ARAB AND NEAR EAST PLANT PROTECTION NEWSLETTER

Food and Agriculture Organization of the United Nations

The Arab Society for Plant Protection and the Near East Regional Office of the FAO jointly publishes the Arab and Near East Plant Protection Newsletter (ANEPPNEL), three times per year. All correspondence should be sent by email to the Editor (aneppnl@gmail.com).

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Food and Agriculture Organization of the United Nations

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EDITORIAL

Distance Learning: a Modern Approach to Provide Knowledge in the Wake of Corona Virus Pandemic

Following the fast spread of Covid 19, leaving behind millions of affected people with relatively high mortality rate worldwide, so many businesses, industries, congresses, educational institutes… etc. were all affected for many months, in the hope that such disaster will disappear soon. Months passed with increased danger and people learned that educational, commercial, industrial and economic activities need to keep moving, and this was only possible through the advances provided by the information technology companies which permitted the establishment of different platforms that enabled reliable distance communication tools. Platforms such as Zoom, Microsoft Team and Google Meet, to mention few, are good and successful examples. Such platforms permitted a very successful mean in permitting societies to continue doing business while staying at home, and distance communications through virtual sessions became the common approach for most institutions private or public. In 2020, most institutions including schools and universities continued their mission in a virtual manner, and it is not clear for how long this will continue. Distance communication and learning has its own advantages and disadvantages. Among the advantages, it is time and cost saving, and people can do their job while staying at home, with no or reduced travel costs which has a positive impact on carbon emissions. At the same time meetings, workshops, congresses are recorded, which permits interested individuals to go back to the recordings at their own convenience.

The disadvantages, however, are many since the efficient use of the communication tools, especially for distance learning, require intensive training which is costly, the presence of different time zones makes coordination of activities around the world a bit difficult, in addition to the fact that the ultrastructure in poor countries do not permit efficient use of these advanced technologies. In addition, distance learning do not have the warmth of direct contact. Nevertheless, keeping societies going half speed is far better than reaching a halt.

The Arab Society for Plant Protection (ASPP), knowing that many scientists are staying home, was able to recruit around 30 scientists, through email distance communication, to write a book entitled: Plant Protection Challenges in the Arab Region: Vision of 2050. The book was written in 2020 and printed in Beirut and became available for distribution in December, 2020. Furthermore, and upon request from the Near East Regional Office of FAO (FAO-RNE) a new "Dictionary of Biotechnology Terms in Food and Agriculture"

with 7000 terms (Arabic-English, English-Arabic) was written by seven selected scientists and was recently submitted to FAO-RNE, and it is expected to be published in 2021.

Besides, ASPP collaborated with EUPHRESCO and other international organizations in writing a "Compendium on Plant Health Research Priorities for the Mediterranean Region" which was published in 2020. In addition, ASPP continued to publish its journal "Arab Journal of Plant Protection (four issues/year) and the Arab and Near East Plant Protection Newsletter (three issues/year), and not to mention other achievements which continuously increase over time, to keep the society alive and vibrant to achieve the ambitions of the plant protection scientific community by keeping up-to-date with global advances, to help members collectively and effectively contribute towards sustainable agricultural development in the Arab region and conserving its environment.

Ibrahim Al-Jboory and Khaled Makkouk

Arab Society for Plant Protection

❖ Crop Protection News from Arab and Near East Countries

INVASIVE AND NEW PESTS

ALGERIA

First Report of *Fusarium equiseti* causing Crown Rot and Damping-off on Durum Wheat in Algeria.

The isolation of Pathogens from wheat seeds sampled from fifty-nine locations in North-eastern Algeria showed the existence of the species *Fusarium equiseti* for the first time in the seeds of the durum wheat in Algeria. The identification was carried out on the basis of macroscopic and microscopic characteristics and confirmed by Molecular identification. The pathogenicity test was performed, on three durum wheat varieties to determine the impact of this isolate on the coleoptile and basal part of durum wheat. The results showed that *Fusarium equiseti* caused a significant diminution in length and emergence rate of coleoptile by 48.99 and 44% respectively, and a decrease in the length of the root and vegetative systems by 45.63 and 27.12%, consecutively. It also caused a diminution in the fresh weight of the root and vegetative systems by 45.65 and 22.52%, respectively. **[Amor Bencheikh, Noureddine Rouag, Walid Mamache, Imene Belabed (Algeria), Archives of Plant pathology and Plant Protection 2020].** https://doi.org/10.1080/03235408.2020.1804303

EGYPT

Three New Species of Mites (Acari: Acaridae and Histiostomatidae) Extracted from the Soil under Pomegranate Trees, Assiut, Upper Egypt.

Three new species (*Caloglyphus punicum* n. sp., *C. azzai* n. sp. and *Myianoetus granatum* n. sp.) represented only by their hypopial nymphs (heteromorphic deutonymphs), extracted from the soil under pomegranate trees, Assiut, Upper Egypt. The holotype deutonymph and paratype deutonymphs of each species are deposited in the Acari collection of Plant Protection Department, Faculty of Agriculture. Assiut University, Assiut 71526 Egypt. The descriptions and illustrations of the three new species are given below. **[Eraky, S.A.[1]; Abdelgayed, A.S.[2]; Abd El-Wahed, N.M.[2]and Ali, A.M.[1] (Egypt), [1]Plant Protection Department, Faculty of Agriculture, Assiut University, Assiut 71526 Egypt, [2]Plant Protection Research Institute, Agricultural research center, Dokki, Giza, Egypt, Egyptian Academic Journal of Biological Sciences, 13(3): 147-156 ,2020]. Email:** seraky53@yahoo.com; ahmed.abdelgid@yahoo.com

Two New Species of *Caloglyphus* Berlese, 1923 (Acari: Acaridae) from Soil in Egypt.

Two new mite species of the genus *Caloglyphus* Berlese, 1923 (Acari: Acaridae) are described and illustrated based on deutonymphal stages collected from mango orchards in Assiut, Upper Egypt. The new species, *C. mangiferus* sp. Nov. and *C. similares* sp. Nov., were extracted from soil samples under the mango trees. The new species are characterized by having a pair of short peduncles globosely setae situated dorsosublaterally on the idiosoma. **[Sayed A. Eraky, Fatma A. Marei, Mohamed A. Nasser & Mohamed W. Negm(Egypt), Department of Plant Protection, Faculty of Agriculture, Assiut University, Egypt; Egypt. Acad. J. Biolog. Sci., 13(4): 65–72, 2020]**

IRAQ

Pestalotia: Crown Rot of Strawberry Disease 1st Report in Iraq.

Strawberry (*Fragaria ananassa* Duch.) considered as mostly locally important consummated vegetable crop in Iraq. Infected plants collected from strawberry farm of Horticulture Department, Agriculture & Forestry Collage,

University of Mosul, Ninevah governorate, North Iraq, during the spring 2018. From tissues being infected, fungus being isolated and identified initially according to its morphological features utilizing hyphal and conidial structures. According to cultural and morphological features, the *Pestalotia* sp. was detected as strawberry pathogen. Fungus pathogenicity was confirmed also via postulates of Koch. This was confirmed by the molecular identification test, methodology confirmed it. Molecular fungal identification pathogen was performed via implementing transcribed internal spacer (ITS) conserved ribosomal region of DNA. All sequences as ITS proved homologous to isolates of *Pestalotia rhododendri* in database of Gen-Bank at similarity % of 100. At Gen-Bank, Iraqi isolate was assigned No. MN128595.1 as Accession. Up to our best knowledge, this is *P. rhododendri* 1st molecular strawberry record in Iraq. **]Huda Hazim Wafi AL-Taae and Ali Kareem Al-Taae (Iraq), Department of Plant Protection. Agriculture and Forestry College, University of Mosul,** Iraq .htaae@yahoo.com**, Plant Cell Biotechnology and Molecular Biology 21(41&42):61-66, 2020[.**

The First Record to moth of *Ocnogyna loewii* zell. (arctiidae: lepidoptera) on Wheat Plants in Iraq and Evaluate Efficacy of some Aqueous Plant Extracts against its Caterpillars.

The study was carried out in the plant pathology Lab in Directorate of Diyala Agriculture during March-April, 2016. The objective of the study was to evaluate aqueous plant extracts *viz. Azadirachta indica*, *Nerium oleander*, *Eucalyptus* sp against caterpillars of *Ocnogyna loewii*, the factorial experiment was conducted with three replications were set up for each treatment. Mortality percentage of caterpillars was increased significantly in treatments *Eucalyptus sp* 76.0%, *Azadirachta indica* 74.0% and *Nerium oleander* 70.6% as compared with control 46.6%, means of intervals were significantly different with increased gradually in percent mortality 37.3, 52.0, 77.3, 86.6 and 92.6% after 7, 14, 21, 28 and 35 days respectively, *A. indica* and confidor were showed maximum percent mortality 100% after 35 days. All aqueous plant extracts of *A. indica*, *N. oleander* and *Eucalyptus sp* have larvicidal activity against caterpillars of *Ocnogyna loewii*. **[Hussein Ali Salim, Majida Hadi Mahdi Alsaady and Liqaa Mohammed Shiblawi (Iraq), Directorate of Diyala Agriculture, Ministry of Agriculture, Iraq, Plant Archives Vol. 20 No. 1, pp. 1366-1370,2020].**

JORDAN

First Report of *Spodoptera frugiperda* in Jordan

2020/213

The NPPO of Jordan recently informed the EPPO Secretariat of the first record of *Spodoptera frugiperda* (Lepidoptera: Noctuidae – EPPO A1 List) on its territory. Moths collected by sex pheromone traps which were placed near commercial maize fields (*Zea mays*) in the northern Jordan Valley, as well as larvae feeding on maize, were sent to the University of Jordan Insect Museum, School of Agriculture, on the 9th of September 2020. Based on morphological characteristics of adult males including genitalia, chaetotaxy of larvae, and external morphology of pupa, the samples were identified as *Spodoptera frugiperda*. For the moment, no significant damage has been observed on infested plants. Intensive surveys and monitoring using pheromone traps will be continued in the infested area and in other agricultural areas. In addition, public awareness campaigns will be conducted. Control campaigns will be conducted if needed, especially in maize fields. **[EPPO Reporting Service 2020 no. 10 –Pests**].

Fall Armyworm *Spodoptera frugiperda* first appeared and recorded in Jordan

Samples of infested corn, larvae of Lepidoptera and adults from pheromone traps collected from the northern Jordan Valley were sent on 13/8/2020 to the Insect Museum at the University of Jordan by workers in the Directorate of Plant Protection and Plant Health at the Jordanian Ministry of Agriculture. This was as part of the joint cooperation between the Ministry of Agriculture and the University of Jordan. The pest was identified as the fall army worm based on the anatomy of the male genitalia and on the distribution of seta on the outer surface of the larvae. Accordingly, a team from the Ministry of Agriculture conducted a field visit in 26/8/2020 to the Northern Jordan Valley with Prof. Ibrahim Al-Juboori, President of the Arab Society for Plant Protection, Prof. Ahmed Katbeh, an insect taxonomist at the University of Jordan and Eng. Mansour Shkerat in order to inspect the field infestation and collect additional samples from the pest. Recently, infested corn samples were received on 9/12/2020 from the southern Jordan Valley, showing the presence of the fall army worm, which indicated the wide spread of

the pest in the Jordan Valley. The Ministry of Agriculture developed a plan to monitor the pest since 2018, which included training courses to engineers and technicians presenting data on monitoring, identifying and controlling the pest. The use of pheromone traps is intensified. The preparation of an integrated control program for this pest is being discussed in addition extension programs for farmers. The survey continues during November and December in Dear Ala'a and in the Shuna Al-Janoubia which revealed dispersion of fall armyworm in all corn fields in Jordan. [**Ahmed Katbeh-Bader, Ibrahim Al-Juboori, Setan Al-Serhan, Mansour Shkerat and Heba Obeidat 2020].**

First Report of Cucurbit Chlorotic Yellows Virus from Cucumber Plants Affected by Interveinal Yellowing Disease in Jordan.

In April 2017, virus-like symptoms, including chlorosis on the upper leaves and interveinal chlorotic spots with brittleness on middle and lower leaves, were observed in cucumber cultivar Banan plants grown under three plastic houses in the Jordan River Valley, Jordan. Disease incidence ranged from 30 to 35%, and affected plants were infested by dense whitefly populations. The observed symptoms were similar to those caused by whitefly-transmitted viruses of the genera *Crinivirus* (family *Closteroviridae*) and *Ipomovirus* (family *Potyviridae*) and by the aphid-transmitted *Polerovirus* (family *Luteoviridae*). To identify the potential agent(s) causing these symptoms, 185 samples from symptomatic plants and 29 from asymptomatic ones were subjected to total RNA extraction using the SV-Total RNA Extraction kit (Promega, U.S.A.). The samples were tested by RT-PCR using species-specific primers and protocols (Boubourakas et al. 2006; Lotos et al. 2014; Orfanidou et al. 2014; Papayiannis et al. 2005). Cucurbit chlorotic yellows virus (CCYV) was detected in 152 of 185 symptomatic samples with primers targeting a fragment of the RNA-dependent RNA polymerase (RdRp) (Orfanidou et al. 2014), and cucurbit yellow stunting disorder virus and cucumber vein yellowing virus were detected in 48 and 10 samples, respectively. All 214 samples were negative for beet pseudo-yellows virus and cucurbit aphid-borne yellows virus, and no virus was detected in the asymptomatic plants. To confirm the presence of CCYV, eight selected RdRp-specific PCR amplicons (757 bp) were purified and ligated into pGEM T-Easy Vector (Promega), and two clones from each product were sequenced (GenBank accession nos. MT248933 to 40). BLASTn analysis showed that the nucleotide sequences shared 93 to 99% identity to RdRp of 32 CCYV isolates from East Asia, the Middle East, North Africa, and the United States. Moreover, transmission of CCYV by *Bemisia tabaci* MEAM1 was carried out from singly infected cucumbers cultivar Banan. Approximately 1,000 whiteflies that were maintained on cucumber (cv. Beta) in isolated insect-proof cages were given an acquisition access period (AAP) of 48 h on cucumber plants singly infected by CCYV. Groups of 30 whiteflies per plant were transferred onto 27 healthy cucumber plants (cv. Cetiriolo Marketmore) in insect-proof cages at the three- to four-leaf stage for an inoculation access period (IAP) of 48 h. A group of 180 whiteflies without an AAP were transferred onto six healthy cucumber plants of the same cultivar to serve as negative controls. After the IAP, all plants were treated with the insecticide Confidor, maintained in a growth chamber, observed weekly for symptom development, and tested by RT-PCR for the presence of CCYV 30 days postinoculation (dpi). Seventeen of the 27 test plants developed yellowing symptoms on lower leaves and tested positive for CCYV by RT-PCR at 21 dpi. The virus specificities of the amplicons were verified by sequencing. No symptoms appeared on the six control plants, which also tested negative for CCYV by RT-PCR. The presence of CCYV in Jordan may have serious epidemiological implications for the cultivation of cucurbits in Jordan and neighboring countries where the virus is prevalent (Abrahamian et al. 2012; Al-Saleh et al. 2014; Orfanidou et al. 2017). Further research is necessary to determine the incidence of CCYV in cucurbit and noncucurbit plant species in Jordan and consequently improve the knowledge about its epidemiology, including its natural host range. **[Salem, N. M., Araj, S., Abu Muslem, M., Bess, H., and Katis, N. I. (Jordan), Plant Disease, Published Online: 8 Oct 2020].** https://doi.org/10.1094/PDIS-03-20-0674-PDN

LEBANON

Tomato Spotted Wilt Virus Associated with Lettuce dieback in Bekaa Valley, Lebanon.

In August 2019, lettuce plants (*Lactuca sativa*) of Romaine hybrid showing virus-like symptoms such as brown necrotic spots, necrosis and drying out of one section of the lamina were observed in three fields located in Bekaa Valley (Bar Elias, Terbol and Zahlé areas) at various incidence (7%, 10% and 15%, respectively). Plants which became infected at an early stage grew poorly and often died. Samples from 32 symptomatic and 10 asymptomatic plants were collected from the three fields and were subjected to DAS-ELISA using commercially antibodies against alfalfa mosaic virus (AMV), tomato spotted wilt virus (TSWV), cucumber mosaic virus (CMV) and impatiens necrotic spot virus (INSV) (Loewe, Germany) (Clark and Adams 1977). All symptomatic plants reacted positively with the TSWV antiserum and no positive reaction was obtained from the asymptomatic plants. AMV, CMV and INSV were not detected. To confirm the occurrence of TSWV, primers L1 and L2 (Mumford et al.1994) were used to amplify a 276 bp fragment of the L RNA segment. PCR products of two positive samples (RAK-5.AS-1 and RAK-5.AS-4) were purified using PCR Purification Kit (Qiagen, USA) and sequenced in both directions. BLAST analysis of the sequences (GenBank accession numbers LR878364 and LR878368) revealed 98.1% and 99.2% nucleotide identity, respectively, with TSWV isolate TRAntToMVEgp from Turkey (KC261947). TSWV was previously reported on tomato in the Byblos coastal area (Abou-Jawdah et al. 2006) but this is the first identification of TSWV on lettuce plants in Bekaa Valley. **[Elia Choueiri[1], Fouad Jreijiri[1], Maria Saponari[2] and Raied Abou Kubaa[2]. (Lebanon) Department of Plant Protection, Lebanese Agricultural Research Institute, Tal Amara, P.O. Box 287, Zahlé, Lebanon. CNR Istituto per la Protezione Sostenibile delle Piante, via Amendola 122/D, 70126, Bari, Italy. Journal of Plant Pathology 25.11.2020** https://doi.org/10.1007/s42161-020-00711-2

SYRIA

First Record of *Tarsonemus amygdali* (Acari: Tarsonemidae) Associated with the Almond Bark Beetle *Scolytus amygdali* Geurin-Meneville, 1847, (Coleoptera: Scolytidae) in Syria.

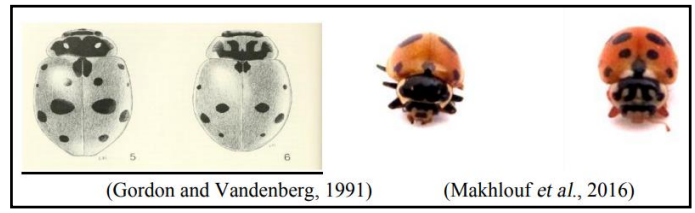
The mites Tarsonemus amygdali (Acari: Tarsonemidae) associated with the almond bark beetle *Scolytus amygdali* Geurin-Meneville, 1847, (Coleoptera: Scolytidae) were recorded in some of the almond groves *Prunus amygdali* and cherry *Prunus avium* in the regions of Arnah and Rankos in the Damascus Countryside Governorate. The mite was defined in the Center for Research and Studies of biological Control at the Faculty of Agriculture, Damascus University, using specialized classification keys, depending on some formal characteristics of the female and the male (Gnathosoma, Idiosoma, the length of the first, second, third and fourth pair of legs, the length of the Tarsal seta of fourth pair of legs, body length and body width). Mites are usually found attached to setae, to grooves in the tarsi, under the wings, and under the elytra. Symbiotic relationships between bark beetles and mites, in which adult beetles transport them, live under the bark of trees infested with beetles, and mites transfer fungi spores to the beetles to feed on. Mites too can be beneficial or detrimental to beetles. Some mite species can contribute to the fungal diversity in beetle galleries by transporting spores within and between trees impacting the behavior**. [Abeer Saleh Al-Abdullah, Wajih Qassis, Abdulnabi Basheer, (Syria), Department of Plant Protection, Faculty of Agriculture, University of Damascus, Majd Jamal ICARDA,2020].**

A New Record of *Blastodacna libanotica* Diakonoff, 1939 (Lepidoptera, Agonoxenidae) on Pear Trees in Latakia Governorate, Syria.

One year old pear shoots showing galls symptoms had been collected during December 2019, Kasab, Latakia, Syria Collected material was kept under lab. Conditions till the emerging of the adult insect from each gall at the end of April. Adult insect species that belong to microlepidoptera was identified to be *Blastodacna libanotica* Diakonoff. This is a new record of this species from Syria.[**Mahran Zeity, Bayan Muzher, Ola Al-Halabi, Saher Al-Halabi, Raafat Albahlool and Majeda Mofleh (Syria), Syrian Journal of Agricultural Research – SJAR 7(4): 486-491 August 2020]. Dr. Mahran Zeity E-Mail:** mzma2009@gmail.com

First Report of Polymorphism of Hippodamia variegata (Goeze) (Coleoptera:Coccinellidae) in the Coastal Area of Syria (Latakia Governorate).

In this study, various morphological patterns of *Hippodamia variegata* (Goeze, 1777) (Coleoptera: Coccinellidae) were identified. Adult specimens were collected from various places of the Syrian coastal area, in Lattakia governorate, and reared in the laboratory at different temperatures (15, 20, 25, 30 and 35)˚C during the period 2014-2016. Different colorations were noted in various forms on the elytron. The number of patches located on the elytron was variable and ranged from 3 to 7 spots. Depending on the number, size and shape of these spots,37 morphs of *H. variegata* were identified.



[Mohammad Ahmad [(1)] Majeda Mohammed Mofleh[(2)] and Hiba Makhlouf[*(3)], (Syria) [(1).]Department of Plant protection, Faculty of Agriculture. Tishreen University, Latakia, Syria. [(2).] General Commission for Scientific Agricultural Research (GCSAR). Damascus, Syria. [(3).] Scientific Agricultural Research Center in Latakia, (GCSAR). Damascus, Syria, Syrian Journal of Agricultural Research – SJAR 7(3): 449-453 June 2020]. hibalim87@gmail.com

Record of the African fig fly, *Zaprionus indianus* Gupta, 1970 (Drosophilidae: Diptera) in southern Syria

In the fall of 2020, severe infections with fruit worms were observed on the common fig *Ficus carica* in the governorates of Sweida and Quneitra in southwestern Syria. Also, large numbers of vinegar-like flies were observed flying on the fig fruits on the trees. Samples were collected from those flies and of the infected fig fruits in the south of As-Suwayda, Orman, and in the southwest of Quneitra governorate, Harfa. Larvae are kept in insect rearing boxes until adult insects appear. Fruit flies and vinegar flies were classified according to the approved classification keys of the insect (Yassin and David, 2010; KREMMER et al., 2017), and the associated insects were defined through the morphological description using their classification keys. Most of the insect's present (> 90%) were the African fig fly *Zaprionus indianus* Gupta, 1970 (Drosophilidae: Diptera). The insect was mainly distinguished by its large size compared to the common vinegar fly, by the two longitudinal white stripes running from the head bristle to the scutellum of the thorax of the adult insect, and by the serrated base dark bristles/spines arising from the forefemure, five large ones on upper side and two on the other. It is believed that this is the first record of this insect in Syria. This species is considered an invasive pest in the region and is on the EPPO Alert list 1 and has recently been registered in several countries of the region, such as Jordan, Iraq, France and Tunisia. Infection in samples collected from the Quneitra governorate was associated with the Mediterranean fruit fly *Ceratitis capitata* Wiedemann (Diptera, Tephritidae). The infection of the African fig fly was about 1% at the first observation in the beginning of October 2020, and the infection rate reached 100% of the fruits at the beginning of November 2020. This insect was only noticed on the yellow fig fruits. This insect is currently being studied in the laboratory and field, and the host range in the local environment**.**

[Wa'el Almatni, Entomologist, Damascus, Syria, 2020].

New Report for Fall Armyworm *Spodoptera frugiperda* (Smith) (Lepidoptera: Noctuidae) In Syria.

The Syrian Ministry of Agriculture, within the early warning system for pests, has installed pheromone traps in the southern border regions since the end of the 2017-2018 season to monitor and surveillance the fall armyworm upon entering the Syrian lands. This action was done after FAW pest invaded the entire African continent in 2016-2017 pheromone traps have been distributed in the provinces of Hums, Hamaa, Alghab, Qunaitera, Reef Damascus and Daraa province was excluded due to unstable security conditions during this period. After it was announced that the pest was present in Jordan in October 2020, field inspection tours were intensified in the fields and vegetable markets and technical information was distributed to raise the awareness. Indeed, the presence of this pest's larvae was detected in the governorate of Daraa - Tafas on the border with Jordan and it is believed that it entered through

insect flight path. The larvae were collected and send to the laboratory of the Plant Protection Directorate on November 4, 2020 for the morphological diagnosis of the larvae, where the yellow letter Y was observed upside down on the head prominent and the presence of four square-shaped black spots on dorsal of the second last segment and four smaller dorsal spots in a trapeze arrangement on most of other segments. A dorsal pale middle and a pair of side lines (Al-Jboory, 2017). The larvae were placed in laboratory culture, awaiting emergence of adult insects. After its registration was announced, the Ministry of Agriculture set up an integrated management program for it and mobilized all prevention staffs in the governorates to limit its spread, as it is considered an invasive insect, which is a quarantine insect included in the EPPO A1 list. FAW is able to invade more than 350 plant species and flies to 100 km in a single generation before laying eggs. It has high fertility, and acquired a resistance to many insecticides in the original home in the Americas. The pest is a great challenge to Agriculture and needs to mobilize all the tactics and extension services to face the pest in particular on corn, sorghum. Wheat, millet and other crops. **[Ayad Mohamed, Dima Annahhas, Khaled Hainon, Hassan Samadi, Raied Abou Kubaa (Syria), Directorate of Plant Protection, Ministry of Agriculture and Agrarian Reform, December, 2020]**

RESEARCH HIGHLIGHTS

ALGERIA

Mycoherbicide Potential of *Alternaria alternata* (Fries.) Kiessler and its Formulations on the Host Weed *Xanthium strumarium* L. This study evaluated the mycoherbicidal potential of *Alternaria alternata* (Fries.) Kiessler on cocklebur (*Xanthium strumarium* L.), a noxious weed in Algeria. Conidial suspension, a rapeseed-oil-based liquid formulation and a sodium-alginate-based solid formulation, all with 10^6 conidia/ml, as well as the herbicide (Mustang®) at a reduced dose (0.45 L/ha) were compared. Inoculum was applied on detached leaves of cocklebur under laboratory conditions and on 4–5 leaf stage cocklebur seedlings in pots in a greenhouse and in the field. Disease severity was highest following application of the liquid formulation in the detached leaf assay (95.5%) as well as in the pot (80%) and field (43%) experiments. Similarly, the oil-based liquid formulation reduced cocklebur height, root length and dry weight by up to 50%, 27% and 58%, respectively in pot trial and 40%, 51% and 45%, respectively in the field experiment. The conidial suspension ranked second in efficacy, followed by the solid formulation. Mustang® showed the highest herbicidal effect. None of the crops tested for host specificity including tomato, wheat, faba bean and zucchini was susceptible to the fungus. Our findings suggest that *A. alternata* has potential as biocontrol agent of cocklebur especially when applied in an oil-emulsion-based formulation**. [Nessma Abdessemed[1], Youcef Anis Bahet [1] and Nadjia Zermane[2]. (Algeria), Biological Control Sciences and Technology (30)-1300-1315, 2020].** https://doi.org/10.1080/09583157.2020.1814692

Chemical Analyses, Antioxidant and Antifungal Effects of Oregano and Thyme Essential Oils alone or in Combination against Selected Fusarium Species. Essential oils (EOs) extracted from aromatic plants are interesting natural products due to their large therapeutic potential and benefits as natural preservatives. In the present work, the chemical composition, antioxidant, and antifungal effects of the essential oils of *Origanum vulgare* (oregano) and *Thymus vulgaris* (thyme), alone or in combination, were investigated. The chemical analysis was performed by gas chromatography (GC) and gas chromatography-mass spectrometry (GC-MS) techniques. The antioxidant activity was investigated using a DPPH radical scavenging activity assay. The *in vitro* antifungal activity was evaluated by disc diffusion, agar dilution, and spore germination inhibition methods against *Fusarium* species isolated from dry rot of potato tubers, whereas the combined effect of the two essential oils was evaluated by the checkerboard technique. GC and GC-MS analyses resulted in the identification of 37 and 41 components in *T. vulgaris* and *O. vulgare* EOs, representing 80.17% and 93.00% of the total oils, respectively. The main compound of thyme oil was thymol (46.97%) and that of oregano oil was carvacrol (59.03%). The DPPH scavenging assay showed a high antioxidant capacity for both essential oils, alone or in combination. The antifungal activity revealed that *O. vulgare* and *T. vulgaris* oils exhibited a great potential antifungal activity with minimal inhibitory concentration (MIC) values of 0.078 - 0.156 µL/mL and 0.156 - 0.313 µ L/mL, respectively. The fractional inhibitory concentration index (FICI) of combined applications of the tested oils ranged from 0.375 to 0.500, suggesting synergistic interactions. Moreover, the oils were found to be effective against the spore germination of all tested *Fusarium* species. In vivo experiments against *Fusarium oxysporum* with wounded potato

tubers supported these results. The findings indicated that both essential oils, alone or in combination, possess antioxidant and antifungal properties and can therefore be used as a potential source of bioactive molecules for preventing lipid peroxidation and fungal contamination of food. **[Bounar, R, Krimat, S. Boureghda, H and Dob, T (Algeria), International Food Research Journal, 27(1): 66 - 77, 2020].** http://www.ifrj.upm.edu.my/ifrj-2020-27-issue-1.html

Sensitivity of *the Pyrenophora teres* Population in Algeria to Quinone outside Inhibitors, Succinate Dehydrogenase Inhibitors and Demethylation Inhibitors. Net blotch of barley caused by *Pyrenophora teres* (Died.) Drechsler, is one of the most destructive diseases on barley in Algeria. It occurs in two forms: *P. teres* f. *teres* and *P. teres* f. *maculata*. A total of 212 isolates, obtained from 58 fields sampled in several barley growing areas, were assessed for fungicide sensitivity by target gene analysis. F129L and G137R mitochondrial cytochrome b substitution associated with quinone outside inhibitors (QoIs) resistance, and succinate dehydrogenase inhibitors (SDHIs) related mutations (B-H277, C-N75S, C-G79R, C-H134R, and C-S135R), were analyzed by pyrosequencing. *In vitro* sensitivity of 45 isolates, towards six fungicides belonging to three chemical groups (QoI, demethylase inhibitor, and SDHI) was tested by microtiter technique. Additionally, sensitivity towards three fungicides (azoxystrobin, fluxapyroxad, and epoxiconazole) was assessed in planta under glasshouse conditions. All tested isolates were QoI-sensitive and SDHI-sensitive, no mutation that confers resistance was identified. EC50 values showed that pyraclostrobin and azoxystrobin are the most efficient fungicides *in vitro*, whereas fluxapyroxad displayed the best disease inhibition *in planta* (81% inhibition at 1/9 of the full dose). The EC50 values recorded for each form of net blotch showed no significant difference in efficiency of QoI treatments and propiconazole on each form. However, in the case of fluxapyroxad, epoxiconazole and tebuconazole treatments, analysis showed significant differences in their efficiency. To our knowledge, this study is the first investigation related to mutations associated to QoI and SDHI fungicide resistance in Algerian *P. teres* population, as well as it is the first evaluation of the sensitivity of *P. teres* population towards these six fungicides. **[Hamama-Imène Lammari, Alexandra Rehfus, Gerd Stammler, Hamida Benslimane (Algeria), Plant Pathology Journal. 36(3) : 218-230,2020].**

EGYPT

The Effects of Mating on the Reproductive Fitness of *Microplitis rufiventris* (Hymenoptera: Braconidae). The synovigenic braconid parasitoid, *Microplitis rufiventris* Kokujev is a promising wasp for use in augmentative releases against young larvae of some noctuid pests, including *Spodoptera littoralis* (Boisduval), in Egypt. It also has the potential to control the invasive noctuid *Spodoptera frugiperda* (J.E. Smith) in Africa. *M. rufiventris* is monandrous in the wild but is polyandrous under some laboratory rearing conditions. *S. littoralis* larvae were used as hosts to gain an understanding of the influence of mating on wasp-fitness. Newly emerged females (0-3 h old) of *M. rufiventris* were assigned to one of six mating schedules: Virgin females mated once (on day 1, 3 or 5) or 3 times during their life or provided daily with fresh virgin males. These mating schedules affected fecundity, reproductive longevity and sex ratio of the progeny. The life time fecundity of wasps mated on day 5 or mated three times was higher than that of other females, but their reproductive longevity was significantly shorter. In most cases, offspring production per female per day decreased with age. Mated *M. rufiventris* females produced significantly more progeny than virgin females. The progeny of virgin females consisted only of males, females that mated once had strongly male-biased sex ratios, whereas multi-mated females had a more female-biased sex ratio. More sperm was stored in the spermatheca than the number of daughters produced in any of the mating schedules. Age at first mating affected the lifetime fecundity. At death, the ovaries of mated wasps contained significantly more mature eggs than those of virgin wasps, indicating that mating increased egg production. This information can help enhance the efficiency of parasitoid mass-rearing and their use as biocontrol agents of noctuid pests. **[Esmat M. Hegazi, Christophe Bressac, Wedad Khafagi (Egypt), Eur. J. Entomol. 117: 266-272, 2020].** DOI: 10.14411/eje.2020.030

Climate Change Impact on the Population Size of *Parlatoria oleae* (Colvee) (Hemiptera: Diaspididae) using RCP scenarios. The present study was carried out to predict the population densities of the plum scale insect, *Parlatoria oleae* (Colvee) on mango trees during three time series (2011-2040, 2041-2070 and 2071-2100) under four Representative Concentration Pathway (RCP) scenarios (2.6, 4.5, 6.0 and 8.5) as compared with the current population of the pest (average of population density for two years of 2017 and 2018) at Esna district, Luxor

Governorate, Egypt. Monthly estimations of total *P. oleae* population indicated the presence of three peaks of insect activity per year. The means of minimum air temperature were entirely under the optimum range for activities of nymphs, adult females and total population of *P. oleae* and this climatic factor was the most effective variables in population changes by 35.99, 36.00 and 36.30% for nymphs, adult females and total population of *P. oleae* during the base year data, respectively. The percentages of explained variance (E.V.%) indicated that the combined effect of these climatic factors viz., maximum temperature, minimum temperature and solar radiation were responsible for 78.75, 77.15 and 78.66 % of the population changes of nymphs, adult females and total population of this scale insect, respectively. The obtained results revealed the all expected values for numbers of nymphs, adult females and total population of insect during the all different time series under all different RCPs scenarios were smaller in comparison to the current population of insect. Expected total population of insect will be smaller at time series of (2071-2100) as compared with the two time series of (2011-2040) and (2041-2070) under the scenarios of RCPs (2.6, 4.5, 6 and 8.5). Also, the time series of (2071-2100) exhibited higher percentages of decreasing of the number of nymphs, adult females and total population with averages of (55.12, 57.26 and 56.08%, respectively) as compared to the time series of 2041-2070 (53.26, 55.34 and 54.20%) and the time series of 2011-2040 (50.91, 52.92 and 51.81%, respectively). Furthermore, the RCP 8.5 scenario exhibited the lowest population density of nymphs, adult females and total population *P. oleae* and the highest decreasing percentage for population density of different stages of *P. oleae* as compared with the other RCPs during all different time series**. [Moustafa M.S. Bakry, Lamiaa H.Y. Mohamed and Shimaa Y.E. Shakal (Egypt), Scale Insects and Mealybugs Research Deptartment, Plant Protection Research Institute, ARC, Dokii, Giza, Egypt. Plant Protection Department, Faculty of Agriculture and Natural Resources, Aswan University, Aswan, Egypt. International Journal of Research in Agricultural Sciences, 7(3): 132-149, 2020].**

Complementary Description of *Panonychus caricae* Hatzinikolis, 1984, with the Resurrection of the Genus *Sasanychus* Ehara, 1978 (Acari, Prostigmata. Tetranychidae). A complementary description of *Panonychus caricae* Hatzinikolis, 1984, is presented based on the morphology of adult female and male individuals collected from fig trees (*Ficus* sp., Moraceae) in Greece. Morphological differences between *P. caricae* and two closely related species, *P. ulmi* and *P. hadzhibejliae*, are discussed. *Panonychus caricae* can be separated from two other *Panonychus* species using the length of the female dorsal setae in combination with the ratio between the length of female dorsal opisthosomal setae f2 and h1, and the ratio between the length of dorsal setae sc1 and h1. A phylogenetic maximum likelihood tree was constructed based on the cytochrome c oxidase subunit I (COI) gene of mitochondrial DNA (mtDNA) from 10 species of the subgenus *Panonychus* s.str. (Including the re-described species *P. caricae*) and the only two species of the subgenus Sasanychus. The phylogenetic tree indicates that these 12 species are clearly separated from each other. The two subgenera, Panonychus s.str. and *Sasanychus*, comprise strongly supported monophyletic clades with 98% bootstrap values. The convergence of molecular and morphological data (dorsal setae set on tubercles or not, number of tactile setae on tibiae I and II, and patterns of the dorsocentral striae) suggests that Sasanychus should not be classified under the genus *Panonychus*. Consequently, molecular and morphological evidence supports the resurrection of the genus *Sasanychus*, which contains two species, *S. akitanus* (Ehara) and *S. pusillus* Ehara & Gotoh, as distinct from *Panonychus*. A key to the world species of *Panonychus* and *Sasanychus* is also provided. **[Tea Arabuli, Ilia State University, Georgia, Tomoko Matsuda, Nihon Biodata Corporation, Kanagawa, Japan, Mohamed W. Negm(Egypt-Japan), Ibaraki University, Japan; Assiut University, Egypt,Tetsuo Gotoh, Ryutsu Keizai University, Japan. Zootaxa 4881(3): 515–531, 2020]**

A New Strategy for Controlling Three Devastating Pests Attacking Date Palm Plantations in El Bahariya and Siwa Oases, Egypt Through using A Special Group of Natural Enemies. Egypt is considered the world leader in date production; yet, *Batrachedra amydraula* Meyrick, *Arenipses sabella* Hampson *and Virachola livia Klug* are threatening this position. This study aimed to set a new strategy by using six parasitoids and predators, *i.e. Trichogramma* sp., *Bracon* sp., *Goniozus* sp., *Chrysoperla* sp., *Coccinella* sp. and *Orius* sp. to trap the different pests' stages in El-Bahariya and Siwa Oases' palm plantations. By the end of the season of each pest, *A. sabella* and *V. livia* infestation% in El-Bahariya control farm recorded 92.1 and 51%, respectively, while *B. amydraula* recorded 40.2%. Infestation declined when natural enemies were released, *i.e.* 0, 1.1 and 1.1%, for the three pests, respectively. In Siwa, infestation in control recorded 52, 40.2 and 43%, while dropped in treatments to 0, 2 and 2 %, for the three pests, respectively. Using this combination of natural enemies was effective and it is recommended to integrate this strategy in palm plantations IPM programs in Egypt, mainly, in protectorates, where using pesticides is prohibited. **[Salwa S.M. Abdel-Samad, Hala A. and M.K. Abbas (Egypt), Plant Protection**

Research Institute, Agricultural Research Center, Cairo, Egypt Central Laboratory for Organic Agriculture, Agricultural Research Center, Cairo Egypt, Egypt. J. Agric. Res., 97 (1), 2019].

IRAQ

The Effect of Bees Feeding on Different Concentrations of Ginger Extract on Some Biological Aspects of Artificially Fertilized Queen Bees *Apis mellifera*. The perception of advantages of honey bee *Apis mellifera* to humans is the important reason to keep searching in this field, this study has led to finding out some effects of the use of ginger extract with feeding bees on some biological aspects of queen bees *Apis mellifera* which artificially fertilized. The results showed that the use of ginger extract, especially treatment T6 (1 volume of feeding mixture number 1 + 1 volume of feeding mixture number 3). It was noticed a significant increase in the total area of honey, brood and pollen collection which reached 8072, 12180 and 9617 square inch respectively, besides increasing of productive age of queen bees which artificially fertilized reached 138.3 days . **[Ahmed J. M. AL-Shammary, Hikmat K. Jassem, Haithim A. Saeid and Ahmed S. Sajit (Iraq), Syrian Journal of Agricultural Research – SJAR 7(4): 446-454 August 2020].**

Terrestrial Plants as Indicator of Pollution in Basrah, Iraq. *Conocarpus erectus, Ziziphus jujube, Phoenix dactylifera* L., *Tamarix aphylla* and *Albizia lebbeck* were chosen in four different areas of Basrah (southern Iraq) and for different times during 2015 to test their tolerance to air pollution, leaves used to estimate the physiological evidence which showed that the low and highest values in December and May respectively, pH values were 4.55-8.67 in *Albizia lebbeck* and *Tamarix aphylla* respectively, and values of ascorbic acid 0.08-10.33 mg/g in *Ziziphus jujube* and *Albizia lebbeck* respectively, content aqueous leaves were 55.96-98.76% in *Albizia lebbeck* and *Ziziphus jujube* respectively, total chlorophyll recorded were 0.01-0.13 mg/g in *Phoenix dactylifera* and *Albizia lebbeck* respectively, while the lowest and highest values of air pollution index were (6.42-14.18) in *Albizia lebbeck* during December and May straight as well. The rise in temperature had a role in raising the sensitivity of plants to air pollutants, and the data showed the variance of values, which is due to the variation of air pollution. **[Amal A.** Mahmood, Luma J. Al Anber and Amal M. Eassa (Iraq), Syrian Journal of Agricultural Research – SJAR 7(4): 455-466 August 2020].

Morphological Characteristics of the Flatheaded Tree borer *Sphenoptera servistana* Obenberger, 1929 life stages in the habitat of stone fruit orchards in central Iraq. Flatheaded tree borer is one of the important pests that threatens stone fruit trees in many countries of the world including Iraq. Detailed studies of some of the morphological and life stages of the *Sphenoptera servistana* (Coleoptera: Buprestidae) were carried out during 2019-2020 in pear, peach, plum and apricot orchards around Baghdad. The characteristics of the life stages of the borer egg, larva, pupa, adult and the development period, in addition to the population dynamics of the emerged adults were investigated on infested trees under field conditions. The results obtained revealed that the borer eggs have an oval shape, white color, 0.77 mm wide and 1.60 mm long. The incubation period was 12-14 days. The larva has a head fused with thorax, the pronotal segment is enlarged, has a creamy color, 3.3 mm wide and 21.3 mm long, 119 mg weight and development duration is from 210-270 days. The pupa was white creamy in color, 5.7 mm wide,13.8 mm long, 85 mg in weight and the development period lasted 14-18 days. The adult male was elongated with a metallic shiny color, 4.08 mm wide, 11.77mm long, and 65 mg in weight, whereas the adult female was 4.49 mm wide, 13.49 mm long, and weighed 81 mg. The adults started to emerge from the tunnels on the trees at the end of the second week of May 2020 and reached to the maximum peak at the middle of the third week of May, then started to decrease gradually until it reached to zero emergence at the end of the same month. Larvae parasitoid wasps *(Atanycolus ivanowi*) were collected and the entomopathogenic fungus *Beauveria bassiana* were isolated from larva and pupa and its tunnels. This field study identified very important biological control components that could be incorporated into integrated control program for this borer **[Khalaf, M.Z. and I.J. Al-Jboory. 2020, Arab Journal of Plant Protection, 38(4): 281-288].**
https://doi.org/10.22268/AJPP-38.4.281288

JORDAN

Disinfection Treatments Eliminated Tomato Brown Rugose Fruit Virus in Tomato Seeds. *Tomato brown rugose fruit virus* (ToBRFV), belonging to the genus *Tobamovirus*, is a highly-virulent emerging virus species, causing disease outbreaks and significant crop losses worldwide. No effective measure has been identified to control ToBRFV infection. Therefore, the objectives of this study were to investigate the effectiveness of three seed disinfection treatments on the elimination of ToBRFV in tomato seeds and their effect on seed quality. Seeds extracted from ToBRFV-infected fruits were treated with 2% hydrochloric acid (HCl) for 30 min, 10% trisodium phosphate (TSP) for 3 h, dry heat at 72 °C for 72 h, or their combinations; then, the seeds were tested for the presence of the virus using serological, molecular, and biological assays. Parallel treatments of seeds in distilled water (hydropriming) or untreated seeds were included for comparison. The quality of the treated seeds was also evaluated in terms of seed standard germination, mean time to germination (MTG), and seedling growth. Seeds extracted from ToBRFV-infected fruits had a 100% contamination rate. Treatment of ToBRFV-contaminated seeds with 2% HCl for 30 min or 10% TSP for 3 h resulted in a 100% disinfection rate, while heat treatment at 72 °C for 72 h or hydropriming treatments resulted in a 0% disinfection rate. Furthermore, seed treatment with HCl or hydropriming for 3 h significantly improved seed germination percentage, reduced MTG (faster speed of germination), and increased seedling length. In conclusion, seed treatment with 2% HCl for 30 min not only resulted in a 100% disinfection rate of seeds from the ToBRFV but also improved seed quality of tomato compared to untreated seeds. **[Samarah, N., Sulaiman, A., Salem, N. M., (Jordan), and Turina, M. (Italy), European Journal of Plant Pathology, Published Online: 31 Oct 2020].** https://doi.org/10.1007/s10658-020-02151-1

MOROCCO

Potential of Moroccan Entomopathogenic Nematodes for the Control of the Mediterranean fruit *fy Ceratitis capitata* Wiedemann (Diptera: Tephritidae). The Mediterranean fruit fy, *Ceratitis capitata* Wiedemann, is a deleterious pest worldwide affecting fruit production. The entomopathogenic nematodes (EPNs) are a potential biocontrol agent that could be efectively used to control this Mediterranean fruit fy. In this study, fve EPN strains reported from diferent felds in Morocco were evaluated for their efcacy against *C. capitata*. In laboratory assays, *Steinernema feltiae*-SF-MOR9, *S. feltiae*-SF-MOR10 and *Heterorhabditis bacteriophora*-HB-MOR7 strains showed signifcantly higher infectivity and penetration rates when compared to the other strains. *S. feltiae*-SF-MOR9 caused the highest larval mortality rate (80%) at 50 infective juveniles (IJs) cm−2. However, additional results showed that both S. feltiae strains were signifcantly effective in controlling *C. capitata* larvae in apricot (*Prunus armeniaca*) fruits on soil surface with high mortality rate at 50 and 100 IJs cm−2. Diferent soil textures and moisture levels resulted in a signifcant variation in EPN strain virulence against *C. capitata*. Sandy clay loam soil in combination with 50 IJs cm−2 of *S. feltiae* (SF-MOR9 or SF-MOR10) caused a higher mortality rate of *C. capitata* larvae. Furthermore, applying these EPN strains at 50–100 IJs cm−2 in combination with 10–15% moisture level showed optimal results against *C. capitata* larvae. Therefore, those two Moroccan EPN strains could be used as promising eco-friendly biological agents against *C. capitata*. **[Fouad Mokrini, Salah-Eddine Laasli, Youssef Benseddik, Abdelmalek Boutaleb Joutei, Abdelali Blenzar, Hicham Lakhal, Mohamed Sbaghi, Mustafa Imren, Göksel Özer, Timothy Paulitz, Rachid Lahlali & AbdelfattahA. Dababat (Morocco), Scientifc Reports, 10:19204, 2020].** https://doi.org/10.1038/s41598-020-76170-7

Diversity and Management Strategies of Plant Parasitic Nematodes in Moroccan Organic Farming and Their Relationship with Soil Physico-Chemical Properties. Organic farming has been increasing steadily over the last decade and is expected to grow drastically in the future. Plant parasitic nematodes (PPNs) are known as one of the most important pests attacking various plants in conventional and organic farming systems. A survey was conducted in January 2019 to determine the occurrence and diversity of PPNs, their associations with soil properties, and to assess their management methods in organically farmed fields in Southern Morocco. Twelve genera of PPNs were identified in soil and root samples collected from 53 organic fields, including *Meloidogyne, Pratylenchus, Helicotylenchus, Tylenchus, Tylenchorynchus, Criconemoides, Trichodorus*, and *Xiphinema*. The root-knot nematodes (*Meloidogyne* spp.) and the root-lesion nematode (*Pratylenchus* spp.) were the most prevalent PPNs. Vegetable crops (bean, onion, and tomato) had high nematode diversity indices compared to some aromatic

and medicinal crops, including the Shannon, Evenness, and plant parasitic index (PPI). Our study underlined that several PPN genera were significantly correlated with soil physico-chemical properties, in particular, soil structure and organic matter. Therefore, it was concluded that soil properties have a considerable impact on PPN communities in organic farming systems located in Southern Morocco. There are numerous strategies for the control of PPNs in organic farming systems. **[Ghizlane Krif, Fouad Mokrini, Aicha El Aissami, Salah-Eddine Laasli, Mustafa Imren, Göksel Özer, Timothy Paulitz, Rachid Lahlali and Abdelfattah A. Dababat (Morocco), Agriculture, 10, 447; 2020].** doi:10.3390/agriculture10100447

Prevalence and Partial Molecular Characterization of Citrus Psorosis Virus in Morocco. Citrus is one of the most economically important fruit tree crops in Morocco. Citrus psorosis virus (CPsV), the type species of the genus Ophiovirus, is the causal agent of psorosis, an economically important graft-transmissible disease of citrus. In order to assess the occurrence and distribution of CPsV in Morocco, surveys were conducted between 2017 and 2019, in the main citrus production areas of the country. Commercial groves, nurseries and one varietal collection were inspected for psorosis symptoms and a total of 435 samples were collected for analyses. The CPsV was widely distributed in the country with an infection rate of 44.8%, especially in the commercial orchards located in the Gharb region where 58.7% of the tested trees were infected. After RT-PCR, six CPsV isolates obtained from six Moroccan citrus growing areas were selected and submitted for molecular characterization by partial sequencing the coat protein gene. Multiple alignment of the obtained sequences showed high nucleotide identity (99.34-99.83%) among the Moroccan CPsV isolates, which clustered in the phylogenetic tree together with isolates from Argentina, USA and Egypt. CPsV spread in Morocco may be due to bud propagation, by small nurseries, from infected old trees, which were planted before the implementation of the certification program in the country. **[Imane Bibi, Ezzahra Kharmach, Zouheir Chafik, Jamal Ben Yazid, Raied Abou Kubaa, Majid Mounir and Mohamed Afechtal (Morocco), Laboratory of Biochemistry and Biotechnologies, Faculty of Science, Mohammed First University of Oujda, Morocco. Istituto per la Protezione Sostenibile delle Piante, UOS Bari, Consiglio Nazionale delle Ricerche, I-70126, Bari, Italy. Department of Food Science and Nutrition, Hassan II Institute of Agronomy and Veterinary Medicine P.B. 6202, Rabat, Morocco 3Régional Agricultural Research Center of Kénitra, National Institute for Agricultural Research (INRA), 14 rue Ibn Temmam, PO Box 257, Kénitra, Morocco, Indian Journal of Ecology, 47(4): 1168-1172, 2020].**

SYRIA

Morphology, Pathogenicity and Molecular Identification of some *Fusarium* species within the *Gibberella fujikuroi* species Complex from Wheat in Syria. *Fusarium* is a worldwide distributed fungal genus and includes different phytopathogenic species, which are able to infect cereals among other crops. This study was carried out to identify and characterize the isolates of *Fusarium* spp. in the *Gibberella fujikuroi* species complex (Liseola section) through morphological and molecular approaches. A total of 105 isolates of *Fusarium* spp. were recovered from crown and roots of wheat plants, showing typical symptoms, collected from four Syrian provinces during 2017-2018. Seventeen isolates in the *G. fujikuroi* species complex were identified as *F. proliferatum*, *F. verticillioides* and *F. andiyazi* based on morphological characteristics, and sequencing a partial translation elongation factor 1-alpha (TEF1-α) gene. The pathogenicity test showed that all recovered isolates of these three species were pathogenic, with low to moderate severity, on durum wheat seedlings under laboratory conditions. To our knowledge, this is the first report of *F. andiyazi* causing crown and root rot on wheat. **[Zidan, L., Jawdat, D., Naffaa, W. (Syria), Current Research in Environmental & Applied Mycology. 10 (1): 156 – 166, 2020].**
Doi: 10.5943/cream/10/1/16

Partial Purification and Characterization of Chitinase Produced by *Bacillus licheniformis* B307. The optimal conditions required for chitinase production from **Bacillus licheniformis** B307 strain, obtained from Syrian soil, were studied. Optimization experiments were carried out under submerged fermentation conditions, and colloidal chitin was the source of carbon. Luria broth medium supplied with 0.5% colloidal chitin was the optimum medium for chitinase production. The maximum chitinase yield was obtained at 30 °C, pH6, incubation time 14 days, and 150 rpm. The optimum chitinase activity was achieved at 60 °C and pH6. The chitinase activity with unmodified medium was 1.9 U/mL which then enhanced about eight folds to reach 14.2 U/mL under optimized submerged fermentation conditions. An extracellular chitinase of **Bacillus licheniformis** B307 was partially purified using

ammonium sulfate precipitation followed by concentration with various sizes of concentrator tubes. The chitinase was partially purified 8.24-fold and specific enzyme activity increased 2.08-fold (2 U/mg). Sodium dodecyl sulfate polyacrylamide gel electrophoresis (SDS-PAGE) of partial purified chitinase exhibited a molecular weight ($\mathbf{M}_r$) near to 36 and 42kDa. These results make it possible to invest in this strain to produce chitinase to be used as antifungal, food additives and other applications. **[Akeed, Y., Atrash, F., Naffaa, W. (Syria), Production, Heliyon Journal. 6: 2405-8440, 2020].** Doi. 10.1016/j.heliyon.2020.e03858

The Efficacy of *Trichoderma harzianum* and Some Pesticides on the Development of Some Fungi that Cause Wheat and Barley Root Rot. This research aimed to study several isolates of pathogenic fungi causing root rot phenomenon on wheat and barley. Six fungal isolates of *Rhizoctonia*, *Fusarium* and *Helmenthosporium*, were used in this study. These isolates were treated with four chemical fungal disinfectants, in addition to fungus *Trichoderma harzianum*. The laboratory experiment was achieved with incubation the isolates within petri dishes at a temperature of 22 ± 2 °C. The diameters of fungal colonies above the culture medium were measured daily for a period of six days. The pot experiments were achieved on durum wheat (Bohooth 5) and barley (Tadmor) which were known with their sensitivity to the infection. The germinated seeds were treated with the fungal disinfectants and then they were planted in the pots within the incubator. After the formation of the two first leaves, the experimental pots were subjected to the natural environmental conditions. The pots were watered and fertilized as needed. Concerning the laboratory dishes within the incubator, the results of statistical analyses clarified that the treatment with fungicide Vetavax and the fungus T. harzianum were more performed. While, concerning the pot exterminates, the results showed that Vitavax was more effective in the reduction of the infection rates for both wheat and barley. Although the beneficial fungus *T. harzianum* had a limited efficacy, its efficacy was high in controlling the isolate R1 of the pathogen *Rhizoctonia*. The obtained results lead to investigate the causes of the limited efficacy of *Trichoderma* in the pot experiments**. [Bachar Aldakil (Syria), Syrian Journal of Agricultural Research – SJAR 7(4): 397-407 August 2020].** bashardakhel6@gmail.com

***In Vitro* Study of Antagonistic Activity of Local Isolate of *Trichoderma harzianumm* against some Phytopathogenic Fungi.** The study was conducted *In Vitro* during 2018-2019 at Plant Pathology Laboratory, Faculty of Agriculture, Omar Al-Mukhtar University, and aimed to evaluate the antagonistic effect local isolate of *Trichoderma harizianum* against four pathogenic fungi (*Botrytis cinerea*, *Macrophomina phaseolina*, *Rhizoctonia solani* and *Sclerotinia sclertiorum*). Results showed that *T. harzianum* isolate had good significant ability to inhibit the studied diseases fungi directly or indirectly. Maximum rate of inhibition was 75.6%, and the highest degree of inhibition according 4 in Sookchaoy scale against *M. phaseolina*. The results of the microscopic examination showed the growth of the anti-fungus hyphae in parallel with the pathogenic hyphae and spirally wrapped around it, causing contraction and degradation them. Direct interaction between bio-control agent and the pathogens causing different diameters in halos lysis of pathogens, also, volatile and non-volatile substances that released by *T. harzianum* was recorded varying degrees of inhibition in all fungi, Finally, the bio-control agent produced antifungal compound that can inhibit the growth of all fungi 100%. **[Amina Abdul-Hamied Saad and Zahra Ibrahim El-Gali (Syria), Syrian Journal of Agricultural Research – SJAR 7(4): 408-421 August 2020].**

Effect of Bio-Synthetic Nanoparticles of *Pleurotus Eryngii* on Inhibition of *Pythum Aphanidermatum* that Caused Damping off Disease. A laboratory studies were conducted during 2018/2019 season at Plant Protection Department, Faculty of Agriculture, University of Tikrit. The study investigated the bio-synthesis of the nanoparticles of an edible mushroom *Pleurotus ostreatus* A2019 using four fractions including fungus filtrate, biomass, hot extract and cold extract of the biomass. The results of the laboratory study indicated that the formation of silver nanoparticles from the *Pleurotus eryngii*,_by detecting the chromatic heterogeneity of these four fractions from yellow to brown, and recorded the highest absorption peaks (using the spectrophotometer) of the silver nanoparticles of all fractions within wavelengths ranged from 350 to 475 nm .All concentrations and fractions of prepared Ag nanoparticles showed the highest inhibition growth against pathogenic fungus *P. aphanidermatum* in comparison to control. The highest inhibition of linear growth was recorded at a concentration of 1.5 mM in the fungus filtrate treatment as it reached 0.66 mm, while the effect of concentration of 0.5 mM in the hot extract treatment of the biomass recorded the lowest inhibition linear growth 0.15 mm with significant differences between them. While the filtrate treatment showed significant superiority with the other treatments and it reached 0.42 mm compared to the other transactions, where the treatments of the cold

and hot aqueous extract and biomass recorded 0.36, 0.16, 0.24 mm respectively. **[Saif saadallah Hassan and Abdullah Abdulkrim Hassan (Syria), Syrian Journal of Agricultural Research – SJAR 7(4): 422-432 August 2020].**

The Effect of Bacterial Strain *Bacillus subtillis* FZB27 FZB27 to Induce Systemic Resistance against *Cucumber mosaic virus* (CMV) in Pepper Plants under Green House Conditions. This study was conducted to evaluate the effect of bacterial strain *Bacillus subtillis* FZB27 to induce systemic resistance against *cucumber mosaic virus* (CMV) in pepper plants using three kinds of applications (seeds, irrigation and seeds + irrigation). The study was carried out at the Scientific Agriculture Research Center in Tartus using randomized complete blocks design. Pepper seeds were submerged for 12 hours in suspension of *Bacillus subtillis* FZB27 with a concentration of 9×109 colony/ml formation unit. After one week after planting the seedlings were irrigated with 20 ml which was the same concentration suspension of *Bacillus subtillis* FZB27, then one week after transplanting, the plants were inoculated with C MV. The results showed that, there was a significant reducing in disease incidence of infected treated plants (50.72-57.16) % compared to the infected control (93.33)%, and the highest reduction was in (seeds+irrigation) application. There was also a significant reducing in disease severity of infected treated plants (48.2-60.17) % compared to the infected control (83.66) %, and the highest reduction was in (seeds+irrigation) application, with no significant differences among the treatment methods. The treatment with Bactria improved peroxidase enzyme activity, and consequently, there was significant increase in infected treated plants which ranged between (4.4-6.4) nmol compared to the infected control (2.5) nmol. The higher activity was with (seeds+irrigation) application. There was also significant increase in uninfected treated plants which ranged between (4.76-7.41) nmol compared to the healthy control (2.10) nmol. The higher activity was with (seeds+irrigation) application. **[Mai Moaalla, Ahmad Ahmad, Omar Hammoudi and Imad Daoud Ismaeil (Syria),–Syrian Journal of Agricultural Research – SJAR 7(4): 433-445 August 2020].**

The efficiency of Olive Pomace in Controlling Root–Knot Nematodes on Colorful Impatiens *(Impatiens walleriana)* in Syria. Root–Knot Nematodes (RKN) are plant- parasitic nematodes from the genus *Meloidogyne*. They are recognised worldwide as a major production constraint in crops of primary economic importance. The*y exist in the soil of hot climate areas or areas with short winters. The Colorful impatiens (Impatiens walleriana),* a species of the genus *Impatiens*, native to eastern Africa, is like other plants which can be infected by RKN. Nematodes can create galls, or swellings on the roots of the plant. Affected plants will look sickly, stunted and wilted and then die. In the present work we used two replications of Colorful impatiens plants showing infection symptoms with RKN. Each replication consists of 15 plants and was treated with: (1) the olive pomace using dosages of 10 gram for each plant; (2) by "Vydate" pesticide (common name Oxamyl). Control plants were treated with water. Plants were left for 179 days and results showed a significant reduction of nematode population on plant roots as well as in the soil when using olive pomace. Furthermore, the vegetative parts became bigger and increased significantly. Moreover, we also observed that the residual effect of organic matters on the plant was less compared to the pesticide (Vydate). As a result, the olive pomace was better than the pesticide in terms of plant strength and in size, but it has the same effect in terms of infection control.We found that the organic control is the best for a healthy environment when comparing with harmful pesticides. **[Zeina Tarek Balady and Khaled Al – Assas (Syria), Department of Plant Protection, Ministry of Agriculture and Agrarian Reform, Damascus-Syria. Department of plant protection, faculty of Agricultural Engineering, Damascus University.**

A New Spread of the Stink Bug *Apodiphus amygdali* (Germar, 1817) (Heteroptera: Pentatomidae).

A new spread of a plant stink bug has been observed in several locations in Syria during the past years. It was observed in Jableh, Lattakia, in citrus groves in July 2017, as a strange insect from plant bugs and in large numbers, and then later on citrus trees in Lattakia in 2019. It has been appeared again in Qamhana, Hama, in July 2019, on peach and plum trees. It was observed in 2020 on several plants and fruit trees in different regions of Syria, as in Homs in May 2020 on walnut trees, and on Sweida on peaches in June 2020. Samples were collected from those insects, and were identified according to the classification keys: Ghauri, 1977, FENT et al., 2010 and a classification expert in Italy. This insect has been identified as *Apodiphus amygdali* (Germar, 1817) (stink bug) (Heteroptera: Pentatomidae). Adult insects are between 15 and 20 mm long, with a distinct brown "shield" shape. The overall color of the adult is yellowish or reddish, with dark pits and yellow or orange yellow or reddish raised spots. The

Connexivum is regularly mottled in a distinctively yellow and black pattern. Lateral margins of *pronotum* markedly sinuate, and a protruding head on the sides. *Juga* is characterized by slight V-shaped atelectasis. The width at the top of the sub juga is equal to the width between the front edges of the eyes. A clear yellow line in the middle of the head area with two faded lateral yellow lines. Antennae are dark brown with light yellow on the base of the last two antennae segments. The insect gathers in large numbers in the afternoon and at sunset on trees. The stink bugs attack several hosts includes many fruit and forest trees. It exists in the region from India to southeastern Europe. **[Wael Almatni, Akram Rojeh, Mahmoud Al-Abdullah, Ministry of Agriculture, Hassan Ahmed Khalil, Al-Baath University, Homs, Syria,2020].**

PLANT PROTECTION NEWS IN THE ARAB AND NEAR EAST COUNTRIES

❖ Graduate Students Thesis (Master and Doctorate)

Morphological and Molecular Identification of *Fusarium* Isolates on Wheat and Detection of Genes Responsible for Mycotoxins Production.

Fusarium root and crown rot and head blight are important diseases limiting wheat production. Although there are many studies related to these two diseases in the world, few studies were conducted in Syria. Therefore, the objectives of this study were: (i) to identify some *Fusarium* species associated with roots, crown and spikes of wheat, based on their morphological characteristics on potato dextrose agar (PDA) and carnation leaf piece agar (CLA) media;(ii) to confirm the morphological identification using some molecular methods; (iii) to detect the genes involved in the biosynthesis of some toxins produced by some *Fusarium* species. One hundred and five isolates were obtained from different areas for wheat cultivation in Syria (Tartous, Latakia, Hama and Sweida), and through the methods adopted in this study, a high-level morphological description of the following twenty *Fusarium* species was achieved: *F. pseudograminearum, F. culmorum, F. sambucinum, F. compactum, F. acuminatum, F. solani, F. semitectum, F. pseudocircinatum, F. oxysporum, F. proliferatum, F. verticillioides, F. sporotrichioides, F.equiseti, F.andiyazi, F.torulosum, F. polyphialidicum, F.brachygibbosum, F. chlamydosporum, F. flocciferum, F. redolens.* The most frequent species was *F. culmorum* with 29.52%, followed by *F. proliferatum* (12.38%), while the frequency of other species ranged between 0.95 and 8.57%. A total of 20 isolates belonging to 8 *Fusarium* species, were tested for their pathogenicity on durum wheat cultivar Doma1, under laboratory conditions and artificial infection. *F. culmorum* was the most virulent, with disease severity of 4.45 using a 0-to-5 rating scale. *F. pseudograminearum* showed also a high pathogenic ability, with disease severity of 4.2, and non-significative differences with the previous species. Followed by *F. proliferatum,* which had an intermediate pathogenicity, with a disease severity level of 1.27. While *F. verticillioides, F. equiseti, F. oxysporum* and *F. andiyazi* were weak pathogens, with disease severities of 0.9, 0.87, 0.4 and 0.7 respectively. *F. semitectum* was not pathogenic under current trial conditions. Most current studies tend to use molecular technologies, especially polymerase chain reaction (PCR), which require an effective and easy DNA extraction method. For this purpose, five DNA extraction methods were compared to obtain DNA of sufficient quality and quantity necessary for its amplification, from three *Fusarium* species. Based on obtained results, the extraction methods can be arranged according to the DNA yields as follows: modified glass beads/CPI >CTAB > glass beads/PCI > Qiagen DNeasy Kit > LETS. This study showed that the use of the modified glass beads/CPI method is appropriate for DNA extraction from *Fusarium* species in generally. The morphological identification of 64 *Fusarium* isolates was confirmed using molecular methods, where 29 isolates of *F. culmorum*, 5 isolates of *F. proliferatum* and 4 isolates of *F. equiseti* were identified using Fc01F / Fc01R, PRO1/PRO2 and FEF/FER primers, respectively. No amplification was obtained using Fg16NF/Fg16NR primers, which confirms the absence *F. graminearum*. It was also possible, using multiplex PCR method, to identify seven *Fusarium* species in a single reaction. This indicates the importance of this method in reducing time, effort and cost. Thirteen isolates belonging to 11 *Fusarium* species were identified, based on sequencing a partial translation elongation factor 1-alpha (TEF1-α) gene region using primers ef1 and ef2, and sequences were deposited in GenBank with the following accession numbers: *F. culmorum* (MN807691), *F. semitectum* (MN883027), *F. solani* (MN890013), *F. proliferatum* (MN865124, MN883028), *F. verticillioides* (MN807690), *F. oxysporum* (MN867481, MN883032), *F. chlamydosporum* (MN883030), *F. andiyazi* (MN867480), *F. torulosum* (MN890014), *F. brachygibbosum* (MN883029) and *F. flocciferum* (MN883031).It should be noted that identification of the last four species was not possible based only on morphological methods because of their

morphological similarity with other species, or the lack of morphological studies related to some of them. So, they were identified using the nucleotide sequence of TEF1-α gene. Specific primers were used to detect some genes involved in the biosynthesis pathway of the three most important groups of mycotoxins (**t**richothecenes**,** fumonisins and **z**earalenone), produced by some *Fusarium* species. Results showed that *F. culmorum, F. pseudograminearum* and *F. semitectum* had both TRI5 and PKS4 genes involved in the biosynthesis of trichotecenes and zeralenone respectively. Tested isolates of *F. verticillioides* had FUM5 gene involved in the fumonisins biosynthesis. While, isolates of *F equiseti* and *F. oxysporum* had the PKS4 gene. Non-amplification was obtained for the other isolates, which indicates that they do not have any of these genes, and therefore their inability to produce these mycotoxins. This study is one of the few or rare studies that gave a precise morphological description of many *Fusarium* species affecting wheat, and it was possible to make a taxonomic key, which can be used as a taxonomic base for the classification of *Fusarium* species. Up to our knowledge, this is the first report of *F. andiyazi* causing crown and root rot on wheat in the world. This study is also the first report on the presence of seven *Fusarium* species: *F. torulosum, F. pseudocircinatum, F. polyphialidicum, F. brachygibbosum, F. chlamydosporum, F. flocciferum, F. redolens* on wheat in Syria. **[Laila Zidan (Syria), Second Faculty of Agriculture, Sweida, Damascus University. [Supervisor: Prof. Dr. Walid Naffaa (Damascus University), Co-supervisor: Dr. Dana Jawdat (Atomic Energy commission of Syria). (Doctorate, 2020).**

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Evaluation of Antagonistic Activity of Local *Bacillus* Isolates and Their Efficiency in The Biocontrol of Gray Mold Fungus *Botrytis cinerea.*

Botrytis cinerea is an economically important plant pathogen that infects more than 200 plant species in the field, greenhouses and storage. *B. cinerea* was isolated from infected strawberry fruit, and identified basing on the colony, conidiophore and conidia morphology and sclerotia formation. The results showed that isolates varied in their growth on PDA medium. The conidiophores were more or less straight, septate and branched at the apex. Sizes of the conidia were 8.2–10 X 9–15 µm. The sclerotia were observed on 30 days old colonies as ring along the edge of the Petri dish. Pathogen taxonomy was further confirmed by PCR using two specific primers, C729+/C729-. Results indicated that the isolates were *B. cinerea* as they produce bands of 700 bp. The closet phylogenetic neighbor according to this DNA fragment sequence data was *B. cinerea* with 99% of similarity. Three hundred seventy eight isolates of *Bacillus* spp. from Syrian soils were tested *in vitro* for their ability to inhibit growth of *B. cinerea*, the causal agent of gray mold disease. The B307 isolate showed the highest antagonism activity with growth inhibition of 68%. In addition, B307 had chinolytic activity, and the fraction from the isolate with more than 50KDa of its cell free crude extract showed the highest chinolytic and antagonism activity against *B. cinerea*. This isolate was identified as *Bacillus licheniformis* according to the 16S DNA gene sequencing data with homology of 99%. The results of this study demonstrated that *B. licheniformis* B307 and its free cell crude extract, which have chinolytic activity, could be used as bio-control agent against *B. cinerea*. The local strain *B. licheniformis* B307 was previously selected as a possible control agent for *B. cinerea* through its chitinase production. In this study, a partial characterization and purification for the chitinase

produced from this strain was performed, and the enzymatic extract antifungal activity for inhibiting the growth of the gray mold was determined on tomato plant. Chitinase was produced from the *B. licheniformis* B307 strain by submerged fermentation method, with an enzyme activity of 14 U/ml. The results of the partial purification showed that the precipitation using 65% ammonium sulfate was the best, since specific activity of 1 U/mg was obtained compared to 0.24 U/mg for the raw extract. The results of the protein electrophoresis showed that there were two fragments with a molecular weight of approximately 36 and 42 kDa accompanied by chinolytic activity. The results of genomic DNA amplification using CHI0 and CHI4 showed appearance of a 1500bp band. The results of the bio-assay of antagonism activity against *B. cinerea* on the studied tomato *Solanum lycopersicum* varieties (Rome, Marmande, local) showed a reduction in incidence by 50-60% in the bacterial-treated plants and 37-51% when treated with enzymatic extracts compared to the control. The results of the biological evaluation of the antifungal activity of enzyme extract against *B. cinerea* on tomato fruits showed a decrease in the severity of infection by 29.4% when the concentration of 10 U/mL of chitinase was used, while the treatment with enzyme extract 100 U/mL of chitinase caused 94.1% reduction in infection. **[Yaser Akeed (Syria), Atomic Energy Commission of Syria. [Supervisor: Dr. Faiza Atrash (Faculty of Science, Damascus University). Co-supervisor: Prof. Dr. Walid Naffaa (Faculty of Agriculture, Damascus University). (Doctorate, November 25, 2019-2020)].** yakeed79@gmail.com

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Survey, Pathogenicity, and Molecular Identification of Novel Fusarium Species Causing Seed Decay and Damping-off Disease of Wheat Crop in Karbala Province, Iraq.

Wheat is the third most cultivated cereal crop after maize and rice in the grass family Poaceae. In Iraq, seed decay and damping-off is one of the diseases affecting the quality and yield of the wheat crop annually. This disease has been caused by several pathogens, including species of the Fusarium genus. This study was accomplished to survey and identify molecularly using the genetic markers (ITS region and Actin gene) of the causal agents associated with this disease observed in wheat fields of Karbala Province. Ninety-three fungal isolates were obtained from twenty-three wheat fields distributed in Karbala province during 2018-2019 season. The results of morphological and molecular analysis have shown that these isolates belonged to seven species of Fusarium genus: *F. solani, F. graminearum, F. oxysporum, F. chlamydosporum, F. culmorum, F. falciforme,* and *F. cerealis*. The most common species was *F. solani,* with percentage 38% followed by *F. oxysporum* and *F. graminearum* with percentages 22 and 20%, respectively. Furthermore, the disease was prevalent in all inspected fields. However, the highest disease incidences were found in the fields of Al-Husseiniya, Al-Hurr, and Al-Khairat regions at percentages of 19,18 16%, respectively. The results also revealed that all species of Fusarium isolated in this study had a high pathogenic ability on wheat seeds and seedlings. In Iraq, *F. solani* and *F. graminearum* were reported previously causing the same disease based on their morphological characteristics only while in this study they were identified for first time molecularly. Additionally, this is the first report of the rest five Fusarium species as causative agents of seed decay and damping off disease on wheat crop in Karbala province, Iraq. [**Mohammed Hassan Jaber[1] and Adnan A. Lahuf (Iraq), Department of Plant Protection, College of Agriculture, University of Kerbala, Karbala Province, Iraq, (Doctorate, 2020)]**

Evaluation of some Plant Extracts on Root Rot and Damping off on Okra Seedlings Caused by *Fusarium solani* and *Rhizoctonia solani*.

This study was conducted to evaluate the efficacy of hot and cold aqueous extracts of leaves and alcoholic of six species of desert plants (*Citrullus colocynthis* L., *Opuntia* spp. L. , *Alhagi maurorum*.L. , *Malva parviflorea* L. , *Suaeda vermiculata* forssk.es J and *Tamarix aucheriana* L.) to reduce root rot disease and the death of seedlings of okra caused by *Rhizoctonia solani* and *Fusarium solani*. Preliminary pathological test results showed that *R.solani* and *F.solani* significantly reduced the germination rate of okra seeds. The germination rates ranged between 40-46.67% compared to 100% without pathogenicity. Either laboratory, the plants were effective in inhibiting the growth of the fungus *Rhizoctonia solani* and *Fusarium solani*, where the results of the study showed that there were no significant differences at the probability level of 0.05 between all concentrations of the studied plants (10, 15, 20, 25)% where all concentrations had an inhibitory effect and when studying the effect Interference The hot aqueous extract was given at a concentration of 10% and 25% inhibition rate of 80.0% and 81.6%, respectively, for the fungus, *R. solani* The hot aqueous extract at a concentration of 10% and 25% was given a rate of inhibition of the fungus *F. solani* was 78.0% and 82.1%. % Respectively. The results of the green house proved that the treatment of seeds with hot and cold alcoholic and aqueous extracts had a positive effect in controlling the disease and differed significantly from the comparison treatment (seeds not treated with the extract) and gave plant extracts at a concentration of 10 and 25% when they overlapped with the fungi *Rhizoctonia solani* and *Fusarium solani* increased in All studied traits of plant length, dry and wet weight of the vegetative and root groups, and lowering the incidence ratio compared to the comparison treatment. The treatment of seeds with aqueous hot extract of bitter melon reduced the infection rate to 0% and gave the highest lengths of the vegetable total to 13.53 cm, the root length of 5.42 cm, the wet weight of the vegetable total reached 0.86 g, the dry weight of the vegetable total reached 0.30 g, the wet weight of the root total was 0.24 g and the dry weight of the total The root was 0.12 g. The results indicated that the alcoholic extracts preserved in commercial corn oil also had a positive effect on the inhibition of the fungi. The alcoholic extract preserved in the oil at a concentration of 10% for bitter melon and 25% for the baker gave an inhibition rate of 84.6% and 85.7%, respectively, for the fungus, *R. solani* gave the alcoholic extract preserved in oil also at a concentration of 10% and 25% for bitter melon and baking plants. The inhibition rate for the fungus *F. solani* was 83.6% and 83.9%, respectively. The infection rate has also been reduced to 0%. **[Asmaa Abdul Munem Talib Al-Araji (Iraq), Supervised by Prof. Dr. Fadhal Abdul Hussein Al-Fadhal, University of Kufa, Faculty of Agriculture, Plant Protection, Iraq (Master, 2020)].**

Study on the Effect of Calcium Carbonate Nanoparticles as a New Strategy to Control the Olive Fruit Fly Bactrocera Oleae (Rossi) in Olive Orchards.

Nanotechnology has received significant attention in crop protection over the last decade, in the form of nanoparticles. This research aimed at studying the effects of application of Calcium carbonate ($CaCO_3$) nanoparticles on the control of the olive fruit fly *Bactrocera oleae* in the field, and on the development of all immature stages of the target insect in the laboratory. Similarly, another formula; colloidal calcium was tested for comparison purposes. The field experiment was carried out in an olive orchard in Viterbo province (Lazio-Italy), yellow traps were used for pest monitoring at the onset of the invasion, and the number of captured adults was evaluated. Infestation level was assessed based on the number of insects detected in field-collected fruits. The orchard was divided into three blocks that were subjected to the following treatments: (A) tap water as a control; (B) colloidal calcium CaCol; (C) Calcium carbonate NPs. Additionally, in another part of the orchard, some olive branches were covered before the presence of the pest and were treated intensively with the above-mentioned suspensions. Thereafter, treated fruits were collected randomly and incubated to evaluate the effect of applied materials on insect development. The monitoring results showed that the highest peak of the fly was on October 16th and the optimal temperature for the fly vitality was (22±2 C°). Infestation level reached the higher number of detected individuals on 26th of September, and was about 155 infested fruits from a total of 200 (collected fruits). The field tests have shown that Calcium carbonate NPs interacts negatively with the fly

emergence better than colloidal calcium, by averting the insect development during early life stages. Laboratory bioassays were conducted in order to ascertain the results obtained in the field. *B. oleae* were reared from infested olives collected in different orchards. Afterwards, three cages were established containing an equal number of healthy olive fruits and each cage was provided with the same number of *B. oleae*. Each cage received a different treatment; Calcium carbonate NPs, colloidal calcium and tap water (control) respectively. Adult emergence per treatment was recorded after 21 days and statistically analyzed. The results showed that insects exhibit similar lifespan, even though treated with different materials, and no insect mortality was observed. There was no significant effect on insect development when comparing Calcium carbonate suspensions and control. The ultimate objective of this research was to study the effect of the used materials on the viability of *B. oleae*, female's productivity, as well as on the interaction between *B. oleae* and its bacterial endosymbiont "*Candidatus* Erwinia dacicola". Several studies have documented that this bacterium plays an important role in the *B. oleae* life affecting its fitness, larval development, oviposition and mating behavior. To this end, *B. oleae* rearing was carried out under laboratory conditions and three trials were performed and replicated three times. Treatments were applied by exposing the olive fruit flies in each cage to a different component (Calcium carbonate NPs, colloidal calcium, tap water) mixed with artificial diets. Thereafter, equal numbers of treated flies were collected from each cage at different intervals; after 1, 2 and 3 weeks of treatment, then killed and used for *Ca.* E. dacicola DNA extraction. Detection and quantification of the bacterial DNA in insect samples was carried out by qPCR targeting the 16S rRNA gene, with EdF1 and EdEn primers in order to quantify the abundance of the bacterial endosymbiont associated with *B. oleae*, based on the number of cycles (Ct) values. The findings indicate that the two formulas of Calcium carbonate incorporated into insect diets, reduced the egg production in the female flies in comparison with the control, also $CaCO_3$ NPs reduced significantly the egg production than the colloidal calcium. The qPCR analyses revealed that no significant effect was observed on the bacterial abundance in treated flies, and insect samples exposed to NPs and colloidal calcium illustrated approximately an equal amount of bacterial DNA compared to control throughout the trial period. Overall, our results encourage further research on Nano-calcium carbonate, in order to use this inorganic nanomaterial for the control of the olive fly in the framework of an integrated pest management program.**[Saleh Falih Fenjan (Iraq), University of Tuscia Viterbo-Italy. Istituto Agronomico Mediterraneo di Bari-Italy, Agricultural Engineer at the Ministry of Agriculture, Iraq. (Doctorate, 2020)]** salih.alquraishi@yahoo.com

Morphological and Molecular study of *Neoscytalidium* spp., Caused Branches Wilt on some Hosts and Control

Twelve pure isolates of *Neoscytalidium* spp. the causal agents of branches wilt and sooty stem were obtained on PDA. The nucleotide sequencing of the isolates *Neoscytalidium* spp. shows the presence of three species of fungi: *N. novaehollandiae* which is isolated from apple trees, mulberry, pomegranate, rubber and castor, *N. dimidiatum*, which is isolated from apple trees, mulberry and poplar *N. hyalinum* which is isolated from apple, orange, bitter orange and Ficus trees. The nucleotide sequencing for the three species *N. hyalinum*, *N. novaehollandiae* and *N. dimidiatum* is registered in the World Gene bank Organization. This is the first record of these species in Iraq from the hosts in this study. The results confirmed that the fungal isolates were able to produce cellulase and laccase enzymes with the various quantities and efficiency of enzyme production. The analysis of fungi filtrate using FTIR method showed that the toxin produced by the fungal isolates was composed of carbon-hydrogen supported by the groups of methylene (CH2) and methyl (CH3) with the presence of the active group of carbon-oxygen which was detected for the first time by GC-Mass method. These active groups showed an 88-91% matching rate with Peroxide Dibutyl which is a strong oxidizing substance. All fungal isolates showed a variation in pathogenic ability and symptoms after inoculating branches with a disc from the edge of the fungal colony. The disease severity was ranged between 33.3% and 98.13%, with a difference in the symptoms on the tested plants. The observed symptoms were wilt, canker, and sooty branch of the Apple, Mulberry, Ficus, Rubber, and Castor young trees additionally, there was a half-oval thickening and increasing in the branch's diameter of the Pomegranate young trees at the site of the fungal inoculation. The canker symptoms at the orange and bitter orange young trees' branch were longitudinal surrounded by the formation of callus after three months of fungal inoculation under the field conditions. The

anatomical cross-section results of the tested young trees branches inoculated with fungi showed a thickening of the branches, cracking and fracture in the area of the Lenticels at the epidermis and cuticle which were separated from the area of the vascular system. Also, fracture was noticed in the area of the vascular bundle. The infection mostly appeared in the vascular bundle and the pith as black or bright yellow spots. The treatment with, score and premium, chitosan NPs and MgO NPs, chitosan and kaoline showed that a reduction in the infection rates when it's used as a pre infection treatment. The disease severity rat with score treatment was 35.38%, while the disease severity in kaoline treatment was 47.65% compared to the control which was 60.76%. In the preventive treatments, the two pesticides treatment score and the premium recorded the lowest disease severity rate, without significant differences between them, 22.1 and 23.8% respectively, while the treatment of kaolin was 41.8%, compared to 56.69% in control. **[Eman Khalil Abdul-Karim and Neran Salem Aljarah (Iraq), University of Baghdad/ College of Agricultural Engineering Sciences/Plant Protection, (Doctorate, 2020)].**

Thesis Abstracts of Arab and Near East Master Students Graduated From Mediterranean Agronomic Institute of Bari 2019-2020

Grapevine Leafroll-associated Virus 4: Universal and Specific Detection of its Strains by Multiplex RT-PCR.

Multiplex RT-PCR was applied to test 100 different GLRaV-4 positive vine samples in ELISA to validate its efficacy to selectively detect 4 different strains of GLRaV-4 (strains 4, -5, -6 and -9). The test showed the presence of at least one of these GLRaV-4strains in 79 samples, 13 of which in mixed infections. The absence of bands in 12 samples and the presence of bands with different molecular weights than expected in 9 samples suggested the presence of genetic variants of GLRaV-4. Sequencing of some of these amplicons confirmed this hypothesis. GLRaV-4 strain 4 was the most common (43%), followed by strains 6 (25%) and 5 (22%), while strain 9 (3%) was much rarer. No significant differences were found in the comparison between RT-PCR, using a universal primer pair, and ELISA in the diagnosis of 20 different infected vines tested at different times of the year. For both techniques, the diagnosis was more effective as the growing season progressed. Cabernet Franc and LN 33 vines graft-inoculated with different GLRaV-4 infected sources showed marked leafroll symptoms 18 months after inoculation, although less severe than those induced by GLRaV-3 and GLRaV-1 used as controls**. [Chelihi Aya (Algeria), Mediterranean Agronomic Institute of CIHEAM Bari (Italy), 2019-2020].**

Characterization and Alternative Control of Mycotoxigenic Fungi causing Postharvest Diseases of Tomato Fruit.

Tomato fruit represent a valuable but perishable commodity, due to fungal spoilage even after harvest. In the present investigation, greenhouse-grown tomatoes from Apulia (southern Italy) were analysed, particularly for the contamination by mycotoxigenic genera. Isolates were characterized by morphological features and sequencing of barcoding genes. Penicillium (37%), Aspergillus (34%), and Alternaria (18%) were the most represented genera. Alternaria strains mostly belonged to species alternata morphotype alternata and were able to produce alternariol. Aspergillus was divided in yellow (76%) and black (24%) strains: the former included species westerdijkiae, ochraceus, and occultus, able to produce OTA; the latter included a welwitschiae strain, able to produce OTA and fumonisins. Penicillium strains were mostly species olsonii, not able to produce regulated mycotoxins. Commercial Generally Recognized As Safe (GRAS) and biostimulant formulations were tested for controlling postharvest decays. In vitro, potassium bicarbonate and peracetic acid+hydrogen peroxide prevented fungal growth, whereas a reduction up to 50% was obtained by zinc chelated and fermented fulvic acids formulations. In vivo trials against Alternaria, by wound and dipping application, confirmed potassium bicarbonate, peracetic acid+hydrogen peroxide and zinc chelated as the most effective formulations for fungal sporification (up to -92%), disease incidence (up to -74%) and severity (up to -91%). **[Djenane Ferielle (Algeria), Mediterranean Agronomic Institute of CIHEAM Bari (Italy), 2019-2020].**

Survey of Fungal Contamination of Bronte Pistachios with Particular Reference to Aflatoxin B1 and Ochratoxin A-producing Aspergilli.

Contaminations by black Aspergilli represent a significant problem for pistachios, both for the loss of product that they cause and for the possible presence of mycotoxins, in particular ochratoxin A (OTA) and aflatoxin B1 (AFB1). This research enabled the creation of the first collection of black and green Aspergilli isolates from Bronte pistachios (CVBianca) and the determination of their ability to synthesize OTA or AFB1. Morphological observations of the colonies were conducted on MEA-Boscalid, a selective medium for *Aspergillus carbonarius*, on CYA and MEA. Significant differences among different isolates emerged between mycelial growth and sporulation in CYA and MEA. Although only *Aspergillus carbonarius* isolates sporulated on MEA-Boscalid after one week of incubation at 25°, extending the incubation for further 7 days allowed more black Aspergilli species to sporulate. Molecular means revealed that *A. niger* accounts for 63.6% of all isolates, (74% of black isolates), whereas *A. flavus* accounts for 14% of all isolates but represents the total of green Aspergilli. Concerning mycotoxin production, 7% and 14% among *A. niger* isolates are OTA- and AFB1-producing respectively. All *A. flavus* isolates can produce AFB1. It is noteworthy that the percentage of AFB1-producing *A. niger* isolates is twice that of OTA-producing ones. **[Mellikeche Wanissa (Algeria), Mediterranean Agronomic Institute of CIHEAM Bari (Italy), 2019-2020].**

Evaluation of Three Predicting Models to Control *Bactrocera oleae* in South Italy (Taranto Province) Conditions.

Bactrocera oleae, commonly known as olive fruit fly, arouses a growing interest due its significant economic losses. The aim of this work is the evaluation of three forecasting models for *B. oleae*, using experimental data from seven orchards located in the area of Maruggio in Taranto province, collected in 2018 and 2019. The first model is based on Cumulative Degree Days (CDD) and empirical data referring to catches of males of *B. oleae* and drupe infestation, throughout two reference periods of the fruit fly annual cycle. The second model, expressed through a canonical correlation analysis, links the average number of males captured and the average temperature recorded between two capture moments with a group of infestation variables. The third model simulates the population density of adult males over time. Overall, the results were interesting; the CDD model was incompatible with the microclimate of Maruggio area. The second model was able to predict the infestations occurred in the experimental conditions especially those of 2019 while the third model, applied only in an orchard, provided an experimental population in line with the real adult population detected by the data. **[Saada Keltoum (Algeria), Mediterranean Agronomic Institute of CIHEAM Bari (Italy), 2019-2020].**

Exploitation of *Dittrichia viscosa* (L.) Greuter Allelopathy in Sustainable Weed Management Practices.

Dittrichia viscosa is a perennial Mediterranean plant species having invasive and allelopathic features. Its biomass contains and releases several secondary metabolites, which are the reason of its phytotoxicity effects. The present study aimed at evaluating the possible application of D. viscosa dried biomass to control weeds. For this purpose, several tests were conducted to determine: (a) the optimal herbicide dose, (b) its effect on different plant and weed species, (c) the influence of soil typology on biomass effectiveness, (d) its impact on seedling growth and plant development and, finally; (e) its effectiveness over time. Thanks to the several experiments carried out, it was possible to observe that: (a) the emergence of most of the species tested was influenced starting from 10 g of dried biomass l-1 of soil; (b) some plant species (e.g. Lepidium sativum and Beta vulgaris) were more sensitive than others; (c) the soil type and characteristics had no impact on biomass effectiveness; (d) the effect of dried biomass was more severe on seed germination than the other phases; (e) dried biomass effectiveness declined gradually over time. In the end, D. viscosa dried biomass proved to have a potential herbicidal activity and it could be a promising tool to be used in IWM strategies. **[Mohamed Nesma Zakaria Mahmoud (Egypt), Mediterranean Agronomic Institute of CIHEAM Bari (Italy), 2019-2020].**

Screening of the Guild of Microorganism Symbionts Associated with Red Palm Weevil

Red palm weevil (RPW), *Rhynchophorus ferrugineus* (Olivier, 1790) is a destructive invasive pest that has caused extensive loss of palm trees worldwide. Moreover, recent studies have shown that the intestinal microbes residing in the gut have potential roles in pest fitness and nutrition assimilation. Nevertheless, experimental evidence on the relationships between RPW and its gut microbiota in addition to the exact effects of gut microbiota on the RPW phenotype and the underlying mechanisms remain elusive. This study used Illumina

HiSeq next-generation sequencing analysis focusing on clarifying the taxonomic profiles of gut microbiota in RPW larva and pupa. The study revealed that RPW harbours a rich and diversified microorganism assemblage that mainly includes bacteria belonging to *Enterobacteriaceae*, *Lactobacillaceae*, *Erysipelotrichaceae*, and *Leuconostocaceae*. Moreover, the bacterial community associated with the two weevil developmental stages differs, whereas the bacterial diversity and richness remarkably decreased at the transition from larva to pupa. As well isolation and sequencing of bacteria from field-caught specimen weevils were conducted, whereas, 27 bacterial species in 21 genera including *Klebsiella, Serratia, Salmonella, Citrobacter, Enterobacter, Providencia, Pseudacidovorax, Pseudomonas,* and *Stenotrophomonas* were detected. However, all these genera included species capable of cellulose degradation. All considered our results provide initial information for the characterization of RPW gut microbiota, cellulolytic bacterial species, and RPW functional association with a guild of symbiotic microorganisms. [**Salim Amira Salim Abdelmenam (Egypt), Mediterranean Agronomic Institute of CIHEAM Bari (Italy), 2019-2020].**

Evaluation of the Pathogenicity of selected Entomopathogenic Fungi Strains against Economically Important Insect Pests in Egypt.

The present study was carried out to evaluate the efficacy of some entomopathogenic fungi (EPF), against a number of sucking insects that cause significant damage to main Egyptian crops. In this context, the *'Galleria* bait method' was used as a model insect and a promising technique for screening EPF isolates. *In vitro* bioassays showed the efficacy of two fungal strains, the commercial one, *Metarhizium anisopliae* (ITCC- 7895) and the local isolate strain, *Beauveria bassiana* (EG4-20), against different piercing-sucking insects: aphids (*Aphis gossypii* Glov., *A. craccivora* Koch. and *Myzus persicae* Sulz.), trips (*Thrips tabaci* Lind.), and whitefly (*Bemisia tabaci* Genn.). Results indicated that ITCC-7895 *M. anisopliae* isolate was more efficient against *A. craccivora* adults (LC_{50} $2.25x10^5$ conidia ml^{-1}) and against *A. gossypii* (LC_{50} $1.05x10^5$ conidia ml^{-1}), compared to EG4-20 *B. bassiana* isolate with LC_{50} of $4.02x10^6$ and $1.28x10^6$ conidia ml^{-1}, respectively. Moreover, *Thrips tabaci* nymphs were more susceptible to *M. anisopliae* (LC_{50} $2.87x10^8$ conidia ml^{-1}). *B. bassiana* was instead more efficient against *B. tabaci* nymphs than *M. anisopliae* with LC_{50} $1.02x10^6$ and $4.76x10^7$ conidia ml^{-1}, respectively. **[Senousy Fatmaalzahraa Ahmed Saber (Egypt), Mediterranean Agronomic Institute of CIHEAM Bari (Italy), 2019-2020].**

Survey of Postharvest of Fungal Contamination and Characterization of Mycotoxigenic Fungi of Table Grapes in Lebanon.

Table grapes are exposed to fungal infections both before and after harvest, in particular, the genera *Aspergillus*, *Penicillium*, and *Alternaria* can cause decays and contaminations by mycotoxins. In this study, the main fungi affecting Lebanese table grapes after harvest were assessed in terms of epiphytic populations, latent infections and rot incidence. Furthermore, the effect of storage with/without SO_2 generating pads was evaluated. Representative isolates were molecularly identified and their toxigenic potential was established, with particular reference to regulated mycotoxins as OTA and patulin. The epiphytic population was found to harbour mainly wound pathogens (*Aspergillus* spp. and *Penicillium* spp.), whereas latent infections and rots were mostly caused by *Botrytis* spp.. SO_2 generating pads caused a significant reduction of the epiphytic population and rots, whereas they were less effective against latent infections. The characterization of *Aspergillus*, *Penicillium* and *Alternaria* isolates showed that *A. tubingensis*, *P. glabrum* and *A. alternata* were the most represented species, respectively. Interestingly, strains of *A. welwitschiae* and *P. expansum* were also found, and produced OTA and patulin, respectively. These data evidenced the need of effective measures to prevent postharvest losses caused by toxigenic fungi in terms of quality and safety issues. **[Khalil Jack (Lebanon), Mediterranean Agronomic Institute of CIHEAM Bari (Italy), 2019-2020].**

Evaluation of the use of "Sentinel-2" Satellite Images for the Classification of areas Affected by OQDS (Olive Quick Decline Syndrome) and for the Monitoring of Control Measures against *Xylella fastidiosa* in Apulia.

The fast and wide spread of the bacterium *Xylella fastidiosa* in EU territory, Italy in particular, and the rise of the number of host species urged to introduce strict emergency measures and mandatory surveys, inspections and diagnostic tests. The use of remote sensing to monitor the distribution of plant diseases has been widely used. Detecting spatial changes, mapping the spread of the disease, helps to take the right decision at the right timing. To this end, from July 2015 until July 2020, olive plantations were analysed using Sentinel-2

(Copernicus mission) satellite images of two municipalities in the region of Puglia: Maruggio (Taranto province) and Ugento (Lecce province), with respectively less and more severe presence of *Xf* symptoms (Olive Quick Decline Sindrome - OQDS). The images have provided their usefulness in the detection of the spatial and temporal evolution of *Xf* infected areas with the use of "ad hoc" combination of vegetation Indices (VIs): MCI-RI-Slope. Similarly, images elaborated in the winter-spring period of the same areas (2018-2020) helped to conclude that the combination of mYI, MCI and Slope indices gives a representative idea of the ground-situation of the application of agronomical practices e.g. removal of weeds, which are the control measures against Xf vectors. Based on the VIs used, two possible global ecological indicators have been defined for the identification and control of *Xylella* in the Apulia territory. [**Ait Mansour Soukaina (Morocco), Mediterranean Agronomic Institute of CIHEAM Bari (Italy), 2019-2020].**

Development of Smart Detection Tools for some Honey Bee Pathogens and Preliminary Survey on the sanitary Status of Honey Bees in Morocco.

In the last decade, the loss of the honey-bees population has been continuously increasing worldwide; this phenomenon is referred to as colony collapse disorder. Several causes are associated with this situation, including *inter alia* honey-bee infections by various pathogens. In the present study, protocols for rapid and sensitive diagnosis of some pathogens were set up and tested during a preliminary survey in three Moroccan regions. In this context, new primer pairs were designed and validated in qPCR for *Nosema ceranae*, *Aspergillus flavus*, *Paenibacillus larvae* and Black queen cell virus (BQCV). Preliminary monitoring of the main honey-bee pathogens in Moroccan apiaries was performed using the newly developed protocols and the already reported RT-PCR for the detection of Bee macula-like virus (BeeMLV), Deformed wing virus (DWV) and slow bee paralysis virus (SBPV). Interestingly, *N. ceranae* was detected in all the surveyed beehives, followed by BQCV (94%), *A. flavus* (81%) and BeeMLV (38%). In contrast, *P. larvae*, DWV and SBPV were not detected. No difference was observed among the regions in terms of prevalence and infection intensities of the detected pathogens. Finally, the present study reports for the first time the presence of *A. flavus*, BQCV and BeeMLV in Moroccan apiaries. **[Jabri Badr-Eddine (Morocco), Mediterranean Agronomic Institute of CIHEAM Bari (Italy), 2019-2020].**

Isolation and Characterization of *Colletotrichum* spp. in the Olive Growing Area of Maruggio (Apulia Region) for the Epidemiological Modeling of Olive Anthracnose Disease.

Olive (*Olea europaea* L.) is one of the major crops in the Mediterranean basin. However, effective and timely disease management continues to pose a challenge to olive growers, and disease outbreaks remain a drawback for the advancement of this sector. Therefore, an improvement of plant protection strategies through advanced monitoring technologies and methodologies is urgent. In this study, many olive orchards in Maruggio and Manduria areas, south Italy, were surveyed on 10 February 2020 for the presence of olive anthracnose disease. A total of 14 Colletotrichum spp. isolates were collected from leaves, branches, and mummies of symptomatic and asymptomatic plant organs of 12 olive orchards. DNA extraction and amplification of ITS, b-tubulin, and GADPH genes through PCR showed high similarity to *C. acutatum* s.s, and particularly to isolates obtained from *Feijoa sellowiana* in the Basilicata region, Italy. A prototype disease prediction model was used to simulate the pathogen dynamics according to environmental factors like temperature, relative humidity, leaf wetness, and rainfall. Olive anthracnose was simulated according to weather conditions in 2019 and 2020. Despite the required improvement, with experiments regarding the pathogen latent period and the infectious period, the model correctly simulated the main steps in the pathogen infection cycle. Surveys in August 2020 confirmed the presence and development of the disease. **[Taibi Othmane (Morocco), Mediterranean Agronomic Institute of CIHEAM Bari (Italy), 2019-2020].**

Comparison of Conventional and Novel Molecular Diagnostic methods for Detection of *Xylella fastidiosa* from Insect Vectors

The efficiency of PCR, real-time PCR and LAMP assays for detection of *Xylella fastidiosa* (Xf) genomic DNA from *Philaenus spumarius* (Ps, 100 specimens) and *Neophilaenus campestris* (Nc, 50 specimens) insect vectors were evaluated using three DNA extraction methods (EM). In addition, a new real-time LAMP technology, i.e., Fluorescence of Loop Primer upon Self Dequenching-LAMP (FLOS-LAMP) was optimized and applied on DNA extracted with the

three EM. EM1 consisted of entire insects heated in an extraction buffer (EB), EM2 consisted of excised heads heated again in the EB of EM1, whereas EM3 consisted of grinding the entire insect, head and body recuperated from EM2, with a CTAB buffer. The comparative analyses showed that EM3 is the most efficient for extracting Xf genomic DNA from insect vectors, of which 44 specimens were positive for Xf in each of the diagnostic methods used, including FLOS-LAMP assay. In general, real-time PCR and LAMP assays were more competent than PCR for detecting Xf in insect vectors, independently from the EM used. The newly optimized FLOS-LAMP technique had a detection limit of 1 fg\µL of Xf genomic DNA, compared to the 10 fg\µL for LAMP. FLOS-LAMP, being a more sensitive and specific assay, together with EM3, were the most appropriate approaches for an accurate detection of Xf in insect vectors. **[Khasib Motasem A.A. (Palestine), Mediterranean Agronomic Institute of CIHEAM Bari (Italy), 2019-2020].**

Identification and Evaluation of an IPM Strategy against the Fly Species (*Dacus frontalis* and *Dacus ciliatus*) on Cucurbits

Dacus frontalis and *Dacus ciliatus* are among the most economically damaging pests of cucurbits in Africa. This study aims to make surveys in order to detect the presence of these pests in northern Tunisia and to evaluate Ceranock attract and kill system against these flies. The lesser melon fly *Dacus ciliatus* is reported in this paper for the first time in Tunisia, where it was found in the region of Tekelsa (Nabeul). It is a pest of cucurbits of economic importance and is common especially in the eastern and southern parts of Africa. *D. ciliatus* and *D. frontalis* was collected by MacPhail traps. The traps used to catch flies, in Zucchini and cucumber fields, are baited with the fertilizer diammonium phosphate (DAP) and the hydrolyzed protein Ceratrap©. Results indicated that DAP and Ceratrap© can be used as effective attractant for monitoring against these *Dacus* species. On the other hand, Ceranock attract and kill strategy restricted significantly the number of flies, in the different plots of zucchini (Z1 and Z2) and cucumber, compared to the control. This strategy has also proved to be successful by giving respective reduction rates equal to 89.5%, 92.6% and 96.3% in Z1, Z2 and cucumber plot. **[Ghalleb Yosr (Tunisia), Mediterranean Agronomic Institute of CIHEAM Bari (Italy), 2019-2020].**

A Preliminary Investigation on the Etiology of Brittle Leaf Disease of Date Palm in Tunisia.

Brittle Leaf Disease (BLD) of date palm, of unknown etiology yet, has assumed epidemic proportions since the 1980's in Tunisia and recently in Algeria and Lybia. A search for the presence of phytoplasma, viroids and viruses, possibly involved in the disease was conducted. Seventy-five samples (leaves\fronds) were collected from symptomatic (25) and asymptomatic (50) date palms (June-July 2019) of three different orchards with trees affected with BLD in Tozeur region (South of Tunisia). RT-PCR assays performed on these samples, using degenerate- and species-specific primers for viruses and viroids detection, respectively, showed no infections with these pathogens. The search for phytoplasma using Nested-PCR assays showed that only 6 symptomatic trees (out of 25 tested, i.e. 8%) were infected, whose sequencing analyses of their PCR amplicons in BALSTn showed 99.44% of similarity with the Candidatus phytoplasma solani (*Ca*. P. solani 16SrXII-A, stolbur group). RFLP and *in-silico* characterization of this phytoplasma clone (33-5) showed that it deals with a new subgroup. The discovery of *Ca*. P. solani for the first time in the date palm, together with its' new subgroup, makes the novelty of this investigation. More studies are needed to determine the etiology of the BLD in Tunisia, although the finding of the *Ca*. P. solani in six symptomatic palms is intriguing at the etiological level. **[Hnaien Safa (Tunisia), Mediterranean Agronomic Institute of CIHEAM Bari (Italy), 2019-2020].**

Preliminary Results in the Development of a Rapid Detection Tool for *Verticillium dahliae* in Olive Orchards.

The use of healthy planting materials is of paramount importance for an effective management of *Verticillium wilt*, a vascular disease caused by the soil-borne pathogen *Verticillium dahliae*. Moreover, the use of pathogen-free propagative materials is crucial to prevent the introduction of the fungus into disease-free areas. The certification of healthy plant propagative materials depends on the availability of sensitive and specific diagnostic tools. Fluorescence of Loop Primer Upon Self Dequenching loop-mediated isothermal amplification (FLOS LAMP), is an emerging diagnostic real time LAMP technique initially developed for the diagnosis of human viruses. Recently, it has been successfully applied for the detection of a plant pathogenic bacterium in its insect vector. The main objective of this work was therefore to develop a FLOS LAMP essay to detect *V. dahliae* in infected olive plants. Two previously described LAMP primer sets were evaluated in order to select

the most efficient ones for use in routine testing. Genomic DNA extracted from 41 isolates of *V. dahliae* was used during the trial. Thirty-six isolates were specifically detected but a non-specific signal was also recognised in the negative control. Preliminary results of this study highlighted the need to design a new set of primers, targeting the conserved IGS genomic sequence in order to develop an effective real time LAMP essay for *V. dahliae* detection. **[Omri Ghofrane (Tunisia), Mediterranean Agronomic Institute of CIHEAM Bari (Italy), 2019-2020].**

❖ Some Plant Protection Activities of FAO and Other Organizations

ACTIVITIES OF THE REGIONAL OFFICE OF FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS – NEAR EAST AND NORTH AFRICA

FAO Supports the Regional Efforts Facing Fall Armyworm by Organizing Virtual Training on Fall Armyworm Biological Control and the 7th National Focal Points Meeting.

The regional office of Food and Agriculture Organization of the United Nation (FAO) in Near East and North Africa region (NENA) has organized virtual training workshop on mass production of Fall Armyworm (FAW), *Spodoptera frugiperda*, natural enemies on 23-24 November. The virtual training aimed to build the regional capacity of biological control specialists on development and implementation of biological control approaches to mitigate the risk of FAW in NENA region. The training was organization in collaboration with experts from the International Centre of Insect Physiology and Ecology "icipe", Kenya, who have gained large experience in the field of FAW biological control since the first report of FAW in the African continent in 2016. The training workshop was organized in two days to cover the main related topics like: the principles of mass rearing of FAW as host for the natural enemies; mass rearing of egg and larval parasitoids, parasitoid release and recovery, quality control for mass rearing/production of natural enemies, and entomopathogenic fungi; their diversity, isolation and mass production. The training was attended by over than 160 participants from 20 different countries, who benefited from the training materials which were in the form of presentations, protocols, checklists and video clips. The monthly virtual meeting of the national focal points on FAW has been held back-to-back after the first day of the training. The monthly virtual meeting is representing regional platform for exchanging information and improve the cooperation between the region countries. During the 7th meeting, the national focal points (NFP) of Jordan and United Arab Emirate (UAE) have presented the national efforts performed to face the threat imposed by FAW. The NFP of Jordan has highlighted the contingency response of the Jordanian authorities since 2017 to establish early warning system, which has proved to be effective when first report of the pest was done during September 2020. While the NFP of UAE has explained the well-established surveillance system, and UAE experience in data collection and management. Since the first report of the pest in Africa in 2016, FAO was alerted and the regional office in NENA has provided the countries with the fundamental information required to develop the national contingency plans. In addition, FAO has provided many countries with essential tools and equipment for FAW monitoring and has organized multiple training workshops at the national and the regional level. Recently, FAO has established FAW Global Action to provide further support to number of demonstration countries in three regions worldwide. The demonstration countries will host experimental plots to assess IPM packages, particularly developed to suit the environmental conditions and culture practices in the region. In NENA region, Egypt has been selected as demonstration country as representing more than 90% of maize cultivation in the region, while Mauritania, Sudan and Yemen were selected as pilot countries, in which the IPM package will be further verified.

FAO Programme on Red Palm Weevil Eradication in the Near East and North Africa

The regional secretariat of the programme has finalized the proposals of six Technical Working Groups (TWGs) focusing on issues of capacity building, research and technology transfer for sustainable management of the RPW. It has also prioritized work packages and activities to be conducted in the next 3 years. The partners roles, budgets, workplans and timelines have been identified and Letters of Agreements (LoAs) are being signed with partner institutions. The programme has completed the nomination of national focal points from 18 countries in NENA Region and the first virtual meeting with the National focal points was convened on 17th November 2020

First Virtual Meeting on Red Palm Weevil Management Programme in Near East and North Africa. A baseline survey questionnaire has been shared with project partners, for collection of baseline data needed for technical assessments. The programme has developed an extensive training plan on RPW management to be conducted starting this month. A plan to combat RPW in Socotra Island has developed and preparations are underway to send materials and equipment to Tunisia and Yemen to help fight the RPW.

Upcoming activities:

The second meeting of the national focal points and the first training on RPW IPM will be conducted on 22nd December 2020. The second training on RPW IPM will be on Tuesday 12th January 2021. An Arabic version of the FAO manual: "Guidelines on RPW Management Practices" will be produced next month. It is expected that the next meeting of the programme steering committee and the official launch of the TWGs field activities will take place in January 2021.

The First Training Meeting of National Contact Points in the Near East and North Africa on Global Action to Standardize Lists of High-Risk Pesticides (HHPs).

The first training meeting of national contact points in the Near East and North Africa was held through the Zoom platform on global action to standardize lists of high-risk pesticides (HHPs), from 13:00 -15:40 pm at Cairo time on Thursday, November 26, 2020.

Key speaker and moderator: Dr. M. Jamal Al-Hajjar, Pesticide Analyst, FAO Consultant NSPDD,

The training workshop were attended by 10 national focal points (NFPs) from ten countries in the Near East and North Africa.

Objective of the training: To focus on the mechanism and criteria for classification of highly hazardous pesticides, with the aim of building capacities, standardizing standards and training on how to classify and list highly hazardous pesticides in accordance with the Global Coordinating System (GHS).

The training covered the following topics:

- Why do HHPs need special attention?
- International policy context of HHPs.
- Steps for HHP risk reduction which are 3 main steps:
    1. Identification
    2. Assessment
    3. Mitigation

Conclusions: The training wrapped up by Dr. Thaer Yaseen and he highly appreciated the coordination and level of proficiently in NENA, and in conclusion the attendees agreed on the schedules of following activities:

1- The date of next training workshop to be on 21 Dec. 2020.
2- The NFPs agreed to submit the first draft of HHPs lists on 15 January 2021, at the latest.

Activities of the Commission for Controlling the Desert Locust in the Central Region (CRC) Food and Agriculture Organization of the United Nation

Desert Locust Situation

Warning level*:* THREAT

General Situation of the Desert Locust during November 2020 and Forecast until mid-January 2021 provided by the FAO Emergency Centre for Desert Locust (ECLO

General Situation

Intense swarm invasion of Kenya likely from mid- December onwards

Substantial breeding caused large numbers of hopper bands to develop within a vast area of eastern Ethiopia and central Somalia during November. Numerous immature swarms will start to form in early December and increase until January. This will cause increasing waves of immature swarms to invade northeast Kenya from mid-December onwards and spread to other counties. Intensive survey and control operations should be maintained in Ethiopia and Somalia while extreme vigilance and preparedness are required in Kenya. Breeding is likely in northern Somalia where heavy rains fell from cyclone Gati and mature swarms are present. Unusually strong winds carried a few older swarms from central Somalia to eastern Kenya and northeast Tanzania. In the Central Region, immature swarms migrated from Yemen to Kuwait and southwest Iran. Swarms moved from eastern Sudan to the Red Sea coast, and immature swarms arrived on the Saudi Arabia coast. Breeding will cause locust numbers to increase along both sides of the Red Sea. In the Western Region, locusts formed groups in western Mauritania, northern Niger, and southern Algeria and limited control was done.

Western Region: CALM

SITUATION. Control operations against groups that formed from breeding in Mauritania (258 ha treated), Niger (1 398 ha), and Algeria (167 ha); isolated hoppers and adults in Chad; isolated adults in Mali and Morocco. FORECAST. More hopper and adult groups in Mauritania and Niger; possible breeding in Mauritania; scattered adults to persist in Morocco and northern Mali.

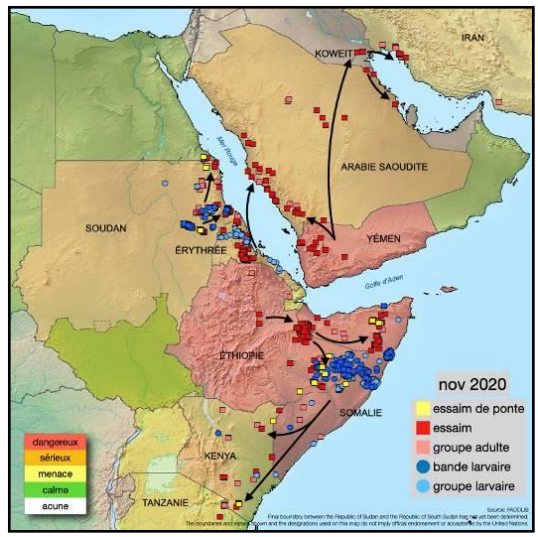
Central Region: THREA

SITUATION. Swarms move into eastern Ethiopia (85 382 ha treated) with widespread breeding and numerous hopper bands there and in central Somalia (30 323 ha), and mature swarms lay in northeast; local breeding in northwest Kenya (167 ha) as mature swarms arrive and lay in the east; swarmlet in northeast Tanzania; swarms arrive in Eritrea (8 986 ha) and breed on coast; swarms in Sudan (66 488 ha) move to coast and breed; swarms move from Yemen (335 ha) to Kuwait; swarms arrive on Red Sea coast of Saudi Arabia (5 190 ha); swarm laying in southeast Egypt
(1 225 ha). FORECAST. Local breeding in Kenya; numerous swarms to form in eastern Ethiopia and central Somalia and invade northern Kenya from mid-December; hatching and hopper bands to form in northern Somalia; breeding and hopper bands along both sides of Red Sea in Sudan, Eritrea, Yemen, Saudi Arabia, and perhaps Egypt.

Easter Region: CALM

SITUATION. Few immature swarms arrive from Arabia on southwest coast of Iran (79 ha treated).
FORECAST. Breeding and hopper bands likely on southwest coast of Iran; low numbers prevail in southeast Iran and southwest Pakistan.

For more up to date information about the Desert Locust situation and forecasts, visit the FAO's Desert Locust website: http://www.fao.org/ag/locusts/en/info/info/index.html and FAO Commission for Controlling the Desert Locust in the Central Region http://desertlocust-crc.org. Source: The FAO Desert Locust Bulletin issued monthly in English and French by the Desert Locust Information Service, AGP Division (Rome, Italy; and Arabic version by the Commission for Controlling the Desert Locust in the Central Region (FAO Regional Office for Near East, Cairo, Egypt http://desertlocust-crc.org).



FAO Leading the Fight against the Desert Locust

The Horn of Africa is facing the worst desert locust crisis in over 25 years, and the most serious in 70 years for Kenya. The current situation – is become a regional plague, as several regions are now being affected simultaneously – which represents an unprecedented threat to food security and livelihoods in the region and could lead to further suffering, displacement and potential conflict. Desert locust swarms formed in the spring-breeding areas of Southwest Asia and are moving across India, Pakistan and the Islamic Republic of Iran. In India, swarms that arrived in Rajasthan in May continued to move and have reached several central states in country – this has not occurred since 1961.

The situation remains alarming, particularly in Ethiopia, Kenya, Somalia and Yemen, where widespread breeding is in progress and new swarms are forming, representing an unprecedented threat to food security and livelihoods at the beginning of the cropping season

Response efforts

FAO's response and anticipatory action is structured around three pillars:

1. **Curbing the spread of desert locusts** through continuous surveillance, ground and air control methods that are technically sound and adapted to the life cycle of desert locusts, conducting impact assessments and promoting environmental, health and safety measures. Under the rapid response plan, 3.2 million ha of land are targeted for locust control.

2. **Safeguarding livelihoods and promoting recovery** through cash interventions, supplementary livestock feed, and livelihood recovery and farming packages. A total of 313 200 households have been targeted for livelihoods protection and recovery support.

3. **Coordination of and preparedness for** the deployment of rapid surge support, collaboration with regional partnerships, regional advocacy and national capacity building.

In the **Greater Horn of Africa**, significant progress was made in 2020, on issues related to capacity building to detect, report and apply technically-sound and safe Standard Operating Procedures (SOPs) to treat infested areas. This allowed governments in the region to treat over 1.25 million hectares and avert major humanitarian catastrophe by protecting food production and rangeland and preventing movement of Desert Locust to western Africa.

In the **Arabian Peninsula**, surveillance and control operation was conducted and over 220,000 hectares were treated, including in Yemen (50,000 hectares). However, Yemen remains an important breeding area with limited capacity to perform interventions to a desirable scale.

All together the livelihood and food security of over 20 million people was protected in Eastern Africa and Yemen and the economic benefit of the intervention is conservatively estimated at around USD 1 billion.
Across the 10 countries included in the FAO Greater Horn of Africa and Yemen appeal in 2020, over 210,000 households, equivalent to some 1.1 million people were assisted on 2020 through anticipatory and/or recovery livelihoods interventions in kind or in cash while another 80,000 households will receive assistance in early 2021 in countries with unimodal farming system with current level of funding.

ARAB SOCIETY FOR PLANT PROTECTION NEWS

The 13th Arab Congress of Plant Protection

1-The new congress date is October 31-November 5, 2021.
2-Registration deadline: September 1, 2021
3-Abstracts submission deadline (confirmation of earlier submitted abstracts, or submitting new ones): April 30, 2021.
4-Acceptance of abstracts: 30 June, 2021
5-Deadline for submitting proposals for invited concurrent oral research papers sessions: March 31, 2021
6-Second congress announcement: May 31, 2021.
7-Third and final congress announcement: July 1, 2021
8-Deadline for hotel booking: July 31, 2021
9. The email address and the website of the congress will continue to be: info@acpp-aspp.com and www.acpp-aspp.com

We apologize for any inconvenience caused by this postponement which was imposed on us by conditions beyond our control, and very much appreciate your kind understanding. Looking forward to meet you all in the fall of 2021 in Tunisia.

The Arab Society for Plant Protection
The Organizing Committee of the 13th Arab Congress of Plant Protection in Tunisia

Dr. Safaa Kumari was selected in the BBC List of 100 Inspiring and Influential Women from around the World for 2020.

BBC every year announces the names of 100 women from around the world for their leadership and inspirational role in their communities. In this month the 2020 list was announced and it included the name of Dr. Safaa Kumari from Syria (https://www.bbc.com/news/world-55042935). The Arab Society for Plant Protection (ASPP) is proud to see one of its active members honored by such a prestigious broadcasting corporation. ASPP is very much aware of the achievements of Dr. Kumari over the past two decades. She is a member of the ASPP Executive Committee, and she played a significant role in its progress through her active participation in its diversified activities. Dr. Kumari is the Associate Editor of the Arab Journal of Plant Protection published by ASPP, and she played an important role in its quality improvement over the past two decades. She served as the chairperson of the ASPP Publications Committee, and during her tenure she published the "Dictionary of Arabic Plant Protection Terms"; the first edition in 2006 and the second edition in 2017. She also participated in editing two reference books, the first book entitled "Virus Diseases of Important Agricultural Crops in the Arab Region", published in 2008 and the second "Challenges of plant Protection in the Arab Countries: Vision of 2050", published in 2020. In addition, she was an active element in organizing the Society congresses held once every three years. ASPP is highly honored and proud to see one of its pillars recognized among the 100 women globally for the year 2020. This recognition did not come by chance, but based on solid professional and social achievements. Her humble and communication skills with others, and her determination to make a difference, made her a role model to follow in our region.

Congratulations to Dr. Kumari for this recognition, and congratulation to ASPP for honoring one of its distinguished members at the global level.
BBC 100 Women 2020: Who is on the list this year? - BBC News

ICARDA's Dr. Safaa Kumari is a BBC 100 Woman 2020 | ICARDA
Safaa Kumari: Nurturing seeds of hope - Features - Nature Middle East (natureasia.com)

Safaa Kumari

Place of Birth: Syria Plant Virologist @ICARDA
As a plant virologist, Dr Safaa Kumari looks for solutions to epidemics that destroy crops. She has spent years discovering virus-resistant plant genotypes, including faba bean resistant to the devastating virus, faba necrotic yellows virus (FBNYV).
The World has changed a lot in 2020. Within a Team tasked to overcome such challenges, it is about ability – not gender. Women must believe that their contribution is equal to that of any man. https://www.bbc.com/news/world-55042935

Compendium on Plant Health Research Priorities for the Mediterranean Region is now published.

The Mediterranean region is home to about 25 000 plant species, of which 13 000 are endemic (not found anywhere else on Earth) and has been recognised as a biodiversity hotspot that is suffering an exceptional loss of habitat. Mediterranean agriculture, forests and other environments are seriously threatened by numerous quarantine and emerging pests, and their negative impacts is expected to increase due to global trade and climate change. In the face of these challenges, the Mediterranean region is particularly vulnerable due to the weakness of national quarantine systems, limited expertise and phytosanitary infrastructures, and not least the lack of funds for research activities in support of statutory plant health. The Compendium on the 'Plant Health research priorities for the Mediterranean region' is the result of the collaboration of experts from leading organizations and initiatives in the region: the International Centre for Advanced Mediterranean Agronomic Studies, the Euphresco network for phytosanitary research coordination and funding, the Arab Society for Plant Protection, the European and Mediterranean Plant Protection Organization, the Food and Agriculture Organization, the Mediterranean Phytopathological Union and the Near East Plant Protection Organization. The compendium summarizes the result of a survey on plant health research priorities organised among experts from National Plant Protection Organizations and research organizations in the Balkan-Mediterranean, Eastern Mediterranean, Maghreb, and Western Mediterranean. The most threatening pests, the research priorities, the important research infrastructures and the needs in terms of capacity are presented. It is hoped that the document will help guiding the identification of research priorities by the funders, that it will contribute to improve the coordination of research efforts on plant health and plant protection and that it will enhance cooperation of stakeholders within the area.

The CIHEAM and Euphresco will continue, with the help of other interested international organizations, to make sure that the document remains relevant over time, in order to serve research collaboration and coordination of plant health research for Mediterranean countries. The Arab Society for Plant Protection contributed to this effort through the participation of four colleagues, Ibrahim Jboory, Ahmed Katbeh, Thaer Yaseen and Khaled Makkouk, who contributed a chapter on "Research Capacity for the Mediterranean Area". Those who are interested to read the full text of the compendium can check the following link: https://zenodo.org/record/4107123#.X437ZdAzaUk

Arab Society for Plant Protection, President delivers a lecture on Fall Armyworm at the School of Agriculture, University of Jordan

The Seminars Committee at the Plant Protection Department, School of Agriculture, University of Jordan, hosted Prof. Dr. Ibrahim Al-Juboori, President of the Arab Society for Plant Protection, to deliver a valuable seminar entitled: "Fall Armyworm, from a native pest to invasive in more than 65 countries: Some Integrated Methods for its Control". The seminar was presented online via the Microsoft Teams application on Monday, December 7, 2020. It was attended by interested faculty members, administrative staff, and graduate students. At the beginning of the seminar, Prof. Al-Juboori was welcomed by Prof. Ahmed Katbeh, chairman of the Seminars Committee in the department. Prof. Al-Juboori spoke about the identification of the pest, its life cycle, biology, and ecology. He emphasized the need for following an integrated management program using various means that can be exploited to limit the proliferation of this devastating pest and keep its populations below the economic injury level. At the end of the seminar, a discussion took place in which questions were raised by the department's students about this dangerous pest that had recently entered Jordan.

ASPP MEMBERS NEWS ABROAD

Dr. Mokhtar Abdulsattar Arif (e-mail: mokhtar.a.arif@gmail.com) from Iraq, works at the Department of Plant Protection, Ministry of Agriculture. He obtained his master's degree from the Mediterranean Agronomic Institute of Bari (CIHEAM -IAMB), Italy in 2016. **Thesis title: Host plant volatile compounds for the management of *Bagrada hilaris* Burmeister (Heteroptera: Pentatomidae**). He obtained his doctorate from the University of Palermo, Scienze Agrarie, Alimentari e Forestali, Italy in 2020. **Thesis title: Chemical Ecology of *Bagrada hilaris* (Burmeister) (Heteroptera: Pentatomidae): intraspecific and interspecific chemical cues**. Most of his research focused on studying the interaction between plants and insects through the applications of behavioral substances (Semiochemicals), especially the interactions between stink bugs and some plants belonging to the Brassica family. His work also resulted in the identification of some compounds that have a direct relationship in the insect response to the appropriate host. Other research focuses on evaluating the role of pheromones in stink bug behavior and their application in integrated pest management. Other studies were contributed to finding some suitable applications in the use of trap crops, which have an important role in the field of organic agriculture. He also participated in designing some special traps in managing a number of stored pests by evaluating some attracting chemicals. Other activities included participation in some studies concerning the evaluation of some egg parasitoids against a number of economically important pests. Some of his research can be found through the following link: https://orcid.org/0000-0003-0945-8811

Evaluation of Brassicaceae Seedlings as Trap Plants for *Bagrada Hilaris* Burmeister in Caper Bush Cultivations.

The caper bush, Capparis spinosa (Brassicales: Capparaceae), is intensively grown on Pantelleria Island (Trapani, Sicily, Sicilian channel) where it has been granted protected geographical indication (PGI) by the EU. On this island, Bagrada hilaris, a stink bug native of Asia and Africa, is the major pest of caper crops. Recent studies have shown the attraction of B. hilaris to volatiles of brassicaceous plants at the seedling stage. The objective of this study was to evaluate three cotyledon-stage seedlings of host plants, Brassica oleracea var. botrytis (cauliflower), Eruca sativa (rocket) and Brassica carinata (Abyssinian cabbage), as potential trap plants for B. hilaris. The relative preferences of these species were first evaluated in laboratory and field experiments, carried out during summer when the level of B. hilaris infestation was the highest. Behavioral bioassays in the laboratory conditions showed that adults of B. hilaris preferred to orient toward seedlings of B. oleracea and E. sativa over B. carinata. Field experiments confirmed these results. Then seedlings were tested in trap plant trials, by sowing them in artificial pots formed with aluminum trays and placing them in caper fields infested with B. hilaris. Results showed that E. sativa and B. oleracea diverted hundreds of B. hilaris individuals from the capers to these sources of attraction. Overall, these results suggest that B. oleracea and E. sativa seedlings used as lure inside traps or as trap plants may be a useful tool in the management of B. hilaris populations. **[Mokhtar Abdulsattar Arif [1](Iraq-Italy), Salvatore Guarino [2], Ezio Peri [1] and Stefano Colazza [1], 1 Department of Agriculture, Food and Forest Sciences, University of Palermo, Viale delle Scienze, Building 5, 90128 Palermo, Italy; mokhtar.arif@unipa.it (M.A.A.);** ezio.peri@unipa.it **(E.P.); stefano.colazza@unipa.it (S.C.), 2 Institute of Biosciences and Bioresources (IBBR), National Research Council of Italy (CNR), Corso Calatafimi 414, 90129 Palermo, Italy,** https://doi.org/10.3390/su12166361

Necrobia rufipes (De Geer) Infestation in Pet Food Packaging and Setup of a Monitoring Trap.

Necrobia rufipes (Coleoptera: Cleridae) is an emerging pest of pet food stores. Information on infestation modalities for this pest is absent and specific monitoring tools are missing. In this paper, the adults' and larvae's ability to enter into pet food packaging was evaluated. Furthermore, to set up of a monitoring trap behavioral bioassay were carried out: testing two adhesive surfaces, one generally used in mouse glue trap and the other used in cockroach trap, to evaluate their ability in avoiding insects' escape; screening different molecules, as candidate food attractants: methyl cyclopentenolone, squalene and stearic acid. The results evidenced that *N. rufipes* enter in packaging through the air vent valves, suggesting that a way to prevent insect infestation would be to modify packaging. Tests showed that the glues have strong differences in the ability to retain the caught insects, with mouse glue more effective than cockroach glue. The behavioral bioassays indicated that methyl cyclopentenolone and squalene are able to attract *N. rufipes* adults in olfactometer. Finally, the dual-choice arena bioassays showed that a mixture of pet food and methyl cyclopentenolone elicited the strongest attraction in *N. rufipes* adults, suggesting that this mixture can be used as lure in monitoring traps. **[Sara Savoldelli, Costanza Jucker, Ezio Peri, Mokhtar Abdulsattar Arif and Salvatore Guarino, Department of Food, Environmental and Nutritional Sciences (DeFENS), University of Milan, Milan, Italy, Department of Agricultural, Food and Forest Sciences (SAAF), University of Palermo, Palermo, Italy, Institute of Biosciences and Bioresources (IBBR), National Research Council of Italy (CNR), Corso Calatafimi 414, 90129 Palermo, Italy].** https://doi.org/10.3390/insects11090623

Inhibitory Effect of Clay/Chitosan Nanocomposite against Penicillium digitatum on Citrus and Its Possible Mode of Action.

Citrus postharvest diseases are commonly controlled by applying synthetic fungicides in packinghouses. Several limitations to pesticides have resulted in a considerable interest in developing alternative non-polluting control means. Clay/chitosan nanocomposite (CCNC) was prepared by an anion exchange reaction between chitosan and clay. The structure and morphology of CCNC was characterized by Fourier-transform infrared spectroscopy (FT-IR), X-ray diffraction (XRD), Transmission electron microscopy (TEM), Scanning electron microscopy (SEM) and energy-dispersive X-ray (EDX). FTIR data and XRD patterns indicate that chitosan was intercalated into the clay layers. TEM result also showed that the dark sheets of clay were dispersion in

chitosan matrix. The surface morphology of CCNC in SEM micrograph showed a massive layered structure with some large flakes and some inter layer spaces. The EDX spectra of the prepared nanocomposite show key elements like C, O, Mg, Al and Si. The fungicidal activity of CCNC was tested against *Penicillium digitatum in vitro* and *in vivo*. A complete inhibition of *P. digitatum* was achieved at 20 µg mL-1 for clay/chitosan (1:0.5), clay/chitosan (1:1) and clay/chitosan (1:2). CCNC was tested *in vivo* for a direct and indirect action (induction of resistance) against green mold of oranges cv. Valencia late. The results showed that considering CCNC direct action a complete inhibition of green mold was observed, whereas a high reduction (70%) of rot was reported for clay/chitosan (1:2) used as a resistance inducer. The mode of action of CCNC on the pathogens was also demonstrated via the genotoxicity (degradation of *P. digitatum*-DNA) and SEM (severe collapse, malformation and irregular branching of hyphae). CCNC is economically interesting because it is easy to prepare and involves inexpensive alternative control means against green mold of citrus fruit. **[Khamis Youssef (Egypt-Brazil), Ayat F. Hashim. Jordan Journal of Biological Sciences, Plant Pathology Research Institute, ARC, Egypt; Food Industry and Nutrition Division, National Research Centre, Egypt, Volume 13, Number 3, September, 349 - 355, 2020].**

Everfresh Biocoating Technology creates a Nature-based Edible Food Coating to Extend Shelf-Life and Reduce Food Waste.

The FoodTech Challenge launched last year by the UAE Food Security Office and Tamkeen, seeks innovative and commercially viable solutions to address UAE's food security and water scarcity challenges and promote sustainable agriculture. Twelve finalists were selected from more than 400 proposals received from over 60 countries across the globe. We are proud to announce that our project 'Everfresh Biocoating Technology' was selected among the 12 finalists. In Everfresh, we preserve food using what nature has developed as the shield and building block for protection in multitude of organisms. We provide nature-based edible food coating technology that is feasible to implement, unique, and cost-effective using a sustainable approach to extend the shelf life of fresh produce and reduce food waste. We have developed a sprayable chitosan-based formulation, derived from crustacean shells. This pioneering product provides a protective, edible coating for agriculture produce while recycling seafood waste. Everfresh team comes from different academic backgrounds, with expertise in the field of biotechnology, chemical engineering, and sales & marketing. Dr. Mohamed Mannaa, The CEO and Co-founder of Everfresh, has over 12 years of laboratory and research experience with over 27 scientific research publications in Microbiology; Daniela Garcia has a Master´s Degree in Management and Global Economy from Yonsei University in South Korea and a Bachelor´s Degree in International Affairs, from the Universidad Central de Venezuela. Experienced in corporate management, marketing and sales, and Ricardo Garcia is a chemical Engineer, experienced in operations, maintenance and continuous improvement of equipment that supports chemical synthesis. We believe in the potential of this idea and possible contribution in food security in the region and worldwide. We are excited to start doing our part to make this world a better place, where there is more food for everyone and less waste. A better place for the present and future generations and for the environment. **[Mohamed Mannaa (Egypt-Koria), 2020].**

Expression of Plant Defence Mechanisms in Sundance Winter Wheat under Conventional, IPM and Bio-Pesticide Disease Management.

Wheat occupies a decent position in the food categories for millions of people worldwide. Several attempts have been done to produce and increase the wheat crop production in a more sustainable way by reducing the chemicals used throughout the production process. One of the most important steps in sustainable wheat production is to control the wheat diseases that affect dramatically on the wheat yield, by enhancing the wheat plant defence mechanism. In this study, three types of treatments containing elicitors (conventional chemical, biological and applying both treatments on the principle of the integrated pest management) have been used on Sundance winter wheat. The aim was to measure the effect of these treatments on the plant defence mechanism. The measurements of the plant defence mechanism were tested by extracting the RNA from the plant samples and quantifying the fold changes in each sample for two

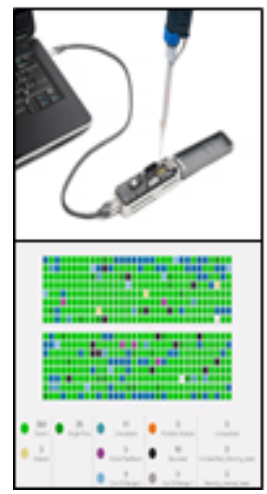
genes (PR1-5, PR1-21) following the treatments by 24 hours. The results were analysed statistically, and they implied that all the three treatments led to induce the PR1-5 gene compared to the untreated samples. However, the results showed that there were no significant differences between the effect of the three treatments themselves on inducing this gene. For the PR1-21 gene, the results clarified that there was no effect on the three treatments on the induction of the PR1-21 gene**. [Kinda Alraiss (Syria- United Kingdom), Master Studies in Sustainable Agriculture and Food Security at the University of Newcastle, UK, Supervisor Dr Julia Cooper, 2020].**

Metagenomic Studies for Detection of Honeybee Viruses.

Honeybees (Apis mellifera) provide pollination services that are crucial for food crops and agriculture. However, declines in insect pollinators, including honeybees, have raised concerns worldwide. Diseases and parasites are among the major factors affecting pollinator health. In particular, the devastating invasive parasitic mite (Varroa distructor) has the greatest impact globally; this parasitic mite has also an indirect negative impact by spreading viral diseases either through the saliva or through weakening bees' immune system, thus leading to the reactivation of latent viral infections. Unraveling the health status of honeybees and the diversity of viral diseases is extremely important for managing diseases and improving the health of the colonies. In this respect, Next-Generation Sequencing (NGS) technologies are useful tools for metagenomic studies and to characterize the virome associated to honeybees. In the present work, we used the High-Throughput Sequencing (HTS) approach to examine the RNA virome from different pooled samples from diseased honey beescollected in Italy. Total RNA was purified using TRI zol reagent and used to construct Illumina TruSeq RNA libraries, which were then sequenced by 2 × 100 bp paired-end reads, generating more than 30 million reads for each library. Bioinformatic analyses showed the occurrence of several viruses belonging to different genera, such as Ifla virus, Triato virus, Sinai virus, Partiti virus, Adenovirus, phycodna virus, Ilar virus, Capillo virus, and others unclassified. The number of detected viruses in our samples was remarkable, suggesting that viruses could be one of the major threats to the Italian apiculture. Furthermore, the application of HTS technology proved to be a very successful and rapid tool for discovering viruses in honeybees. **[Raied Abou Kubaa, Annalisa Giampetruzzi, Meriem Ahdouga, Rocco Addante, Hamid El Bilali, Maria Saponari. Institute for Sustainable Plant Protection, National Research Council (CNR), Bari, Italy Department of Soil, Plant and Food Sciences, University of Bari Aldo Moro, Bari, Italy 3 International Centre for Advanced Mediterranean Agronomic Studies (CIHEAM-Bari), Valenzano (Bari), Italy.Proceedings of the XI International Scientific Agricultural Symposium "Agrosym" Jahorina, Bosnia and Herzegovina, pp 244, 8-9/10/2020].**

Nanopore Sequencing Technology for Improving Plant Diseases Diagnosis

The sequencing through nanopore sensing technology has now almost a decade of application. The scalability of its throughput can reach even giga bases amount in a few hours of run. The major success of the technique is the possibility to perform quite long (up to some kb in length) reads on a single DNA or RNA molecule (Deamer *et al*., 2016) by the fast passage through nanometer-sized pores of a single-stranded nucleic acid molecule, activated by a motor protein on a membrane, that has the immediate output of an electric signal. This, finally, greatly reduces the need of bioinformatic analysis and elaboration for genome reconstruction and annotation. A number of unbiased plant pathogens detection works are on the floor, mainly to test its potential application as field-based tool. Some examples were reported in maize and yam viruses (Filloux *et al*., 2018;), bacterial tomato pathogens (Mechan Llontop *et al.,* 2020), the root rotting disease (red core) on strawberry (Adams *et al.,* 2020).cassava mosaic associated viruses in field tests (Boykin *et al.,* 2019), wheat viruses (Fellers *et al.,* 2019) or cereal rusts typing (Saunders *et al.,* 2019) or an overall method for surveillance of plant pathogens in crops and insect pests (Badial *et al*., 2018; Della Bartola *et al.,* 2020). Overall, early and rapid identification of individual pathogens at a molecular level has great potential in saving crops and preventing disease spread within a short period. At IPSP-CNR (Bari, Italy) nanopore sequencing is going to be applied for the identification of viruses and viroids, in ornamentals and fruit tree species, mainly when affected by unknown etiology diseases. Nanopore sequencing



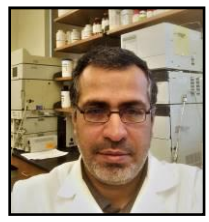
technology is progressing at modern steps, promising a future where portable sequencing will be routine in surveillance and detection of plant diseases.
[Raied Abou Kubaa & Angelantonio Minafra (Institute for Sustainable Plant Protection, CNR, Bari, Italy, 2020].

A Comparative Taxonomic and Diversity Study of Litter-Associated Fungi in Northwest Arkansas Forests

Assist. Prof. **Dr. Rajaa Abdulrazzaq Al Anbagi** have been received Doctor of Philosophy in Cell and Molecular Biology / Fungi in May 2020. She was enrolled in the graduate school at the University of Arkansas in the United States of America as a part of the Iraqi scholarship program. Her dissertation was entitled " A Comparative Taxonomic and Diversity Study of Litter-Associated Fungi in Northwest Arkansas Forests" under the supervision of Dr. Steven L. Stephenson. She investigated for the first time the fungal community assemblages associated with litter microhabitats in two historical forests in the Ozark Mountains of northwest Arkansas. In that project, Rajaa applied metagenomic techniques (metabarcoding techniques) using next generation sequencing in addition to traditional methods including fungal fruiting body inventories and Sanger sequencing technique to document and compare the hidden taxonomic and functional diversities and fruiting body productivities of the interested fungi. Also, she investigated the effect of prescribed burning practices which is applied on litter materials of Pea Ridge forest. During her study, she inquisitively worked with thousands of sequences reads and computationally and manually identified 541 fungal OTUs including diverse species and many new sequences recorded for the first time across both study sites. These incredible experiences lead to involvement in a new wave of methodological studies and obtaining insight in mycobiome research, DNA-barcoding approaches and developing microbiome studies. The metabarcoding approaches are now extensively deployed in research for community characterization, detecting novel taxa, and exploring the dynamic nature of richness, function and structure for fungi, bacteria and other microorganisms not only along different substrates in agricultural or forest ecosystems but also in distinct sites of the human and animal body for clinical sampling. She has ambition to investigate and characterize mycobiome and microbiome structures of different Iraqi samples using metabarcoding approaches in addition to applying other new molecular methods in various fields such as biological, ecological and agriculture sciences. It is noteworthy that Dr. Rajaa Al Anbagi obtained bachelor's and master's degrees in biological sciences from collage of sciences for women at University of Baghdad. She has been teaching graduate and undergraduate courses in different Iraqi universities, and mainly covered on fungal morphogenesis, fungal diversity, genetics and molecular biology, mycology, medical fungi, biotechnology, cell and genetics, microbiology, and microbial physiology. She has published 14 papers and 3 papers under processing in addition to writing a textbook in practical microbiol physiology. She has been a member in several committees and participated in some training programs. [**Rajaa Abdulrazzaq Al Anbagi, 2020].**

Using techniques of cell and molecular Biology for studying fungal plant pathogens

Assist. Prof. **Dr. Fakhir Eraheem Hameed Alshuwaili** obtained his Ph.D. in Cell and Molecular Biology/Plant pathology and Mycology from University of Arkansas -Fayetteville, Arkansas, USA through a funded scholarship by Iraqi Government. He gained his bachelor's degree in plant protection in 1999 and his master's degree in plant pathology in 2002 from Department of Plant protection- University of Baghdad. During his Ph.D. study, he identified a new pathogen on the soybean in USA and worldwide and built phylogenetic trees with multigene of some Diaporthe species. Furthermore, he studied genetic diversity for some species in different geological regions via Genotyping by Sequencing (GBS). Also, he characterized a gene (cytochrome p450) that involved in pathogenicity of a pathogenic fungus, *Diaporthe longicolla* using Mutagenesis and genetic screen**. He is working right now as an assistant professor in Department of Horticulture/ Agriculture College/ Green University of Al-Qasim, Babil, Iraq** and plan to use techniques of the molecular Genetics in research about plant diseases and mycology in Iraqi agricultural sector. [**Fakhir Eraheem Hameed Alshuwaili, 2020]**



Some his research works:

1- **Alshuwaili, F**., Zaccaron, M., Rupe, J., and Bluhm, B. 2019. Taxonomic diversity of Diaporthe species associated with soybean in Arkansas. *The 46th Annual Meeting of the Southern Soybean Disease Workers*. March 6 – 7, Pensacola Beach, Florida.
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Dr. Mohamed W. Negm, the 1st Arab Researcher in the Editorial Board of the International Journal of Acarology (IJA)

Dr. Mohamed W. Negm - Assistant Professor at the Department of Plant Protection, Faculty of Agriculture, Assiut University -was assigned in March 2020 to work as an Associate Editor for the International Journal of Acarology (IJA), to be part of a team of five Associate Editors of various nationalities around the world. Dr. Negm - currently working at the Laboratory of Applied Entomology & Zoology, Ibaraki University, Japan - is the first Arab researcher to be chosen for this position at this prestigious scientific journal. The IJA, one of the oldest scientific journals specialized in the study of acarology in the world, is a peer-reviewed journal concerned with experimental scientific research on the mites and ticks. It is included in many academic databases such as Scopus and other databases and has reputable impact factor. The IJA is published by the well-known publisher Taylor & Francis Group.

Towards a More Sustainable Agriculture

The global agricultural system is facing several challenges that threaten not only its continuity, but also that of the human population that depends on it. These hurdles include, but are not limited to 1) feeding a growing population; 2) providing a livelihood for farmers and 3) protecting the environment. Making progress on all these fronts is essential to move towards a more sustainable food system, but that task is difficult, as initiatives

in one front can lead to trade-offs in another. Environmentally-friendly agricultural approaches are vital to ensuring food security and more importantly to providing produce that is safe to consumers and that answers their increasing demand for food that contains no or low pesticide residues. Surpassing the first limitation can have positive consequences such as raising farm productivity, making food available for consumers at lower prices, thus improving farmer's livelihood. It can also lead to trade-offs, where low impact crop production and protection methods may impose increased costs to farmers, leading to higher prices for consumers. Maintaining an equilibrium of initiatives that answer these three challenges is essential to unlocking enhanced agro-biodiversity and care for the environment on which the whole system depends on. Through science powered by nature, it is essential to provide the farming communities a variety of products that tackle food security and food safety, improve the livelihood of farmers while preserving the environment for future generations.

Integrated pest management with minimal or no use of chemical pesticides is one of the approaches that needs to be adopted in large scale in the comig decades. Many private companies are developing effective products in that direction. The time has come for agricultural systems to reduce the dependency on broad-spectrum pesticides and synthetic fertilizers and substitute these with environmentally-friendly inputs that help us shift towards a more sustainable food web. [**Dr.Robert Malek and Dr.Aya Ibrahim ORO AGRI, Europe, 2020]**

Behavioral Effects Induced by Organic Insecticides can be exploited for a Sustainable Control of the Orange Spiny Whitefly *Aleurocanthus spiniferus.*

The Orange Spiny Whitefly (OSW) *Aleurocanthus spiniferus* (Hemiptera: Aleyrodidae) represents a new serious threat to *Citrus* spp., grapevine and ornamental plants in the whole Mediterranean area. Such threat urgently calls for the development of a sustainable control strategy, including insecticides compatible with biological control, and applicable also in organic citrus farming that represent an essential part of Mediterranean agricultural economy. Therefore, we evaluated the toxicity and the effects on host searching, oviposition, and probing and feeding behavior exerted on OSW by organic insecticides supposed to have limited side effects on environment and ecosystem services, i.e. sweet orange essential oil (EO), extract of *Clitoria ternatea* (CT), mineral oil, pyrethrin and azadirachtin. Despite none of the compounds caused a significant mortality of any of the OSW instars, we observed interesting effects on whitefly behavior: (i) EO and pyrethrin showed a relevant repellent effect, with impairment of both adults landing and oviposition on treated plants; (ii) CT and pyrethrin strongly affected probing behavior. Here, in the light of our findings, we discuss possible OSW sustainable control strategies and further research perspectives. **[Selma Mokrane, Giuseppe Cavallo, Francesco Tortorici, Elena Romero, Alberto Fereres, Khaled Djelouah, Vincenzo Verrastro, Daniele Cornara, Scientific Reports 10, 15746 (2020).** https://www.nature.com/articles/s41598-020-72972-x

Congratulations

The Minister of Agriculture and Agrarian Reform in Syria, Eng**. Muhammad Hassan Qatna,** issued a decree appointing **Dr. Eyad Muhammad Muhammad** as Director of the Central Plant Protection Directorate. It is noteworthy that Dr. Eyad Muhammad holds a PhD in Plant Protection from Damascus University with a honors grade and an average of 96 degrees. Previously, Dr. Muhammad was the head of the biological enemy's center in Lattakia and then the head of the Plant Protection Department in the Lattakia Agricultural Directorate. He was also appointed in 2018 as an expert at the Arab Center for Studies of Arid Zones and Arid Lands (ACSAD), where he participated in several lectures and scientific seminars in plant protection sciences, the last of which was a workshop on the quick decline disease of olive trees caused by the bacterium *Xylella fastidiosa* and its insect vectors in addition to a lecture on the biological control of the red date palm weevil. Dr. Muhammad also participated in authoring and preparing several scientific works, the most important of which was an Arab reference on the integrated management of the red palm weevil, in which he is a member of the Arab scientific team to combat this weevil. Dr. Muhammad has several participations in scientific conferences at the Arab and international levels and has many published papers in both Arabic and English

languages, in addition to being a co-supervisor of many master's and doctoral dissertations and a Lecturer in several training courses in the field of biological control, scale insects and their biological enemies and integrated pest management, for Syrian and Arab agricultural engineers.

XYLELLA NEWS

Xylella fastidiosa Invasion of New Countries in Europe, the Middle East and North Africa: Ranking the Potential Exposure Scenarios.

After the recent high-impact European outbreaks of *Xylella fastidiosa* (*Xf*), a xylem-limited plant pathogenic bacterium native to the Americas, this research aims to rank the risks of potential entry, establishment and spread of *Xf* in new countries across Europe, the Middle East and North Africa. A novel risk-ranking technique is developed, based on combining entry risk drivers (imported plants, direct flights and ferry connections) with risk factors related to establishment and spread (presence of potential insect vectors, vulnerable economic crops, alternative hosts and climate suitability) of this pathogen. This reveals that western European countries have the highest risk for entry, but that the Mediterranean basin runs the highest risk for establishment and spread of *Xf*. Lebanon in particular has the highest level of risk for *Xf* dispersal within its suitable territory. Countries without current outbreaks combining high risks of *Xf* arrival and establishment are mainly in the Mediterranean basin: Turkey is at the highest level of risk, followed by Greece, Morocco and Tunisia, which are ranked at the high level. The ranking model also confirms the vulnerability, in terms of invasion by *Xf*, of southern European countries (Italy, Portugal and Spain) in which the pathogen has already been reported. High summer temperatures in these southern countries are likely to be the significant determinant for the overall invasion process, while northern European countries have a high level risk for the arrival of the pathogen, but relatively low summer temperatures may limit establishment and spread of major outbreaks. In general, our study provides a useful approach for mapping and comparing risks of invasive non-native species and emerging pathogens between countries, which could be useful for regional horizon scanning and phytosanitary and biosecurity management**. [Frem M, Chapman D, Fucilli V, Choueiri E, Moujabber ME, La Notte P, Nigro F, University of Bari Aldo Moro, Italy, University of Stirling, United Kingdom. Lebanese Agricultural Research Institute, Zahle- Lebanon,** CIHEAM **Bari, Mediterranean Agronomic Institute, Italy, National Research Council -IPSP, Bari, Italy. NeoBiota 59: 77-97, 2020]. Michel Frem. Email:** mefrem@lari.gov.lb

Differences in the Endophytic Microbiome of Olive Cultivars Infected by *Xylella fastidiosa* across Seasons.

The dynamics of *Xylella fastidiosa* infections in the context of the endophytic microbiome was studied in field-grown plants of the susceptible and resistant olive cultivars Kalamata and FS17. Whole metagenome shotgun sequencing (WMSS) coupled with 16S/ITS rRNA gene sequencing was carried out on the same trees at two different stages of the infections: In spring 2017 when plants were almost symptomless and in autumn 2018 when the trees of the susceptible cultivar clearly showed desiccations. The progression of the infections detected in both cultivars clearly unraveled that *Xylella* tends to occupy the whole ecological niche and suppresses the diversity of the endophytic microbiome. However, this trend was mitigated in the resistant cultivar FS17, harboring lower population sizes and therefore lower Xylella average abundance ratio over total bacteria, and a higher α-diversity. Host cultivar had a negligible effect on the community composition and no clear associations of a single taxon or microbial consortia with the resistance cultivar were found with both sequencing approaches, suggesting that the mechanisms of resistance likely reside on factors that are independent of the microbiome structure. Overall, Proteobacteria, Actinobacteria, Firmicutes, and Bacteriodetes dominated the bacterial microbiome while Ascomycota and Basidiomycota those of Fungi. **[Annalisa Giampetruzzi, Paula Baptista, Massimiliano Morelli, Cristina Cameirão, Teresa Lino Neto, Daniela Costa, Giusy D'Attoma, Raied Abou Kubaa, Giuseppe Altamura, Maria Saponari, José Alberto Pereira and Pasquale Saldarelli, University of Bari AldoMoro, Bari, Italy; Centro de Investigação de Montanha (CIMO), Bragança, Portugal; Consiglio Nazionale delle Ricerche, IPSP, Bari, Italy; Biosystems & Integrative Sciences Institute (BioISI), Plant Functional Biology Center (CBFP), Braga, Portugal. Pathogens, 9(9), 723, 2020].** https://doi.org/10.3390/pathogens9090723

Biological Pesticides to Help Save Olive Oil Heritage

Vienna, 25 June, 2020 – The BIOVEXO Project was launched recently with a secured European Union funding of EUR 6.6 million to establish, select and validate top performing, sustainable biopesticides that have shown to be effective against an aggressive pathogenic bacterium *Xylella fastidiosa*. The bacterium threatens to destroy Europe's olive and almond orchards. Since 2013, the spread of *Xylella* has been rapidly increasing in Spain and Italy due to transmission by an insect vector. The plant pathogen severely damages, and often completely destroys, olive orchards within a few years. Europe is in danger of losing orchards unless urgent solutions are found to combat *Xylella fastidiosa*. While there are some products currently on the market, there are no pesticides that are scientifically proven effective against *Xylella*, according to the European Food Safety Authority. In the hardest-hit Apulia region of Italy, olive production has already collapsed by 65 to 80 per cent due to *Xylella*. Heritage 400-year-old olive trees have been destroyed in Italy and an estimated 100,000 jobs have been lost. *Xylella* is spreading to other crops, such as almonds, where Spain and Mallorca especially have been hard hit. The pathogenic bacteria have also been found in France, Portugal and even Israel, highlighting the threat to Mediterranean agriculture. Across Europe, *Xylella* is projected to cause substantial yield losses of 35 to 70 per cent in olive harvests and 13 per cent in almond harvests. Two million tonnes of olive oil production are potentially at risk in Europe unless an effective treatment to the bacterium is found. To date, no organic solution exists on the market to battle the devastation caused by *Xylella*, flagging the urgent need to develop sustainable biopesticides to combat the spread of the disease. In response to the increasing threat of *Xylella* outbreaks in Europe, the BIOVEXO Project aims to eliminate the disease in the long-run and introduce disease management measures which are viable both economically and environmentally. Above all, it intends to preserve some of the most impacted regions which have considerable cultural heritage value.

BIOVEXO will establish a set of biopesticides which, in combination, will target the *Xylella* bacterium directly, and will also act on its insect (spittlebug) vector transmitting the disease. Six innovative bio-based solutions will be tested prior to market introduction, as well as examined for both preventative and curative purposes. The AIT Austrian Institute of Technology is taking the role of Scientific Coordinator of BIOVEXO and the Vienna-based EU funding consulting and services company RTDS is acting as Project Coordinator.

BIOVEXO Scientific Coordinator from AIT, Stéphane Compant, said that the research concept of BIOVEXO was well-grounded based on previous findings and results dealing with olive protection against *Xylella*. He added that there were multiple impacts in finding effective and organic solutions to combat the disease.

"Olive oil production is in jeopardy due to the numbers of jobs that have been, and could be, lost due to this problem. It is important that we find viable solutions to protect farmers' incomes who have cultivated orchards, sometimes centuries old, across generations, as well as guarantee European olive oil supply with less chemical residues. Many of these olive groves are important, cultural heritage assets that have a far-reaching tourism value for Mediterranean countries. We need to act quickly to avoid farmers abandoning their groves in the process of turning to other crops," Compant said. During the project, small-scale on-field validation and improved formulations of the six solutions are planned. Once completed, the top-performing biopesticides will be selected for a large-scale pilot and a real-life evaluation in Apulia (Italy) and Mallorca (Spain) — the two most dominant *Xylella* outbreak regions throughout Europe. Integrated pest management measures will be applied to the existing, as well as the newly planted orchards in the two regions, making BIOVEXO one of the most paramount efforts in the European agriculture industry in finding sustainable practices to combat the *Xylella* disease. At least, the two best performing solutions will be brought forward, closer to the market, at the end of the project (Technical Readiness Level 7-8) by toxicity testing and sustainability assessment. Furthermore, the products will be evaluated regarding their economic potential, regulatory compliance and suitability for industry-scale production. TRL 9 aims to prove the technology concept in an operational environment with potential for commercialization. The European Commission says that *Xylella fastidiosa* "is one of the most dangerous plant bacteria worldwide, causing a variety of diseases, with huge economic impact for agriculture, public gardens and the environment". The BIOVEXO Consortium

The BIOVEXO Project, Titled *Biocontrol of Xylella and its vector in Olive Trees for Integrated Pest Management* plans to target six promising candidate biocontrol solutions acting either against *Xylella* or its vector, which include two bacterial strains, a microbial metabolite, two plant extracts, and an entomopathogenic fungus. The Project is implemented by a diverse consortium of 11 partners, as required by the multi-disciplinary nature of the Project. The partners of the BIOVEXO Project are RTDS Group (Austria), Austrian Institute of Technology (Austria), Consiglio Nazionale delle Ricerche (Italy), Centro di Ricerca, Sperimentazione e Formazione in Agricoltura Basile Caramia (Italy), Universidad de Sevilla (Spain), Universiteit Antwerpen (Belgium), Globachem NV (Belgium), Domca SA (Spain), Acies Bio Biotehnološke Raziskave in Razvoj Doo (Slovenia), Aimerit SL (Spain) and Asociación Agraria De Jóvenes Agricultores (Spain). SMEs, academic institutes, and research associations leverage their complementary expertise and amalgamate the practical knowledge and best practices of the participating olive growers and farmer associations to find a best-fit bio solution. The duration of the BIOVEXO Project is 5 years, from 1 May, 2020 until 30 April, 2025.

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Weekly Webinar on *Xylella fastidiosa*

The University of Berkeley (USA) will organize weekly seminars on *Xylella fastidiosa* drom January 26 until April 27, 2021, to present the various disciplines and tools that aid in the study and understanding of the many interactions between *Xylella fastidiosa*, its insect vectors, and their plant hosts, as well as the implications that these interactions have on plant disease epidemics, the environment, and society.

The following programme is scheduled:

January 26, Steven White, Modelling the spread of *Xylella fastidiosa*

February 2, Sabina Avosani, *Philaenus spumarius*: from behaviours to vibrational manipulation

February 9, Biagio DiSalvo, Interactions between *X. fastidiosa* and grapevine endophytic bacteria

February 16, Christian Colella, Global Pathogens, Local Pathologies: Social Movements and Scientific Knowledge in the Case of *Xylella fastidiosa* in Italy

February 23, Qing Ge, Relationship between Cu homeostasis and virulence of *X. fastidiosa*

March 2, Daniel White, Fluid dynamics simulations suggest novel targets for fighting plant diseases caused by *Xylella fastidiosa*

March 9, Mario Pagano, Someone to blame: the Italian Xylella case before the European Court of Justice

March 16, Ofir Bahar, *Xylella fastidiosa* outbreak in Israel

March 23, Marina Monte, Host plant selection by *Philaenus spumarius* nymphs: using the ground cover as a population control strategy

March 30, Michael O'Leary, Restriction-modification systems and nanopore-derived methylation patterns in *Xylella fastidiosa*

April 6, Vinton Thompson, The biology of spittlebugs in relation to Xylella - some consequences of xylem feeding as a lifestyle

April 13, Gianni Gilioli, A spatial epidemiological model describing the local disease dynamics of *Xylella fastidiosa*

April 20, Kasia Rybak, How the Arabidopsis immune system responds to *Xylella fastidiosa*

April 27, Miguel Romàn -Ecija, Phenotypic and genomic traits potentially associated with plant colonization and pathogenicity of two Spanish strains of *Xylella fastidiosa* subsp. multiplex ST6

The webinars will be approximately 40 min in length with 10-15 additional minutes allocated for questions at the end. Webinars will be broadcasted via Zoom (talks will not be recorded).Registration is possible via the link: https://docs.google.com/forms/d/e/1FAIpQLSdA31m8Tltzhk3-WihUAMHgDpVd6RwEthwQgRNUfiKH9PwdUQ/viewform?vc=0&c=0&w=1&flr=0

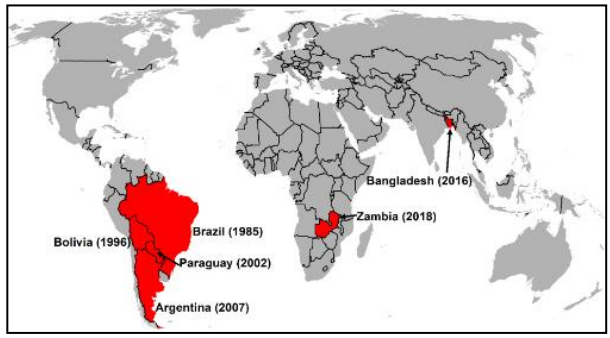
General News

Observations on the African fig fly, *Zaprionus indianus* (Gupta, 1970) associated with corn cob infested by fall armyworm, *Spodoptera frugiperda*

Survey of fall armyworm, *Spodoptera frugiperda* (J.E. Smith) have been made in the groceries selling corn cobs during the months of October and November 2020 in different regions of Amman, Jordan. Number of dipteran larvae and pupae were collected for further investigations. African fig fly, *Zaprionus indianus* Gupta, 1970 (Diptera: Drosophilidae) was found associated with the fall armyworm infestations in particular when the infestation spot is in the connection of cob with silk strings. *Z.indianus* was first recorded on dates in Jordan by Al-Jboory and Katbeh 2012, then collected by Alawamleh *et al.*, 2016 from mulberry, grapes, peach,nectarine, plum, figs, dates, fig, pomegranate, guava, sweet and sour orange, apple and blackthorn**.** The flies attracted by the fermented infested lesion with fall armyworm larvae, they increase the fermentation process of cobs by producing yeasts and bacteria**. [Ibrahim Al-Jboory, November, 2020].**

Wheat Blast has made the Intercontinental Jump to Africa

Researchers in Zambia confirm the arrival of this devastating fungal disease to the African continent.
By CIMMYT, September 28, 2020
Scientists observe wheat blast in Zambia's Mpika district. (Photo: Batiseba Tembo/ZARI)
Wheat blast, a fast-acting and devastating fungal disease, has been reported for the first time on the African continent. In an article published in the scientific journal *PLoS One*, a team of scientists confirmed that symptoms of wheat blast first appeared in Zambia during the 2018 rainy season, in experimental plots and small-scale farms in the Mpika district, Muchinga province. Researchers from the International Maize and Wheat Improvement Center (CIMMYT), the US Department of Agriculture – Foreign Disease Weed Science Research Unit (USDA-ARS) and the Zambian Agricultural Research Institute (ZARI) participated in this study. Wheat blast poses a serious threat to rain-fed wheat production in Zambia and raises the alarm for surrounding regions and countries on the African continent with similar environmental conditions. Worldwide, 2.5 billion consumers depend on wheat as a staple food and, in recent years, several African countries have been actively working towards reducing dependence on wheat imports. "This presents yet another challenging biotic constraint to rain-fed wheat production in Zambia," said Batiseba Tembo, wheat breeder at ZARI and lead scientist on the study.



First Round Online Meeting for the Project *"Commercialization of an Automated Monitoring and Control System against the Olive and Med Fruit Flies of the Mediterranean Region" - FruitFlyNet-ii*

FruitFlyNet-ii is a Strategic Project for Open Innovation funded by the European Neighborhood Instrument Cross-Border Cooperation Mediterranean Area **ENICBCMED/EU program**. The project started on September 1st, 2020 and involves six organizations: the Agricultural University of Athens (AUA, Greece - **Applicant**), The University of Cordoba (UCO, Spain), The University of Molise (UNIMOL, Italy), The Lebanese Agricultural Research Institute (LARI, Lebanon), L'Institut de l'Olivier (IO, Sfax, Tunisie), Centre Régional des Recherches en Horticulture et Agriculture Biologique (CRRHAB, Susse, Tunisie).
The first –round online meeting was held from 3rd to 5th of November 2020.The first day was open to the public especially the stakeholders (farmers, researchers, authorities, regional services, agricultural cooperatives, and agricultural enterprises), followed by two days of kick-off meeting reserved for the representatives of the partners. General project overview activities, technical WPs, schedule time, expected outputs and results were discussed during the meeting. The purpose of this new program is to produce a fully automated package solution of efficiently and environmentally friendly control the olive fruit fly (*Bactrocera oleae*) and the Medfly (*Ceratitis capitata*). The project support technological transfer among research, industry and SMEs, offer demand driven innovations and commercializing of research results and prototypes. The final solution will be based on a Location Aware System (LAS) providing two prototypes, the *OliveFlyNet* and the *MedFlyNet*, and consisting of two e-traps, and a set of e-services including an automatic identification and e-counting pest mechanism, spraying track path recording, spraying risk maps and e-guides for IPM spraying. The two LAS prototypes will be optimized and tested in 8 large scales of living labs that consists a new approach in cross-border EU research policies where stakeholders are involved to test the LAS functionalities. The marketing sector will be progressively involved at the last stage of the project in order to elaborate a market potential of LAS to proceed with the commercialization of the final product. The ***FruitFlyNet-ii*** is based on a previously funded ***FruitFlyNet***/ENPICBCNET/II-B/2.1/0856 project where LAS has been tested, evaluated, and demonstrated in small-scale crop areas with very promising results for these particular key-pests. **[Zinette Moussa, Lebanese Agriculture Research Institute – Fanar, Lebanon, 2020].**
Contact person: Theodore Tsiligiridis, Professor on Networking and ICT in Agriculture, Informatics Laboratory, Agricultural University of Athens, e-mail: tsili@aua.gr, tel: +30 (210) 529.4176, skype: tsiligiridis.theodore.

SELECTED RESEARCH PAPERS

- **Inoculation Period and Citrus Host Effect Establishment of New Infections of '*Candidatus* Liberibacter asiaticus' Transmitted via Vegetative Grafting.** Mark E. Hilf and Weiqi Luo, 12 May 2020. https://doi.org/10.1094/PDIS-09-19-2022-RE

- **A Genome Sequence Resource for the Geographically Widespread Anthracnose Pathogen Colletotrichum asianum.** Yanan Meng, Yihua Ren, Wenjing Wang, Mark L. Gleason, Rong Zhang, and Guangyu Sun, 26 May 2020. https://doi.org/10.1094/PDIS-01-20-0034-A

- **Sensitivities of Cucurbit Powdery Mildew Fungus (Podosphaera xanthii) to Fungicides.** Mohammad Babadoost, Salisu Sulley, and Yiwen Xiang, 14 Sep 2020. https://doi.org/10.1094/PHP-04-20-0031-RS

- **A Rapid, Equipment-Free Method for Detecting Phytophthora infestans in the Field Using a Lateral Flow Strip-Based Recombinase Polymerase Amplification Assay.** Xinyu Lu, Ying Zheng, Fan Zhang, Jia Yu, Tingting Dai, Rongbo Wang, Yuee Tian, Heng Xu, Danyu Shen, and Daolong Dou, 14 Sep 2020. https://doi.org/10.1094/PDIS-01-20-0203-SC

- **Endophytic Colonization of Rice (*Oryza sativa* L.) by the Symbiotic Strain *Nostoc punctiforme* PCC 73102.** Consolación Álvarez, José A. Navarro, Fernando P. Molina-Heredia and Vicente Mariscal, 18 Jun 2020. https://doi.org/10.1094/MPMI-01-20-0015-SC

- **Invasion Biology, Ecology, and Management of Western Flower Thrips.** Stuart R. Reitz, Yulin Gao, William D.J. Kirk, Mark S. Hoddle, Kirsten A. Leiss, and Joe E. Funderburk, Annual Review of Entomology, Vol. 65:17-37, January 2020. https://www.annualreviews.org/doi/10.1146/annurev-ento-011019-024947

- **Integration of Entomopathogenic Fungi into IPM Programs: Studies Involving Weevils (Coleoptera: Curculionoidea) A_ecting Horticultural Crops.** Kim Khuy Khun, Bree A. L. Wilson, Mark M. Stevens, Ruth K. Huwer and Gavin J. Ash, Insects **2020**, 11, 659; doi:10.3390/insects11100659

- **A Newly Reported Parasitoid, Pentatomophaga latifascia (Diptera: Tachinidae), of Adult Halyomorpha halys in Beijing, China.** Juhong Chen , Wenjing Li, Qianqian Mi, Feng Zhang, Shusen Shi and Jinping Zhang, Insects 2020, 11, 666; doi:10.3390/insects11100666

- **Organic Control of Pear Psylla in Pear with Trunk Injection.** Celeste E. Wheeler, Christine Vandervoort and John C. Wise, Insects 2020, 11, 650; doi:10.3390/insects11090650

- **Compatibility between Entomopathogenic Fungi and Egg Parasitoids (Trichogrammatidae): A Laboratory Study for Their Combined Use to Control *Duponchelia fovealis*.** Emily Silva Araujo, Alex S. Poltronieri, Carolina G. Poitevin, José Manuel Mirás-Avalos, Maria Aparecida Cassilha Zawadneak and Ida Chapaval Pimentel, Insects 2020, 11, 630; doi:10.3390/insects11090630

- **Vibrational communication and mating behavior of the meadow spittlebug Philaenus spumarius.** Avosani, Sabina; Daher, Elissa; Franceschi, Pietro; Ciolli, Marco; Verrastro, Vincenzo; Mazzoni, Valerio, Entomologia Generalis Volume 40 Number 3, p. 307 – 321,2020. DOI: 10.1127/entomologia/2020/0983 BibTeX file

- **Potential of Moroccan Entomopathogenic Nematodes for the Control of the Mediterranean Fruit Fly Ceratitis capitata Wiedemann (Diptera: Tephritidae).** Fouad Mokrini ,Salah-Eddine Laasli, Youssef Benseddik, Abdelmalek Boutaleb Joutei, Abdelali Blenzar, Hicham Lakhal , Mohamed Sbaghi, Mustafa Imren, Göksel Özer, Timothy Paulitz, Rachid Lahlali & AbdelfattahA. Dababat, Scientifc Reports, Volume 10:19204, 2020. https://doi.org/10.1038/s41598-020-76170-7

- **Diversity and Management Strategies of Plant Parasitic Nematodes in Moroccan Organic Farming and Their Relationship with Soil Physico-Chemical Properties.** Ghizlane Krif , Fouad Mokrini , Aicha El Aissami , Salah-Eddine Laasli , Mustafa Imren,Göksel Özer , Timothy Paulitz, Rachid Lahlali and Abdelfattah A. Dababat, Agriculture 2020, 10, 447. doi:10.3390/agriculture10100447

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SURVEY

Survey and genetic variation among *Botrytis cinerea* isolates collected from protected crops along the Syrian Coast
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Preliminary survey of some rust fungi (Uredinales) and their host plants at Al-Kadmous Region, Syria
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Temporal dynamics of the codling moth and its parasitoids at two different regions in southern Syria
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Effect of two strains of plant growth promoting rhizobacteria on the incidence and severity of infection with tomato yellow leaf curl virus and on some plant growth criteria for tomatoes grown under greenhouse conditions
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NATURAL ENEMIES

Population dynamics of Phytoseiids mite on apple orchards in southern Syria
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Pages 258-265, https://doi.org/10.22268/AJPP-38.3.258265

PAPERS, WHICH WILL BE PUBLISHED IN THE ARAB JOURNAL OF PLANT PROTECTION (AJPP), VOLUME 38, ISSUE 4, DECEMBER 2020

- **Detection and distribution of *Grapevine fanleaf virus* in some grapevine growing regions in Syria.** E.H. Akel, N. Ali, N. Asaad and I.D. Ismail
- **Effectiveness of some local isolates of entomopathogenic nematodes for the control of *Tuta absoluta* (Meyrick) under laboratory and field conditions.** A. Darwish, A. Bashir and K. El-Asas.
- **Influence of host insect on some biological characters of the parasitoid *Pristomerus vulnerator* (Panzer, 1799) (Hymenoptera: Ichneumonidae: Cremastinae) in the laboratory**. R. El-Halbouni, A.N. Basheer and G. Ibrahim.
- **Population dynamics of spiny bollworm *Earias insulana* (Boisd.) on okra in Lattakia, Syria**. A. Arab, M. Saleh, N. El-Ali, I. Oukasha and E. Al-Joury.
- **Quantification of leaf rust resistance source in wheat germplasm in relation to epidemiological factors.** Y. Ali, M.A. Khan, H.M. Aatif, M. Ijaz, M. Atiq, M. Bashair, M.Z. Mansha, A.A. Khan, M. Hussain.
- **Parasitoids Associated with Citrus wax scale *Ceroplastes floridensis* Comstock (Hemiptera: Coccidae) on Citrus Trees in Lattakia, Syria.** N. Abo-Kaf, I. Mohamed and A. Hussein.
- **Morphological characteristics of the flat-headed tree borer *Sphenoptera servistana* Obenberger, 1929 life stages in the habitat of stone fruit orchards in central Iraq.** M.Z. Khalaf and I.J. Al-Jboory.
- **The role of some bio-fertilizers and salicylic acid in phenolic content and peroxidase enzyme activity in pepper plants infected with C*ucumber mosaic virus*.** M.S. Ibrahim, Y.A. Hammad and S. Raee.
- **Biosynthesis of nanoparticles and their applications for the control of agricultural pests: A review.** M.T. Alloosh.
- **Fumigant action of commonly used insecticides as a curative treatment of red palm weevil *Rhynchophorus ferrugineus* (Olivier) in infested date palms**. S.R. Al-Ballaa.

EVENTS OF INTEREST 2020-2021

15-18/3/ 2021	The 10th International Integrated Pest Management (IPM) Symposium in Denver, Colorado, USA. https://ipmsymposium.org/2021/call_for_proposals.html
20-22/4/2021	The 16th Congress of the Mediterranean Phytopathological Union in Limasol, Cyprus. Info@easyconferences.org
12-16 /7/ 2021	IX EURAAC Symposium of the European Association of Acarologists in Bari- Italy, https://euraac2020.com/
18-23 /7/2021	XXXVI International Congress of Entomology, Helsinki, Finland. www.ice2020helsinki.fi
31/10-4/11/2021	The 13th Arab Congress of Plant Protection in Tunis (2020), Hammamat, Le Royal Hotel, Tunisia. www.acpp-aspp.com

Platanus orientalis Dohuk Governorate, Oshawa Resort, Iraq

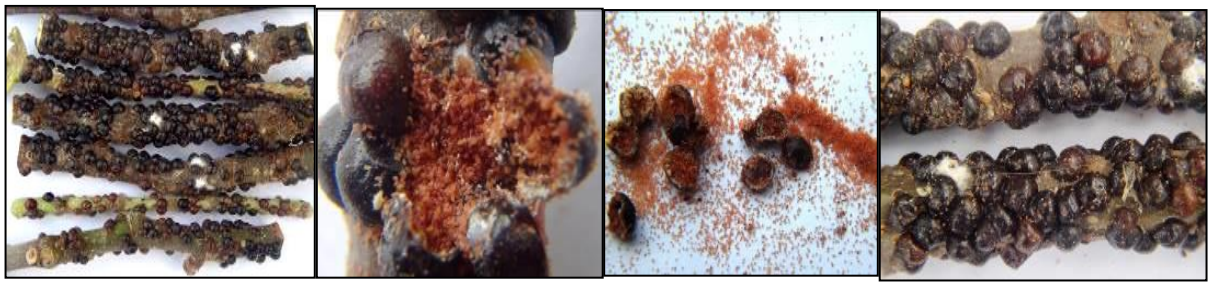
Dohuk Governorate (**Northern Iraq**) includes a Group of Resorts, including the Oshawa resort in which waterfalls were placed cut from the stems of the ginar trees (***Platanus orientalis***) to sit on in the middle of the waterfalls, which led to the growth and developed of the Basidiomycota fungi on it, which are symbiotic fungi (**Mycorrhiza**) coexisting with the roots of these Trees and upon death of trees, the fungi form the fruiting bodies appearing on the wood to preserve the species, and this group of fungi belongs to the order Polyporales and its common name is Turkey tail mushroom, of which the common genus is *Polyporus* and most of it belongs to the genus *Trametes* (*Trametes versicolor or Polyporus versicolor*). **[Prof. Dr. Nadeem Ahmed Ramadan (Iraq), Department of Biology, College of Science/University of Mosul-Iraq, 2020].**
Nadeem.ramadan53@yahoo.com, Nadsbio1@uomosul.edu.iq

Mexican Black Scale, *Saissetia Miranda* (Hemiptera: Coccoidea: Coccidae)

Mexican Black Scale, *Saissetia miranda* invaded figs in Iraq

Mexican black scale was first collected during 2017 on figs in central Iraq.The pest was identified by three scientific centers as a *Saissetia miranda* and considered as a new pest in the Iraqi agroecosystem. The scale population was increased through the fall seasons of 2019 and 2020.Damages was noticed on fruits, twigs, leavies and the female laid more than 1200 eggs per generations. For more information read the article below. **[Mohamed Z.Khalaf and Ibrahim J.Al-Jboory 2020]**

Effect of the Mexican Black Scale, *Saissetia Miranda* (Hemiptera: Coccoidea: Coccidae) In Iraqi Agroecosystem, Biochem. Cell. Arch. Vol. 20, No. 1, pp. 1485-1492, 2020.



The Editorial Board of The Arab And Near East Plant Protection Newsletter Highly Appreciates the Contribution Of Several Arab Scientists In This Issue, Namely:

Abdulnabi Basheer, (Syria), Nadeem Ahmed Ramadan (Iraq), Laila Zidan (Syria), Walid Naffaa(Syria), Mahran Zeity(Syria), Yaser Akeed(Syria), Esmat M. Hegazi (Egypt), Abdelgayed, A.S.(Egypt), Mokhtar Abdulsattar Arif (Iraq-Italy), Moustafa M.S. Bakry(Egypt), Mohammed Hassan Jaber(Iraq), Adnan A. Lahuf(Iraq), Asmaa Abdul Munem Al-Araji (Iraq), Fadhal Abdul Hussein Al-Fadhal (Iraq), Ali Kareem Al-Taae(Iraq), Zeina Tarek Balady(Syria), Khaled Al –Assas (Syria), Khamis Youssef (Egypt), Abdelfattah A. Dababat(Turkey), Saleh Falih Fenjan (Iraq), Hussein Ali Salim (Iraq), Zinette Moussa (Lebanon), Mohammed Ziadan Khalaf (Iraq), Mohamed Mannaa (Egypt-Koria), Abdelfattah A. Dababat (Morocco), Kinda Alraiss(Syria- United Kingdom), Eman Khalil Abdul-Karim (Iraq), Neran Salem Aljarah (Iraq), Mohamed Waleed Negm (Egypt-Japan), Nida Salem (Jordan), Wael Almatni (Syria), Imane Bibi (Syria), Robert Malek(Lebanon), Aya Ibrahim (Lebanon), Ayad Mohamed (Syria), Dima Al-Nahhas(Syria), Khaled Hainon(Syria), Hassan Samadi(Syria), Anne-Sophie Roy (EPPO, France), Chelihi Aya (Algeria- Bari), Djenane Ferielle (Algeria- Bari), Mellikeche Wanissa (Algeria- Bari), Saada Keltoum (Algeria- Bari), Mohamed Nesma Zakaria Mahmoud (Egypt-Bari), Salim Amira Salim Abdelmenam (Egypt-Bari), Senousy Fatmaalzahraa Ahmed Saber (Egypt-Bari), Khalil Jack (Lebanon-Bari), Ait Mansour Soukaina (Morocco-Bari), Jabri Badr-Eddine (Morocco-Bari), Taibi Othmane (Morocco-Bari), Khasib Motasem A.A. (Palestine-Bari), Ghalleb Yosr (Tunisia-Bari), Hnaien Safa (Tunisia), Omri Ghofrane (Tunisia-Bari), Taibi Othmane (Morocco-Bari), Mamoon Alalawi (FAORNE) Lidia AbdelShahid, (FAORNE), Heba Tokali (FAORNE), Ahmed Elsayed (FAORNE),Ashraf Al-Saeed Khalil(Egypt), Ashraf Fathy Abd El-Rahman(Egypt). Rajaa Abdulrazzaq Al Anbagi(Iraq), Fakhir Eraheem Hameed Alshuwaili(Iraq), Salwa S.M. Abdel-Samad (Egypt), Selma Mokrane (Italy).

News and announcements from all, on any aspect of plant protection in the Arab world, are invited for the Newsletter. Contributions from the Executive Committee of the Arab Society for Plant Protection and from the four Subject Matter Committees, as well as from national societies in the Arab region dealing with any aspect of plant protection, are kindly requested and highly appreciated.

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