EG to 1.67 for *T. cacoeciae*. All tested *Trichogramma* showed female-biased sex ratios, more than 76% females (except *T. brassicae* gave 68% female offspring).

BC28

EFFICACY OF TWO BIOPESTICIDES FROM BACILLUS THURINGIENSIS, SACCHARPOLYSPORA **SPINOSA** AND THE CHEMICAL **INSECTICIDE FENVALERATE** AGAINST THE GRAM POD BORER **HELICOVERPA** ARMIGERA (HUB) ON CHICKPEA PLANT. Tag Elsir E. Abdalla¹, Francis I. Oji² and Entisar A. Osman¹. (1) Agricultural Research Corporation (ARC), Gezira Research Station, P.O. Box 126, Wad Medani, Sudan; (2) Hudeiba Agricultural Research Station, Hudeiba, Sudan, Email nasraarc@gmail.com

Gram pod borer (*Helicoverpa armigera*) is the major pest on chickpea crop in Sudan. The economic important of this pest have not been previously evaluated in Sudan. Furthermore, chemical control is one of the important method for controlling this pest. The current study used biopesticides for the first time for controlling this pest on chickpea. The Study was conducted at Gezira Research Station (GRS) and Hudeiba Research Station (HRS) (Sudan) during 2004/2005 and 2005/2006 seasons, to evaluate the two biopesticides derived from Bacillus thuringiensis (Bt Agerin 6.5 WP) and from Saccharpolyspora spinosa (Tracer 240 SC) in addition to the pyrethroid product, fenvalerate (Sumicidin 20% EC) against the gram pod borer, and the consequence on yield. The three tested pesticides were applied at recommended dose, 25% more than recommended dose and 25% less than recommend dose. In parallel, a laboratory test was carried out on larvae of the pest. The results show that three pesticide at 25% more than the recommended dose for Bt, at recommended dose for tracer and for fenvalerate, reduced the number of larvae, damage pods/plant significantly, also increased the percentage of vield.

BC29

EGG PARASITOID WASP *MICRODONTOMERUS OVIVORUS* AS A NATURAL ENEMIES OF THE ACACIA TREES STEM BORER STERASPIS SPECIOSA. <u>Mawada M. Khidir¹</u>, Zuhair F. Alabjar² and Tigani M. Allam³. (1) Environment and Natural Resources Research Institute (ENRRI), Sudar; (2) National Center for Research and Ministry of Sciences and Communications, Sudan; (3) Zoology Department, Faculty of Sciences, University of Khartoum, Sudan, Email: moda-55@hotmail.com

Acacia trees producing gum Arabic are of great (socio)-economic, and ecological importance in Sudan. Insect attacks are one of the main causal agents in the decline in the gum Arabic vielding trees. Larvae of stem boring beetles Steraspis speciosa (family: Buprestidae) were found to infest Acacia trees such as A. seval. Steraspis speciosa is one of the largest groups of insects pests that destroy host trees, having a great effect during times of drought. Microdontomerus ovivorus was found to attack the eggs of Steraspis speciosa glued to the stems of Acacia trees. The parasitic wasp completes its developments within the host. Female wasps lay their eggs on *Steraspis speciosa* eggs. The larvae hatch from the eggs (about seventeen to nineteen larvae on only one egg of Steraspis speciosa) and start to feed on the eggs of the host. Pupation took place in mid June. The pupa developed to adults within 30 to 35 days. The adults chewed a round hole to emerge from the egg shell. The parasitoid adults began to emerge in mid of July. The symptoms of infestation as appeared on Steraspis speciosa eggs by change in colour. The eggs turned to dark brown or brownish in colour. Observations showed that one or two holes appeared on the shell of the infested eggs. These were the emergence holes of the adults of Microdontomerus ovivorus. Percent of eggs infested by Microdontomerus ovivorus under field conditions was assessed during the study period 2013. The results showed that the percent of infestation in the locations of study areas (ELRawakeeb, Soba and Shambat) was found to be 93%, 68% and 46% respectively. However, the percent of infested eggs in the laboratory was reached to 97%. Biology and ecological aspects of parasitoid should be considered prior to their use in biological control.

BC30

TESTING THE EXTENT OF GENETIC BUILD **RESPONSE OF SYRIAN LABORATORY STRAIN** OF **CRYPTOLAEMUS** MONTROUZIERI MULSANT (COLEOPTERA: COCCINELLIDAE) TO RANDOM ALLOGAMY AND BROTHER-SISTER MATING TECHNIQUES FOR SIX GENERATIONS. Nadia Al-Khateeb1, Louai Asslan2, Ahmed El-Heneidy³ and Abdulnabi Basheer⁴. (1) Lattakia Center for Rearing Natural Enemies, Directorate of Agriculture in Lattakia, Ministry of Agriculture, Syria; (2) Ministry of Agriculture and Agrarian Reform, Damascus, Syria; (3) Faculty of Agriculture, Damascus University, Damascus, Syria; (4) Department of Biological Control, Plant Protection Research Institute, Agricultural Research Center, Ministry of Agriculture, Giza, Egypt, Email. nadia4@scs-net.org

The research was carried out on Syrian Laboratory Strain of *Cryptolaemus montrouzieri* Mulsant (Coleoptera: Coccinellidae) when reared on

Planococcus citri (Risso) at Lattakia Center for Rearing Natural Enemies during 2011-2012 at 25±2 °C, 60±10% RH and 16:8 h (L:D). The research objecteve was to know the effect of two mating techniques (random allogamy and brother-sister mating) on the most important morphobiological parameters for six generations. Morphobiological parameters values of different generations for each technique were compared with parent generation (Po), parameters' response for each mating technique was calculated at the end of the ³rd and ⁶th generations. Obtained results showed that there were no significant differences between (F3) and (Po) in all the morphobiological parameters, when using both mating techniques, except in case of larval developmental period, as a significant increased from 11.7±1.06 days, when using brother sister mating to 13.3±1.25 days when using random allogamy technique. Fecundity and reproduction parameters response for the brother sister mating in (F6) were estimated -53.96%, -56.81%, respectively and increased to -23.07%, -18.61%, respectively, when using random allogamy technique. As well, were the parameters (length of female, preying potential of the 3rd larval instar, and preying potential for each of male and female).

BC31

RANDOM EFFECT OF ALLOGAMY **TECHNIQUE** ON CERTAIN PARAMETERS MORPHOBIOLOGICAL OF SYRIAN AND EGYPTIAN STRAINS OF **CRYPTOLAEMUS MONTROUZIERI (MULSANT)** FOR SIX GENERATIONS. Louai Asslan¹, Nadia Al-Khateeb², Ahmed El-Heneidy³ and Abdulnabi Basheer⁴. (1) Ministry of Agriculture and Agrarian Reform, Damascus, Syria; (2) Lattakia Center for Rearing Natural Enemies, Directorate of Agriculture in Lattakia, Ministry of Agriculture, Syria;(3) Faculty of Agriculture, Damascus University, Damascus, Syria; (4) Department of Biological Control, Plant Protection Research Institute, Agricultural Research Center, of Agriculture, Giza, Egypt, Email: Ministry louaiaslan@vahoo.com

The research was carried out on Syrian and Laboratory Strains of Cryptolaemus Egyptian montrouzieri Mulsant (Coleoptera: Coccinellidae) at Lattakia Center for Rearing Natural Enemies during 2011-2012. The predator was reared on the citrus mealybug, Planococcus citri (Risso) at 25±2 °C, 60±10% RH 16: 8 h (L: D) for six generations by using two hybridization techniques, the first was between male from Syrian laboratory strain and female from Egyptian laboratory strain of C. montrouzieri $(Sy \times QEg),$ the second hybridization techniquewasmale from Egyptian laboratory strain and female from Syrian laboratory strain of C. montrouzieri ($\partial Eg \times QSy$). Results of the first hybridization technique showed that there were significant increases in the numerical values of the studied morphological indicators at (F6), comparing with (Po). This increase was with positive values for the parameters response, of length of female, preying potential of the ³rd larval instar and larval developmental period. Fecundity, reproduction, and survival rate (+39. 86, +51. 44 and +9. 03%, respectively) recorded significant increases at (F6) comparing with (Po). Results of the second hybridization technique showed that there were no significant differences in the values of most of the morphobiological parameters response between (F3) and (F6). These values ranged between -15 and +15%.

BC32

EFFECTIVNESS OF BEAUVERIA BASSIANA AND METARHIZIUM ANISOPLIA TO CONTROL APHIS FABAE AND HAYALOPTERUS PRUNI. Sahil K. Al- Jamil and Mohammad F. Edan, Plant Protection Department, College of Agriculture& Forestry, Mosul University, Iraq, Email:sahilaljameel@yahoo.com

The study was carried out to evaluate the pathogenicity of Beauveria bassiana and M. anisoplia at the concentrations 1×10^4 and 1×10^6 spor/ml as a biocontrol agensts Aphis fabae and Hayalopteru spruni. Results showed that the higher percentage of mortality of 1st. and 3rd, age of A. fabae and H. pruni nymph after 14 dayes of treatment with B. bassiana at conc. 1×10^4 , 1x10 ⁶spor/ml was 100% but in control was 10%. The high mortality rate by *M. anisoplia* in the 3^{rd} . age of *A*. fabaand H. pruni at the conc. 1x 106 spor/ml after 14 day s from treatmen t was 95. 3 and 90% respectively. Results offield study showedthat the higher mortality rate of A. fabae and H. pruni in the3rd. age nymph at the treatmen twith 1 x 10^6 spor/ml of *B. bassiana* was 92.8, 89%, respectively but the higher mortality ate of M. anisopliawas in3rd. nymph age of A. fabae and H. Pruni at 1x10spor/ml conc. After 12dayes of application its about 89 and 83.6%, respectively.

BC33

ISOLATION OF ENTOMOPATHOGENIC AND OPPORTUNISTIC FUNGI FROM SOIL IN DUHOK PROVINCE, KURDISTAN REGION OF IRAQ BY DIFFERENT SELECTIVE ISOLATION MEDIA. <u>Samir Khalaf Abdullah¹, Rebwar Ahmed</u> Mustafa² and Lazgeen Haji Assaf³. (1)Biology Department, Faculty of Science, University of Zakho, Iraq; (2)Agriculture Technical College in Halabja, Sulaimani Technical University, Iraq; (3) Lazgeen Haji Assaf, Department of Plant Protection, Faculty of Agriculture and Forestry, University of Duhok, Iraq, Email: Samer_abdalh@yahoo.com

Soil is a natural habitat for several important insect pathogenic fungi which play a key role in regulating populations of soil dwelling insect pests. Forty soil samples were collected during 2012-2013 from different agro ecosystems at Duhok governorate and screened for the presence of soil dwelling entomopathogenic fungi by using four different selective isolation media. The four isolation media were

prepared by modifying previously prepared DOC2 medium and a selective medium based on the use of Cetyletimethyl ammonium bromide (CTAB) with oatmeal agar (OT) as a basal medium. The percentage occurrence of fungi and number of detected species was significantly affected by the type of isolation medium. The least number of recovered species (5 species) was on DOC2 medium, whereas, the highest number (14species) was displayed by CTAB+OT medium. The two true entomopathogenic species Lecanicilliumlecanii and Metarhizium anisopliae successfully recovered only with our new formula by combination of DOC2+CTAB and OT+CTAB media, whereas, DOC2 and DOC2+OT media failed to recover the two species. This result indicated that addition of CTAB to media was a vital factor for the recovery of the two entomopathogenic species. L. lecanii and M. anisopliae have been recorded for the first time from Iraqi soil. Several other opportunistic pathogens were also detected. These include Aspergillus flavus, A. parasiticus, Clonostachys rosea and Fusarium spp.

BC34

EFFECT **TEMPERATURE** ON THE OF BIOLOGY OF DIAERETIELLA RAPAE (MCINTOCH) (HYMENOPTERA: APHIDIDAE) **REARED ON CABBAGE APHID BREVICORYNE** BRASSICAE (L.) (HOMOPTERA: APHIDAE). Abed Annaby Basheer¹, Lo'ay Asalan¹ and Rash Asaad². Department of Plant Protection, Faculty of Agriculture, Damascus University, Syria. (2) Center for Biological Control Research, Faculty of Agriculture, Damascus University, Syria. Email: basherofecky@yahoo.com

Laboratory experiments were conducted to determine the fertility, life span and life table parameters for the Diaeretiella rapae when reared on the cabbage aphid Brevicoryne brassica at 15, 20, 25, 30° C, 60±5% RH and light period of 16 hrs/day. The average duration of one generation from egg to adult was 24.25 (16.83 (12.84 (10.62 days; the average duration of adult female was 14.13 (10.67 (8.67 5.60 days; the average number of eggs/female, during its entire life, was 50.53 .58.73 63.73 and 13.27 eggs, at the above-mentioned temperatures, respectively. The average net compensation R₀ was 33.50, 38.64, 49.82 and 9.83 females/female/generation); the intrinsic rate of increase r_m was 0.14, 0.22, 0.30, and 0.21 females/female/day; and population-doubling time DT was 4.95, 3.15, 2.31 and 3.30 days at the abovementioned temperatures, respectively. The data showed that the parasitoid could double its population faster at 25°C when compared with other studied temperatures.

BC35

PATHOGENICITY OF LOCAL ISOLATES OF ENTOMOPATHOGENIC FUNGUS *BEAUVERIA BASSIANA* AGAINSTNYMPHS OF COTTON WHITE FLY *BEMISIA TABACI* AND GREEN **PEACH APHID** *MYZUS PERSICAE*. <u>Amal Haj</u> <u>Hassan</u>, Mohammad Ahmad and Sabah ALmaghribi, Lattakia Center for Rearing Natural Enemies, Agriculture Department, Lattakia, Syria, Email: amal.haj@gmail.com

Under laboratory conditions, ninety tow local isolates of the entomopathogenic fungus *Beauveria* bassiana were tested against third nymph stage of cotton white fly *Bemisia tabaci* and green peach aphid *Myzus* persicae at concentration of 1×10^6 conidia/ml. Rates of mortality were varied for most isolates during the experiments. Mortality for 6 isolates of *B. bassiana* was more than 75% and it was ranged between 50 and 75% for other 12 isolates and there was no significant difference among them by Tukey Test at 5%, the value of Median lethal time (LT50) of the most virulent isolate among them was 3. 39 day on *B. tabaci* but on *M. persicae* the mortality of 9 isolates was $\leq 75\%$ while three of them was more than 90% with 3. 26 days value for LT50 for the most virulent one.

BC36

LABORATORY STUDY ON THE EFFECT OF TREATMENT OF MALE AND FEMALE HOUSE FLY MUSCA DOMESTICA L. BY THE FUNGUS ASPERGILLUS FLAVUS LINK:FRIES ON SOME BIOLOGICAL CHARACTERS. Salim J. Jarjees and<u>Ibrahim A. Hassan</u>, Department of Plant, College of Agric. and Forestry, University of Mosul, Iraq, Email:dribrahim56@yahoo. com

Spraving male flies with a concentration of 10^6 conidia/ml of Aspergillus flavus caused a reduction in egg production of untreated females. There was no significant effect of the concentration 10⁵ conidia/ml in the reduction of the egg production of the treated females. All the spore concentrations caused reduction of new generations of flies, while those consentrations had no effect on the pre-oviposition period. Moreover, spraying the male with the conidia caused the reduction age of both untreated female and treated males. Spraying of females with conidia suspension caused inhibition of egg production accompanied with the increasing of conidia suspensions and the inhibition of developing new generation but the pre-oviposition period was affected. Ages of treated females and untreated males were not affected with the spraying of conidia suspension 107 conidia/ml.

BC37

CHARACTERIZATION OF NATIVE BACILLUS THURINGIENSIS STRAINS FROM SUDAN. N.E. Gorashi, H. A. Elshafie, H. A. Hamid and H. A. Dirar, Department of Biopesticides and Biofertilizers, Environment and Natural resources Institute, Alamart Mohamed Najib St., 57National Centre for Research, Khartoum, Khartoum, Sudan; Plant Protection Department, Faculty of Agriculture, University of Khartoum, Shambat, Sudan, Email:naiemaeltayeb@yahoo.com

Bacillus thuringiensis is a gram positive, spore forming bacterium. This bacterium is capable of producing insecticidal crystal proteins which are toxic to insect pests and disease causing organisms. These proteins are specific and applicable in transgenic plants. The main aim of this research is to isolate native strains of entomopathogenic B. thuringiensis from Sudan. Soils samples were collected from different locations, in addition to stored products dirt and debris of dead store insects. Bacillus strains isolated were characterized morphologically and biochemically. The toxicity of the isolated strains was tested against three important insect pests, including the red flour beetle, the greater wax moth and the house mosquito. Thirty nine isolates closely resemble Bt were identified and their toxicities were tested at 500 ppm against larvae of the three insectsin addition to their effect on food consumption. The isolated strains have crystals of different shapes and sizes. Mortality percentages of larvae caused by the different isolates, after 10 days varied from 12.5 to 85% against the red flour beetle compared to 12.5% in the control, and from 12.5% to 81% were recorded among the greater wax moth compared to 12.5% in the control. While mortality percentages of 25% to 95% were calculated among the house mosquito larvae exposed to the different isolates for 42 hours. Significant difference were seen in the amount of food consumed by the different larvae exposed to these isolates. Percentages of isolates with dual activity were higher than those exhibited toxicity against one species. Regression analysis revealed differences in the lethal times between different isolates towards the three insects, where mosquito was proved the most sensitive with 29 hours Lt50 achieved byisolate Om-5. However, Lt50 ranged from about 88 to 176 hours for the red flour beetle and from 49. 9 to 96 hours for the greater wax moth. From this study it is clear that Sudan environment is rich in this bacterium and isolates with multiple cry genes is dominant as indicated by their crystal morphology and toxicity to larvae from different insect Orders. This results need to be strengthened with molecular tests like PCR, in addition to determination of the LC50. The effective isolates should be examined under field conditions, formulated and commercialized

BC38

SURVEY OF APHID SPECIES AND ASSOCIATED PARASITOID ON CULTIVATED AREA IN AL-HOMRA, JORDAN. Hazem S. Hasan¹, Leena A. Irshaid² and Saeid Abu-Romman². (1)Department of Plant Production and Protection, Faculty of Agricultural Technology, Al-Balqa' Applied University, Al-Salt, 19117, Jordan; (2) Department of biotechnology, Faculty of Agricultural Technology, Al-Balqa' Applied University, Al-Salt, 19117, Jordan, Email: Leena_irshaid@yahoo.com

Species of Aphidiinae and the possible associated parasitoids have not been recently surveyed in ecologically isolated, cultivated area in Al-Homra.

The present survey record the presence of five different aphid species colonizing different cultivated plants in Al-Homra region, namely; *Aphis gossypii* Glover, *Aphis craccivora* Koch, *Aphis citricola* Vander goot, *Myzus persica* Sultzand *Brachycaudus amygdalinus*. The present survey identified four parasitoids of the Braconidae family *Aphidius colemani*, *Aphidius* sp. *Trioxes* sp. *Ephederus persica* and one species that belongs to the Aphelinidae *Pachyneuron aphidis* family and one hyperparasite belongs to the Alloxistidae family.

BC39

LABORATORY REARING AND PROPAGATION OF

SOMEENTOMOPATHOGENICNEMATODEISOL ATES OFMEDITERRANEAN FLOUR MOTH EPHESTIA KUEHNIELLA. <u>Amani Jawish</u>, Abdulnabi Basheer and Khaled Al-Assaa, Plant Protection Department, Faculty of Agriculture, Damascus University, Damascus, Syria, Email: amanijawish@yahoo.com

The potential use of Mediterranean flour moth Ephestia kuehniella larvae for the rearing and propagation of some entomopathogenic nematode isolates collected from Damascus province soils was investigated. Four nematode isolates were used: VH11(Heterorhabditisindica), PHA and DKH9, of Heterorhabditis sp. and RST of Steinernema sp. These isolates were used in five concentrations (1000,500, 250, 100, 50 infective individuals/ml). The results showed that Ephestiakuehniella was very sensitive to nematode infection, and the entomopathogenic nematode life cycle in it was shorter than that in larva of wax moth. The quantitative production was identified as the number of nematodes in a fixed weight (0.02g) of insect host. The average production of wax larva ranged between 15-10 thousand individuals in wax moth larva, and 36-57 thousands in Ephestia kuehniella. The flour moth significantly produced more infective individuals than larva of wax moth.

BC40

BIOLOGICAL CONTROL OF TOMATO WORM *HELICOVERPA ARMIGERA* USING THE EGG **PARASITOID** *TRICHOGRAMMA PRINCIPIUM* **AND** *BACILLUS THURINGIENSIS* IN SAUDI **ORGANIC FARMING.** <u>Radwan Yakti¹ and Safar</u> Alkahtani². (1) Organic Farming Project, Ministry of Agriculture Riyadh, Saudi Arabia; (2) King Saud University, Riyadh, Saudi Arabia, Email: radwan.yakti@giz.de

Tomato fruit worm, *Helicoverpa armigera* Hbn. (Lepidoptera: Noctuidae) is the most serious pest that causes significant damage to the tomato and other crops such as cotton, corn, pepper and alfalfa in Saudi Arabia. Field study was conducted to evaluate the effect of the biocide *Bacillus thuringiensis* and the egg parasitoid*Trichogramma principium*on tomato worm infestation and tomato yield under field conditions. The results showed that the release of simple dose of the parasitoid (100, 000/ha) has reduced the fruit infestation to 59. 41% while the treatment with 1 Kg Bt. /ha reduced the fruit infestation to 41. 65%. The combination of both treatmentswas significantly more effective than each treatment alone. The effectiveness of all treatments was increased significantly with increasing concentration. This was reflected also on the tomato yield. So, the release of the egg parasitoids twice in two weeks interval led to significantly more yield than the other treatments. The release of a single dose of the parasitoid and a treatment with 1 kg Bt. /ha after two weeks led to a satisfactory result.

BC41

THE PREDATORS OF AGRICULTURAL IMPORTANCE IN ARID AND SEMI-ARID REGIONS OF NORTHERN SUDAN. Abdalla Abdel <u>Rahim Satti, Environment</u>, Natural Resources and Desertification Research Institute, National Centre for Research, P. O. Box 6096, Khartoum, Sudan, Email: satisattisat@yahoo.com

The arid and semi-arid regions of northern Sudan lie approximately between latitudes 17- 22°N and 14- 17°N, respectively. Most cultivated lands in these areas are confined to narrow strips of about 2 km in widths along the two banks of the Nile. Natural plants grow scarcely in terms of species and numbers and show gradual decrease as we go from the southern fringe of semi-arid region to the arid northern part, corresponding with a similar trend of low rains. The objective of this study was to know the important predators prevailing in these regions and their relative seasonality on some hosts. This was achieved through field surveys performed sporadically during the last two decades, covering at least two locations in each of the arid and semi-arid zones. The results showed appreciable numbers of predators mostly belonged to five major groups; four were insects (i. e. chrysopids, coccinellids, syrphids and mantids) while the fifth comprised spiders. They were recorded at variable levels on the different crops, a case attributed largely to the differences in prey species and microclimate among such hosts. Moreover, the populations of most predators were found to increase in certain seasons, especially winter, while some species reflected almost regular levels all the year round. The differences in climatic conditions, like temperature and relative humidity, and kind of prey species seemed to represent the main factors inducing such variability from one season to another. Generally, no clear differences were observed among the detected fauna in arid and semi-arid regions. In conclusion, two predatory insects (viz., Chrysoperla carnea and Hippodamia variegata) plus some thomisid, salticid and cob-weaver spiders were considered promising in regulating insect pests' populations due to their permanent high prevalence and wide distribution in the studied regions. So, these predatory species need to be evaluated properly as bio-control agents.

BC42

EFFECT OF BIOLOGICAL COMPLEX ON PEAR *PSYLLA CACOPSYLLA PYRICOLA* (F.) (**PSYLLIDAE: HEMIPTERA)IN HOMS PROVINCE, SYRIA.** Wajeeh Kasses¹, Randa Abu-Tara² and<u>Bassam Oudeh³</u>. (1)Faculty of Agriculture, Damascus University, Syria; (2)Faculty of Science, Damascus University, Syria; (3)GCSAR, Agricultural Scientific Research Center at Homs, Syria, Email: B oudeh@hotmail.com

The natural enemies associated with pear psylla Cacopsylla pyricolla (F.) were monitored in Mokhtaria Research Station, Agricultural Research Center, Homs during the seasons of 2011 and 2012. The results showed presence of eleven predators and two parasitoids. Thepredators include the following species in five orders: (Heteroptera)Anthocoris nemoralis (F.), Orius horvanthi (Reuter) (Anthocoridae), (Neuroptera) Chrysoperla carnea (S.) (Chrysopidae), (Coleoptera) Coccinella septempunctata (L.), Oenopia conglobata (L.), Coccinella undecimpunctata (L.), Hippodamia variegata (Goeze), Adalia bipunctata (L.) (Coccinellidae) and Rhagonycha fulva (Scop.) (Cantharidae), R. fulvawhich is a new record on C. pyricola in Syria, Diptera Eupeodes corollae (F.), (Dermaptera) Forficula auricularia (L.) (Forficulidae). The parasitoids belong to family Encyrtidae order (Hymenoptera) **Trechnites** psyllae (R.) and Psyllaephagus euphyllurae (M.)]. The predator A. nemoralis was the most abundance with C. pyricola ranging from 45 to 49% in comparison with otherpredators which trapped by beating tray. On the other hand, the parasitoid T. psyllae was the most abundance with the pest ranging from 46 to 87% in comparison with natural enemies which were attracted tosticky traps, and both A. nemoralis and T. psyllae were the most coexisted with the pest, while other predators and parasitoids existed during definite periods of the growing season. Most natural enemies above responded directly to increase of prey population dynamic as indicated by apositive correlation and simple correlation coefficient of total natural enemies above in season 2011 was insignificant and positive with eggs and nymphs of the pest 0. 23 and highly significant and positive with adults 0. 41, while was in season 2012insignificant positive with eggs 0. 16 and highly significant and positive with nymphs 0. 38 and adults 0. 88 at probability level 5%. Therefore, usingtotal of natural enemies could play an important role in reduction of the pest populations.

BC43

PREDATORY EFFICACY AND BIOLOGICAL PARAMETERS OF COCCINELLID SPECIES AGAINST APHIDS. Muhammad Arshad, Malik Husnain Ahmad, Rashad Rasool Khan and M. Dildar Gogi, Deparment of Entomology, University of Agriculture Faislabad, Pakistan, Email: arshaduaf@gmail.com

The study regarding predatory efficacy and biological parameters of three coccinellid species namelv: Coccinella septempunctata Lin. С. undecimpunctata Lin. and Menochilus sexmaculatus Fab. against wheat aphid under controlled conditions conducted in the Insect Biodiversity was & Biosystematic Laboratory, Department of Agri. Entomology, University of Agriculture, Faisalabad. It was concluded from the results that under laboratory conditions, incubation period lasted 3. 66, 3. 5 and 4. 66 days for *Coccinella* septempunctata, Coccinella undecimpunctata and Menochilus sexmaculatus respectively. Whereas the larval instars i. e. 1st, 2nd, 3rd and 4th of Coccinella septempunctata Lin. lasted 3, 2.66, 3.33 and 4.00 days, respectively. In case of C. undecimpunctata Lin. and M. sexmaculata Fab., larval instars lasted 3, 3.33, 2.66, 4.00, and 2.33, 3.66, 3.00. 4.00, respectively. Pupal period for all three species lasted 5.33, 4.87, and 5.66, respectively. Adults of Coccinella septempunctata, Coccinella and Menochilus undecimpunctata sexmaculatus devoured 1783, 1292 and 1448 aphids during their life span of 33.33, 35, and 29 days respectively. Larval instars of C. septempunctata consumed on an average 7.33, 12.99, 24.72 and 36.08 aphids/day respectively. Immature stages of C. undecimpunctata and M. sexmaculatus devoured 5.36, 10.66, 16.77, 21.5 and 5.5, 10.31, 17.16, 24.91 aphids/day, respectively.

BC44

NOTE ON THE DYNAMIC OF SOME PREDATORS OF PESTS IN AN ORANGE GROVE IN TADMAIT (ALGERIA). Kahina Belmadani, Nawal Dehyna, and Salah EddineDoumandji, Department of Agricultural and Forestry Zoology, Agronomical Upper National School, El-Harrach street Hassen Badi Belfort El Harrach, 16000 (Algiers), Algeria, Email: kaina_nova@yahoo.fr

Predatory insects that attack crops are allies of farmers. There are: predators and parasites. Common predators are spiders, predatory mites, ladybugs, beetles and hoverflies. The most common parasites are wasps and flies. At what times of the year do predators appear and with what pests their appearance coincides? To follow this dynamic in addition to the diversity (H') and equitability (E) of the identified fauna, wecarried a study using the Japanese umbrella from 2008 to 2009 in an orange grove in Tadmait near Tizi-Ouzou (Algeria) in which there is a little human intervention. The results show that spiders are identified during the 12 months. However in January in addition to spiders appear Chilocorus bipustulatus (Coccinellidae) coinciding with the appearance of Dialeurodes citri(Aleurodidae) and Aonidiella aurantii(Diaspidae) [(H' = 3.9 bits), (E = 0.)9)]. In April we noticed the presence of Chrysoperla carnea of Chilocorus bipustulatus and two species of

aphid *Macrosiphum* sp. and *Aphidae* sp. ind. [(H' = 4, 0bits); (E = 0, 9)]. For May there appearance of Chalcidae, Ichneumonoidea and Chilocorus *bipustulatus*, in addition to a species of aphidae [(H'=4, 2 bits): (E= 0, 8)]. In June there is *Chrysoperla carnea*. two species of Chalcidae and one of Ichneumonoidae with species Aonidiella aurantii, Parlatoria zyziphi (Diaspididae) and *Dialeurodes citri* [(H '= 2, 6 bits); (E = 0.5]. It is reported in August *Chrysoperla carnea*, Aspidiophagus citrinus and with a aphidae sp. ind., Aonidiella aurantii and Dialeurodes citri [(H' = 3, 5)]bits); (E = 0, 9)]. For September we note the presence of Chrysoperla carnea and Chalcidae sp. 1 ind. and as pest Aonidiella aurantii, Parlatoria zyziphi and Dialeurodes citri [(H' = 3.8 bits); (E = 0.9)].

BC45

EFFICIENCY OF *BEAUVERIA BASSIANA* (BALS.)VUILL WITH SOME ADJUVANTS FOR CONTROL OF CORN STEM BORER, SESAMIA *CRETICA* LED IN FIELD.<u>H.M. Saleh¹</u>and H.M. Aboud². (1)College of Agriculture, University of Anbar, Iraq;(2)Agricultural Researcher Office, Ministry of Science & Technology, Iraq,Email:hamf56@yahoo.com

A study was conducted under field conditions to evaluate the efficiency of two isolates of Beauveria bassiana (Iraqi, Chinese) with some of the adjuvants added with suspension of the two isolates. Results revealed that the two isolates reduced the percentage of the corn plants infestation as compared with control treatment. Results also indicated that spraving corn plants by the suspension of the Iraqi isolate with DMS (0.02%) significantly reduced the percentage of corn plants infestation to (1.62%) compared with control treatment (21.86%) after 36days of application. Wherease, the results of studying the efficiency of different cultural medium for propagation of Beauveria bassiana showed that the soybean extract aloneand combined with date juce achieved the best mycelium growth and sporulation after seven days from culture compared with other cultural medium as it reached264.3mg 243.6 mg and 2.17×108 2.52×108spore per 0.1gm, respectively.

BC46

TEMPERATURE DEPENDENT DEVELOPMENT OF THE PREDATOR, **SCOLOTHRIPS** SEXMACULATUS (PERGANDE). Marwa Al-salahi¹, Abdulnabi Basheer² and Louai Asslan³. (1)Plant Pathology division, Plant Protection Administration, General Commission for Scientific Agricultural Research. Damascus, Syria;(2)Department of Plant Faculty Agriculture, Damascus Protection. of University, Damascus, Syria; (3)Department of Plant Agriculture, Damascus Protection, Faculty of Email: University, Damascus, Syria, marwaalsalahi@yahoo.com

Temperature is an important factor that affects the efficacy of biological control agents. Effect of

temperature on life table parameters of Scolothrips sexmaculatus (Pergande) (Thysanoptera: Thripidae), the predator of the two-spotted spider mite Tetranychus urticae Koch (Acari: Tetranychidae), was studied under laboratory conditions at three constant temperatures (20. 25 and 30°C). The durations of development for eggs, 1st and 2nd larval instars, pupa, and adult at the three tested constant temperatures were measured. The total developmental period from egg to adult's emergence was estimated at 23.2, 13.3 and 10.8 days, respectively. The developmental period decreased significantly with increasing temperature from 20 to 30°C. Survival rate was the highest at temperature (30°C) in comparison with the other temperatures (20 and 25°C). Egg stage of S. sexmaculatus showed highest mortality levels at all temperatures. Generation period, as well as the ovipositional period decreased significantly at the temperatures ranged from 25.1 to 11.54 days, 52.8 to 41.2 days between the two temperature extremes, respectively. The maximum total fecundity (229.3 eggs/female) and the minimum (94.1 eggs/female) were recorded at 30 and 20°C, respectively. The mean number of fertile eggs laid per female per day was highest at 30°C (4.9 eggs) and lowest (2.7 eggs) at 20°C. Thermal requirements for development (developmental thresholds and thermal constant) of S. sexmaculatus were estimated as 10.8°C and 200 degree-days (DD), using the common linear model. 30°C was the optimum temperature for development. The results showed that the population of S. sexmaculatus was able to develop at a broad range of temperatures; therefore, it is well adapted to the temperatures of the Mediterranean region.

BC47

INTERACTION OF APHIDS AND PREDATORS ON DIFFERENT GENOTYPES OF RAPESEED IN ISLAMABAD, PAKISTAN. <u>Muhammad Riaz</u>and Saqib Rehman, National Agricultural Research Centre, Insect Pest Management Program, Department of Plant and Environmental Protection, Park road, Islamabad, Pakistan-44000, Email: dr.riaznarc@yahoo.com

Twenty two genotypes of rapeseed viz. R13107, R1313, R13147, R13144, R13116, R13101, R13141, R13129, R13124, R13108, R13149, R13132, R13148, R13103, R13130, R13121, R13127, R13105, R13111, R13134, R1326 and R13109 were sown in the field area of National Agricultural Research Centre (NARC), Islamabad Pakistan during 2013-2014 following RCBD with three replications. The objective was to study varietal interaction between aphids and predators on these different rapeseed genotypes. The aphid population fluctuated dramatically in every week. But the genotypes R13107, R13139, R13141, R13144 and R13116 were comparatively more susceptible, respectively. The genotypes R13109 and R13105 were resistant to aphids' population in every week. The peak population of the pest was observed in February. Coccinellid larvae played maximum role in population fluctuation of aphids followed by green lace-wing and syrphids. In the third week of February, both the pest population and natural enemies were decreased due to heavy rain. So environmental factor was also effected their population. Conservation of natural enemies would help develop sound environment for crop management strategies. Therefore, the application of chemical insecticides should be avoided for the control of aphids on rapeseed crop.

BC48

DETERMINATION OF THE MOST IMPORTANT **BIOLOGICAL CHARACTERISTICS OF TOW** EGG PARASITOIDS TRISSOLCUS GRANDIS VASSILIEVI THOMSON AND TRISSOLCUS MAYER ON SUNN PEST EGGS (EURYGASTER **INTEGRICEPS PUT.) UNDER LABORATORY CONDITIONS.** Sultan Shiekhmous¹, Mohammad Quja Nehal², Mohammed Nayef Al-Salti² and Randa Abou-Tara¹. (1) Department of Plant Protection, Faculty of Agriculture, University of Aleppo, Aleppo, Syria;(2) Department of Plant Protection, Faculty of Agriculture, University of Aleppo, Aleppo, Syria; (3) Department of Natural Sciences, Faculty of Sciences, Damascus University, Syria, Email: randaaboutara@hotmail.com

The biology of the two Sunn Pest (Eurygaster integriceps Put.) parasitoids, Trissolcus grandis Thomson and Trissolcus vassilievi Mayer (Scelionidae: Hymenoptera) were investigated under laboratory conditions 23±1°C, L:D 16:8 photoperiod and 75±5% RH. The results showed that female longevity was 20.00 and 17.70 days, mean number of parasitized eggs/female was 116.40 and 106.90, average percent of females was 84.73 and 84.00%, mean development time from egg to pre-pupal stage was 7.10 and 6.17 days, the mean development time from egg laying to emergence for females was 15.68 and 14.72 days, and for males 14. 43 and 13.35 days for T. vassilievi and T. grandis respectively. These results indicated some superiority of T. vassilievi over T. grandis because of its capability of parasitizing higher number of sunn pest eggs as a result of longer female longevity.

BC49

USE OF FUNGI ISOLATED FROM AGRICULTURAL SOIL IN THE AREAMINAR ZARZH MILA MANTDATE TO COMBAT THE APHID, APHIS FABAE. Wided Abdelaziz, Wissem Khenfer, Ghozlane Boursas, Hayat Makroud, Lynda Merdas andMeriem Benaissa, Microbiology Laboratory, Faculty of Natural Science and Life, University of Constantine, Algeria, Email: az_wided@yahoo.fr

This work is an introduction in research for the fungi isolated from dead aphids and soil to be used against the black bean aphid, *Aphis fabae*. The presence of the following fungal species was recorded by using current microbiological tests: Fusarium with 43%, followed by the two genera *Aspergillus* and *Penicillium* with 21%. *Rhyzopus* was present but with 7%, and 4% was recorded for the two genera , *Botrytis* and

Peacilomyces. The invitro pathogenicity tests showed that treatments with *Fusarium* sp, *Penicillium* sp, and *Aspergillus niger* have a significant effect on *Aphis fabae* and reproduce the natural symptoms of entomopathogenic fungi.

BC50

EFFICACYOFCRYPTOLAEMUSMONTROUZIERIINBIOLOGICALCONTROLOFPLANOCOCCUSCITRIUNDERGREENHOUSECONDITIONS.KarimSaeidi,Department of entomology, Agricultural and NaturalResourcesResearchResourcesResearchCenter ofYasouj, Iran, EMAIL:saeidi391@yahoo.comKarimSaeidi, Saeidi, S

The citrus mealybug, Planococcus citri Risso, (Hemiptera: pseudococcidae) is one of the most important pest of citrus in Iran. In this survey, predatory potentials of coccinellid predator, Cryptolaemus montrouzieri Mulasnt (Coleoptera: Coccinellidae) against citrus mealybug were investigated under laboratory conditions (28±5 °C and 65±5% R.H). Third instar nymphs and adults of C. montrouzieri were the most voracious feeders on different instars of mealybug. The number of 1st instar nymphs of mealybug consumed by 1^{st} , 2^{nd} , 3^{rd} and 4^{th} instar larvae and adult beetles of *C*. montrouzieri was 25.56, 51.15, 79.25, 98.36 and 343.44, respectively. The respective numbers of 2nd and 3rd instar nymphs of mealybug consumed were 16.23 and 4.50, 35.21 and 8.28, 77.20 and 16.61, 81.16 and 32.19, 356.20 and 118.50. The corresponding figures for adult female mealybug were 0.83, 4.32, 9.75, 14.17 and 78.60, respectively. The results indicate that C. montrouzieri has the potential to be exploited as a bio control agent in South of Iran; inoculative releases of 4th instar larvae and adults may provide instant control of P. citri. Field experiments should be conducted to determine the efficiency of the ladybird on this mealybug.

BC51

INTERACTION BETWEEN BACILLUS **THURINGIENSIS** BERLINER AND THE HOST/PARASITIOD SYSTEM **AUTOGRAPHA** GAMMA- APANTELES RUFICRUS. Atef Mahmoud Mohamed Saved¹, Mohmed Mostafa El-Maghraby² andRefat Mostafa Sherif³. (1) Plant Protection Research Institute, ARC, Egypt; (2) Plant Protection Department, Faculty of Agriculture, Zagazig University, Egypt, Email: atef.mahmoud1@gmail.com

Experiments to study the effect of *Bacillus thuringiensis* Berliner at low concentrations on the relationship between the host *Autographa gamma* and the parasitoid, *Apanteles ruficrus* were conducted under laboratory conditions. Results indicated that, the combined effect of *B. thuringiensis* and parasitism significantly influenced *A. gamma* mortality resulting in an obvious increase in mortality compared to the treatment with *B. thuringiensis*. Mortality of larvae exposed to Dipel 2x alone were directly related to

increasing biocide concentration, while it was not the case in parasitized larvae treatments. Six days of LC50 values for concurrently exposed larvae in the absence of parasitization was 161 mg/l, while it was 45 mg/l for larvae parasitized by *A. ruficrus*. Results showed that *A. ruficrus* can be used, in addition to use of *B. thuringiensis* whether alone or in combination as good biological control agents in an integrated pest management (IPM) program against semi-looper larvae.

BC52

THE INFLUENCE OF TEMPRATURE ON SOMEBIOLOGICALCHARACTERISTICSOFBIOLOGICALCHARACTERISTICSOFTRICHOGRAMMAEVANESCENSON THE EGGOFTHELESSERDATEMOTH.JasimK.Mohammad¹,RadhiF.Al-Jassani²andAbdul-SattarA.Alli³.(1)StateBoardforAgriculturalResearches,MinistryofAgriculture;(2)Dept.Pl.Prot.Coll.ofAgric., BaghdadUniversity,Iraq,Al-AnbarUniversity,Iraq,Email:abdulsattararif@yahoo.com

The lesser date moth Batrachedra amydraula Meyr is considered as a key pest attacking date palm fruits and causing serious yield loss. Biological control by using the egg parasitoids Trichogramma proved effective against this pest. The effect of different temperature regimes on some biological characteristics of Trichogramma evanescens was investigated when reared on the eggs of lesser date moth under laboratory condition. Results indicated that the developmental periods of the parasitoidswas greatly influenced by temperature. The longest life spanwas 35 days recorded at15C° while the shortest one was7 days at 33C°. The optimum temperature for the development of this parasitoid ranged between 22-27 C°. The upper development threshold was 38.4°C and the lower was 11. 4C°. Results also showed that the highest parasitism rate was 95.4% recorded at 25 ± 2 C°. Adult's emergence and female longevity were also influenced by temperature. The feasibility of the results in mass production and the use of the parasitoid for the control of lesser date moth was discussed.

BC53

PATHOGENICITY OF INDIAN ISOLATES OF **ENTOMOPATHOGENIC** FUNGI AGAINST IMPORTANT INSECT PESTS AND NATURAL ENEMIES. Paul BishwajeetIbrahim¹, Κ Shankarganesh² andGautam Sharma Ram Das Pratibha³.(1) Biological Control Laboratory, Division of Entomology, Indian Agricultural Research Institute, New Delhi-11001; (2)Divisionof Plant Pathology, Indian Agricultural Research Institute, New Delhi-110012, P.O.Box - 6096, Khar Town, Sudan, Email: fataloope@yahoo.com

Entomopathogenic fungi (EPF) are one of the best alternatives to chemical pesticides and crucial component of IPM. Eight isolates of *Beauveria bassiana*

(Balsamo) Vuillemin and Metarhizium anisopliae (Metsch.) Sorokin, were obtained from Indian Type Culture Collection (ITCC) and National Centre of Integrated Pest Management, New Delhi. They were screened against adults of. Bactrocera dorsalis. larvae of Corcyra cephalonica (Stainton) and Spodoptera litura (Fab). By exposing the insects to 2-3 weeks old culture of (EPF) The pathogenicity of four isolates was proved, using contact method. Three isolates ITCC No. 6628, ITCC No. 6645 and B. NCIPM were found pathogenic to fruit flies: whereas, in case of C. cephalonica, pathogenicity of first two isolates in addition to (M. NCIPM) was proved. Mortality of adult fruit flies was 100% within 5-6 days of exposure. However, in case C. cephalonicamortality ranged from (31-98%) within three weeks. Subsequently, the pathogenic isolates were tested against Coccinella septumpunctata (L.) and C. cephalonica. Significant differences were observed among isolates, and the isolate B. NCIPM was found relatively safe to C. septumpunctata.

BC54

SOME TOXICITY OF RECOMMENDED **INSECTICIDES IN SUGARCANE AND COTTON** то **TEICHOGRAMMA** FIELDS EVANESCENSWEST. A.A. Barakat, H.M.A. Badawy, Sondos Abdel-Tawab Mohamed M.A. Ewais, andNaglaA.R. Hamed.(1) Economic Entomology and pesticides Department, Faculty of Agriculture, Cairo University, Egypt;(2) Plant protection Res. Inst. ARC, Egypt, Email: mamin2001@yahoo.com

The potential effects of five different insecticides(kz oil 95% EC, malathion 57% EC, challenger 36% SC, admiral 10% EC and spintor 24% SC, which are used in sugarcane and cotton fields, on some bioaspects of the egg parasitoid Trichogramma evanescens West. were studied. KZ oil 95% EC inhibited emergence of T. evanescens when the recommended concentration or lower were used. Malathion 57% EC at concentrations of 0.44, 0.88, 1.75 and 2.5 ml/L (recommended rate) decreased emergence of adult parasitoids to 65.8, 52.3, 24.4 and 16.4%, respectively, While it reached in the control treatment 73.8%. Malathion did not only shorten longevity of emerged adult parasitoids, but also decreased the fecundity of emerged female parasitoids. Challenger 36% SC decreased percentage of emerged parasitoids and shorten their longevity to an average of 0.6 ± 0.42 day when the recommended concentration was tested. Admiral 10% EC at concentrations of 0.063, 0.125, 0.25 and 0.5 ml/L (recommended rate) had no effect on emergence, longevity of adult parasitoids or on fecundity of emerged parasitoid females. In contrary, spintor 24% SC had a drastic effect on emergence and longevity of T. evanescens even when it is used at the lowest concentration. This harsh effect makes its use in crop fields released with the parasitoid questionable.

BC55

BIOLOGICAL CONTROL OF POWDERY MILDEW (ERYSIPHE CICHORACEARUM) ON CUCUMBER UNDER PROTECTEDAGRICULTURE CONDITONS IN JPRDAN VALLEY. Jamila A. Edress, <u>Hifizi Abu-Blanand</u> and Akel N. Mansour, Faculty of Agriculture University of Jordan, Amman Jordan, Email: hifzi@ju.edu.jo

Powdery mildew disease caused by Ervsiphe cichoracearum, is one of the most destructive foliar diseases of cucumber in Jordan. Application of fungicides is the most effective method for the disease control. Recently, the fungicides became less effective due to development of pathogen resistance in addition to their effect on human, plants and other beneficial organisms. Therefore, environmentally safe methods are needed to replace chemical pesticides or reduce their consumption in the ecosystem. In this study, polymerase chain reaction (PCR) as well as cloning and sequence analysis were performed to define two antagonistic fungi Trichoderma harzianum and Cladosporium antifungal ccladosporioides. The activity of Trichoderma Cladosporium harzianum, ccladosporioides. Inula viscosa extract (20%), Lawsonia inermis extract (20%), combinations of I. viscosa extract with T. harzianum, I viscosa extract with CI. cladosporioides, extract of L. inermis with T. harzianum, L. inermis with CI cladosporioides, Fytomax PM (Azadirachtin 0.1%), in addition to the use of water and sunomyl (R) W (10g/20 L(R) Wp which served as negative and positive and positive controls were evaluated to control powdery mildew disease of cucumber plants growing in plastic houses conditions at the research station/Faculty of Agriculture during spring, 2013. As primary step eleven cucumber cultivars were screened for the susceptibility of powdery mildew under plastic house conditions. The results showed that Biet alpha cultivar was the most susceptible cultivar than others. Therefore, this cultivar was used to evaluate the effect of biological control agents on powdery mildew development. The experiment was conducted as completely randomized design, with three replicates. Spraying cucumber plants three times, at one week interval by a hand atomizer under plastic house conditions with previously treatments gave sufficient control to powdery mildew disease. The obtained results showed that, all used led to significant decrease in disease severity compared with control (negative control) treatment. The highest inhibition was obtained with Fytomax PM (Azadirachtin 0.1%) a commercial product of neem and CI. Cladosporioides followed by T. harzianum, L. inermis extract (20%) and I. viscosa extract (20%) compared with negative control (distilled water). However, there were no significant difference between the biocontrol agents in the co- application treatments as compared with application of each agent alone. In conclusion, biocontrol agents could be used strongly as an alternative and safe method for controlling powdery mildew disease of cucumber.

BC56

BIOLOGICAL AND CHEMICAL CONTROL OF TOMATO SEEDLING ROT AND DAMPING OFF DISEASE CAUSED BY *RHIZOCTONIASOLANI*KÜHN. <u>Hurria Hussien Al-</u> juboory, Salah Ahmed and Sieve Ismail, Department of Plant Protection, College of Agriculture, University of Baghdad, Iraq, Email: hhaljboory@vahoo.co.nz

This study was conducted to evaluate the efficiency of Trichodermaviride and Beltanol against Rhizoctoniasolani, the causal agent of tomato seedling damping off. R. solani was isolated from infected tomato seedling collected from plastic houses of the Plant Protection Department, College of Agriculture. Results showed the presence of two different isolates RS1 and RS2, and their pathogenicity was tested on tomato seeds in culture media and on tomato seedlings. Results showed that RS1 was more pathogenic, as it produced a germination rate of of 0.0% compared with 47% with RS2 and 97% in the control. The germination rate of tomato seeds cultivated in soil contaminated with RS1 and RS2 were 15.5 and 39.4%, respectively, compared with 100% in the control. T. viride demonstrated high antagonistic degree of 2 on bell scaleagainst *R*. solani on culture media. WhereasBeltanoltotally inhibited R. solani grown on PDA media. The addition of T. viride grown on sorghum seeds at 2g seeds/kg soil, and Beltanol at 1 ml/L into soil contaminated with R. solani, caused significant reduction to infection rate, 30.5% and 13%, respectively, compared with 95.5% in soil contaminated with the fungus (control).

BIOTECHNOLOGY

BT1

EFFECT OF DIPPING IN HOT WATER AND SODIUM BICARBONATE ON SOME STORAGE CHARACTERISTICS OF PATHOGENIC AND PHYSIOLOGICAL DISORDERS OF ORANGE FRUITS. <u>Nameer Najeeb Fadhil</u> and Nagham Salah Salim, Hort. Department, College of Agriculture & Forestry, Mosul University, Iraq, Email: nameer_fff@yahoo.com

Local orange fruits were brought from a private orchard to the laboratory, precooled and stored in the cold room at 7°C for 2 days before performing the following treatments: 1- dipping in the solution of Kurzate fungicide at the concentrations of 0 and 2 gm.l⁻¹, 2- dipping for 2 minutes in 0 (control), 10 and 20% fungicide and 1.5 and 3% sodium bicarbonate, 3paraffin waxing (non waxed and waxed), and interaction between treatments. The fruits of each treatment were dried and put in perforated polyethylene bag, sealed and stored in the cold room at 4±1°C, and 85-90% R.H. for

120 days. The results revealed that 2 gm.l⁻¹ fungicide treatment was not effective on orange storage characteristics, but was effective in preserving vitamin C and reduced significantly chilling injury and *Alternaria citri* incidence. Waxing orange fruits reduced significantly weight loss, total soluble solids and total acidity, in addition, waxing treatment reduced significantly chilling injury and *Alternaria citri* incidence. 1.5 and 3% sodium bicarbonate treatments were the most effective, as they reduced significantly total soluble solids and total acidity, and all dipping treatments preserved vitamin C. Furthermore, 1.5 and 3% sodium bicarbonate was very effective in reducing chilling injury and *Alternaria citri* incidence.

BT2

USING REMOTE SENSING TECHNOLOGY AS A TOOL FOR PREDICTING THE EGYPTIAN COTTON LEAFWORM SPODOPTERA LITTORALIS (BOISD.) ANNUAL GENERATIONS. <u>Hassan F. Dahi¹</u>, Ibtisam A. M. Hemeida², Sayeda S. Ahmed² and Amira H. A. Moursey¹. (1) Cotton leafworm Department, Plant Protection Research Institute, Agricultural Research Center, Dokki, Giza, Egypt; (2) Department of Entomology and Pesticide, Faculty of Agriculture, Cairo University, Giza, Egypt, Email: hassandahi@yahoo.com

This study was conducted to evaluate the effect of four constant temperatures 17, 22, 27 and 32 °C on the biology of the Egyptian cotton leafworm. Spodoptera littoralis and determine the threshold temperature and calculate the thermal units for all stages in the laboratory to determine the threshold temperature and the average number of degree days required to complete one generation, then use this information for predicting annual generations of S. littoralis under field conditions. Remote sensing was used as a new technology in calculating the thermal units for pest to predict the number of annual generations. In the laboratory study, it was found that the thresholds of development were 11.58, 6.44, 12.45, 10.69 and 9.76°C for eggs, larvae, pupae, pre-oviposition period and generation, respectively, whereas the averages of their thermal units were 41.97, 329.18, 134.24, 25.04 and 511.4 degree days, respectively. A field study was conducted at Qaha farm, Qalyubiya Governorate for two successive years (2010 and 2011) using sex pheromone traps. The data showed that S. littoralis had 7 annual generations, in addition to one overwintering generation. Results indicated that the mean deviations between the observed and expected generations were +2, +3, +3 +3, 0, +4, and +3 days with an average of +2.57 day in 2010,whereas it was +1, +1, 0, +1, -1, +2, and zero day with an average of +0.71 day in 2011.

BT3

BACTERIAL SECONDARY METABOLITES AS PLANT GROWTH PROMOTING COMPOUNDS. <u>Samia Mezaachz-Aichour</u>, Nora Haichour, Amina Boukhalfa, Ibtissem Madaci, Abdlhadi Guechi and Mohamed Mihoub Zerroug, Laboratory of Applied Microbiology, Faculty of Natural and Life Sciences, University Ferhat Abbas Setif 1, Algeria, Email: mezaic2002@yahoo.fr; med_zerroug@yahoo.fr

Plant growth promoting rhizobacteria (PGPR) inhibit the growth of many phytopathogenic agents by several mechanisms including the production of a wide variety of secondary metabolites, capable of inhibiting plant pathogens and playing a role in biological control. Low crop yields are due to several biotic and abiotic factors and the presence of plant pathogens. Chemical control is considered as an effective solution for these problems. However, such application is no longer acceptable because of the adverse effects associated with it. Biological control by using secondary metabolites-producing bacteria such as hydrocyanic acid, siderophores, phosphatase production and indole acetic acid. These substances protect plants against plant pathogens without any undesirable effects. Cyanohydric acid bacterial production was investigated in TSB medium (Tryptic Soy Broth), phosphates solubilization was qualitatively evaluated in Pikovskaya medium, whereas AIA and AIA-derived compounds were quantified by a colorimetric method in L-tryptophanadded TSB medium. Pseudomonas and Bacillus are examples of such rhizobacteria which produced AIA at a rate of 100%, secreted phosphatase at 100% rate, and produced siderophores and HCN at 43.47% and 8.69% rates, respectively.

BT4

FACTORS AFFECTING IN VITRO **PROPAGATION**, CALLUS INDUCTION, **ANTIMICROBIAL** AND **INSECTICIDAL** ACTIVITIES OF ARTIMESIA HERBA ALBA PLANT EXTRACTS. Yousef S. Abadi¹, Mohamad A. Shatnawi¹ and Mohammed S. Al-Alawi². (1) Al-Balqa Applied University, Biotechnology Department, Faculty of Agricultural Technology, Al-Salt, Jordan; (2) Al-Balqa Applied University, Plant Production and Protection Department, Faculty of Agricultural Technology, Al-Salt, Jordan, Email: mshatnawi1@vahoo.com.au

Jordan has been well-known for many years to have a wide range of natural medicinal Plants. *Artemisia herba-alba* is a wild medicinal herbal plant found in Jordan. *A. herba alba* biodiversity is threatened to disappear because of heavy grazing, land cultivation and harvesting by people to use in folk medicine. In this study, plants were micro-propagated in vitro via callus induction and extracts of *A. herba alba* were evaluated against bacteria, fungi and insects. Microshoots were sub-cultured after six weeks on hormone free MS medium to generate enough plant material. In the current study, a simple and reliable method for in vitro propagation and callus growth and development was developed. Leaf extracts from plants in the field or from in vitro growth of A. herba-alba were screened for potential antimicrobial activity against some microbes such as Escherichia coli, Staphylococcus aureus and Candida albicans using ethanolic and methanolic extracts. Both in vitro and in vivo leaf extracts showed similar antimicrobial activity.

BT5

EVALUATION OF CHLOROSIS DEVELOPMENT BY NUMERICAL IMAGE ANALYSIS IN *PHASEOLUS VULGARIS* **LEAVES TREATED WITH TABTOXIN**. <u>Foouzia Dehbi</u>¹, D. Harzallah², L. Bouamama² and A. Hannachi². (1) University Ziane Achour, Faculte des Sciences, Algeria; (2) la nature et de la vie Djelfa. Algeria, Email: f_dhbi@yahoo.fr

Tabtoxin is a non-specific phytotoxin, produced by *Pseudomonas syringae* pv. *tabaci* and plays an important role in the development of disease symptoms. When applied on bean leaves it causes chlorotic lesions and reduces significantly the amount of chlorophyll. In this study, the chlorosis development in *Phaseolus vulgaris* leaves treated by tabtoxin was evaluated by photography and numerical image analysis (NIA). This method was compared with classical evaluation methods such chlorophyll content and visual evaluation of symptoms. NIA appeared to be a practical tool for evaluating chlorosis development in *Phaseolus* leaves.

BT6

PRESENCE OF TOXA AND TOXB VIRULENCE GENES SYRIAN **POPULATION** IN OF PYRENOPHORA TRITICI -REPENTIS. Hamida Yahyaoui², Benslimane¹, Amor Yasmine Benamrouche³, Amina Beldi Atmane³ and Michael Baum⁴. (1) National High college of Agriculture (E.N.S.A), Department of Botanic 1, Avenue Pasteur, Hassen Badi, Algiers, Algeria; (2) International Maize and Wheat Improvement Center, Apdo. Postal 6-641, 06600, Mexico DF, Mexico; (3) M'hamed Bougara University (U.M.B.B.), Faculty of Sciences, Department of Biology, Molecular Biology Lab., Algeria; (4) International Center for Agricultural Research in Dry Areas (ICARDA), Amman, Jordan, Email: h.benslimane@ensa.dz

Tan spot caused by *Pyrenophora triticirepentis* is a major wheat disease worldwide and can cause important yield loses. It has been shown that this filamentous fungus produces a combinations of at least three host-specific toxins; PtrToxA, PtrToxB, and PtrToxC. Each one interacts with a host sensitivity locus. The virulence of an isolate is correlated with the presence of these toxins and resistance in the host is associated with absence of the sensitivity loci. Breeding for resistance to tan spot can be improved by knowledge of the prevalence of the toxin-encoding genes (virulence

genes) in local pathogen populations. Two toxins PtrToxA and PtrToxB are under control of two known and cloned genes ToxA and ToxB, and molecular tests for these genes have been developed. Using PCR, we screened a collection of 40 isolates collected in 2011 from several infected fields in Syria. The ToxA and ToxB primers, amplified a positive band of the predicted size from isolates analyzed. In all areas, both genes ToxA and ToxB were present. The results showed that ToxA was found in 55% of the cases, whereas ToxB was present in 77.5% of the cases. Our study revealed the presence of a large pathological variability and lead us to conclude that there are several races in the surveyed fields; races 5 or 6 (ToxA⁻, ToxB⁺), races 7 or 8 (ToxA⁺, ToxB⁺), races 1 or 2 (ToxA⁺, ToxB⁻) and races 3 or 4 (ToxA⁺, ToxB). The implication of these results for resistance breeding is evident; it would allow breeders to better target genotypes in field selection, according to deployment of ToxA and ToxB virulence genes.

BT7

IDENTIFICATION OF GENES INVOLVED IN RESPONSES TO BOTRYTIS CINEREA INFECTION AND ABIOTIC STRESS USING REVERSE GENETIC APPROACHES. Synan F. Abu Qamar, Arjun Sham, Salma Al-Ameri and Ahmed Al-Azzawi, Department of Biology, United Arab Emirates University, P.O. Box 15551, Al-Ain, UAE, Email: sabuqamar@uaeu.ac.ae

Transcriptional reprogramming forms a major part of a plant's response to pathogen attacks. The Arabidopsis cell wall (CW) expansin-like A2 (EXLA2) gene was identified based on its down-regulation in response to infection by the necrotrophic pathogen Botrytis cinerea, and on the reduced susceptibility of an exla2 mutant to the same pathogen. This mutant was equally susceptible to Pseudomonas syringae pv. tomato; however, it was more resistant to another necrotrophic fungus Alternaria brassicicola, when compared to the wild-type or the 35S:EXLA2 overexpression lines. The *exla2* mutants also enhanced tolerance to the phytoprostane-A1 (PPA1). Our results suggest that the absence of down-regulation of EXLA2 leads to increased resistance to B. cinerea in a COI1dependent manner, and this down-regulation can be achieved by PPA1 treatment. The EXLA2 is significantly induced by salinity and cold, and exogenous application of Abscisic acid (ABA). The exla2 mutant also showed hypersensitivity towards increased salt and cold, and this hypersensitivity required a functional ABA pathway. In addition, the altered expression in EXLA2 indicates that plant CW structure is an important player during Arabidopsis developmental stages. Overall, EXLA2 appears to be important in response to various biotic and abiotic stresses, particularly in the pathogenesis of necrotrophic pathogens and tolerance to abiotic stress.
BT8

PHYLOGENY OF RED PALM WEEVIL (RHYNCHOPHORUS FERRUGINEUS) BASED ON ITS1 AND ITS2. Monther T. Sadder^{1,2}, Polana S.P.V. Vidvasagar³, Saleh A, Aldosari³, Mahmoud M, Abdel-Azim³, Abdullah A. Al-Doss². (1) Plant Biotechnology Lab, Department of Horticulture and Crop Science, Faculty of Agriculture, The University of Jordan, Amman, 11942, Jordan, Email: sadderm@ju.edu.jo; (2) Department of Plant Production, College of Food and Agricultural Sciences, King Saud University, Rivadh 11451, Saudi Arabia; (3) Chair of Date Palm Research, Department of Plant Protection, College of Food and Agricultural Sciences, King Saud University, Rivadh 11451, Saudi Arabia

Red palm weevil (Rhynchophorus ferrugineus Olivier) populations were collected from several regions in Saudi Arabia, in addition, samples from United Arab Emirates, Italy and Spain were also utilized. Insects were graded morphologically based on different patterns of pronotum markings. Moreover, the DNA was isolated from the collected insects for molecular analysis. The entire ITS1-5.8S-ITS2 region was cloned and sequenced for both R. ferrugineus and its related species R. vulneratus (Panzer) collected from Indonesia. The novel ITS1 sequence form Rhynchophorus was found to be unique in the current Genbank database. Discrimination power of ITS1 region was shown to be much higher than ITS2 region. Penetrance of different pronotum markings varied from one region to another. The pronotum-based clustering deviated from that revealed by ribosomal sequence. Several InDels and nucleotide substitutions were detected along the ITS1-5.8S-ITS2 region between R. ferrugineus and R. vulneratus. The data supports a two-species classification rather than considering them color morphs of the same species.

BT9

MOLECULAR CHARACTERIZATION OF BEMISIA TABACI GENN. SPREAD ALONG THE SYRIAN COAST USING ISSR AND MTCOI. <u>Humam S. Barhoum¹</u>, Ahmad M. Mouhanna² and Louai H. Asslan². (1) Department of Plant Protection, Agriculture Faculty, Damascus University, Syria; (2) Biological Control Studies and Research Center, Damascus University, Syria. Email: Ahmadmouhanna@gmx.net

This study aimed to detect genetic variations among the whitefly populations of *Bemisia tabaci* Genn. spread along the Syrian coast. 44 Insect samples were collected from different regions: Tartous, Banias, Lattakia and Jableh, and were reared separately on Eggplant. Six ISSR -primers were used. The cluster analysis showed that the phylogenetic tree was divided, depending on agricultural environment, into four classes C1, C2 and C3. Shannon's index was 2.771, 2.771 and 2.48, respectively. Whereas the class C4 included just the sample Bt-20. According to nucleotides sequence analysis of cytochrome C oxidase I (COI) gene, the phylogenetic tree showed the existence of nonB, Q, B and M *B. tabaci* biotypes along the Syrian Coast. Bootstrap value obtained by mtCOI technique was in the range 59-100%.

BT10

RECENTBIOTECHNOLOGYAPPLICATIONSANDTHEIRCONTRIBUTIONTOALGERIANAGRICULTURE:PRIORITIESANDCHALLENGES.LaidLamriBenderradji,BiotechnologyandMetagenomicsLaboratory,FacultyofSciences,BordjBouArreridjStreet,M'silaUniversity,M'sila28000,Algeria,benderradjilaid@yahoo.fr

Plant tissue culture is one of the main methods and techniques used for plant breeding. Since its establishment in the early seventies of the last century, scientists were able to isolate and extract genomic material (DNA) and make changes for genes of interest conferring desirable traits to pass them into other target plants via genes ttransfer. Regeneration of whole plantlets from individual cells through in vitro culture facilitated easy propagation of selected species. Among uses of new technologies for plant biotechnology is biofermentation for producing such a higher mass of microorganisms, especially in bacteria for biological control uses and bio-fertilizers production. These techniques can be classified first into technical modification of agronomic traits or second in pharmaceutical plant products and vaccines. The objectives of this study is: i) the contribution to define proprieties of plant biotechnology in Algeria, and to do this, we must target the goals of sustainable development taking into consideration our obligations to the global community in terms of international conventions which Algeria is part of, such as the preservation convention for biodiversity and conservation; ii) the study of some techniques for plant biotechnology applications in order to select the appropriate technologies after considering the cost, efficiency and available human skills, keeping in mind that Algeria has its own specific peculiarities in relation to genetic resources potential.

BT11

WATER STRESS EFFECTS IN INITIATION, GROWTH AND DIFFERENTIATION OF AESCULUS HIPPOCASTANUM COTYLEDON CALLI. Sajida A.Abood and Rana Tarek, Department of Biology, Faculty of Sciences, Al Mossel University, Iraqi. Email: www.sajida1187@yahoo.com

The research included study the effect of benzyladenine (BA)and naphthalene acetic acid (NAA) at 0.5,1.0 and 2.0 mg/l for each one in initiation and growth of callus from embryogenic axes removed cotyledons isolated from seeds of *Aesculus* hippocastanum. The results indicated that the best medium for initiation and growth of callus was Murashige and Skoog (MS) medium containing 2.0mg/l

of BA and 0.5mg/l of NAA depending on callus fresh weight which reached 10.19g after 45 days of growth. Shoots formation occurred on callus grown in medium containing 2.0mg/l of BA and 1.0 mg/l of NAA after 70 days of growth. The study included also the addition of polyethylene glycole (PEG 6000) at different concentrations of 0.5,1.0,1.5 and 2.0% to media and their effect on average fresh weight and some cellular contents of callus. After 30 days of growth, 1.0, 1.5 and 2.0% PEG caused decrease in average fresh weight of callus but 0.5% PEG led to an increase in callus fresh weight which reached 12.343g as compared to the control (9.530g). Furthermore, proline content increased with decrease in carbohydrates, proteins and nucleic acids(DNA&RNA) content extracted from callus grown in all PEG-containing media. There was reduction in callus induction ability and plant regeneration efficiency with increasing levels of PEG(6000) that were used to create water stress.

BT12

TRANSFORMATION OF T-DNA GENES TO COTYLEDONS OF SESAME (SESAMUM INDICUM L.) BY CO-CULTIVATION WITH A. TUMIFACIENS. Nihal E. Al- Taee¹, Sajida A. Abood¹ and Mozahim K. Al-Mallah², (1) Deartment of Biology, College of Science, University of Mosul, Iraq; (2) Department of Biology, College of Education, University of Mosul. Iraq, Email: nihalaltaee@vahoo.com

The results showed for the first time a successful co-cultivation of embryogenic axes removed cotyledons isolated from sesame (Sesamum indicum L.) seed (local cv.) with strain C58C1 Rifa (PM90) of Agrobacterium tumefaciens harboring Ti plasmid containing genetic marker of Rifa Res+ GentaRes+ considered as natural vector for transformation. It was found that 15 min. incubation was sufficient and efficient in the formation of big mass of tissues from these tiny cotyledons. When these tissues were placed on a synthetic medium (MS + 8.0 mg 1^{-1} BA +2.0 mg 1^{-1} (NAA using 3.0 g 1⁻¹ Agaros and 5.0 mg 1⁻¹ of silver nitrate). 7 shoots were differentiated. It is demonstrated This tissue was genetically transformed when placed on the selective medium containing 100 and 40 mg l⁻¹ of rifampicin and gentamycin, respectively.

BT13

GENITIC ENGINEERING OF APPLE (MALUS DOMESTICA BORKH.) FOR RESISTANCE TO FUNGAL DISEASES USING G2PSL GENE FROM GERBERA HYBRID (ASTERACEAE). N.M. Ali Bacha and A.M. Abdul Kader., General Commission for Scientific Agricultural Research (GCSAR), Biotechnology, Department, Douma, P.O. Box 113, Damascus, Syria, Email: nalibasha@live.com/; ahmadabdulkader2@gmail.com

In the present study, g_2ps_1 gene from Gerbera hybrida coding for 2-pyrone synthase which contribute for fungal and insect resistance was used. The aim was to work out an efficient approach of genetic transformation for apple cvs. 'Golden Delicious', 'Royal Gala' and 'MM111' and 'M26' rootstocks for improving their fungal resistance using genetic engineering techniques. Adventitious shoot formation from leaf pieces of apples studied was achieved using middle leaf segments taken from the youngest leaves from in vitrogrown plants. Optimum conditions for 'direct' shoot organogenesis resulted in high regeneration efficiency of 90%, 95%, 92%, 94% in the studied apples, respectively. Putative transgenic shoots could be obtained on MS media or 2.0 mg l⁻¹ TDZ with 0.2 mg l⁻¹ NAA in the presence of the mg 1⁻¹ BAP, B5 Vitamins, and selection agent "PPT" at 3.0-5.0 mgl-1. Shoot multiplication of transgenic shoots was achieved on synthetic media which contained MS + B5 vitamins + 1.0 mg l⁻¹ BAP + 0.3 mg l⁻¹ IBA, 0.2 mg l⁻¹ GA3+1.0 g/l MES+ 30 on: g/l sucrose + 7.0 g/l Agar, with the selection agent PPT at 5.0 mg l⁻¹ and were sub-cultured every 4 weeks in order to get sufficient material to confirm transformation of the putative shoots obtained. Six, seven, one and six transgenic clones of the apple genotypes studied, respectively, were obtained and confirmed by selection on the media containing the selection agent "PPT" and by PCR analysis using the suitable primers in all clones obtained for the presence of the selection" bar gene (447 bp) and the gene-ofinterest "g2PS1" (1244 bp), with transformation efficiency of 0.4%, 0.6%, 0.1% and 0.3%, respectively. These transgenic clones were multiplied further in vitro in the presence of the selection agent 'PPT' and were rooted in vitro. Rooted transgenic plantlets were successfully acclimatized and are being kept undercontainment conditions according to the biosafety bylaw in Syria to evaluate their performance for fungal resistance.

BT14

CALLUS FORMATION FROM TRANSGENIC HAIRY ROOTS OF CARROT PLANTS INDUCED BY AGROBACTERIUM RHIZOGENES R1601. <u>Amjad A. Mohammed¹</u> and Mozahim K. Al-Mallah². (1) Department of Biology, College of Science, University of Mosul, Iraq; (2) Department of Biology, College of Education, University of Mosul, Iraq.

The current study aimed to produce callus cultures from the transgenic hairy roots of carrot plant Daucus carota L. allowing the possibility of producing genetically transformed plants containing genes for resistance to diseases, drought and salinity conditions. The formation of transgenic hairy roots on carrot seedling stems inoculated with Agrobacterium rhizogenes R1601 was successful. This led to the efficient cultures of transgenic hairy roots when isolated from stems and cultured on the surface of solid MSO which exploited in the development of callus when transported to the solid MS supplemented with different concentrations of plant growth regulators NAA and BA and TDZ. The best media for callus initiation was MS medium +1.0 mg /L each of NAA and BA that developed to form callus cultures. Paper electrophoresis results demonstrated the present of agropine in hairy roots and callus initiated from it which proved the incidence of genetic transformation of these tissues.

BT15

SENSITIVIY STUDY OF DIFFERENT TOMATO VARIETIES FOR *TOMATO YELLOW LEAF CURL VIRUS* **BY USING PCR TECHNIQUE**. Abdulkareem Kassim Jabar Al- Molla¹, Hammadi Kadhim Jasim² and Mothana Ekaidi Al-Maadhedi³. (1) Ministry of Agriculture, Maysan Agricultural Directorate, Iraq; (2) University of Basra, Date palm Research Centre, Iraq; (3) Agricultural Research Directorate, Ministry of Agriculture, Iraq, Email: aqj_1958@yahoo.com

Polymerase chain reaction (PCR) was used to detect *Tomato yellow leaf curl virus* (TYLCV) for the first time in different tomato varieties grown in Iraq. The provinces surveyed were Basrah, Maysan, Karbala, and Baghdad. It has been shown that there are dissimilarities among varieties of tomato for the infection with TYLCV. The expected 400bp bands were amplified when infected varieties were assayed. Result also showed that this virus was recorded in some tomato varieties for the first time in Maysan province in Iraq.

BT16

EFFECT OF ECTOMYCORRHIZAL ON THE GROWTH OF PINUS BRUTIA AND AMYGDALUS COMMUNIS SEEDLINGS. <u>Rupak T. Abul Razaq.</u> Faculty of Agricultural Sciences, Sulaimani University, Sulaimania, Iraq, Email: ropak2004@yahoo.com

The study was conducted in Sarchinar forest nursery near Sulaimaniah during two successive seasons through two experiments one of them to produce pine seedling Pinus brutia Ten. and the other to produce almond seedlings Amygdalus communis L. Field experiments included the role of ectomycorrhizal fungi genus Boletus, levels of nitrogen and phosphorus addition in production of pine and almond seedlings by using sterilized and non-sterilized soils. Factorial experiment in complete randomized design was used for both experiments with four replications. Inoculation treatments were using no inoculation and using Boletus piperatus fungus spores that is common in the forests of Sulaimaniah region, nitrogen fertilization levels were (0, 10 and 20 kg/Donum) while phosphorus fertilization levels were 0, 20 and 40 kg/donum. Some growth characters such as seedling height, stem diameter and the dry matter content were included in this study. However, nitrogen and phosphorus content of the seedlings was measured in addition to roots infection rate with the mycorrhizal fungus. Analysis of variance was done for the collected data and LSD test was used to compare the treatments averages and correlation coefficient was determined among the characters. Results revealed that inoculation with ectomycorrhizal fungi significantly increased the target characteristics in pine and almond seedlings particularly seedling height, stem diameter and the dry matter and nitrogen and phosphorus content of the seedlings in both sterilized and non-sterilized soils. Nitrogen and phosphorus levels had no significant effect on some of these characters such as seedling height, stem diameter, dry matter and nitrogen and phosphorus content of pine seedlings, whereas it had significant effect on increasing all the above mentioned traits in almond seedlings, except for phosphorus content.

BT17

SENSINGOLIVEDISEASESUSINGVISIBLE/NEARINFRARED(VIS/NIR)SPECTROSCOPY.NawafAbu-KhalafandMazenSalman,TechnicalandAppliedResearchCentre(TARC),PalestineTechnicalUniversity,Kadoorie(PTUK),Tulkarm,P.O.Box7,Palestine,Email:nawafu@hotmail.comHermiteHermiteHermiteHermite

Olive (Olea europaea L.) is the most widespread agricultural crop in Palestine. Recent data available revealed that there are more than 10 million olive trees (67.3% of all fruit trees) grown in Palestine, covering more than 50% of agricultural land area grown with fruit trees. Olive production is very important to the Palestinian income contributing to about 13% of the national income in good years. Unfortunately, olive trees in Palestine are attacked by the peacock eye spot disease (olive leaf spot (OLS)) caused by the fungus Spilocaea oleagina. The life cycle of the pathogen requires an incubation period of at least two weeks depending on environmental conditions. Conidia of the fungus may remain viable for several months. Early detection of the pathogen is an important step toward towards developing management strategies. The use of visible/near infrared (VIS/NIR) spectroscopy might be a promising solution for sensing the severity and incidence of OLS before visual symptoms appear on the leaves. The method has several advantages e.g. fast, relatively cheap and accurate. This research aimed to investigate the possibility of using VIS/NIR spectroscopy for sensing the severity of OLS. Preliminary results showed that VIS/NIR can predict the latent severity of OLS with at least 70% accuracy. Interestingly, the classification rate of OLS using VIS/NIR increased with increasing OLS severity on olive trees.

BT18

MAPPINGVULNERABILITYOFAGRICULTURE TO PESTS AND DISEASE RISKSUNDER CHANGING CLIMATE IN DRY AREAS.Chandrashekhar M. Biradar¹, Fawaz Tulaymat¹, SafaaG. Kumari², Tebkew Damte³, Fouad Abbad Andaloussi⁸

, Rachid Moussadek⁸, Saadia Lhaloui⁴, Abdelhamid Ramdani⁸, Sanae Krimi Benchegroun⁴, Zafar Ziyaev⁵, Adane Abraham³, Berhanu Bekele³, Worku Denbel³, Seid A. Kemal⁶, Mustapha El-Bouhssini⁷ and Aden Aw-Hassan¹. (1) International Center for Agriculture Research in the Dry Areas (ICARDA), Amman, Jordan; (2) ICARDA, Tunis, Tunisia; (3) Ethiopian Institute of Agricultural Research, Addis Ababa, Ethiopia; (4) INRA, Settat, Morocco; (5) Kashkadarya Scientific Research Institute of Grain Breeding and Seed Production, Beshkent 3km, Karshi, Uzbekistan; (6) ICARDA, Addis Ababa, Ethiopia; (7) ICARDA, Rabat, Morocco(8) INRA, Rabat, Morocco, Email: c.biradar@cgiar.org

Global change (Climate variability and change as well as farming system) is becoming a norm and poses a serious threat to food security with increased concerns of agricultural vulnerability to pests and disease (P&D) risks. The nature and magnitude of the vulnerability of crops to P&D risks are not yet welldefined and uncertain in terms of spatio-temporal distribution which further hinders the effective implementation of pest management strategies and biosecurity policy planning for field crops. One of the foremost preventive measures is to map vulnerability of crops to specific P&Ds and its hotspots and hot-times curb and mitigate the risk in advance.

In this study, the fundamental ecological concepts that address factors governing species distribution has been taken as a foundation in development of P&D vulnerability maps for North Africa, Central Asia and Eastern Africa regions. The model combined geo-spatial climate data, crop phenology, persistence of pests and similarity conditions in conjunction with *in-situ* observations. The risk is measured by a vulnerability index where high values indicated a high potential for risks and subsequent epidemic developments in a given location. The initial results of the vulnerability of the crops to P&D under present and future climatic scenarios will be presented.

BT19

BUILDING A THEMATIC PORTAL AIMED AT CITRUS PROTECTION. Antonino Felice Catara, Marco Tomasello, Marcella Russo, Nicoletta Paparone, Vittoria Catara, <u>Rosa La Rosa</u>, Roberto Salemi and Patrizia Bella. (1) Science and Technology Park of Sicily, z.i. Blocco Palma I, Str.le Lancia 57, 95121 Catania, Italy; (2) Department of Agricultural and Food Science (DISPA), University of Catania, Via Santa Sofia 100, 95123 Catania, Italy; (3) Xenia Progetti srl, Via Acicastello 71, 95021, Aci Castello (CT), Italy, Email: larosar@unict.it

Accurate and rapid diagnosis is very important in controlling pests and diseases in a sustainable way and in preventing the spread of harmful organisms. Regional and global databases aimed at providing different kinds of solutions to plant protection have become particularly popular due to the general decline in expertise for identifying and diagnosing plant pests and diseases. Under the Rural Development Program of Sicily (PSR Sicilia 2007-2013), a portal based on the symptoms of citrus pests and diseases, environmental and nutritional factors, and genetic disorders was created (www.patagrumi.pstsicilia.it). It provides a rapid identification of pests and diseases, enables queries to be posted by sending pictures of new or uncertain symptoms, and gives feedback on the control guidelines and preliminary information on samples for lab analysis. More than 600 images were accessible by PC. Android or Smartphone, by searching by the affected part of the plant, host plant or disease name, as well as by free scrolling. Free downloads of publications and a dedicated connection with lab experts were also provided. In six months, more than 2800 users have visited the portal, which consists of more than 16,000 pages. Achievements during the development and management of the portal with possible future directions will be discussed.

BT20

AND MOLECULAR SPECTRAL CHARACTERIZATION OF NOVEL LEAF ENDOPHYTES AND INTEGRATED DISEASE OF **COLLETOTRICHUM** MANAGEMENT **GLOEOSPORIOIDES** CAUSING MANGO ANTHRACNOSE. Shaik Thahir Basha¹, M. Nagalakshmi Devamma² and N.P. Eswara Reddy³. (1) Microbiology Division, Department of Virology, Sri Venkateswara University, Tirupati-517502, Andhra Pradesh, India; (2) Department of Botany, Sri Venkateswara University, Tirupati-517502. Andhra Pradesh, India; (3) Department of Plant Pathology, S.V. Agricultural College, ANGRAU, Tirupati-517502. India, E-mail: thahirbashas@yahoo.com

The study reported in this paper provides molecular insight into the novel leaf endophytes evaluated for their broad-spectrum antifungal activity and suppression of the most devastating fungal pathogen, Colletotrichum gloeosporioides causing mango anthracnose, responsible for 30-60% postharvest losses affecting quality and quantity of the mango produced in Andhra Pradesh, India. Out of 350 samples, the leaf endophytes viz., STB10, STB83, SCB10 and SCB56 along with the compatible fungicide thiophanate methyl proved to be the best combination in combating the highly virulent pathogen in field trials and further delayed in ripening of the fruits up to 19 days. The potential endophytes cloned and identified by housekeeping 16S rRNA genetic marker. Furthermore, the bioactive molecule in the STB10 culture filtrate was characterized by UV, FTIR, LC-MS and NMR studies. The RAPD profiles with 115 random primers delineated the reproducible polymorphic bands ranging as low as 200 bp to as high as 4000 bp indicating high degree of polymorphism at nucleic acid level among the potential leaf endophytes. The unique bands of 100 bp and 250 bp amplified with the primer OPA-20 in STB20 was earmarked to develop SCAR markers. Studies on 16S rRNA-RFLP with molecular scissors viz., EcoR1, BamH1 and HindIII indicated diverged polymorphism in restriction banding pattern among the antagonistic leaf endophytes. The development of more economically sustainable talc based and liquid formulations of the novel leaf endophytes retaining higher bio control potential with maximum shelf life and the scope for commercialization will be discussed.

BT21

COPING STRATEGIES FOR TWO GENOTYPES OF SWEET PEPPER *CAPSICUM ANNUUM L.* **IN SALINE CONDITIONS.** <u>Karima Bouassaba</u>, Hakima Blttar and Sara Himour, Laboratory Development and Valuation of Genetic Resources, University Mentouri, Constantine, Algeria, Email: Karima2125@yahoo.fr

Salinity is a serious problem that have recently emerged and became a determinant for the productivity of most field crops and vegetables, including sweet pepper Capsicum annuum L. because of their impact on the physiological mechanisms. Accordingly, selection of resistant varieties to salinity and the search for resistance attributes that can distinguish genetic resistance was initiated. An experiment was conducted using a complete randomized design for two genotypes of sweet peppers Super maconi and Deux marconi during the seedling stage, containing 4 sodium chloride (NaCl) concentrations with four replicates for each treatment. Plant seedlings were grown under four NaCl concentrations: The control treatment with no salt added, the first treatment had NaCl concentration of 25 Mmol/L, the second treatment had NaCl concentration of 50Mmol/L, the third treatment had NaCl concentration of 150 Mmol/L. In the experiment, each of proline, sugars, minerals (sodium and potasium) were measured. Results obtained indicated that the cultivar Super maconi was more salt tolerant than Deux marconi.

BT22

PRESERVATION AND PCR AMPLIFIACTION OF PLANT PATHOGENCI FUNGI. <u>Muhammad</u> <u>Fahim Abbas</u>, Farah Naz, Aliya Tariq and C. Abdul Rauf, Fungal Plant Pathology Lab. Department of Plant Pathology, PMAS Arid Agriculture University. Rawalpindi, Pakistan, Email: fahimuaar@yahoo.co.uk

Long-term preservation of plant pathogenic fungi in a viable state plays a pivotal role for plant pathology, molecular and morphological identification, strategies development for new and re-emerging pathogens, breeding resistant plants and quarantine. *Fusarium oxysporum, Alternaria* sp., *Heminthosporium* sp. and *Rhizoctonia solan*i were isolated from lentil, tomato, mungbean and chickpea and preserved through sterile soil, mineral oil, distilled water and cereal grains methods. The preserved cultures were revived after 6, 12 and 18 months on nutritional artificial media and colony color, texture, colony growth rate and spore formation were recorded. Silica gel was observed reliable as compared to other preservation methods. Some isolates lost their viable character after long term preservation and nucleic acid of these pathogenic fungi was isolated. ITS region of pathogenic fungi was amplified (650 bp) using universal sense (TCCGTAGGTGAACCTGCGG) antisense and (TCCTCCGCT TATTGATATGC) primers through polymerase chain reaction (PCR) assay.

BT23

STUDY OF THE HEALTH STATUS OF CORK TREES AND ITS IMPACT ON CORK PRODUCTION. <u>Amina Ghalem</u> and Rachid Tarek Bouhraoua, Laboratry of Reaserch Scientifique Management and Conservation of Water, Soil and Forests, University Abou Baker Belkaid Tlemcen, Algeria, Email: aminaghalem@ymail.com

The cork oak forest are the largest forests in the Mediterranean region. They cover around 2.5 million hectars, and they are located in 7 countries including Algeria (16%). Such forests are characterized by a rich biodiversity of plants and animals. At present, such forests continue to deteriorate because of the deterioration of the health staus of the cork trees, which is a result of various factors including air pollution, insects and diseases, fires, over-extraction of cork and overgrazing. In this study, a range of cork trees of different health conditions in the western Algeria (Zariffet and M'Sila) were examined. A visual assessment was made over 10 years to estimate the proportion of lost foliage from trees. Trees were classified into four classes : Class 1 "healthy trees" where lost foliage was less than 25%, Class 2 " weak trees" with 25-60% defoliation, Class 3 "degraded trees" with 60-95% defoliation, class 4 represent "dead trees" with 100% defoliation. The results obtained showed that the health status of the trees varied from one year to another. In 2001 the proportion of degraded trees was 80% in Zarieffet and 93% in M'Sila. The period from 1999 to 2002 had negative effects on the health of cork trees because of decreased rainfall during this period. In 2006, a significant improvement in the health status of the same trees was noticed, and 80% of trees have a good health in Zarieffet and 60% in M'Sila. This observed variability in the health status of the cork trees suggest that they have the ability to tolerate difficult growing conditions. Trees have the ability to renew their foliage when the climatic conditions improved. This had an impact on the speed of cork growth, which is removed periodically from the tree. In trees with poor health, the speed of growth decreased from 7% in the coastal forest (M'Sila), to 12% in the mountain forest (Zarieffet). The decrease in cork growth led to a slow down in the production cycle from 2 to 3 years, causing economic damage and risk to kill weak trees when their cork was harvested.

BENEFICIAL INSECTS

BE1

PESTICIDES ALTERNATIVES FORTHE CONTROL OF BEE PESTS AND DISEASES IN HADRAMOUT PROVINCE, YEMEN. Ghazi Ali Mahrous, General Authority for Research and Extension, Sayoun, Hadramout, P.O. Box 9007, Yemen, Email maqtary75@yahoo.com

Bee keeping in Hadramout province is a very old practice that can go back to the tenth century. Yemen historically described as the honey land, when honey trade was rated fourth in Hadramout trade. Hadramout is known to produce high quality honey which is well known nationally and internationally. The price of Hadramout honey could reach 100 fold the average world price. The Hadramout ecology permits the growth of specific plant species that influence the quality of hone produced in that area. This study described all pests and diseases that attack bee hives in Yemen and chemicals used for their control. It also summarizes the effects of chemical residues on human health and on the environment. The study also summarizes the safe alternatives available for the control of these pests and diseases.

BE2

FORAGING AND POLLEN GATHERING ACTIVITIES OF HONEYBEE (APIS MELLIFERA) COLONIES DURING TALH (ACACIA GERRARDII) FLOW. Awad Mohamed Awad, Ayman Ahmad Owayss and Abdulaziz Saad Alqarni, Department of Plant Protection, College of Food and Agriculture Sciences, King Saud University, Riyadh 11451, P.O. Box 2460, Saudi Arabia, Email: awad.univ@gmail.com

Talh (Acacia gerrardii Benth.) trees are melliferous plants restricted to Africa and the Middle East. They contribute to fodder, stock pasture, traditional medicine and the production of major honey types harvested in Saudi Arabia. Data on activities of honeybee (Apis mellifera) colonies during Talh flow, which coincides with extremely hot-dry and often windy weather is missing. This study was conducted to evaluate the rates of out-going and pollen-gathering foragers of honeybee colonies during Talh flow for two subspecies of bees. The bee colonies collected food relatively well during Talh flow, although accompanied with extreme hot-dry and relatively windy weather. The indigenous (A.m. jementica) colonies collected food significantly better than the imported (A.m. carnica) colonies. The nectar-rich Talh trees reduced the negative effect of the hot-dry-windy weather. The foraging and pollen gathering activities are ruled by weather conditions and nectar secretion rate of the Talh trees. Consequently, they varied hourly, monthly and seasonally according to the variations in weather and Talh nectar secretion rate.

BE3

PERCENTAGE OF POLLEN GRAINS PROTEIN COLLECTED BY HONEYBEES WORKERS. Mahdi Mohammed Salih Saed, Plant Protection Department, Faculty of Agriculture, Mossul University, Iraq, Email: mahdialbadrani@vahoo.com

Chemical analysis of pollen grain collected by honeybees workers by pollen grain traps from fields near to Danadan region in Mosul city was conducted during 7April to 27October. Results showed that the collected samples differed in protein content as measured by its nitrogen content. The highest nitrogen content was found in samples collected in April, May and June and the lowest was in samples collected during September.

BE4

LABORATORY DETECTION OF BEES APIS MELLIFERA L. POLLEN CONTAMINATION BY HEAVY METALS. <u>Kamila Ward Shahir¹</u> and Karim Kadum Jalut². (1) Plant Protection Department, Agriculture College, Baghdad University, Iraq; (2) Department of Environment and Water, Ministry of Science and Technology, Baghdad, Iraq.

Seventeen pollen samples were collected from honeybee workers from hives from different Governorates (Baghdad, Babylon, Wasit, Najef, Mesan, Basra and Kirkuk). Contamination with Pb , Cd , Cu , Ni and Zn in pollen samples was detected in the laboratory of the Directorate of Environment and water Research, Ministry of Science and Technology in Baghdad. The results showed that all samples were contaminated with Pb (0.04–2.15 mg/kg). The concentration of Pb was high in Babylon-Mussiab and low in the governorates of Kirkuk, Basra and Mesan. The imported pollen samples (0.4-0.25 mg/kg) showed high contamination with Cd (0.01-0.03 mg/kg). The concentration of Cd was high in pollen from Babylon-Mussiab (0.03 mg/kg) and low in Baghdad, Najef, wasit , Mesan and Kirkuk (0.01 mg/kg). The imported pollen samples had a Cd concentration of 0.01- 0.03 mg/kg. The concentration of Cu was 1.47-7.55 mg/kg. The concentration of Ni contamination was 0.13-6.27 mg/kg, with highest concentration in Baghdad and Abu-Ghraib, and lowest in Kirkuk and Basra. The concentration of Zn was in the range 3.50-11.02 mg/kg, with highest concentration in Baghdad and Abu-Ghrainb, and lowest in Kirkuk. Results obtained that pollen collected in Iraq is safe.

BE5

BEE WORKERS FLIGHT ACTIVITIES DURING SPRING AND SUMMER SEASON UNDER THE CONDITIONS OF NINAWA PROVINCE, IRAQ. Muzahim A. Elsaiegh and <u>Mohammed K. Al-Hamdany</u>, Plant Protection Department, College of Agriculture and Forestry Mosul University, Iraq, Email: bee.mohammed@yahoo.com

The study was conducted in the Plant Protection Department, College of Agriculture and Forestry, Mosul Uniersity. Bee colonies of local hybrid bees and Iranian bees (Caucasian strains) were kept in locally manufactured Langstroth hives painted in white color. The results showed that the highest mean number of outgoing and incoming worker bees/minute from/to the hive was 51.85 and 49.41, respectively, in the SLH-P10 treatment, and the lowest mean was 23.32 and 27.01bees/minute in the SCI-P 5 treatment. The highest mean of propolis weight gathered by traps during spring and summer was 14.49 grams/colony in the SCI-P 10 treatment, and the lowest mean was 1.37 grams/colony in S L H-P 5 treatment. Seven plant sources were identified from which bees collected propolis in the study area.

BE6

COMPARTIVE STUDIES ON SOME CHEMICAL PROPERTIES OF TRADITIONAL AND UNTRADITIONAL HONEYS IN EGYPT WITH SPECIFIC REFERANCE TO EGYPTIAN HONEY STANDARDS. <u>H.M. Fathy</u>, E. I. Haggag, M. I. Sanad and M.R. Abd–El-Dayem, Economic Entomology Dept., Faculty of Agriculture, Mansoura University, Email: dr_hasen@yahoo.com

The present study was carried out during 2010 and 2011 to evaluate some chemical properties of traditional and untraditional honeys in Egypt with specific reference to Egyptian honey standards. The results showed significant difference between clover honeys and both citrus and untraditional honeys, while insignificant difference was found between citrus and untraditional honeys. Mean pH values in citrus and untraditional honeys was higher than in clover honeys. The free acidity values of ten citrus honey samples ranged from 10.17 to 22.67 ml.eq./kg, with a mean value of 16.64 ml.eq./kg, and from 11.50 to 20.25 ml. eq/kg with a mean value of 14.44 ml. eq/kg in clover honey, and from 12.00 to 39.83 ml. eq/kg with a mean value of 19.31 ml. eq./kg in untraditional honey. Total acidity values of citrus honey ranged between 20.34 and 33.00 ml. eq./kg with a mean of 25.49 ml. eq./kg and for clover honey ranged from 14.33 to 28.88 ml. eq./kg with a mean value of 24.14 ml. eq./kg., whereasin untraditional honey ranged from 14.17 to 57.16 ml. eq./kg with a mean value of 26.63 ml. eq./kg. The ash content in all traditional and untraditional honeys was acceptable by the Egyptian Standards (2005), that means ash content was not higher than 0.6 %, as it ranged between 0.0807 to 0.2638 % in citrus honey, and from 0.1240 to 0.1584 % in clover honey, and from 0.0896 to 0.3457 % in untraditional honey. Insignificant differences were found among all samples of clover honey, and significant differences between citrus and clover honeys.

BE7

PATTERN OF NECTAR SECRETION IN FLOWERS OF SIDR (ZIZIPHUS NUMMULARIA (BURM. F.) WIGHT & ARN) AND ESTIMATING ITS POTENTIAL IN HONEY PRODUCTION UNDER STREESED ENVIROMENTAL CONDITIONS. <u>Hail S. Raweh</u>, Ayman A. Owayss and Abdulaziz S. Alqarni, Plant Protection Department, College of Food and Agriculture Sciences, King Saud University, P.O Box 2460, 11451 Riyadh, Saudi Arabia.

This study was conducted at Rodhat Khoraim, about 120 km north eastern of Riyadh city. Pattern of nectar secretion of sidr flowers (Ziziphus nummularia (Burm. F.) Wight & Arn) was observed in two flowering seasons during 2013; the first or the main season from June to July and the second or the secondary season from August to October. Five sidr trees were chosen randomly during the flowering period and two different flower groups were marked (one group of one-day old flowers and the other group for two-day old flowers). All tested flowers were caged using Bridal-veil cloth. Nectar secretion was determined by washing technique in the following day times: sunrise (5 AM), forenoon (8 AM), noon (11 AM), afternoon (3 PM), and sunset (5 PM), according to the local time of Riyadh city. The results obtained showed that the opening of flowers occurred partially in the early morning before 6 am, i.e. during sunrise, while other flowers opened after sunrise. Nectar was secreted mostly during the 1st day of flower opening and the rest during the 2nd day, while in the 3rd day no nectar was secreted. Nectar secretion was low during sunrise (average 0.012±0.002 mg/flower) and increased gradually during forenoon (average 0.037±0.004 (average mg/flower)) and noon 0.099 ± 0.011 mg/flower), and reached a peak during afternoon (average 0.155±0.013 mg/flower) and decreased during sunset (0.101±0.010 mg/flower). The highest nectar secretion was during August followed by July and then September with averages of 0.09±0.011mg/flower, 0.09±0.009 mg/flower, and 0.08±0.008 mg/flower, respectively, whereas the least nectar secretion was recorded in June and October with an average of 0.06±0.009 mg/flower and 0.06±0.013 mg/flower, respectively.

BE8

ANTIMICROBIAL ACTIVITY AND TOTAL PHENOLIC CONTENT OF ALCHOHOLIC PROPOLIS EXTRACTS. <u>Mayadah Hajal</u>i, Bassam Al-Oklah and Rudwan Badr Al-Deen, National Commission for Biotecnology, Damascus, Syria.

Twenty five propolis samples from 9 Syrian provinces (Al-Qunaitera, Swaidaa, Damascus countryside, Hamaa, Idleb, Tartous, Lattakia, Aleppo and Al-Hasaka) and three samples from Jordan (Na'our, Jarash, and Jebiha), in addition to commercial samples (Hungarian, Chinese and Sakka Amini) were extracted using 70% alcohol. The extraction rate was 4.4681.16%, and the total phenolic content was 0.46-3.22 mg/100 g. The alcoholic extracts were applied on 4 Gram positive bacterial species (Staphylococcus haemilyticus, S. lugdunensis, Bacillus subtilis, B. cereus) and 4 Gram negative bacterial species (Enterocobacter cloacae, Citrobacter brakkii, Proteus mirabilis, Salmonella sp.) to determine the antibacterial activity in the range of 1/20 to 1/1280 of Meuller Hinton Broth (MHB). The results obtained revealed that the alcoholic extract of the Hungarian and Sakka Amini, and Al-gouta and Al-kalamon samples had the highest antibacterial activity. The most resistant species were Salmonella sp. and Bacillus cereus, whereas Enterobacter cloacae and Staphylococcus Haemilyticus were the most sensitive species among the Gram negative and positive bacteria, respectively.

BE9

SCREENING OF HONEYBEE COLONIES IN RELATION TO GROOMING BEHAVIOR AS A MECHANISM TO VARROA MITE, VARROA DESTRUCTOR, IN SOUTHERN SYRIA. Abdullaha Nouman¹, Majd Jamal² and Wafaa Yakoub³. (1) General Commission for Scientific Agricultural Research(GCSAR), Damascus, Syria; (2) International Center for Agricultural Research in the Dry Areas (ICARDA), Syia; (2) Department of Plant Protection, Faculty of Agriculture, Damascus University, Syria, Email: yako-ce@scs-net.org

beekeeping require Successful effective to control Varroa mite, which approach is characterized by rapid reproduction and spread. Existence of varroa tolerant honeybee lines or breeding programs depend on selecting honeybee colonies with varroa tolerance as the main step in its integrated management. Grooming behavior was measured by percent of fallen and injurious mites on the bottom board by checking mites cuticle and legs. No significant differences were observed among colonies, although there were apparent differences during the study period. Grooming behavior was notobserved in colonies characterized with low average daily fall of mites at less than one mite per day during 2008. The highest grooming behavior average (68.30%) was recorded in colonies with no specific standards of Syrian honeybee race during 2008. Grooming behavior was 40% in one colony in the second group during 2009. The first group colonies that were close to the Syrian race standards were variable during 2011. The highest and lowest grooming behavior averages were recorded in colonies belonging to this group. This may be due to different genotypes which varied in their defensive reaction against varroa mite. During 2009, the first group colonies were characterized by grooming behavior average of 31.47% as compared with 13.71% for the third group which was less closer to Syrian race standards and 26.79% for the fourth group which achieved the Carniolan race standards. A grooming behavior average of 22.1% for the fifth group achieved some Carniolan race standards. In 2011, the grooming behavior average was 47.57%, 41.75% and 38.56% for the first, second and third groups, respectively, based on their relatedness to the Syrian honeybee race.

BE10

MORPHOMETRICS OF APIS MELLIFERA L. AND APIS CERANA FAB. Mohammed M. Ibrahim, Y.S. Chandel and Anil, Department of Entomology, CSK Himachal Pradesh Agricultural University, Palampur 176 062 (H.P.), India

The morphometrics of workers of two honeybees hives, Apis mellifera and A. cerana were examined for their variability in Himachal Pradesh. In A. mellifera, head height x width, proboscis length, thorax length, abdomen length, fore wing length x width, cubital index, hind wing length x width, number of hamuli, coxa length, trochanter length, femur length, tibia length and metatarsus length x width were recorded as 3.14-3.22 x 3.64-3.72, 6.24-6.34, 4.14-4.38, 5.54-6.08, 8.88-9.25 x 2.97-3.02, 2.02-2.28, 6.20-6.48 x 1.78-1.82, 20.48-22.00, 1.06-1.18, 0.76-0.81, 2.41-2.55, 2.87-2.96 and 1.86-1.98 x 1.04-1.12 mm, respectively. In A. cerana, these parameters were recorded as 2.87-3.07 x 3.49-3.78, 5.35-5.46, 3.97-4.39, 5.18-6.01, 8.46-8.93 x 2.86-3.03, 2.70-3.38, 5.97-6.37 x 1.62-1.72, 18.64-19.90, 0.91-1.08, 0.63-0.76, 2.29-2.42, 2.72-2.95 and 1.83-1.97 x 0.98-1.07 mm, respectively. The mean of different locations of the above parameters of A. mellifera differed significantly as compared to A. cerana. The morphometrics of three characters (proboscis length, fore wing length and cubital index) of A. mellifera and A. cerana were compared with the earlier reports. In A. mellifera, mean proboscis length (6.29 mm) and fore wing length (9.13 mm) of the present studies were close to those of A. m. ligustica and A. m. meda. However, the cubital index was calculated to be 2.20 which was close to A. m. caucasica and A. m. anatoliaca. In A. cerana, mean proboscis length (5.41 mm) and forewing length (8.67 mm) were found to be close to those of A. cerana. However, cubital index value of A. cerana was 3.01, suggesting a wide variance.

RODENTS, BIRDS & SNAILS

RO1

ROLE OF TWO RAPTORS LANNER FALCON FALCO BIARMICUS AND OWL OF ATHENA ATHENE NOCTUA IN REGULATING POPULATIONS OF CROP PESTS IN A SEMI-ARID REGION IN ALGERIA. D. Berrabaha, F. Hoceini, B. Doumandji-Mitiche and S. Doumandji, Ecole nationale supérieure d'Agronomie ENSA (Département de Zoologie Agricole et Forestière, Alger, Algérie, Email: bdj1ina@yahoo.fr

In 2013, a study of the diet of two predatory birds in the region of Sidi Hadjras near the natural reserve Mergueb (Algeria) identified 19 pests prey species cultures. The results revealed the dominance of rodents in the food menu Lanner Falcon *Falco* biarmicus (Relative Abundance = 64.5%) and fields rat as the most abundant (RA = 90%) species, and birds. Insects were the most sought (RA = 95.72%) by the Owl Athene noctua, with Rhizotrogus sp. as the most consumed (RA= 59.91%) insect followed by Messor grandinidus with (RA= 12%) and Messor arenarius (RA = 10.9%). It appears from this study that these raptors play an important role in regulating many pests.

RO2

EUROPEAN STARLING STURNUS VULGARIS FEED ON OLIVE FRUITS ONLY IN THE EASTERN PART OF MITIDJA IN ALGERIA. <u>Hassiba Berrai</u> and Salaheddine Doumandji, National School of Agronomy, El Harrach, DZ-16200, Algiers, Algeria, Email: sabrina_berrai@yahoo.fr

The study of the diet of the European starling by the analysis of the contents of digestive tracts of Sturnus vulgaris captured in the oriental part of Mitidja (Algeria) highlights 157 species distributed between 1100 individuals. Invertebrates were distributed among five groups : Gastropoda, Arachnida, Myriapoda, Crustacea and Insecta. The insects were distributed in nine orders: Blattoptera, Orthoptera, Dermaptera, Mallophaga, Heteroptera, Homoptera, Coleoptera, Hymenoptera and Diptera. Coleoptera members were the most consumed by the starling, followed by Hymenoptera members. Social insects of the family Formicidae such as Tapinoma nigerrimum and Messor barbara were frequently ingested. Among the botanical species that dominated were fruits of Pistacia lentiscus and olives. The ingested preys belonged to various classes of sizes going from 1 mm to 55 mm. The factorial analysis of the correspondences applied to the species ingested by Sturnus vulgaris can be placed in four groups. The most important was group A which included omnipresent species such as Messor barbara, Olea europaea and Pistacia lentiscus. The analysis of variance applied to the diet of Sturnus vulgaris did not show significant difference between the three stations.

RO3

SURVEY AND SEASONAL DISTRIBUTION OF RODENT SPECIES AT A SHEEP FARM IN EL-KAWTHER CITY, SOHAG REGION, EGYPT. <u>Abd</u> <u>El-Aleem S.S. Desoky¹</u>, Saudi A.S Baghdadi² and Hosham S.K. Ahmed^{1,2}. (1) Plant protection Department (Zoology), Faculty of Agriculture, Sohag University, Egypt; (2) Agric. Zoology and Nematology Department, Faculty of Agriculture, Al-Azhar University, Egypt, Email: abdelalem2011@yahoo.com

The present work was aimed to identify rodent species in sheep a farm at Sohag University during December 2012 till November 2013. The results revealed the presence of three rat species, the Lesser garbia, *Gerbillus* sp., was recorded (1.08%); the Nile grass rat, *Arvicanthis niloticus* (4.44%.), and the white bellied rat, *Rattus rattus frugivorus* which was the dominant species (94.27%.). On the other hand, the highest population of rodent species were recorded in spring (34.41%) and summer (29.03%) followed by autumn (20.79% and winter (15.77%). These results can be useful in the development of a future strategy for implementation of rodent management programs in

cultivated and newly reclaimed agro ecosystems in Egypt.

RO4

THE EFFECT OF HIGH DOSES OF AQUEOUS EXTRACTS OF MELIA AZEDARACH AND NERIUM OLEANDER LEAVES ON LIVER AND KIDNEY TISSUES IN MALE SWISS RAT. Fatimah Qasim Mohammed, Biology Department, College of Science, Mosul University, Mosul, Iraq, Email: dr.fatma3000@yahoo.com

The present study was conducted to know the effect of high doses of aqueous extracts of Melia azedarach and Nerium oleander leaves on liver and kidney tissues in male swiss rats. These plants were recognized with high toxicosis and broad medical uses. Thirty mature male albino rats were randomly divided to three equal groups: control group and two treatments group. Control group was treated with drinking water, while the second group was treated with 75 g/kg body weight of aqueous extracts of Melia azedarach leaves. The third group was treated with 520 mg/kg body weight of aqueous extracts of Nerium oleander leaves. The results indicated that animals showed clinical signs of toxicosis one hour after treatment with extracts, these signs included allergic symptoms and weakness, frequent urination, diarrhea, nervous excitation, depression, convulsive movement and finally death of 4-6 rats were dead in each group within 24 hours compared with control group. Histopathological changes revealed acute cellular necrosis in hepatocytes, lymphatic infilteration, vacculation, coagulative necrosis and hemosiderin pigments in the liver. Kidney tissue showed hemolysis of cells lining renal tubules, extensive tubular necrosis with haemosidren pigment in the cytoplasm of convoluted tubular cells. The study revealed high toxic effect of Melia azedarach and Nerium oleander plants on liver and kidney tissues.

RO5

INFLAMMATORY EFFECTS OF IMIDACLOPRID ON THYROID ACTIVITY IN RATS. Leila Saadi1, Yasmine Mahboubi1, Khadija Bouknoi¹, Rafika Matallah² and Nemcha Lebaili². (1) Toxicology Laboratory, Biology and Cellular Physiology Department, Faculty of Natural and Life Science, University of Blida 1, Algeria; (2) Eco-Biology Laboratory, ENS. Kouba, Algeria, Email: saadileila4@gmail.com

Imidacloprid is a neonicotinoid insecticide and has been extensively used for crop pest and pet flea control because of its high specificity as an insecticide. Imidacloprid toxicity on mammalian tissues has not been adequately evaluated. In the present study, potential acute thyroid toxic effects of imidacloprid were analyzed in rats as a model of mammalian using inflammatory system. Two sub-lethal dose of imidacloprid (1/85 LD50 and 1/120 LD50) were administrated orally in two different rat groups and 30 days post-administration, the animals were sacrificed and thyroids were surgically removed. Exposure to imidacloprid led to significant decrease in FT3 and FT4 concentrations in plasma samples. Histopathological showed significant thyroid study parenchyma alterations, shrinkage of follicles, presence of collapsed follicles, loss of colloids and the presence of follicular squamous cells. These results suggest that imidacloprid cause inflammation in thyroid gland in rats.

RO6

THE ROLE OF GINGER IN CURING LUNGS HISTOLOGICAL DEFECTS OF ALBINO MICE EMBRYOS CAUSED BY FEEDING PREGNANT NIMALS WITH MICROWAVE-EXPOSED RATION. Janan H. Abdul-Fattah¹ and Noor S. Al-Taee². (1) College of Science, University of Mosul, Iraq; (2) College of Science, University of Koya, Iraq, Email: jananhaseeb@yahoo.com

This study was conducted to investigate the effects of consumption of ration exposed to microwaves radiation on histopathology of lung tissue of mice embryos, and the role of ginger Zingiber officinale in curing these effects. 100 Mus musculus pregnant mouse were used at age 10-14 weeks, their weight 25±2 gm, were divided into 10 groups: control group and nine experimental groups, 10 mice/group. Ginger was used in the form of aqueous extract with concentration of 1000 mg/kg body weight. The period of treatment was 18 days starting from the 1st day until 18th day of pregnancy which is the dissecting day. Embryos were fixed by Bouin's solution for 48 hr. cut as 5 μ and stained with Ehrlich's Haematoxylin & Eosin. The histopathological examination showed the presence of changes which increased with increasing duration of the exposure. Pathological changes of lung appeared as emphysema with thickening of the walls of alveoli as well as congestion of blood vessels. Groups which were with ginger extract showed treated reduced histopathological effects on lungs tissue of mice fed on ration exposed to microwave radiation for different periods of time.

RO7

EFFECT **OF** ROSEMARINUS **OFFICINALIS** AND PLANT H2O2 1% ON SOME PHYSIOLOGICAL, HISTOLOGICAL AND **BIOCHEMICAL PARAMETERS IN MALE MUS** MUSCULUS. Raja Mustafa Al-Annaz, Department of Biology, College of Science, Mosul University, Iraq, Email: rajaaalanaz@gmail.com

This study was conducted to investigate the effect of Rosemarinus officinalis powder 10 g/kg food against the oxidative stress induced by 1% H2O2 in drinking water in mature two months old male mice, 25-30 g in weight. The oxidative stress was determined by measuring the level of glutathione (GSH) and the level of malondialdehyde (MDA) in liver tissue. The study also evaluated the effects of 1% H2O2 on biochemical and hematological parameters. The mice were divided into four groups, 6 mice/group and treated for two months. The first group was the control, the second was treated with rosemary alone, the third group was treated by 1% H2O2 with drinking water and standard food, and the last group was treated with rosemary 10 g/kg with 1% H2O2 in drinking water. The results revealed that the powdered rosemary had an antioxidant activity which caused refreshing of hematology parameters (R.B.C, W.B.C, Hb, P.C.V.) as compared with control, with increased level of GSH and a significant decrease in MDA level. Results of this study endorsed previous findings that recommend the use of plants that have antioxidant activities such as rosemary to provide protection from oxidative stress.

RO8

BIOLOGICAL CONTROL OF INSECT PESTS BY THE SOUTHEREN GREY SHRIKE (*LANIUS MERIDIONALIS*) IN ALGERIA. <u>Ahmed Taibi¹</u> and Salaheddine Doumandji². (1) Abou Bakr Belkaid University of Tlemcen, Algeria; (2) National School of Agronomy, El Harrach, DZ-16200, Algiers, Algeria.

A total of 5513 preys were noted in 431 pellets of the Southern Grey Shrike Lanius meridionalis, [178 (East Mitidja), 599 (Oum El Bouaghi), 487 (Biskra) and 249 (Bouhannaq)]. The average preys per pellet varied from 6.1 to 16.5. In Ramdhania, Geotrupes sp. (11.9%) dominated in winter, Gryllidae sp. indet (27.6%) in spring and Messor barbara in summer (18.4%) and in autumn (79.4%). In Baraki, Messor barbara dominated in spring and autumn (13.1% and 70.6%, respectively). In El Medfoun, Geotrupes sp. dominated in winter (10.5%), Anisolabis mauritanicus in spring (13.8%), Acinopus sp. in summer (28.0%) and Messor barbara in autumn (22.5%). In Sidi Okba, Sepidium sp. dominated in winter, Bothynoderes sp. in spring and Cataglyphis bicolor in summer and autumn. In Bouhannaq, Geotrupes sp. dominated in winter (20.8%) and Aethiessa floralis barbara in summer (7.9%). The total richness of preys for L. meridionalis in all areas was 375 species [97 species in Bouhannaq and 222 species in Baraki]. In the menu, insects were the most represented (83.5% -91.8%).

RO9

FIRST RECORD OF FOUR SNAIL SPECIES IN EGYPT.<u>Marwa A.M. Genena¹</u>, Fatma A. Mostafa, A.H. Fouly and A.M. Yousef. (1) Biology Department, Faculty of Science, King Faisal University, Saudi Arabic; (2) Agric. Zoology Department, Faculty of Agriculture, Mansoura University, Mansoura, Egypt, Email: marwaaz2002@yahoo.com

In Egypt, the four land snail species namely; Allopeas clavulinum Potiez & Michaud, Opeas pyrgula Schmacker & Boettger, Helicodiscus singleyanus inermis Pilsbry and Vallonia pulchella (Muller) were recorded for the first time associated with various ornamental plants at Mansoura district, Dakahlia Governorate. These land snails were found to belong to three families; Subulinidae, Helicodiscidae and Vallonidae. The two species A. clavulinum and O. *pyrgula* belong to the subulinid snails characterized by having turret shape shell with seven whorls measuring 7.0-7.5 mm high and 2.3-2.5 mm wide for the former and 8.0 mm high and 2.0-2.2 mm wide for the latter. However. both of Н. singleyanus inermis (Helicodiscidae) and V. pulchella (Vallonidae) can be distinguished by having tiny flattened transparent shell with 4.5 whorls measuring 1.8- 2.2 mm high and 3.0-3.5 mm wide for the former and 1.2-1.3 mm high and 2.0- 3.0 mm wide for the latter. Moreover, shell color, shell aperture shape and the presence of umbilicus are taxonomic characters that differ among the four land snail species.

SUPPLEMENT These abstracts will be published on the ASPP website together with all abstracts

E60

ROLE OF OXALIC ACID AND MALIC ACID IN RESISTANCE TO CHICKPEA LEAF MINER. Lina <u>Ali¹</u>, Mustapha El-Bouhssin², Mohamed Imtiaz³ and Nawal Kakah¹. (1) The University of Aleppo, Faculty of Agriculture, Aleppo, Syria; (2) ICARDA, Rabat, Morocco; (3) CIMMYT, Pakistan, Email: lina.7755@gmail.com

The Research was conducted at ICARDA in 2010-2011 (spring and winter seasons), using High Performance Liquid Chromatography to find out the roles of oxalic and Malic Acids in resistance to chickpea leaf miner. We scored the damage in eight different resistance lines using a scale 1-9 where 1 = no mines and 9 = many miners in almost all the leaves. For the damage score, we found highly significant differences between the lines, with 2.75 in resistant line ILC 5901 in 2010-2011(spring and winter), whereas the damage score was 8.25 and 7.25 in the susceptible line ILC 3397, in 2010-2011 (spring and winter), respectively. Using HPLC to determine the concentrations of organic acids in the leaves, we found significant differences in the concentration of Oxalic acid between the resistant and susceptible lines. The concentration of Oxalic acid in the resistant line ILC 5901 was 2.316 and 2.265 in winter and spring season, respectively. Whereas in the susceptible line ILC 3397, the concentrations of Oxalic acid were 1.538 and 1.512 in winter and spring seasons, respectively. There was a negative correlation between the concentration of Oxalic acid and the damage caused by Leaf miner, and this relationship was significant in the spring season, indicating the role played by this acid in the resistance of these lines to Leaf Miner. There were significant differences between the lines in the concentration of Malic acid, but there was no correlation between the concentration of this acid and the resistance of the lines to Leaf miner, and this shows that this acid has no role in the resistance of chickpea to this insect. The content of oxalic acid in leaves could be used as a marker to screen chickpea germplasm for resistance Leafminer.

F68

STUDIES ON PATHOGENCITIY AND GENETIC DIVERSITY VERTICILLIUM DAHLIAE ISOLATES INFECTING OLIVE IN SYRIA. <u>Basima</u> <u>Barhoum¹</u>, Ahmed El-Ahmed², Taissir Abou Al Fadil³, and Miloudi Nachit¹. (1) General Commission for Scientific Agricultural Research, Latakia Center, Syria, (2) Department of Plant Protection, Faculty of Agriculture, University of Aleppo, Syri; (3) Ministry of Higher Education, Division of Special Education, Syria; (4) ICARDA, BIGM/Rabat, P.O. Box 6299, Rabat Instituts, Morocco, Email: basimabarhom@yahoo.com

Field surveys were conducted in the most olive growing areas in Syria in the following provinces: Aleppo, Idlib, Hama, Daraa, to determine the fields infected with verticillium wilt and to estimate its incidence. Samples were collected from infected olive branches showing symptoms of the disease, from which causative disease (verticillium dahliae) was isolated, and later the pathogenicity of the isolates were studied and their ability to drop the leaves of an indicator plant (cotton), under conditions of plastic house in ICARDA. The isolates were also described molecularly by using AFLP (Amplified fragment length polymorphism) tool in the laboratory of durum wheat at ICARDA, to study the degree of genetic diversity among them. The data were analyzed statistically using the Genstat7 and XLSTAT2011 programs. The results showed a higher incidence of verticillium wilt disease in the studied areas to four-fold compared to what it was in the nineties. The isolates differed among them in pathogenicity and ability to drop the leaves, they ranged from high (SH2, SE2, SH8), medium (SE1, SH1), to weak pathogenicity (SH2, SE2). In addition, the results showed that 40% of the tested isolates were defoliating pathotype, which is for the first time to be reported in Syria. Further, The study of molecular markers for isolates demonstrated that the isolates were grouped according to their pathogenicity and defoliating ability. Further a correlation was found between Mctt-Eagg and Mcac-Eatt with the defoliating v.dahliae isolates.

N36

DISTRIBUTION OF NEMATODE GENERA AND SEASONAL FLUCTUATION OF MELOIDOGYNE INCOGNITA WITH REFERENCE TO ITS CONTROL ON DATE - PALM TREES IN EGYPT. <u>A.E. Khalil</u>, and Samaa M. Shawky, Nematology Department, Plant Pathology Research Institute, Agricultural Research Center, Giza, Egypt, Email: ashraf_373@yahoo.com

Under field conditions, distribution (vertical and horizontal) of eleven nematode genera on three date-palm cvs. Barhi, Samani and Zaghlool. Seasonal fluctuation of *Meloidogyne incognita*, and its biological control on date-palm cv. Zaghlool were investigated during one year of 2012. Results indicated that all eleven nematode genera recovered were found in high densities at a depth of 30-50 cm for both types of whereas only genera viz. distributions, three Criconemoides, Tylenchus and Trichodorus were detected in low densities at depth over 50 up to 100 cm in the case of vertical. However, at depth of 50-100 cm only three genera e.g. Aphelenchus, Criconemoides and Tylenchus were recovered in low number in the case of horizontal. Meanwhile, seasonal fluctuation of M. incognita population (J2) showed generally high peaks

on date - palm cvs. Zaghlool, Samani and Barhi soil in August 2012, where Zaghlool cultivar ranked first in this respect. M. incognita (J2) population increased gradually during July, August and September on tested cultivars, then decreased in November and December 2012. Regarding M. incognita integrated biological control on date-palm cv. Zaghlool, dual treatments gave better results than single one for both percent reduction of reproduction factor and percentage increase of crop vield (78.1%), especially, Paecilomyces lilacinus + Datura stramonium treatment. Results also indicated amount increase in concentration of total sugar, total phenol, reducing sugar and free phenols in date-palm cv. Zaghlool of dual treatment than the single one, where *P*. lilacinus plus D. stramonium ranked first, however, the opposite trend was recorded in the case of total amino acids.

P25

LARVICIDAL ACTIVITY OF AROMATIC PLANT EXTRACTS AGAINST THE LARVAE OF CULEX PIPIENS VECTORS OF WEST NILE VIRUS. Mohamed Yassine Sayah¹, Abdelhakim El Ouali Lalami², Hassan Greech Hassan³, Youssef Rodi El Kandriy¹, Fouad Ouazzani Chahdi¹ and Faouzi Errachidi¹. (1) Laboratory of Applied Organic Chemistry, Faculty of Science and Technology Saiss, Morocco: (2)Regional Laboratory Fes. of Epidemiological and Environmental Health Diagnostic, Hospital El Ghassani, Fes, Morocco; (3) Laboratory of Development and Industrial Application, the National Institute of Medicinal and Aromatic Plants, Taounat Morocco, Email: sayah.m.y@gmail.com

In recent years Morocco has encountered the problem of insecticides resistance used in disease vector control program. This situation prompted us to use essential oils as insecticidal and larvicidal agents. After screening, we selected the common juniper (Juniperus communis), the mediterranean cypress (Cupressus sempervirens) and the lemon grass (Cymbopogon citrate) essential oils against Culex pipiens at the larval phase. The larvicidal effect of tested essential oils and a chemical insecticide used as control (Malathion), was used according to the World Health Organisation protocol. Essential oils have shown an interesting larvicidal activity against Culex pipiens, with an interesting lethal doses (LD₅₀= 64 ppm and LD₉₀= 210 ppm) of Juniperus communis essential oils and (LD₅₀= 80 ppm and $LD_{90}=$ 680 ppm) in the case of *Cymbopogon citrate* while gives onely a $LD_{50} = 90$ ppm. Chemical insecticides, showed a significant larvicidal activity with $LD_{50}=0,096$ ppm and $LD_{90}=$ 1.05 ppm.

EX31

PLANTS FROM SOUTH-WEST OF ALGERIA AS SOURCE OF TREATMENT AGAINST BAYOUD DISEASE. <u>Noureddine Boulenouar^{1,2}</u>, Abderrazak Marouf³ and Abdelkrim Cheriti². (1) Biological Sciences Department, El-Bayadh University, El-Bayadh 32000, Algeria; (2) Phytochemistry & Organic Synthesis Laboratory, Bechar University, Bechar 08000, Algeria; (3) Biological Sciences Department, Naama University, Naama 45000, Algeria. Email: noureddine.boulenouar@gmail.com

Fusarium oxysporum f.sp. albedinis (Foa) is the causal agent of a lethal disease of date palm "Phoenix dactylifera L." called Bayoud. The antifungal test against Foa was evaluated using direct bioautography for extracts from four medicinal and/or poisonous plants (Acacia raddiana, Asteriscus graveolens (Forsk.), Citrullus colocynhis (L.) Schrad, Pergularia tomentosa). The choice of extracts was based on activity against Foa using disc diffusion techniques and relative virulence. The most effective extracts (detected inhibition and relative virulence decreased below 50%) were chosen for direct bioautography test. Direct bioautography has a great importance based on effectiveness. Extracts from Acacia raddiana showed no effect on chromatograms. The best results were represented by ethyl acetate extract of Citrullus colocynthis fruits (7.75±1.06 mm) and ethyle acetate extract of Asteriscus graveolens stems (7.00 ± 1.41 mm). The efficiency of some species especially Citrullus colocynthis indicates the presence of highly sensitive targets in foa, which can be exploited for the development of efficient treatment against Bayoud.

BC57

EVALUATION EFFICACY OF SOME BIOAGENT IN PROTECTION OLIVE TREE AGAINST INFESTATION OF TERMITE *MICROCEROTERMES DIVERSUS* (SILV.). R.F. Al-Jassany¹ and M.A. Al-Salehi². Plant Protection Department, College of Agriulture, University of Baghdad, Iraq; (2) Biology Department, College of Science, Almustansiriya University, Iraq, Email: Radhialjassany@yahoo.com

The study was conducted to evaluate the efficacy of pathogenic nematodes Steinernema carpocapsae and Heterohabditis bacteriophora at 10⁶ and 10⁷ infective larvae (IJ)/ml distilled water and the fungi Beauvaria bassiana at 10⁶ and 10⁷ spores/ml distilled water against termite *M. diversus* on olive trees during 2005-2006 season. Results showed that the two species of nematodes caused high reduction in the density of termite workers in the beginning of treatment and this effect was disappeared during the following four mounts of treatment. B. bassiana inhibited the infestation with termite on trees for three months, while the workers continued its activity with high density in the control treatment. The workers reinfested olive trees treated with nematodes and fungi but at low density with significant difference compared to the control. Results of the study showed that soil and olive trees treatment with S. carpoeapse, H. bacteriophora and B. bassiana have lid to the mortality of high numbers of termite workers with weaken termite colonies but not totally eliminated, therefore it is necessary to repeat the application of the bioagents every 6 months to obtained good control of termite on olive trees.

BC58

STUDY THE IMPACT OF DIFFERENT TEMPERATURE LEVELS ON PATHOGENIC **EFFICACY** SOME FOR STRAIN **ENTOMOPATHOGENIC NEMATODES** SOME 1SOLATED FROM ORCHARDS IN DAMASCUS GOVERNORATE. Amani Jawish, Abdulnabi Basheer and Khaled Al-Assaa, Plant Protection Department, Faculty of Agriculture, University, Damascus, Syria, Email: Damascus amanijawish@vahoo.com

Study was conducted to verify the pathogenic efficacy of six nematodes strains isolated from soil of some fields of Damascus Governorate using the concentration of 250 individual/ml on the last stage wax worm, Galleria mellonella larvae under different temperatures (15-20-25-30°C), where three isolates, belong to the genus Heterorhabditis and three isolates belong to Steinernema. The assessment of effectiveness was calculated depending on the knowledge of the death and reproduction rate of the nematodes under different temperature Levels. Results showed that the temperature 25°C is optimal for all isolates used in terms of the death rate, as results showed that the isolates of the genus Steinernema more adapted to low temperatures compared to Heterorhabditis isolates, where these isolates had the highest percentage of death AT 15°C, while the Heterorhabditis isolates achieved the highest rate of death when the temperature was 30°C. The time required to kill 50% of the wax worm larvae at different temperatures was calculated, it decreased with increasing temperature for each of the isolates. The results showed that the shortest life cycle was at the temperature 25°C, whereas at 15°C Steinernema isolates were the fastest in the life cycle, while the life cycle of the Heterorhabditis isolates was slow and long at this temperature. where infectious individuals exited after long of infection. When the temperature was 30°C Heterorhabditis isolates were the fastest in life cycle. The reproduction rate of the isolates were calculated under different temperatures and the results showed that Steinernema isolates gave the highest density of the infectious stage at the temperature 15°C, also achieved Heterorhabditis isolates had the highest concentration of the infectious stage at 30°C whereas infectious individuals of Steinernema isolate RST did not exit at this temperature. and the few infectious individuals that emerged from the isolates RM-RTA of the genus Steinernema at the temperature 30°C were vitality weak.

BC59

ENTOMOPATHOGENICNEMATODESHETERORHABDITISBACTERIOPHORAANDSTEINERNEMAFELTIAESUPPRESSIVEROOT

KNOTNEMATODESMELOIDOGYNEINCOGNITAON TWO CUCUMBER CULTIVARSAND INCREASE OF GROWTH. Yones M. Bder andLuma Al-Banna, Plant Protection, University of Jordan,Email: Younis_bader@yahoo.com

Two growth chamber experiments were conducted to investigate the suppressive effects of EPN on RKN: one performed on the cucumber cultivar RS 189F1 and the second one on the cucumber cultivar Beit alpha. Each experiment included 14 treatments on which two doses, 200 and 1000 IJ/pot (1000c³ peatmoss), of each EPN isolate either simultaneously or preceding the inoculation of RKN (8 egg masses/pot) were applied on pots filled with peatmoss and planted with cucumber seedlings. Cucumber plants treated with RKN only, EPN only, and untreated plants were served as controls. Treatments were replicated 16 times. Four plants were harvested from each treatment every week up to four weeks. Foliage weight, roots weights, and number of galls and egg masses on roots were recorded for the four weeks periods. Results showed that the application of the two isolates of EPN alone or in combination with RKN increased both foliage and root weight over those of RKN only treatment and moreover most of the treatments have higher foliage and root weights than untreated control plants. The application of EPN three days before RKN inoculation inhibited or greatly suppressed the galling and egg mass production in both cucumber cultivars compared to plants inoculated with RKN alone. While, when EPN were added at the same time of RKN inoculation, a considerable number of galls and egg masses were observed especially when low dose of IJs of EPN were used. However, the number of galls was still lower than those plants inoculated only with RKN alone.

BC60

POPULATION DYNAMICS OF THE HIBISCUS MEALYBUG MACONELLICOCCUS HIRSUTUS GREEN (HOM., PSEUDOCOCCIDAE) AND ITS PARASITOID ON GUAVA TREES IN MADABA. Muna Al-Fwaeer¹, <u>Ibtihal Abu-Obaid¹</u>, Firas Al-Zyoud², Asem Abo-Alosh¹, Manal Halaybeh¹. NCARE, Baq'a, 19381 Jordan; (2) Department of Plant Protection and IPM, Faculty of Agriculture, Mu'tah University, Karak, 61710, Jordan, Email: ibtihal@ncare.gov.jo

The hibiscus mealybug, *Maconellicoccus hirsutus* Green (Hom., Pseudococcidae) is distributed throughout the world, and attacks a wide spectrum of host plants including Guava. *M. hirsutus* causes direct and indirect damages to the Guava plants. However, no attention has been paid on the effect of abiotic and biotic factors on *M. hirsutus* in Jordan. Therefore, the present study aimed at investigating the population dynamics of *M. hirsutus* on guava taken into account the effect of direction, time, temperature and associated parasitoid throughout the 2009/2010 growing season in Madaba District - Jordan. The results indicated that *M. hirsutus* nymphs have three peaks. The adult females appeared in early February with very low numbers, while the most presence of the females occurred in mid July. Males appeared also in early January and then in late July and early August. The highest number of the parasitoid, Anagyrus sp. was reported during February. According to the direction, adults were significantly the highest in North followed by West and South. In regards to all stages (eggs, nymphs and adults), the pest was significantly found more in East (391 individuals), followed by West (359 individuals) and South (350 individuals). In the other hand, the parasitoid individuals were significantly higher in North and West, followed by South. There was a positive and significant correlation between the number of *M. hirsutus* nymphs and the parasitoid, Anagyrus sp. (r = 0.444, P = 0.039), and *M. hirsutus* adults and *Anagyrus* sp. (r = 0.403, P =0.050). Moderate mean temperature and RH seem to be favorable for the pest, since most of nymphs and adults occurred during these conditions. It is to be mentioned that the infestation by the pest reached up to 98%. In conclusions, the current study provides basic information about the population dynamic of the pest and its associated parasitoid, and this will help positively in controlling the pest in Jordan successfully.