Food and Agriculture Organization of the United Nations

ARAB AND NEAR EAST PLANT PROTECTION BULLETIN

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ARAB AND NEAR EAST PLANT PROTECTION BULLETIN

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EDITORIAL

Use of Bacteriophages for the Biological Control of Bacterial Tree Diseases

Trees and woody plants can be attacked by many pests and pathogens individually or as poly-microbial infections. In particular, infections caused by tree-specific bacterial pathogens have become more common during the last decade, causing serious concern for important tree and woody plant species in horticulture, urban environments, and forests.

For example, Xylella and Pseudomonas bacteria are causing significant economic and ecological devastation throughout Europe in olive, cherry, and other stone fruits, mainly because of a lack of efficient control methods and the emergence of bacterial resistance to traditional antimicrobial compounds such as copper and antibiotics. Hence, there is an urgent need for innovative approaches to tackling bacterial plant diseases.

One way to achieve this could be through the application of biological control, which offers a more environmentally friendly and targeted approach for pathogen management. Many workers recently investigated the use of pathogen-specific viruses, bacteriophages (or phages), for the bio-control of bacterial tree diseases. Phages are an important component of plant microbiomes and are increasingly studied in plant-pathogen control due to their highly specific host ranges and ability to selectively kill only the target pathogenic bacteria. However, their use still poses several challenges and limitations, especially in managing the bacterial diseases of long-lived trees.

Recent research identified a number of phages that has good potential as a component in the management of a number of important bacterial diseases: Bacteriophage Atu_ph02 for the control of crown gall disease caused by *Agrobacterium tumefaciens*; PEa phages for the control of fire blight disease caused by *Erwinia amylovora*; Psa phages for the control of canker, leaf spot or decline of several fruit trees caused by *Pseudomonas syringe* pathovars; a mixture of phages to control bacterial blight diseases of several fruit trees caused by *Xanthomonas* spp.; and finally a mixture of phages to control several sub-species of the bacterium *Xylella fastidiosa* which causes decline to several important fruit trees. For more details on this topic, readers are advised to read the review paper by Emily R. Grace *et al*. entitled " Seeing the forest for the trees: Use of phages to treat bacterial tree diseases" recently published in the September 2021 issue of the "Plant Pathology" journal. https://doi.org/10.1111/ppa.13465

Khaled Makkouk, Beirut, Lebanon

Food and Agriculture Organization of the United Nations

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INVASIVE, NEW PESTS AND BENEFICIALS

Yemen

First Report of Wilt Disease Caused by Fusarium oxysporium on Fragariae Plants in Yemen
Fragariae's plants showed that from April to September of the 2017 year, wilting, yellowing, stunting and dead symptoms in several plastic houses in Mabber district, Damar governorate. Highly symptoms incidence on transplants than major; this description is similar to that mentioned by Winks and Williams (1965). Stem base and roots samples were submerged in 2% sodium hypochlorite for two min., rinsed with sterile distilled water, transferred to Petri dishes containing potato dextrose agar (PDA) medium, and incubated at 24-27 ºC for one week. Fungi were selected on PDA medium with hyphal tip method. Based on the cultural and morphological characteristics and dimension measures of fungus spores by micrometer slide according to traits recommended by Booth (1981) and Burgess and Liddell (1983), fungus mycelium showed that extensive and produced several pigments on PDA medium. The purple pigment isolates produced chlamydospores and microconidium spores septate from one to three cells their length ranged between 6-25 µm and 2.5-6 µm in width; the brown pigment isolates produced microconidium and macroconidium spores septate from two to four cells they are ranged between 37-50 µm in length and 6-8 µm in width, the isolate without pigment produced sclerotia and microconidium spores with on cell their ranged length between 2.5-6 µm and 1-2 µm in width. The disease has now quickly spread throughout late years in plastic houses, caused that the farmers to circulate fragariae transplants with them, and not to know infection their by wilt fungus. [El_Ariqi, Shawqi Nasher Saif and El_moflehi, Mahmoud Ali Abdallah (Yemen), Department of Plant Protection, Faculty of Agriculture, Sana'a University, Yemen, 2022]. mel_moflehi@yahoo.com

Algeria

First Report of *Fusarium cerealis*, Identification, and Virulence as Causal Agents of Crown Rot on Wheat in Algeria.

In this study, FCR-symptomatic samples from northeast Algeria were collected. Macroscopic data and microscopic characteristics were used to identify the 23 isolates, which were then confirmed by molecular identification. NCBI GenBank assigned the accession number MW358286 to isolate FC14, which was identified as *Fusarium cerealis*. Under controlled conditions, two pathogenicity tests were performed on nine bread wheat cultivars (cv). The first one is an *in vitro* test in the growth chamber. The second one was an *in vivo* test in the greenhouse. The results revealed that all cultivars were susceptible to FC14, and that *F. cerealis* reduced germination and coleoptile emergence rates significantly, with GI% and AUDPC values of 38.09% and 49.58% for cv. Boumerzoug, respectively. With cv. Bordj Mehis, *F. cerealis* decreased the RCL% and RCW% by 50.71% and 60.70%, respectively. The presence of *F. cerealis* species as an agent causing FCR was identified for the first time in Algeria.[Hamza Bouanaka[1] , Ines Bellil[1] and Douadi Khelifi[(1,2)] [1]Laboratoire de Génétique Biochimie et Biotechnologies Végétales, Faculté des Sciences de la Nature et de la Vie, Université Frères Mentouri Constantine[1], Constantine, Algeria; [1]École Nationale Supérieure de Biotechnologie, Pôle Universitaire, Nouvelle Ville Ali Mendjeli Constantine, Algeria, **Archives of Phytopathology and Plant Protection, 2022].** https://doi.org/10.1080/03235408.2022.2035557

Saudi Arabia

First Report of *Spodoptera frugiperda* in Saudi Arabia 2022/033

Spodoptera frugiperda (Lepidoptera: Noctuidae – EPPO A2 List) was first reported in Saudi Arabia in October 2021. Low-level infestations were detected in maize (*Zea mays*) crops in the governorates of Najran and Al-Kora. Phytosanitary measures have been taken, including destroying the infested maize crops, installing traps around the two infested sites, and spraying neighboring crops with appropriate pesticides. The situation of Spodoptera frugiperda in Saudi Arabia can be described as follows: Present, not widely distributed. **[EPPO Reporting Service 2022 no. 2 – Pests].**

Source: IPPC News (2022-02-04) Fall armyworm detected in the Kingdom of Saudi Arabia. https://www.ippc.int/en/news/fall-armyworm-detected-in-the-kingdom-of-saudi-arabia/

Syria

First Record of the Shiny Spider Beetle *Gibbium psylloides* (Czenpinski, 1778) (Coleoptera: Ptinidae) in Syria.

The Shiny Spider Beetle *Gibbium psylloides* (de Czenpinski, 1778) was recorded in several houses, warehouses and cellars in Rukn al-Din area in Damascus. This insect inhabits shops, homes, warehouses, barns, sheds, and food storage places. Adults are negatively attracted to light, usually inhabit dark and humid areas, tolerate cold, and live longer. The insect develops from a wide range of plant and animal origins and is harmful to books, textiles, and museum exhibits, although it is usually considered a nuisance rather than a pest. The adult insect is 1.7-3.2 mm in length and is reddish-brown. Elytra is relatively smooth, without striae but sometimes longitudinally wrinkled around the base. The head is small and transverse from the top. The antennae are long and covered with a thick golden mantle. The legs are long, strong, and covered with dense pale arches. **[Mohamad Kanouh, Abdul-Nabi Basheer, Mohamad Emad Al Araj (Syria), Department of Plant Protection, Faculty of Agriculture Damascus University, Syria, 2022].**

First Record of the Parasitoid *Cotesia* (=*Apanteles*) *glomerata* (Hymenoptera: Braconidae) on the larvae of *Chrysodeixis chalcites* (Esper) and *Spodoptera lettoralis* (Boisd) (Lepidoptera: Noctuidae) in Syria.

Cotesia glomerata was recorded on the larvae of *Chrysodeixis chalcites* (Esper) and *Spodoptera lettoralis* (Boisd) (Lepidoptera: Noctuidae) on the host plant (beans) in the greenhouses in lattakia during October and November 2021, Larvae that seemed to have been parasitized were collected and reared with beans leaves in Petri dishes in 9 cm diameter until adult emergence at 25 ± 1 °C, 60% RH, and LD 16:8 h, adults were identified at the laboratory of entomology at Latakia Center for Rearing Naturale Enemies and Biological Control Studies and Research Center at Faculty of Agriculture, Damascus University. Parasitoid adult is small (about 7 mm), it has two pairs of wings, and the hindwings are smaller than the forewings, the antennae are about 1.5 mm long. **[Nadia Al-Khateeb (1), Louai Aslan (2). (1). Biological Control Center, Directorate of Agriculture, Lattakia, Syria. (2). Biological Control Studies and Research Center, Faculty of Agriculture, Damascus University.2022]**

Larvae of *Cotesia glomerata*

Adult of *Cotesia glomerata* on the sample

Adult of *Cotesia glomerata*

RESEARCH HIGHLIGHTS

Iraq

Morphology and Molecular Identification of the Larval Stage of Two Species from the Genus *Chrysobothris* eschscholtz, 1829 (Coleoptera, Buprestidae). The genus of *Chrysobothris* Eschscholtz, 1829 is one of the most diverse and widespread genera of the family Buprestidae of some 700 described species distributed throughout the world. In Iraq, particularly in the Kurdistan region, about four species have been recorded so far; many of these species are sympatric, share larval host plants, and are difficult to reliably separate morphologically. The current study investigates species limits and relationships among the recognized species occurring within the Erbil Province; mitochondrial cytochrome Coxidase(COX I) molecular analysis confirmed the monophyly of two Chrysobothris species, *Ch. affinis* (Fabricius, 1794) and *Ch. chrysostigma*(Linnaeus, 1758). Implications of the resultant larval morphology and molecular techniques are discussed. Diagnostic characteristics dependent on identifying the species within Chrysobothrisin larval stage were illustrated and then compared with the molecular data**. [Pshtiwan A. Jalil and Wand K. Ali (Iraq), Department of Plant Protection, College of Agricultural Engineering Sciences, Salahaddin University-Erbil, Iraq. Department of Biology, College of Education, Salahaddin University-Erbil, Iraq. Bull. Iraq nat. Hist. Mus 16 (4):557-570, 2021].** Pshtiwan.jalil@su.edu.krd

Survey of Insects in Some Southern Iraqi Marshes. This study included a survey and review of the scientific names of the marsh insects (aquatic and surrounding) to unify and update the database. The survey reveals 109 species under 77 genera that belong to 32 families and seven orders as follows: Coleoptera (44 species), Diptera (7 species), Ephemeroptera (2 species), Hemiptera (14 species), Hymenoptera (11 species), Lepidoptera (2 species) and Odonata with 29 species. Information on specimens' collection for each species, synonyms and geographical distribution were provided. **[Hanaa H. Al-Saffar and Razzaq Shalan Augul (Iraq), Bull. Iraq nat. Hist. Mus. 16 (4):571-621, 2021].** https://doi.org/10.26842/binhm.7.2021.16.4.0571

Evalution Efficiency of Different Isolate of Actinomycetes for Control of Cucumber Seedling Damping-off Disease caused by *Rhizoctonia solani* (Khun). This study was conducted in the Plant Protection Department, College of Agriculture, the University of Basrah during 2017-2018 to isolate and identify Actinomycetes from different environmental sources and evaluate their efficiency to control cucumber damping-off disease caused by *Rhizoctonia solani*. 28 isolates of Actinomycetes were isolated from various sources in the Basrah region. All such isolates were gram-positive, amylase and catalase-positive and they had branched hyphae. Molecular identification following amplification of 16sRNA confirmed that Actinomycetes isolate. No 6 isolated from soil had a similarity of 99% with *Streptomyces griseus*. In contrast, isolate No 66 isolated from date palm roots had a similarity of 99% with *Brevibacterium celere*. The nucleotide sequence of the two isolates has been deposited at NCBI with Genbank accession number LC501385.1 for *S. griseus* and LC501386.1 for *B. celere*. The dual culture technique showed that Actinomycetes isolates *S. griseus* and *B. celere* had high antagonistic activity against *Rhizoctonia solani,* which produced inhibition zones of 7 and 15 mm in diameter, respectively. On the other hand, volatile compounds released from *S. griseus* and *B. celere* inhibited the growth of *R. solani* by 68 and 81.5%, respectively. Pot experiment showed that all actinomycetes isolates significantly reduced cucumber seedling damping-off incidence caused by *R. solani*.**[Fayyadh, M. A. and L. K. Awad (Iraq), Plant Protection Department, College of Agriculture, University of Basrah, Iraq. 2021. Arab Journal of Plant Protection, Vol. 39, No. 4, 2021].**

Iraq

Response of Aphid Parasitoids to Volatile Organic Compounds from Undamaged and Infested *Brassica oleracea* with *Myzus persicae.* Headspace solid microextraction (HS-SPME) and GC-MS were used to investigate volatile organic compounds (VOCs) from cabbage plants infested and uninfested with green peach aphid *Myzus persicae*. The HS-SPME combined with GC-MS analysis of the volatiles described the differences between the infested and uninfested cabbage. Overall, 28 compounds were detected in infested and uninfested cabbage. Some VOCs released from infested cabbage were greater than uninfested plants and increased the quantity of the composition from infested plants. According to the peak area from the GC-MS analysis, the VOCs from infested cabbage consisted of propane, 2-methoxy, alpha and beta pinene, myrcene, 1-hexanone, 5-methyl-1-phenyl-, limonene, decane, gamma-terpinen and heptane, 2,4,4-trimethyl. All these volatiles were higher in the infested cabbage compared with their peak area in the uninfested cabbage. The results of the study using a Y-shape olfactometer revealed that the VOCs produced by infested cabbage attracted *M. persicae* substantially more than uninfested plants or clean air. The percentage of aphid choice was 80% in favor of infested cabbage; 7% were attracted to the clean air choice and uninfested plants. A total of aphids, 7%, were attracted to clean air. Comparing between infested and uninfested cabbage plants, the aphid was attracted to 63% of the infested cabbage versus 57% of the uninfested cabbage. The preferences of *Aphidus colemani* and *Aphelinus abdominalis* to the infested or uninfested plants with *M. persicae* and compared with clean air indicated that parasitoids could discriminate the infested cabbage. Both parasitoids significantly responded to the plant odor and were attracted to 86.6% of the infested cabbage plants. **[Qasim Ahmed[1], Manjree Agarwal[2], Ruaa Alobaidi[3], Haochuan Zhang[2] and Yonglin Ren[2] (Iraq), [1]Department of Plant Protection, College of Agricultural Engineering Sciences, University of Baghdad, Baghdad 10071, Iraq; [2]Department of Agricultural Sciences, College of Science, Health, Engineering and Education, Murdoch University, Australia; [3]Department of Clinical Laboratory Sciences, College of Pharmacy, Al-Mustansiriyah University, Baghdad 10052, Iraq, Published in Molecules, 27, 1522, 2022.]** doi.org/10.3390/molecules27051522

Effects of Volatile Organic Compounds (VOCs) emitted by citrus infested with *Aonidiella aurantii* on the Predator *Rhyzobius lophanthae* Attraction. This study identifies the volatile organic compounds (VOCs) emitted by citrus when infested with California red scale (*Aonidiella aurantii*) and determines which of these elicit behavioural responses in the predator *Rhyzobius lophanthae*. Headspace solid-phase micro extraction (HS-SPME) technique combined with gas chromatography-mass spectrometry (GC-MS) was used to identify compounds, and a Y-tube olfactometer to determine *R. lophanthae* behaviour responses. According to the results, 22 VOCs were detected in infested citrus plants and some of them were increased in lemon, orange and tangerine by *A. aurantii* infestation. *R. lophanthae* individuals were attracted to infested citrus saplings. According to bioassays with the olfactometer, they were attracted to methyl salicylate and D-limonene at dosages of 1 and 10 µL/mL using a Y-tube olfactometer. These results explain how citrus volatiles can affect the response of the predator *R. lophanthae*. **[Ahmed Alsabte, Qasim Hussein Ahmed, Ali Kayahan and İsmail Karaca (Iraq), Phytoparasitica, 2022].** https://doi.org/10.1007/s12600-022-00978-4

The Efficiency of Magnesium Oxide, Nano Magnesium Oxide and Cinnamon Alcoholic Extract In Controlling *Fusarium oxysporum* f. sp. *lycopersici* on Tomato. The study was conducted at the College of Agricultural Engineering Sciences, University of Baghdad. The study aimed to evaluate the efficacy of magnesium oxide, nano magnesium oxide and the alcoholic extract of cinnamon in inhibiting the growth of *Fusarium oxysporum* f.sp. *lycopersici in vitro*, as well as its effectiveness in reducing the infection severity and disease severity under greenhouse conditions. The results revealed the significance of nano-magnesium oxide in inhibiting the growth of fungus *in vitro*, as the inhibition percentages were 98.07, 98.43 and 100%, respectively, while the inhibition rates of magnesium oxide alone were 78.83, 88.07 and 97.43% at concentrations of 1, 2 and 3g/100ml, respectively. Moreover,

the results found that the inhibition rates were 65.57, 79.72 and 90.87% for the alcoholic extract of cinnamon.In contrast, the results showed the effectiveness of nano magnesium oxide in reducing the severity of the disease, which was 0.5. At the same time, the treatment with pesticide Beltanol recorded the lowest reduction in the disease severity at 1.2, with significant differences in comparison to the control group represented by the treatment with fungus alone, which was 3.45, where the substantial effectiveness in the studies substances in the reduction of infection severity was recorded 12.5-30%, while the treatment of fungus alone was 86.25**%. [Eman K. Abdul-Karim (Iraq), Department of Plant Protection, College of Agricultural Engineering Sciences, University of Baghdad, Iraq. International Journal of Agricultural and Statistical Sciences, Vol. 17, Supplement 1, pp. 1611-1618, 2021].**

Identification of the Causal Agent of Sooty Stem and Branches Wilt Disease in Some Trees in Iraq. The study was conducted at the College of Agricultural Engineering Sciences, Department of Plant Protection, in 2018-2019 in Baghdad/Iraq. The research aims to molecular identification of the fungal pathogen *Neoscytalidium* sp. The causal agent of the wilt branches disease on apple *(Malus domestica*), pomegranate (*Punica granatum*), mulberry (*Morus alba*), India rubber (*Ficus elastica*), castor (*Ricinus communis),* by 18S ribosomal RNA gene and DNA sequencing, to demonstrate the pathogenicity, and host range of the fungal isolates. The results showed compatibility of 100% with a standard in Gene Bank from *Neoscytalidium novaehollandiae* in pomegranate, mulberry, apple, and rubber, while in Castor having nine Trinsvertion C>G, A>T,T>G, T>G, G>C, T>G, A>C, A>T, and T>A, and five Transition G>A, G>A, A>G, A>G, and G>A) having 97% compatibility with standard isolates deposited in Gene Bank.This is the first record of the pathogen *N. novaehollandiae* on these host trees in Iraq. The pathogenicity test confirmed their ability to infect all types of trees with different symptoms and infection severity. The higher infection severity was found to be on the apple trees(88.09%). This result indicates the susceptibility of apple trees to *Neoscytalidium novaehollandiae,* the causal agent of dark stem and branches wilt disease, compared to other trees in Iraq. **[Eman K. Abdul-Karim and Neran S. Aljarah(Iraq), Plant Protection Department, Collage of Agricultural Engineering Sciences, University of Baghdad, Iraq. Plant Archives.Vol. 21, Supplement 1, pp. 807-813, 2021].** neran.ajarahl@coagri.uobaghdad.edu.iq

Isolation and Molecular Identification of the Causal Agent of Fusarium Head Blight of Wheat in AL-Qayyarah Sub District, Ninevah Governorate. The current work was conducted on Fusarium head blight disease of wheat that was caused by Fusarium species. A survey was carried out of several wheat fields at AL-Qayyarah sub-District, Ninevah Governorate, during two growth stages of wheat (Booting to Heading) From the middle of April to May, and (Ripening) the second phase of the period from May to the beginning of June during the growing season 2019-2020. The highest disease incidence in both stages was 42.826% and 61.92%, respectively). The lowest disease incidence in the first period was recorded at (6.864%) and increased to (11.162%) in the second period. *F. graminearum* was isolated from spikes in a high frequency of 26.902%. *F. culmorum* was isolated from spikes in a high frequency of 26.03%, *Fusarium* spp. were isolated from all wheat fields in both stages. Pathogenicity of the fungus in wheat plants was also confirmed by Koch's postulates. Molecular identification of Fusarium isolates was made by amplifying the internal transcribed spacer (ITS) region of the conserved ribosomal DNA using primers ITS1 and ITS4. All the ITS sequences were compared for gaps, and similarity sequences of the fungus were homologous to those of *F. graminearum* and *F. culmorum* isolates in the GenBank database with a similarity percentage of 99%, thereby confirming the identity of the causative agents of the disease. This could be the first recording of *F. graminearum* and *F. culmorum* on the wheat in AL-Qayyarah sub-District, Ninevah Governorate, in Iraq. The nucleotide sequence of ITS from the Iraqi isolate has been assigned GenBank Accession No MW737663.1.and MW737664.1. respectively.**[Salim I. Akram[1], Ali K. Al-Taae[2] and Karkaz M. Thalij[3] (Iraq), [1]General Grain Trading Company, Ministry of Trade, Iraq. [2]Plant Protection Department., College of Agriculture and Forestry, Mosul University, Iraq. [3]Food Science Department, College of Agriculture, Tikrit University, Tikrit, Iraq. V.International Scientific Congress of Pure Applied and Technological Sciences, Istanbul Turkey, 3-5 March 2022].**

Jordan

Localization and Mechanical Transmission of 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, causing disease outbreaks and significant crop losses worldwide. The growing number of ToBRFV epidemic episodes prompted the investigation of the role of seeds in the dissemination of the virus as an important aspect in the overall disease management. Therefore, the objectives of this study were to determine the localization of ToBRFV within tomato seeds and evaluate its seed transmission characteristics. Seeds extracted from naturally ToBRFV-infected tomato fruits were tested for the presence of the virus using serological, molecular, and biological assays. Three immunolocalization techniques were used to determine the localization and distribution of ToBRFV within the different tissues and parts of tomato seeds. To evaluate seed transmission of ToBRFV, two grow-out experiments were conducted to assess the rate of both vertical (seeds to progeny seedlings) and possible horizontal transmission (plant to plant) based on serological and molecular assays. Seeds extracted from ToBRFV-infected fruits had a 100% contamination rate. The localization of ToBRFV in tomato seeds is only external on the seed coat (testa). Seed transmission rate from seeds to their seedlings was very low (0.08%), while no transmission was recorded from plants to plants in a small-scale greenhouse experimental setup. In conclusion, ToBRFV is a seed-borne virus located externally on tomato seed coat and transmitted mechanically from ToBRFV-contaminated tomato seeds to seedlings, which could initiate a disease foci and eventually drive further dissemination and spread of the disease in a new growing area. **[Salem, N. M., Sulaiman, A., Samarah, N., Turina, M. and Vallino, M. (Jordan), Plant Disease, (Published Online: 21 Jan 2022].** https://doi.org/10.1094/PDIS-11-20-2413-RE

Algeria

Evaluation under Laboratory Conditions of the Efficacy of Four extracts of Spontaneous Plants from the Mzab Valley (Algeria) against the Date Palm Mite (*Oligonychus afrasiaticus*). Trials were conducted to test the hydrosols of 4 spontaneous plants on the date palm mite, *Oligonychus afrasiaticus*, a key pest of date palm in Algeria. Extracts from those plants (basil, harmel, colocynth, and hyssop) tested against date palm mite showed promising results. The quantities of essential oils extracted from the four plants were extremely low, which is why only hydrosols were used. The results obtained change depending on the number of sprays and the reading time after treatment. The hyssop extract caused a high mortality rate of 91%, followed by colocynth and basil extracts with average mortality rates of 64% and 62%, respectively. The lowest mortality rate, 6%, occurred when applying harmel extract. **[Babaz, Y., Guezoul, O., and Bouras, N. (Algeria), Tunisian Journal of Plant Protection 16 (2): 29-41, 2021].** https://doi.org/10.52543/tjpp.16.2.2

***Cadophora sabaouae* sp. nov. and *Phaeoacremonium* Species Associated with Petri Disease on Grapevine Propagation Material and Young Grapevines in Algeria.** A field survey conducted on asymptomatic grapevine propagation material from nurseries and symptomatic young grapevines throughout different regions of Algeria yielded a collection of 70 *Phaeoacremonium*-like isolates and three *Cadophora*-like isolates. Based on morphology and DNA sequence data of b-tubulin (tub2) and actin, five *Phaeoacremonium* species were identified, including *Phaeoacremonium minimum* (22isolates), *Phaeoacremonium venezuelense* (19 isolates), *Phaeoacremonium parasiticum* (17 isolates), *Phaeoacremonium australiense* (8 isolates), and *Phaeoacremonium iranianum (*4 isolates). The latter two species (*P. australiense and P. iranianum*) were reported for the first time in Algeria. Multilocus phylogenetic analyses (internal transcribed spacer, tub2, and translation elongation factor 1-a) and morphological features allowed the description of the three isolates belonging to the genus *Cadophora* (WAMC34, WAMC117, and WAMC118) as a novel species, named *Cadophora sabaouae* sp. nov. Pathogenicity tests were conducted on grapevine cuttings cultivar Cardinal. All the identified species were pathogenic on grapevine cuttings. **[Wassila Aigoun-Mouhous[1,2] Alla Eddine Mahamedi [2] Maela Léon[3] Cherifa Chaouia [1] Abdelghani Zitouni [2] Katerina**

Algeria

Barankova[4] Ales Eichmeier[4] Josep Armengol[3] David Gramaje[5] and Akila Berraf-Tebbal[4] (Algeria), Plant Disease 105:3657-3668,2021].https://doi.org/10.1094/PDIS-11-20-2380-RE

Absence of Genetic Differentiation in Performance Traits of *Sinapis arvensis* Populations from Crop and Non-crop Habitats Across Northern Algeria: Implications for Management. Weeds can originate from adjacent habitats, dispersing naturally from non-crop habitats as well as brought in from other crop fields by machinery or as contaminants of crop seeds. This constant dispersal may homogenize populations and transmit resistance genes. In this study, we examined (a) the genetic variation in quantitative traits and (b) the level of resistance to two widely used herbicides, amidosulfuron + iodosulfuron-methyl-sodium and florasulam + 2,4-D, in eight population pairs of *Sinapis arvensis* from crop and adjacent non-crop habitats across eight regions in Northern Algeria. Our quantitative genetic approach to phenotypic and phenological data of plants grown under controlled conditions from seeds of these populations showed similar levels of within-population genetic variation and no genetic differentiation in quantitative traits between the two habitat types. This points to an important exchange of S. arvensis seeds and/or pollen between the two habitat types, but not among crop fields at the regional scale, as we found a strong regional effect for most of the plant traits for both habitat types that correlated with longitudinal temperature and precipitation gradients. We also found an absence of resistance against the two herbicides at a detection level of 10%. Florasulam + 2,4-D showed a higher level and speed of phytotoxicity compared to amidosulfuron + iodosulfuron-methylsodium. Given our findings, we propose measures for more efficient management of *S. arvensis*, including minimization of seed dispersal during transport of straw balls, crop rotation to avoid the build-up of herbicide resistance, and management of populations in the close vicinity of crop fields. **[Sara Benchaa, Sarah Bouchemousse, Hacène Abdelkrim, Heinz and Müller-Schärer (Algeria), Weed Research. 2021].** DOI: 10.1111/wre.12481

Distribution of Major Clonal Lineages EU-13-A2, EU-2-A1, and EU-23-A1 of *Phytophthora infestans* Associated with Potato Late Blight Across Crop Seasons and Regions in Algeria. Potato is one of the most important crops in Algeria and worldwide. Each year, potato late blight, caused by *Phytophthora infestans*, is responsible for significant damage that leads to large production losses and is thus a direct threat to food security in Algeria. In this study, 131 isolates of *P. infestans* and 92 DNA fingerprints captured on FTA cards were sampled from commercial and seed production fields in three major potato production regions (western, eastern, and central) during the main-season and late-season in Algeria over six cropping seasons (2010–2016). Genotypes of *P. infestans* and population genetic diversity were analyzed using a 17- plex simple-sequence repeat (SSR) marker assay, and the mating type of all isolates was characterized. Both mating types (A1 and A2) were found and often occurred in the same field. Differences in mating-type proportion were observed between regions and between sampling periods. Analysis with SSR markers showed the prevalence of the EU_13_A2 lineage (70%) over EU_2_A1 (16%), EU_23_A1 (10%), and 4% of unknown multilocus lineage (MLL). The EU_13_A2 showed differentiation within the group. EU_23_A1 was found mainly in late-season crops. However, the cropping region did not influence the distribution of lineages due to the dispersal of the pathogen in Algeria by seeds. The genetic structure did not reveal an apparent variation in the distribution of the three lineages throughout the sampling regions. These data provide important new information on the composition and change over time of *P. infestans* populations in Algeria and open the way for a better understanding of the local epidemiology of this important pathogen. **[Lyes Beninal, Zouaoui Bouznad, Roselyne Corbière, Sihem Belkhiter, Romain Mabon, Abdelmoumen Taoutaou, Abdelaziz Keddad, Eve Runno-Paurson and Didier Andrivon (Algeria), Plant Pathology.71:458–469, 2022].**

Algeria

Multiple Methods for Varietal Resistance Assessment of Durum Wheat Cultivars Against *Fusarium culmorum* the Causal Agent of Fusarium Head Blight and Crown Rot in Algeria 2021. This research was conducted to evaluate multiple methods and parameters for the assessment of varietal resistance of durum wheat against FCR and FHB. *Fusarium culmorum* was used in three susceptibility tests. Several phenotypic parameters (%GI, AUDPC1, DS, AUDPC2, %TKWloss, %FDK) were measured. Results revealed no significant correlation between the different parameters, except %GI and AUDPC1. This result indicates that in vitro Petri dish test can be used to predict the varietal resistance against the initial seed infection by *F. culmorum*. This study highlighted the complexity of resistance testing for FCR and FHB, and demonstrated the need to use as many resistance testing protocols as possible. **[Hamza Bouanaka, Ines Bellil[1], Douadi Khelifi . (Algeria), Physiological and Molecular Plant Pathology 115, 101683, 2021].**
https://doi.org/10.1016/j.pmpp.2021.101683

Molecular Identification of Some *Fusarium* isolates and Their Chemotypes Involved in Fusarium Head Blight on Durum Wheat in Algeria. The present study reports the species identification of *Fusarium* isolates infecting Durum wheat cultivated in Algeria. Characterization of isolates was initially carried out based on morphological criteria and further confirmed by molecular studies. Molecular identification was performed by PCR assays using species-specific primers. The results showed that more than 40% (3/7) of the isolates belong to the *F. culmorum* species. This research also revealed, for the first time, the presence of *F. cerealis* (*F. crookwellense*) in Algeria. Finally, the use of primer assemblies allowed us to highlight that most isolates were of the DON chemotype; only two isolates were found to be NIV chemotype. **[Salah Hadjout, Sylvain Chéreauc , Leila Mekliche, Gisel Marchegay , Christine Ducos , Houda Boureghda , Mohamed Zouidi, Christian Barreau, Zouaoui Bouznad and Florence Richard-Forget (Algeria), Archives of Phytopathology and Plant Protection 2022].**
https://doi.org/10.1080/03235408.2022.2034363

Morocco

Biodiversity of Nematode Communities Associated with Wheat (*Triticum aestivum* L.) in Southern Morocco and Their Contribution as Soil Health Bioindicators. Soil nematodes are major soil organisms known to reduce wheat production worldwide. However, they are a crucial part of soil biodiversity. Due to the limited data available regarding nematode biodiversity associated with cereal crops in Morocco, a survey was conducted in 2019 across 80 wheat fields. Thirty-three nematode taxa were obtained with different trophic groups: 11 bacterivores (i.e., *Rhabditis* and *Cephalobus* spp.), 11 herbivores (i.e., *Pratylenchus* and *Heterodera* spp.), 6 fungivores (i.e., *Ditylenchus* and *Aphelenchoides* spp.), 4 omnivores (i.e., *Dorylaimus* and *Aporcelaimus* spp.) and one predator (*Mononchus* spp.). For each locality, the diversity of nematode communities was assessed through multiple diversity indices. Three areas (Ait Melloul, Oulad Dahou, and Sidi Boushab) were more diversified and had pronounced nematode occurrence. Moreover, few localities (e.g., Ait Amira and Lqliaa) were shown to be disturbed. Our study underlined that several nematode taxa were significantly correlated with edaphic and climatic/geographic properties. On the other hand, the spatial and parsimony analyses revealed that plant feeders were most associated with bacterial feeders in disturbed soils. This work showed that the soil nematodes associated with wheat crops are diverse and can serve as an essential tool for soil biomonitoring at a large scale. **[Salah-Eddine Laasli , Fouad Mokrini ,Rachid Lahlali , Tadesse Wuletaw , Timothy Paulitz and Abdelfattah A. Dababat (Morocco), Diversity, 14(3), 194,2022].** https://doi.org/10.3390/d14030194

Tunisia

Prevalence and Genetic Diversity of Grapevine Virus D in Tunisia. The prevalence and the genetic diversity of grapevine virus D (GVD) isolate from rootstocks, wine and table grape varieties grown in Tunisia were studied. RT-PCR assays performed on the coat protein gene (CP) showed the presence of GVD in 31.5% of the 403 samples tested. The highest rate of infection was found in table grapes (56.5%), followed by autochthonous table grapes (24.1%), wine grapes (20.8%) and rootstocks (12.5%). Sequences and phylogenetic analyses of the partial CP genes of 14 GVD isolates showed nucleotide identities that ranged from 84% to 99%. The Tunisian GVD-isolates were segregated into 3 phylogenetic groups together with international isolates reported in GenBank. The present study extends our knowledge of the presence of GVD in Tunisian vines and its genetic diversity, which is helpful for developing broad-spectrum molecular diagnostics (RT-PCR) capable of detecting the different isolates infecting vines. **[Selmi, I., Elbeaino, T., Arezki, L., El Air, M., Digiaro, M., and Mahfoudhi, N.(Tunisia), Tunisian Journal of Plant Protection 16 (2): 19-27.2021].**

Continuous Pest Surveillance and Monitoring Constitute aTool for Sustainable Agriculture: Case of *Xylella fastidiosa* in Morocco. Climate and trade changes are reshaping the cartographic distribution of lethal pervasive pathogens. Among serious emerging challenges is *Xylella fastidiosa* (*Xf*), a xylem-limited phytopathogenic bacterium that produces losses and damages to numerous crops of high economic and agronomic importance. Lately, this grave quarantine pathogen has expanded its distribution by arriving in several European countries and infecting both wild and cultivated plants, and no cure has been identified so far. Countries without current outbreaks like Morocco need to monitor their crops frequently because detecting diseases in the early stages may reduce the enormous losses caused by *Xf*. For that purpose, inspections were managed in different regions in Morocco from March 2020 to July 2021 to assess the presence of *Xf* in several growing areas of vulnerable economic crops (i.e., almond, citrus and olive). To extend the likelihood of detection, hosts have been inspected and sampled randomly over different environments, including symptomatic and asymptomatic plants. Eachsample was screened for the existence of *Xf* by using the DAS-ELISA commercial kit, while furtheranalyses were carried out for doubtful samples, by PCR. Both tests did not show any positive sample in the investigated areas. This finding updates the *Xf* situation in Morocco and confirms that this country is still a free territory from this bacterium, at least in the monitored regions.**[Kaoutar El Handi, Majida Hafidi , Miloud Sabri, Michel Frem, Maroun El Moujabber , Khaoula Habbadi, Najat Haddad, Abdellatif Benbouazza, Raied Abou Kubaa and El Hassan Achbani.Sustainability 2022, 14, 1485.** https://doi.org/10.3390/su140

Lebanon

Biological Approaches Promise Innovative and Sustainable Management of Powdery Mildew in Lebanese Squash. Biological management techniques act as a promising and sustainable alternative to alleviate pathogen-induced losses, improve ecosystem functions, and reinforce the resilience of agricultural systems. Lebanese squash production has been threatened by powdery mildew disease caused by the fungus *Podosphaera xanthii*. Very few studies, even unpublished ones, stress the evaluation of biological control approaches in the Lebanese agriculture sector. Here, we have aimed to evaluate the effect of five safe biological treatments (olive soap, sodium bicarbonate, garlic extract, horsetail, and compost tea) in the management of powdery mildew on Lebanese squash in organic open field conditions. Plants were treated after the first spots of powdery mildew appeared on leaves. We then examined the leaves to evaluate disease incidence and severity and to compare the ability of the five treatments to reduce powdery mildew disease and incidence in comparison with the untreated control. Plants treated with sodium bicarbonate and garlic extract were the least affected by powdery mildew regarding disease incidence and severity, while tea compost proved to be the least effective product. Organic management of vegetable crops is extremely important to ensure global food security and reduce pesticide applications.**[Michel Frem[1, 2], Franco Nigro [2, 3],Serge Medawar[1] and Maroun El Moujabber[4].[1] Lebanese Agricultural Research Institute, Zone El Roumieh, Qleiat, Keserwan, Lebanon; [2]Department of Soil, Plant and Food Sciences, University of Bari Aldo Moro, 70126 Bari, Italy; [3]Center of Research, Training and Experimentation in Agriculture "Basile Caramia",70010 Bari, Italy. [4]Mediterranean Agronomic Institute, CIHEAM Bari, 70010 Bari, Italy, Sustainability, 14(5), 2811, 2022].** https://doi.org/10.3390/su14052811

LIBYA

Occurrence and Etiology of Canker Disease in Olive Trees. This study was conducted to investigate the fungi that cause canker disease and the death of the twigs of the branches in olive trees in Valley AL-Bilad Bani Waleed. And test its pathogenicity in the severity of its infection. The symptoms of the disease that were seen on olive trees are summarized in the occurrence of dieback with lesion and crack in the main branches and the affected areas reddish-brown, with the formation of the crack layer in the cracks. The appearance of xylem cells in the affected branches. The microscopic examination showed that (12) fungi were associated with canker disease on olive trees, and the fungus *Alternaria alternata*, was the most frequently recorded with a frequency of 41.38% in the examined samples. Also, the sensitivity of olive cultivars to infection with *Alternaria alternata* was studied. Canker symptoms were similar to canker symptoms in the field on the cuttings olive. The fungus *Alternaria alternata* is the main cause of canker disease on olive trees in Libya. **[Fateh Zidan and M. Nafa, Astill (Libya), Department of Plant Protection, College Faculty of Agriculture/University Bani Waleed, Libya. 3(1): 1-12,2022].**

Egypt

Effect of Artificial Mediated Abiotic Components Against Plant-Parasitic Nematodes. The artificial mediated abiotic components such as soil temperature, dry heat, irradiation, and CO2 can work for controlling plant-parasitic nematodes. Higher soil temperatures with transparent or black plastic cover reduced citrus nematode, *Tylenchulus semipenetrans* on navel orange and reniform nematode, *Rotylenchulus reniformis* on sunflower. Also, the dry heat was used to control rice root nematode, *Hirschmanniella oryzae* on rice soil and root and wheat soil. Several investigators reported that the number of galls and egg masses of root-knot nematode, *Meloidogyne incognita* on roots of several plants were reduced gradually by increasing gamma irradiation doses. When tomato plants infected by the root-knot nematode, *Meloidogyne incognita* were exposed to combined elevated atmospheric CO2 concentration (+100 ppm) and higher temperature (+2oC), tomato shoot dry weight and nematode control were increased compared to prevailing conditions**.[M.M.A.Youssef and Wafaa M.A. El-Nagdi (Egypt) Pakistan Journal of Nematology, 39(2): 95-98, 2021].**

Rodent Damage and Their Control for Attacking Seeds of *Rhamnus cathartica* (Buckthorn) Plants in Rural Areas, upper Egypt. Buckthorn *(Rhamnus cathartica)* is one of the delicious winter fruits and was mentioned in the Qur'an as "Sidr". Buckthorn has multiple health benefits, as it is rich in fibers, vitamins, and elements. This study was conducted in some

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rural areas in Al-Monshah district, Sohag Governorate. A mechanical survey and control of the rodent species that attacked the seeds of buckthorn trees in rural areas were studied. The results showed one type of rodent climbing on buckthorn trees which is the grey-bellied rat, *Rattus rattus alexandrinus*. The results showed a decrease in the number of rickety seeds after performing the mechanical control (destroying rodent nests from buckthorn trees). The mean year of general post-control reduction during the study period was 96.55**%. [Tarek M. Abo-Elmaged, Saudi, A.S. Baghdadi and Abd El-Aleem S. S. Desoky (Egypt), Mansoura University, Journal of Plant Protection and Pathology, Vol. 12 (9):647-650, 2021].**

Assessment of Damage caused by Rodents in Some Maize Varieties in Farshut Area, Qena Governorate, Egypt. The work herein was carried out to estimate the damage caused by rodent species on some cultivars of yellow and white maize crop at EL-Dahasa village, Farshut district, Qena governorate, Egypt, during the summer 2018 and 2019 seasons. The genotypes studied were three Yellow maize (Balady and Single Cross: S. C. 2055, S. C. 2066) and four white maize [(: S. C. 4 and Single cross S. C. 6) and (three ways cross: T.W. C. 310 and T. W. C. 11)]. The Balady variety is more attacked by rodents compared to the single and triple hybrids, and this may be due to the early maturing variety (80-90 days) compared to the single and triple hybrids (110-120 days). Also, the yellow corn cultivars are more vulnerable to rodents than the white cultivars because they contain a greater amount of oils compared to the white cultivars. **[Elrawy, A .A. A, Mahmoud N. A, Baghdadi S. A. S, Desoky, A.S. S. (Egypt), Archives of Agriculture Sciences Journal, Volume 4, Issue 1, Pages 168–173, 2021].** https://aasj.journals.ekb.eg/article_184601.html

Redescription of *Panonychus caglei* Mellott, 1968, with Ontogenetic Development (Acari: Tetranychidae). A redescription of the adult stages of *Panonychus caglei* Mellott, 1968 (Acari: Tetranychidae), is presented based on new material collected from Japan, and type specimens (holotype and paratypes). Morphological differences in the setation of legs have been reported, and measurements of taxonomic characters are added. We also have described the ontogenetic development of the juvenile stages. The ventral idiosomal chaetotaxy in the larval stage lacks pregenital and genital setae which are added consecutively through development. The pregenital pair of setae appear in the protonymphs, while the first pair of genital setae is firstly observed in the deutonymphal stage.**[Mohamed W. Negm (Egypt), Ibaraki University, Japan; Assiut University, Egypt, and Tetsuo Gotoh ,Ryutsu Keizai University, Japan. Zootaxa 508 (1): 157–173, 2021].**

Cold case: The disappearance of Egypt bee virus, a fourth distinct master strain of deformed wing virus linked to honeybee mortality in 1970's Egypt. In 1977, a sample of diseased adult honeybees (Apis mellifera) from Egypt was found to contain large amounts of a previously unknown virus, Egypt bee virus, which was subsequently shown to be serologically related to deformed wing virus (DWV). By sequencing the original isolate, we demonstrate that Egypt bee virus is in fact a fourth unique, major variant of DWV (DWV-D): more closely related to DWV-C than to either DWV-A or DWV-B. DWV-A and DWV-B are the most common DWV variants worldwide due to their close relationship and transmission by Varroa destructor. However, we could not fnd any trace of DWV-D in several hundred RNA sequencing libraries from a worldwide selection of honeybee, varroa and bumblebee samples. This means that DWV-D has either become extinct, been replaced by other DWV variants better adapted to varroa-mediated transmission, or persists only in a narrow geographic or host range, isolated from common bee and beekeeping trade routes. **[Joachim R. de Miranda, Laura E. Brettell, Brenda V. Ball, Nor Chejanovsky, Anna K. Childers, Anne Dalmon, Ward Deboutte, Dirk C. de Graaf, Vincent Doublet, Haftom Gebremedhn, Elke Genersch, Sebastian Gisder, Fredrik Granberg, Nizar J. Haddad, Rene Kaden, Robyn Manley, Jelle Matthijnssens, Ivan Meeus, Hussein Migdadi, Meghan O. Milbrath, Fanny Mondet, Emily J. Remnant, John M. K. Roberts, Eugene V. Ryabov, Noa Sela, Guy Smagghe, Hema Somanathan, Lena Wilfert, Owen N. Wright, Stephen J. Martin & Brenda V. Ball ,Virology Journal ,19:12,2022].** https://doi.org/10.1186/s12985-022-01740-2

Graduate Students Thesis (M. Sc. and Ph. D.)

Tracking and Attracting of the Red Palm Weevil, *Rhynchophorus ferrugineus* (Olivier) (Coleoptera: Dryophthoridae).

The red palm weevil (RPW), *Rhynchophorus ferrugineus* (Olivier, 1790) (Coleoptera: Dryophthoridae), is a destructive insect pest of palm trees, destroying thousands of date palm trees in Saudi Arabia and other palm-growing countries. This study was aimed for tracking and attracting the RPW in Saudi Arabia. The objectives were for tracking the RPW in the field using radio telemetry with and without the presence of pheromone traps, and to test new attractants as kairomones in pheromone traps and to study the effect of some factors on RPW trapping efficiency. Radio telemetry (RT) has provided beneficial knowledge on the movements, habitat preference, and reproductive behaviour of numerous species of animals. In this study, the movements and habitat preferences of RPW in date palm orchards in KSA were tracked using radio telemetry with and without the presence of pheromone traps. This study is a novel one as a field trial attacking RPW. Two field tracking studies were conducted in late April and early May 2019 with the presence and absence of pheromone traps. In each study, 12 wild-caught adults (six females and six males) were equipped with radio transmitters (LB-2X, HOLOHIL). Tagged adults were released on a platform at the height of 1.50 m in a date palm orchard. Readings were taken in three hours intervals from 4:30 am to 7:30 pm for eight days. The results of field tracking studies indicated that the movement behaviour was influenced by the presence of pheromone traps. The average flight of the RPW was 69.1 m (7.7 -213 m) and only 24.4 m (10 -90 m) in the presence of pheromone traps and in the absence of pheromone traps, respectively. The mean distances females and males covered were 95.80 and 42.40 m in the presence of pheromone traps and 32.47, 16.30 m in the absence of pheromone traps, respectively. The percentages of tagged adults that dispersed more than 50 m were 50 and 8.3% in the presence and absence of pheromone traps, respectively. The RPWs were adapted to an aggregation behaviour in the absence of pheromone traps, whereas the aggregation rates were 75.0, and 33.3% in the absence and presence of pheromone traps, respectively. Adults showed a high preference in selecting habitats. RPW adults were attracted to infested or previously infested male palm trees, surface water of drip irrigation systems, and pheromone traps. In conclusion, radio telemetry appears to be an appropriate technique to track RPW in date palm orchards when wild-caught adults are used. To implement the study's second objective, experiments were conducted using pheromone traps. One experiment was conducted to evaluate the effects of trap locations, pheromone source, and temperature on RPW surveillance. Another pheromone traps experiment was performed to investigate two new attractants (spathe extract and commercial pollen water compared with fermented dates) on the efficiency of trapping. Pheromone traps have a crucial role in the integrated pest management (IPM) of the RPW. The objective of this study was to increase the efficacy of pheromone traps by assessing the effect of trap locations, determining ideal ambient temperatures during trapping, the use of date palm fruits fermentation as a kairomone, and finally, the source of the pheromone lure on capture rates of RPW. The study was conducted for 12 weeks beginning on 20 April 2019, at Altholima farm, Ad Diriyah governorate. The capture rate ranged from 1.25 to 9.00 RPW per trap per week. Pheromone traps that were placed in the shade, near date palm trees in areas of relatively high soil moisture captured more RPW adults (9 adults/trap/week). In comparison, traps exposed to sunlight showed low capture rates (1.25 adults per trap per week). Traps at the field edges captured more adults than

those in the middle of the field. Capture rates were highly negatively correlated with temperature (R= - 0.88, and P= 0.0002), where the results indicated that increasing ambient temperature decreased the capture rate. The Ferrolure traps captured significantly higher RPW than the Rhylure traps (5.55 and 3.83), respectively. The sex ratio of captured weevils was female-biased. The field assay of fermented date fruits showed that more RPW adults were attracted to traps with 8-day old fermented dates but without significant differences between five and eight-day fermented dates. Our results showed that the trap's location, type of lure, and installing pheromone traps at the edges of the orchard during moderate air temperature (22-33˚C) increased the efficacy of pheromone traps. The results obtained from the Y-tube olfactometer assay showed that the response of adults to 5 and 8-day old fermented date fruits was relatively high (86.7-100%). The residence time of female RPW was lower but not significantly different than those of male RPW. Improved the efficacy of the pheromone trap is crucial for implementing control methods for RPW based on trapping systems using new effective attractants. The efficacy of three attractants was assayed: the spathe extract, commercial pollen water and fermented dates kairomones in the laboratory and the field to enhance trapping systems through increased capture rates of RPW adults. The experiments were conducted at two separate palm orchards: Nafa farm, Al Kharj governorate, and Altholima farm, Ad Diriyah governorate. The Y-tube olfactometer was used in the laboratory to assay the responses of adults to tested attractants. The results of the Y-tube olfactometer assay indicated that the response of adults to spathe extract, commercial pollen water and fermented dates kairomones was relatively high (80-86.7%). No difference was obtained in responses between males and females for all tested kairomones. The trap capture rates have been influenced by kairomone sources in the field. Our results showed that the captured rate of RPW was more for traps containing fermented dates (59% and 64.5% in Nafa farm and Altholima farm, respectively) than spathe extract traps and commercial pollen water traps (19.7, 21.3 and 13.2, 22.4% in Nafa farm and Altholima farm, respectively). Regardless of the source of the kairomone lure, the correlation (R= 0.54, and P= 0.07) was moderately positive between the capture rate with temperature in Nafa farm. Moreover, the number of captured adults increased with the decreased ambient temperature in fermented dates traps (R= 0.60, P= .04). No correlation between the capture rate with temperature (R= 0.12, and P = 0.71) was showed in the Altholima farm. Further and extensive studies are, therefore, recommended to cover all aspects of the RPW in Saudi Arabia. **[Ameen N. Al Ansi (Saudi Arabia), Supervised by Abdulrahman S. Aldawood, and Abdulrahman A. Al Janobi, Entomology, Plant Protection Department, College of Food and Agriculture Sciences, King Saud University, Saudi Arabia (Doctorate, 2022)].**

Ecological and Taxonomical Studies of some Mite Species Infesting Pomegranate Trees and their Predators in Assiut Governorate.

The present work aimed to study the biodiversity and incidence of phytophagous mites on pomegranate trees in 11 suburbs of Assiut Governorate. Samples were taken randomly at different heights, including (leaves, buds, fruits, branches, inflorescence, inflorescence malformations, malformed buds and soil under pomegranate trees). From the obtained results, the incidence revealed the occurrence of 190 mite species (50 mite families and 100 genera) on pomegranate orchards. The population dynamics of two harmful mite species on two pomegranate varieties (Abou-Tig, El-Fateh and Manfalout cities) within two studies years were recorded. Four pomegranate teers were selected from each cultivar, and samples were randomly taken (25 leaves) from both two varieties (Assiuty and Manfalouty "Baladi"). The obtained data showed high numbers of the false spider mite, *T. punicae* on Baladi (Manfalouty) variety at Abou-Tig and El-Fateh. Two annual peaks of the pest were recorded in July and August in the two studied years. While the brown avocado mite, *O. punicae* had four annual peaks recorded in June, July, August and September. Some biological aspects of mites were studied; the shortest developmental durations were 12.56 & 9.63 days for *E. scutalis* female and male at 35°C. The highest total means fecundity rate was 13.13 eggs/female (with a daily rate of 1.59 eggs/female/day) at 30°C. The thermal constants (K) were (56.82, 100.80, 83.93, 122.23, 345.97, 419.22, 308.60 and 648.66) (DDs) for the previous stages as physiological times required for this species phenomena. The maximum values of the intrinsic rate of increase (r_m) and the finite rate of increase (λ) was obtained at 35°C (*i.e.,* 0.120 and 1.12 individuals/female/day). The gross reproductive rate (GRR) was the

highest at 35°C (16.4 eggs/female/generation). The shortest time for population density doubling (DT) was (5.77) days at 35°C. The biology, life table parameters and predation efficiency of the predatory mite, *E. scutalis* feed on *T. punicae* mobile stages and *S. phillyreae* eggs were tested at constant conditions (30±1ºC and 65±5% R.H.). The predator completed its developmental times on both prey pests in (6.20) and (6.45) days. The prey type slightly influenced the mite; when fed on *T. punicae* mobile stages, its developmental time was shorter than on *S. phillyreae* eggs. Whenever the finite rate of increase (λ) was higher than on the insect eggs. The mean generation time (T) was also affected when fed on mite stages. The *E. scutalis* female consumed high numbers of insect eggs during its oviposition period, and the longevity was longer than when fed on *T. punicae* mobile stages. Description of a new genus (*Egyptglyphus* Eraky et al. 2019) and four new species of the Acaridida mites (Acaridae and Histiostomatidae), *Egyptglyphus oconnori* Eraky et al., 2019; *Caloglyphus azzai* Eraky et al., 2020; *Caloglyphus punicum* Eraky et al., 2020 (Family Acaridae Latreille, 1802) and *Myianoetus granatum* Eraky et al., 2020 (Family Histiostomatidae Berlese, 1897). **[Abdelgayed Salah Ahmed Abdelgayed (Egypt), Department of Plant Protection, Faculty of Agriculture, Assiut University, Egypt, Plant Protection-Agricultural Animal Pests. Supervised by Abdel-Wahab M. Ali; El-Sayed A.M. El-Eraky; Nazeh M. Abd El-Wahed (Doctorate of Philosophy, 2022)].**

Influence of Genotypic Variability in Cotton (*Gossypium hirsutum* L.) on Efficacy as A trap Crop for *Striga hermonthica* (Del.) Benth. on Sorghum

The present investigation was undertaken at the College of Agricultural Studies, Sudan University of Science and Technology, and the Microbial Weed Control Laboratory at the Environment and Natural Resources and Desertification Research Institute, National Center for Research during the period 2015-2018 to evaluate the efficacy of some selected cotton cultivars as rotational and/or intercrops for suppression of *Striga hermonthica* parasitism in sorghum. Cotton cv Hamid, Barakat, Barac (c) 67, Abdeen, Sene1 and Wager, obtained from the Agricultural Research Corporation (ARC) Wad Medani, Sudan, were subjected to a series of laboratory, greenhouse and field experiments. Three genotypes were grown in a greenhouse, harvested, severed into roots, stems, leaves, flowers, bolls and seeds, air-dried and powdered and tested for germination inducing activity (GIA). The GIA for the powder varied with plant part and crop cultivar. Irrespective of cultivar, GIA was highest for roots (31.9-49.9%) and lowest for bolls (16.59-26.52%). Among cultivars, Hamid showed the highest overall GIA (48.9% germination) while Barac (c) 67 showed the lowest (16.5% germination). GIA declined with plant age. Further, GIA of Hamid was superior to that of Barakat and Barac (c) 67. GIA of cotton cv Hamid root powder increased with powder amount, reached a maximum (67.5% germination) and subsequently declined. GIA of cotton cv Hamid root exudates increased with volume and time, reached a peak (38.45% germination) at 15µL 30 DAS and subsequently declined. GIA of roots exudates of cotton cv Hamid collected *in situ* from potted plants grown in the open tended to increase plant density. Green house experiments showed that *Striga* emergence progressively increased with time in the control pots, while reduced and delayed emergence was observed on sorghum when preceded by cotton. Of all cotton cultivars, Wager and Hamid were the least and most suppressive to the parasite emergence, respectively. *Striga* dry weight mirror-imaged *Striga* emergence and was significantly suppressed in sorghum planted after cotton, irrespective of the cultivar. Sorghum planted subsequent to cotton, irrespective of cultivar, displayed increased height, leaf area, relative leaf chlorophyll content and dry weight and the increments over the control were often significant. *Striga* emergence and dry weight on sorghum planted after cotton cv Hamid progressively increased with increasing parasite seed bank. However, sorghum growth attributes did not follow a consistent trend. Field data on intercropping sorghum cv Abu Sabeen, Wad Ahmed and Arfaa Gadamac with cotton cv Hamid revealed that *Striga* emergence was invariably higher on the sole crop and emergence of the parasite was often earlier and more intense on sorghum cv Abu Sabeen. Intercropping reduced *Striga* emergence on all sorghum cultivars, and the observed reductions were 51.3-82.3%, 31.5-100% and 58.5-100% on Abu Sabeen, Wad Ahmed and Arfaa Gadamac, respectively. It could be concluded that cotton cv Hamid could be deployed as an integral part of an integrated *Striga* management strategy in the irrigated and high rain-fall areas in locations where *Striga* is pandemic. However, a mechanism other than

induction of suicidal germination, through which cotton suppresses *Striga* infection in subsequent sorghum, has to be ascertained. Further, the effects of agricultural practices, *viz* fertilizers and herbicides, on the efficacy of cotton, as a trap crop have to be investigated. **[Abdel Rahman Hamed Abdel Rahman Hashim (Sudan), Sudan Academy of Sciences, Ministry of Higher Education and Scientific Research, Sudan (Doctorate, 2022)].**

Exploring Farmers' and Pesticide Retailers' Perceptions and Practices towards the Deployment of Pesticides in the Sultanate of Oman

This study was carried out to understand farmers' and pesticide retailers' perceptions and practices on pesticides for field vegetables in Oman. Covering seven governorates in Oman, 160 farmers and 75 pesticide retailers were surveyed. Results distinguished the 40 farmers belonging to the Farmers Association (FA) from those who did not (nFA). FA respondents diagnosed common pests and diseases of vegetables in Oman better than nFA respondents. At least 50% of both groups could identify problems and knew which pesticide to use, but the remainder could not. Around half of FA recommended the correct dose rate and pre-harvest interval (PHI) compared to about 30% of nFA. On health and safety, 77% of FA identified the potential risks of pesticides to humans and the environment, whereas 60% of nFA indicated there were no possible risks. Nearly one-third of all respondents never wore PPE while using pesticides. Most FA respondents (68%) claimed that they "usually and always" read the label safety instructions in contrast to only 14% of nFA. Although they were the primary source of advice to farmers, many pesticide sellers failed to identify many of the pests and diseases (50%), select the proper pesticide (70%), or recommend the correct dose rate (37%) and PHI (44%). Forty-one percent "never" read the label safety instructions, and 27% "never" explained health and safety risks to customers. Spatial variability of pesticide application in three fields highlighted the variable coverage achieved using high-pressure sprayers, the coefficient of variation consistently exceeding 30%. In a further field, the farm was targeting over twice the recommended rate. In conclusion, there is an urgent need to introduce training for all stakeholders, including farmers, pesticide retailers and government extension officials, to improve crop protection capabilities and awareness of IPM. The study recommended phasing out high-pressure sprayers and using the proper sprayers. **[Mahmoud Mohammed Al Nabhani (Sultanate of Oman), University of Reading – UK, (Doctorate, 12 January 2022)].**

Isolation and Identification of Fungi Associated with Date Palm Offshoots from Tissue Culture and Evaluation of the Efficiency of Silver Nanoparticles and *Trichoderma longibrachiatum* in their Control.

The results of the field survey of tissue culture date palm farms in the three study areas (Alsiba,Safwan and Alharitha) of Basra Governorate, which were conducted during the period 2018-2020, showed the spread of leaf spot, black scorch and wilt diseases on date palm trees planted in these region. Many species of fungi were isolated, which numbered about 36 species, *Neodieghtonia phoenicum* was reported as causing black scorch, *Scytalidium lignicolaa, Neoscytalidium dimidiatum* and *Phoma costarricensis* as causing leaf spot disease. The results of isolation from the roots of date palms infected with wilt disease showed isolates of *F. solani, F. proliferatum F1, F.fujikuroi F4, F.fujikuroi F3 and F.proliferatum F7*. The addition of silver nanoparticles and *T. longibrachiatum* reduced the negative effect of *Fusarium* spp. So the percentage of date palm seed germination increased, and the rate of damping-off decreased. Molecular identification of some fungi was carried out using ITS1-ITS4 primers and the genetic sequence of the rDNA gene was deposited in the International Center for Biotechnology Information under the number

OK255499.1, MZ675601.1 and OK235483.1 for the fungi *P. costarricensis*, *N. phoenicum* and *A.alternata*. **[Alaa Ouda Manea(Iraq), Plant Protection Department , Agriculture College, University of Basrah-Iraq, Supervised by Mohammed A. Fayyadh and Yehya A.Salih (Doctorate, 2022)].**

A Study of Some Methods for Apple Spider Mites Management in As-Suwayda Governorate, Southern Syria.

Some management methods of spider mite population were studied on apple trees from 2018-to 2021 at different elevations in As- Suwayda Governorate, Southern Syria. Population dynamics of phytophagous mite *Tetranychus urticae* Koch (Acari: Tetranychidae), *Panonychus ulmi* Koch (Acari: Tetranychidae) and Phytoseiids were studied on Golden Delicious and Starking Delicious apple varieties. Different densities of spider mites on the two varieties were monitored. The Phytosiieds (*Typhlodromus* (*Typhlodromus*) *pyri* Scheuten, *Typhlodromus* (*Typhlodromus*) *cotoneastr* Wainstein) population density was higher on Starking Delicious. Susceptibility of eight apple varieties towards the two studied spider mite species showed significant differences of infection among varieties, which correlated to the content of apple leaves of main nutrients (N P K). Principal component analysis (PCA) showed a positive correlation to *P. ulmi with* apple-leaf contents of potassium and showed a positive correlation to *T. urticae* with nitrogen and phosphor. The most susceptible varieties to *P. ulmi* were Top Red, Starking Delicious and Starking Red Delicious. The most vulnerable varieties to *T. urticae* were Golden Delicious, Golden 972 and Granny Smith. Results showed no significant effect of basal application of fertilizers, except in the case of potassium sulphate, on the number of the two species. In contrast, foliar spray treatment had variable effects on both species. It decreased the numbers of *T. urticae* and increased the numbers of *P. ulmi.* Nitrogen and phosphorus had positive impacts on *T. urticae*. Field application of horticulture oils on both apple varieties proved efficacy in reducing numbers of both mite species, during dormant and growth seasons. The suppression impact of summer oil on Phytoseiids mites was more notable than dormant oil. The effect of botanical bio-pesticide on all development stages of *T. urticae* and *P. ulmi* was studied under lab and field conditions. The study demonstrated that Herbomite and Nimbecidine1% EC were effective miticides; the number of mobile stages reached 1.5/leaf compared with 5.1 / leaf in the untreated control; thus, it can be used in IPM programs. The effect of several acaricides of a different mode of action groups were evaluated under in lab and field conditions (Cyflumetofen, Hexythiazox10%, Abamectin 1.8%, Spirodiclofen24%). They showed different efficiency. Activity of Spirodiclofen24% on eggs retched 100% after15 days of treatment and 96.01% in Cyflumetofen treatment and 100% on mobile stages in both acaricides. Mixing some acaricides with summer oil led to a long-lasting effect compared to other treatments. **[Jihan Al Abdallah (Syria), Faculty of Agriculture, Damascus University (Doctorate, 2022)].**

Use of Some Integrated Control Agents in Reducing the Spread of Olive Wilt Disease caused by the Fungus *Verticillium dahliae*

This study aimed to evaluate the effect of olive mill wastewaters OMWW (a by-product of olive oil extraction) and some fungicides which belong to several chemical groups on colony growth, production and germination spores, and biomass weight of *Verticillium dahliae* the causal agent of olive wilt disease. Results showed that all fungicides had proved efficacy in reducing *V.dahliae* colony growth, hexaconazole had ranked first in Inhibition percent with IC_{50} (1.37) ppm. Regarding OMWW, results indicated that 100 and 150 ml/l have the highest effect and prevented *V.dahliae* colony growth completely with IC_{50} (54.06) ml/l. Concerning fungicides' effects on *V.dahliae* biomass, hexaconazole had the highest efficacy of 93.26 and 85.34% by concentrations of 1000 and 100 ppm, respectively. OMWW had good effects since 100 and 150 ml/l gave 93.86 and 99.11 inhibition%, respectively. Semi-field experiment's results indicated that OMWW with 450 ml/l gave the highest effectiveness reaching 80%, followed by fosetyl-al (double recommended concentration) as the effectiveness reached 77.14%, followed by azoxystrobin at 70%, while OMWW at 300 ml/l gave a medium efficacy (57.33%).**[Khayam Muhrez(Syria), Agricultural Engineering Collage, Tishreen University, Syria, Supervised by Mohamad Tawil and Basima Barhom. Date 20/12/2021 (Doctorate, 2021)].**

Crop Weeds: Phytodiversity and Means of Control

Weeds can originate from adjacent habitats, dispersing naturally from non-crop habitats as well as brought in from other crop fields by machinery or as contaminants of crop seeds. This constant dispersal may homogenise populations and transmit resistance genes. In this study, we examined (a) the genetic variation in quantitative traits and (b) the level of resistance to two widely used herbicides, amidosulfuron+ iodosulfuron-methyl-sodium and florasulam + 2,4-D, in eight population pairs of *Sinapis arvensis* L. from crop and adjacent non-crop habitats across eight regions in Northern Algeria. Our quantitative genetic approach on phenotypic and phonological data of plants grown under controlled conditions from seeds of these populations showed similar levels of within-population genetic variation and no genetic differentiation in quantitative traits between the two habitat types. This points to an important exchange of *S. arvensis* seeds and/or pollen between the two habitat types, but not among crop fields at the regional scale, as we found a strong regional effect for most of the plant traits for both habitat types that correlated with longitudinal temperature and precipitation gradients. We also found an absence of resistance against the two herbicides at a detection level of 10%. Florasulam + 2,4-D showed a higher level and speed of phytotoxicity compared to amidosulfuron + iodosulfuron-methyl-sodium. Given our findings, we propose measures for more efficient management of *S. arvensis*, including minimisation of seed dispersal during transport of straw balls, crop rotation to avoid the build-up of herbicide resistance, and management of populations in the close vicinity of crop fields and the search for natural herbicides for eco-responsible weed control. Herbicides are considered as important agrochemicals to increase food supply since weeds are responsible for the major reduction in crop production. Unfortunately, herbicides are more than just anti-weed agents. The present study aimed to evaluate the herbicidal effect of essential oils (EOs) from three species, namely *Thymus fontanesii* Boiss. et Reut., *Satureja calamintha* subsp. ne*peta* Briq. and Eucalyptus citriodora on some of the most harmful weeds in Algeria (*Sinapis arvensis L., Avena fatua L., Sonchus oleraceus L., Xanthium strumarium L., Cyperus rotundus L., Orobanche crenata Forsk. et Cuscuta campestris Yuncker*). The evaluation of the herbicidal activity of EOs was estimated by *in vitro*, *in vivo* and in situ bioassays in the presence of durum wheat culture. EOs isolated by hydrodistilation were analyzed by gas chromatography-flame ionization detector (GC–FID) and GCmass spectrometry (MS). Carvacrol (52.1%), thymol (13.3%), p-cymene (12.2%) and γ-terpinene (8.1%) were the dominant compounds in *T. fontanesii* EO, 1,8-cineole (28.4%), pulegone (10.2%), menthone (9.7%) and isomenthone (9.6%) in S. calamintha EO while, citronellal (64.7%) and citronellol (10.9%) in *E. citriodora*. Germination and root and seedling length of weeds were strongly affected by all concentrations used (0.01, 0.02 et 0.03%). While higher concentrations (0.03%) were required for fully effective herbicidal

activity on parasitic plants. Seedlings at the 3-4 leaf stage treated with the various oily solutions showed visible symptoms of phytotoxicity after six days of treatment. The functioning of the photosynthetic apparatus and the integrity of the plasma membrane were strongly affected by the different concentrations of 3 EOs. Nevertheless, durum wheat has shown strong resistance to the treatments used. In open fields, only the highest concentrations of each EO show effects close to chemical treatment (anti-dicotyledonous herbicide + anti-monocotyledonous herbicide) on the density (coverage) and richness of the weeds in the crop and on the yield and weight of a thousand seeds of durum wheat. Based on these results, it can be concluded that the three EOs possess herbicidal activity against species from different botanical families and can be used as a natural herbicide. However, it would be interesting to broaden the spectrum of research and evaluation of the herbicidal potential of the three aromatic species, which opens the way for other experimental studies on these EOs and their components, and their formulations as herbicides, their applications in open fields in the presence of crop. **[Sara Benchaa(Algeria), Department of Botany, Supervised by Hassan Abdelkrim, (Doctorate, December 12th 2021)].**

Molecular Characterization of *Luteoviridae* Infecting Cool-season Food Legumes and Development of Diagnostic Reagents for their Detection

This study focused on developing diagnostic reagents and molecular tools for the detection of luteoviruses, and studying the molecular variability of different luteovirus isolates from different countries of Central and West Asia and North Africa (CWANA) region. Field surveys to identify viruses that affect cool-season food legume crops and cause yellowing/stunting symptoms were conducted from the period of 2013-to 2018 in five countries of the CWANA region (Ethiopia, Lebanon, Morocco, Sudan and Uzbekistan). Chickpea, faba bean and lentil samples showing symptoms suggestive of virus infection were collected. Results of the serological test (TBIA) showed that the most common prevalent viruses were those belonging to the family *Luteoviridae* as they were detected 36% of tested samples from all countries. Faba bean necrotic yellows virus (FBNYV) was detected in samples from Uzbekistan, Sudan, Lebanon, and Ethiopia, whereas Chickpea chlorotic dwarf virus (CpCDV) was detected only in Sudan.

Serological results were confirmed by amplification with reverse transcription-polymerase chain reaction (RT-PCR) and sequencing of the partial coat protein gene.

Presence of nine species belonging to *Luteoviridae*: Bean leafroll virus (BLRV: in chickpea from Uzbekistan), Soybean dwarf virus (SbDV: in lentil from Ethiopia, chickpea from Ethiopia and Uzbekistan), Beet western yellows virus (BWYV: in chickpea from Ethiopia and Uzbekistan), Cucurbit aphid-borne yellows virus (CABYV: in faba bean from Lebanon, chickpea from Sudan and Uzbekistan), Chickpea chlorotic stunt virus (CpCSV: in faba bean from Lebanon and Morocco, lentil from Ethiopia, chickpea from Ethiopia and Morocco), Cotton leafroll dwarf virus (CLRDV: in chickpea from Sudan and Uzbekistan), Pepo aphid-borne yellows virus (PABYV: in chickpea from Sudan), Pepper vein yellows virus (PeVYV: in chickpea from Sudan). To our knowledge, this is the first report of BrYV, CLRDV, PABYV, PeVYV and CABYV infecting chickpea worldwide. **[Abdulrahman Mukahal (Syria), Senior Research Assistant, Seed Health Lab, ICARDA, Lebanon, defended his MSc thesis degree on February 21, 2022, at the Agricultural Research Corporation (ARC), Wad Madani, Sudan. Mr Mukahal has been registered at the Sudan Academy of Sciences in collaboration with "The International Center for Agricultural Research in the Dry Areas (ICARDA)". The study was supervised by Abdelmagid Adlan Hamed, ARC-Sudan and Safaa Kumari, ICARDA-Lebanon. (Master, 2022)].**

Nutritional Effect of Spirulina and Black Cumin on the Production of Serum Against *Potyvirus* Bean common mosaic virus (BCMV) and some Methods of Induction of its Resistance.

This study was conducted in the laboratories of the College of Agriculture, Tikrit University, the College of Veterinary Medicine, Diyala University, the Iraqi Center for Cancer Research and Medical Genetics / Baghdad and in the Al Aswad area of Al Khalis District /Diyala province for spring cultivation season of bean 2021, where study aimed to produce a local antiviral serum Potyvirus Bean common mosaic virus (BCMV) and the effect of the type of nutrition on its immune activity.

BCMV virus was multiplied in bean plants,It was extracted from the leaves of bean plants, and 7.39 mg/100 gm leaves of the pure virus were obtained, It was found that the absorption ratio of the pure virus at wavelengths 260/280 was 1.15.

The results of feeding the experimental animals with *S. platensis* and *N. sativa* maintain that the immune system of the experimental animals was stimulated in terms of increasing the production of antibodies, growth, and weight gain of the experimental animals and obtaining the antiviral serum in a larger amount compared to the control treatment. The amount of produced serum reached 27 ml of the groups that were injected with the virus. An antiviral serum was prepared by injecting a pure preparation of it into a number of laboratory rats at different stages, and its titer was estimated at 1/1024.

The effectiveness of the antiserum was tested with the extract of a plant infected with the virus by sedimentation test in a liquid medium, and its efficacy appeared to a degree higher or equal to that of the imported serum in diagnosing the virus. **[Dhelal A. Farhan and Maadh A. Al-Fahad (Iraq), Department of Plant Protection College of Agriculture, University of Tikrit, Iraq (Master,202٢)]**

Bio-Ecological Investigations on *Exochomus nigromaculatus* (Coleoptera: Coccinellidae) as a Predator of *Phenacoccus solenopsis* in Khartoum Area, Sudan.

The cotton mealybug (CMB) *Phenacoccus solenopsis* (Tinsley) (Hemiptera Pseudococcidae) is an accidentally introduced pest during the last decade in Sudan. Soon after its appearance, the pest managed to multiply rapidly in population and spread to different parts of the country causing severe infestation and serious damage to various cultivated and wild plant species.

Therefore, the current study was an attempt to evaluate the status of CMB in the Khartoum area, mainly through some bio-ecological investigations.

This included a field survey of CMB and its associated coccinellid predators on some primary host plants in January 2019, where population levels of the main detected coccinellid species (*Exochomus nigromaculatus*) were assessed on selected hosts and non-hosts (i.e., aphid infested) of CMB in the area. Moreover, studies dealt with some parameters on developmental durations of pre-imaginal stages, life tables data and feeding rates of *E .nigromaculatus*, were tracked when the predator reared on *P. solenopsis* fed on sprouting potato (*Solanum tuberosum* L.) tubers.

Such parameters were performed from March – to May 2019, under laboratory conditions (24.26 ± 0.98 ºC and 44.94 ± 1.45% R.H), at the Environment, Natural Resources and

Desertification Research Institute, National Centre for Research, Khartoum. Results of field survey revealed that there was a declining population trend of *P. solenopsis* in the study area, with just localized niches on a few hidden host plants.

This suggests the presence of specific stresses (a biotic and biotic), the important of which was the occurrence of potent indigenous natural enemies, particularly predators and parasitoids, which invite further research to evaluate their actual role in regulating the population of the pest.

Four coccinellid predators were detected in association with the CMB in the field, with *E. nigromaculatus* being the major species found. The level of *E. nigromaculatus* seemed to follow the population density of its prey host, *P. solenopsis*.However, regarding plants infested with three species of aphids but non-hosting CMB, the predator showed higher levels on hosts of *Melanaphis sacchari* and *Aphis nerii* than on hosts of *Rhopalosiphum maidis*.

For laboratory results, the mean incubation, total larval and total pre-imaginal periods of *E. nigromaculatus* were 6.85 ± 0.13, 16.79 ± 0.32 and 29.24 ± 0.30 days, respectively. There was a progressive increase in larval duration, starting from the second instar (2.88 ± 0.15 days) up to the fourth instar (7.47 ± 0.26 days). Oviposition period was 13.50 ± 1.06days, and the mean fecundity was (82.63 ± 12.13) eggs when the predator preyed on *P. solenopsis*.

The mentioned bioagent conveyed high survival rates during the fourth larval instar (100%) and pupal stage (97.14%), and medium survival during the other pre-adult stages (50.00 – 65.42%). The calculated major life tables' parameters indicated that the net reproduction rate (Ro), mean generation time (T), intrinsic rate of increase (rm) and doubling time (DT) computed were, 12.08, 34.85, 0.07 and 9.69, respectively.

The weaknesses observed in fecundity and some critical life tables data could be attributed to climatic conditions and some other uncontrollable technical factors during the study period, which necessitate re-evaluation of these biological aspects in future research. Nevertheless, the current predator was thought to be important, because of several characteristics that believed to add to its potentiality, including its wide prevalence and dominance on all CMB infested plants, besides its good survival rate and potential ability to devour appreciable amounts of *P. solenopsis* insects during both larval and adult durations.

The results of a non-choice test conducted showed that the total larval instars killed 37.13±2.11 CMB nymphs during their lifetime, while adult males and females consumed respectively as high as 11.00 ±2.12and 12.50 ±1.69 nymphs merely per one day. The overall results concluded that there is a possibility of management of the CMB in the country via proper assessment of all abiotic and biotic factors affecting population buildup and spreading of this pest to formulate a sound program for that goal.**[Afrah Abdalgader Eltiab Ali (Sudan), Sudan University of Science and Technology, College of Agricultural Studies, Ministry of Higher Education and Scientific Research, Sudan (Master,2022)].**

Molecular Characterization of *Rhizoctonia solani* Isolates and Testing the Susceptibility of Potato Cultivars to the Pathogen.

Potato *Solanum tuberosum* L. is one of the most important food and industrial crops worldwide.

Stem canker and black scurf caused by *Rhizoctonia solani* Kühn. [Teleomorph: *Thanatephorus cucumeris* (A.B. Frank) Donk], is an important disease associated with potato cultivation worldwide, including in Syria. Nineteen isolates of *R. solani* were obtained from sclerotia formed on infected potato tubers, collected from fields in Homs and Aleppo governorates during the spring season (February, March, April), and from fields in Damascus countryside (Sa`sa) and Daraa governorates during the summer season (August, September) in 2018-2019.

The isolates varied in their morphological characteristics (colony color and appearance), ability to form sclerotia, color of sclerotia and their distribution in the plate.

The result of molecular analysis using ITS4-B / AG3-1F primers for *R. solani* detection, and Rs2R1 / Rs1F2 for AG3-PT identification, showed that all isolates belonged to *R. solani* (sub-group AG3-PT) as they produced bands of 669 bp and 500 bp respectively, except isolates Rs4, Rs12, Rs13, Rs14, Rs19. Isolates of *R. solani* varied in their pathogenicity, however isolate No.Rs15 was the most virulent in the disease development on potato plants under artificial inoculation.

The relative susceptibility of seven commercial

and local potato cultivars against *R. solani* was tested. The assessment was based on black scurf severity and negative effect on plant growth and expected impact on yield. The tested cultivars showed a variable reaction to the black scurf disease and subsequent plant growth, but no totally immune cultivars were found. Based on the index disease (ID), 'Agria', 'Ultra' and 'Labella' were shown to be highly susceptible to this pathogen, 'Spunta' was moderately resistant, whereas 'Everest' was the most tolerant.

The most susceptible cultivar "Afamia" exhibited post-emergence stem death, large and deep canker on stems, with no new tubers formation. Although "Synergy" was moderately susceptible, and the black scurf incidence was higher than that of "Everest" and "Spunta", the loss of tubers' weight was not significant compared to the previous two cultivars.

Up to our knowledge, this is the first study in Syria for the molecular detection of *R. solani* AG3, and for testing the susceptibility of the most important cultivated potato varieties to black scurf disease. **[Sally Abo Akl (Syria), General Commission for Scientific Agricultural Research Supervised by Walid Naffaa, Department of Plant Protection, Faculty of Agriculture, Damascus University, (Master, 2021)].**

Identification of Volatile Organic Compounds (VOCs) Released from Uninfested and Infested Cucumber With Cotton *Aphis gossypii* and Their Impact on the Pest and Its Natural Enemies.

A laboratory and field study was conducted at the Ministry of Agriculture, Plant Protection Department, integrated management projects for production and plant protection. The objective was to evaluate the efficiency of VOCs released from uninfested and infested cucumber plants with *Aphis gossypii* for Faris and Meirn varieties to attract natural for the autumn and spring seasons 2020-2021. VOCs were extracted from the head space of uninfested and infested cucumber leaves with *A. gossypii* using the SPME technique combined with GC-MS. Overall, 35 and 31 compounds were identified in uninfested and infested cucumber leaves for both cultivars, respectively.

The behavioural response of *A. gossypii* and *C. septemunctata*, *A. ambiguous*, *C. carnea* to two VOCs Limonene (Li) and Methyl Salicylate (MS) extracted from infested leaves for the attraction of aphids and their natural enemies to uninfested, and infested leaves were examined by using Olfactometer. The results showed that *A. gossypii* were attracted to both uninfested and infested leaves more than its attraction to MS and Li compounds, while *C. septemunctata are* attracted to both MS and Li compounds more than the attraction to uninfested and infested leaves. *A. ambiguous* was attracted to uninfested leaves more than attracted toward the Li compound. However, it attracted the MS compound, and the result showed no response to the uninfested leaves or infested leaves. Whereas the predator *C. carnea* showed its response toward the MS compound more than the attraction to both uninfested and infested leaves. *C. carnea* did not attract to the Li compound.

The results showed a significant difference in the attraction of *C. septemunctata*, *A. ambiguous,* and *C. carnea* to 3 concentrations in the laboratory. The results showed the response of natural enemies to the lure of VOCs with the concentration of 50µl attached to the yellow sticky glue trap. The average of parasitoids and predators that were attracted to traps containing MS were 9.33, 1.38 at 7 days post hang, respectively.

Meanwhile, the average of parasitoids and predators that were attracted to the traps containing Li were 4.83, 2.83 at 7 days post hang, respectively. The results of traps containing MS nano form showed that the average of parasitoids and predators attracted to traps were 3.16, 1.66 and 6.16, 3.32 at 7 and 14 days post hang, respectively. Once yellow traps containing Li nano form were set as a lure, the average of parasitoids and predators were 1.33, 1.77 and 2.33, 3.43 at 7 and 14 days post hang, respectively.

The results of the spectrophotometer illustrated significant differences in chlorophyll amount of cucumber leaves of 161.50 and 49.71 mg/gm at the beginning and end of infestation, respectively, between uninfested and infested cucumber leaves.

The results of economic losses estimation showed that fruit weight was 67.3% and 67.9% for the cultivars Merian and Faris, respectively.**[Hind Salem Mahamoud Abd (Iraq), Department of Plant Protection, College of Agricultural Engineering Sciences, University of Baghdad, Supervised by Qasim Hussein Ahmed (Master, 2021)].**

FAO Plant Protection Activities

Activities of the regional office of Food and Agriculture Organization of the United Nations – Near East and North Africa

Senior Officers' Meeting of the 36th session of the FAO Regional Conference for the Near East Kicks Off

The Senior Officers Meeting of the 36 session of FAO Regional Conference for the Near East (NERC 36) kicked off on 10th of January 2022. The discussions on the first day focused on transforming food systems to achieve sustainable development. Hosted and chaired by the Republic of Iraq, NERC 36 is held under the theme "Restart and Recover: Better, greener and more resilient Agrifood Systems to achieve the sustainable development goals." Dr. Mithaq Abdul-Hussein Al-Khafaji, Technical Undersecretary of the Iraqi Ministry of Agriculture, led today's Senior Officers Meeting, which brought together about 30 FAO member countries and representatives of partner organizations, civil society, the private sector, and the academic sector to develop innovative policies related to the theme of this year's conference.

Abdelhakim Al-Waer, Assistant Director-General and Regional Representative for the Near East and North of the Food and Agriculture Organization of the United Nations (FAO) said at the opening session that the region is experiencing difficult times because of the Covid-19 pandemic. "We have seen the pandemic's multiple effects on food security and nutrition, and the current situation dictates that we take a special approach to agricultural and food systems to transform them and make them more efficient, inclusive, resilient and sustainable."

Al-Waer urged all participants to work towards better production, better nutrition, a better environment, and a better life while leaving no one behind.

The Near East and North Africa region is witnessing aggravating challenges, such as the effects of climate change and water scarcity, protracted crises and conflicts, the increasing number of malnourished people, as well as the increasing demand for food due to demographic changes and vulnerabilities in the food supply chains as a result of the growing dependence on imports.

Because of this, the organization has adopted an integrated and detailed regional program to respond to the effects of these challenges and help recovery. This program includes the following four regional priorities:

- Rural transformation through inclusive and sustainable intensification of smallholder farming and agricultural and food value chains
- Transforming agrifood systems to promote healthy diets for all.
- Greening agriculture: Towards sustainable recovery and climate change action
- Building agricultural and food systems resilient to multiple shocks and stresses through a holistic approach to risk management.

"The FAO's regional program is a strong and common response to the needs of the region's countries," said Dr Al-Waer. It links all parts of the organization and uses our technical, operational, and normative capabilities and our data to support work at regional and country levels,".

Near East and North Africa Endorse FAO's Strategic Priorities on Transforming Agrifood Systems

Participants in the regional conference pledge support for inclusive and sustainable rural and agricultural development, promoting food security for all

Agriculture ministers and delegates from the Near East and North Africa region signalled their commitment on 8th of February 2022 to work towards transforming agri-food systems, fostering inclusive rural development, and supporting a shift to sustainable, climate-sensitive agriculture. The commitments form the core of the ministerial declaration agreed at the closing of the 36th session of the Food and Agriculture Organization of the United Nations (FAO) Regional Conference for the Near East (NERC36).

Government officials, academics and representatives of the private sector and civil society participated in the meeting, hosted by Iraq in a hybrid modality, which included several presentations by senior FAO officials. The ministers expressed their support for the FAO Strategic Framework 2022-2031 and formally endorsed the four Regional Priorities under FAO's programme of work for the region, which focus on creating inclusive value chains and employment opportunities for rural youth, promoting food security and healthy diets for all through trade, food safety and efforts to reduce food loss and waste, greening agricultural practices to ensure environmental sustainability, and building resilience to multiple shocks and stresses. The Near East and North Africa (NENA) is home to 419 million people, 40 percent of whom live in rural areas, and one in five of whom work in agriculture. While enormously varied, the region shares the challenges of severe land and water scarcity. NENA is also home to rising levels of food insecurity and an increasing incidence of extreme poverty and alarming problems of overweight and obesity, especially among children and women. Conflicts, social unrest, huge dependency on imported food, financial and economic crises and multiple colliding and overlapping shocks reflect the region's vulnerability, the ministers said. The Regional Conference, an increasingly powerful governance mechanism for FAO that is held every two years, offered opportunities for Members to review the Organization's work in the region and, in the words of Muhammad Karim Al-Khafaji, Iraq's Minister of Agriculture and Chairperson of NERC36, to take full ownership of outcomes that their joint actions deliver.

"Agrifood systems should and must lead the successful rejuvenation of your region," FAO Director-General QU Dongyu said in closing remarks to the participants. He congratulated delegates for reaching a consensus on the ministerial declaration and emphasized that Ministers of Agriculture and Rural Affairs must play a central role in terms of political commitments and action plans to allow other key partners to help them move forward. "We have to help the farmers with enabling policies, investment, innovation and information technology," he added.

The regional conference included a series of ministerial roundtables on food security and

healthy diets, building resilient rural communities for better production, better nutrition, a better environment and a better life for all leaving no one behind, and green recovery and climate action.

FAO also organized a side event on water, energy and food to galvanize preparations for the UN Framework Convention on Climate Change's COP27 and 28 summits, both of which will be held in the region.

Participants also assessed the efficacy of FAO's recent and ongoing work in the region. That includes engaging three NENA countries – Sudan, Syria and Yemen – in the Hand-in-Hand Initiative, aiming to match investments and skills with poorer populations. Another Member, the United Arab Emirates, has taken action to mobilize support for participating countries outside the region. FAO's 1000 Digital Villages Initiatives, which seeks to tap e-commerce and other Internet opportunities to benefit rural smallholders, has been rolled out in seven NENA countries: Algeria, Egypt, Jordan, Libya, Mauritania, Morocco and Tunisia.

FAO's global initiative One Country One Priority Product, launched in September 2021, holds enormous potential for a region with some of the oldest agricultural traditions in the world, as FAO's Director-General emphasized in his opening remarks to NERC36. Soon FAO will also release a regional edition of the State of Land and Water, a flagship product designed to offer decision-makers up-to-date information on the status and trends of natural resources management in the region and response options. FAO is also helping Members in the NENA region combat a host of transboundary animal and plant pests and diseases such as Desert Locust, Fall Armyworm, *Xylella fastidiosa*, Red Palm Weevil, Peste des Petits Ruminants and Rift Valley Fever, among others, which have required resource-intensive actions around the region. Members of the NERC: Afghanistan, Algeria, Azerbaijan, Bahrain, Cyprus, Djibouti, Egypt, Iran, Iraq, Jordan, Kuwait Kyrgyzstan, Lebanon, Libya, Malta, Mauritania, Morocco, Oman, Pakistan, Qatar, Saudi Arabia, Somalia, Sudan, Syrian Arab Republic, Tunisia, Turkmenistan, United Arab Emirates, Turkey, Yemen. https://www.fao.org/neareast/news/view/en/c/1471428/

المجلس الدولي للتمور
International Dates Council

وزارة البيئة والمياه والزراعة
Ministry of Environment Water & Agriculture

منظمة الأغذية والزراعة للأمم المتحدة

The International Date Council

Establishment Meeting of the International Date Council, Al-Ahsa, Kingdom of Saudi Arabia, 15-16 February 2022

The International Date Council (IDC) held its establishment meeting in Al-Ahsa Governorate, Kingdom of Saudi Arabia, on February 15 and 16, 2022, with participation of a number of agriculture ministers and representatives from date producing and exporting countries, in addition to officials of regional and international organizations. The IDC aims to foster international cooperation between the members to develop the dates sector, promote the production of quality dates, work towards improving its processing and supporting national and international market development and transparent international dates trade. The meeting discussed many important topics and issued several resolutions. The meeting approved the IDC strategy for the period 2022-2026 and the five-year work plan, approved the IDC activity plan for 2022, and urged the IDC Secretariat to develop the necessary tools for follow-up and evaluation. The Council elected the Chairperson and Vice-Chairperson of the Council of Members, the Executive Board and appointed the Executive Director of the Council. Dr Abdulhakim Elwaer, FAO Assistant Director-General and Regional Representative for the Near East and North Africa addressed the ministerial meeting on 16th Feb. He highlighted the importance of the date palm as a strategic crop for producing countries in NENA Region, contributing to national economies, and constituting an important income-generating crop to the inhabitants of critical parts of the region. Touched on some of the main challenges facing the sector and on some areas where the FAO has provided and continues to provide support to the date palm sector. In his statement, the ADG reiterated FAO's commitment to supporting the IDC and the date palm producing countries.

The Official Launch of the FAO Programme on Red Palm Weevil (RPW) Eradication in the Near East and North Africa (NENA) Region, February 17, 2022

FAO Programme on RPW Eradication and the Ministry of Environment, Water and Agriculture, Kingdom of Saudi Arabia

On Thursday, February 17, 2022, in Al-Ahsa Governorate, Saudi Arabia, and as a side event of the establishment meetings of the International Date Council (IDC), the FAO regional programme on RPW Eradication in the NENA region convened a meeting to mark the launch of the field activities of the regional programme. Dr Suliman Al-Khatib, Director General of Plant Resources of the Ministry of Environment, Water and Agriculture (MEWA), and representative of the Kingdom of Saudi Arabia in the RPW programme addressed the meeting on behalf of His Excellency Eng. Ahmed Ayyada Al-Khamshi, Undersecretary, MEWA. The

meeting was addressed by the Assistant Director-General of FAO and Regional Representative for NENA region Dr AbdulHakim Alwaer and Dr Ibrahim Al-Dukheri, Director-General of the Arab Organization for Agricultural Development (AOAD). Dr M. Ali Bob represented the IDC on behalf of the Executive Director Dr Abdulrahman S. Al Habib. The meeting was also attended by Dr Abdul Aziz M. Abdul Karim, Assistant Undersecretary for Agriculture Affairs Ministry of Works, Municipality Affairs and Urban Planning, Kingdom of Bahrain, and Dr Hassan Alayied, Director of International Cooperation and Partnership, King Abdulaziz City for Science and Technology, KSA. The meeting was attended by Eng. Ayman Al-Ghamdi, Director General of the Plant Health Department, MEWA, KSA, and members of the RPW Management Programme in the Kingdom. The meeting was also attended virtually by more than 30 members of the RPW Programme, members of the programme committees, a group of experts, leaders of programme technical working groups (TWGs) and national focal points representing countries in the regional RPW programme. The RPW is a serious pest of date palm, coconut and ornamental palms that attacks about 40 palm species in more than 50 countries, causing extensive damage to palm trees and other plantations and threatening production, farmers' livelihoods and the environment .The regional programme to eradicate the RPW was established in partnership with many countries and organizations and with generous support from the Kingdom of Saudi Arabia, the United Arab Emirates and the Sultanate of Oman. FAO, with international partners and countries in the region, has developed a framework strategy for the eradication of the RPW and developed the regional programme to eradicate the RPW in the countries of the NENA, as one of the most affected areas, in order to help countries improve strategies for the eradication of the RPW and control programmes to contain the infestation and spread of weevil and reduce palm damage. The programme addresses the gaps in the management of the RPW in areas of scientific research, technology transfer and capacity building .The programme developed work proposals of five TWGs in areas of RPW monitoring and early detection, the participation of farmers, the development of control protocols and techniques, study of the social and economic impact of the RPW, development of phytosanitary systems and border protocols, and the production of certified palm propagation materials for sustainable management of the RPW. Twelve work packages were prioritized to be tackled by the five TWGs in the next two years, and ten cooperation agreements have been signed with programme partners:

1. The Mediterranean Agronomic Institute (CIHEAM-Bari), Italy
2. Arab Organization for Agricultural Development (AOAD)
3. International Center for Agricultural Research in the Dry Areas (ICARDA)
4 International Center for Biosaline Agriculture (ICBA)
5. The Near East Plant Protection Organization (NEPPO)
6. The Phoenix Research Station (PRS), Spain
7. The University of Genoa, Italy
8. The Arab Center for the Studies of Arid Zones and Dry Lands (ACSAD)
9. King Abdulaziz City for Science and Technology (KACST), KSA (LOA signed during the meeting)
10. King Faisal University, KSA (LOA signed in March 2022)

Mr Thaer Yaseen, FAO Plant Protection Officer, NENA region and technical director of the RPW programme presented a report on the progress of the activities of the FAO programme on RPW Eradication from the NENA region. The leaders of the five TWGs presented progress reports on accomplishments and planned activities. Discussion followed with comments from Dr Ibrahim Jboory, President of the Arab Plant Protection Organization, Dr Mohamad Abdullah of ACSAD and Eng. Fidaa Al-Rawabdeh of the AOAD, the Regional Office for the Arab Mashreq, and other speakers .Thanks to the Kingdom of Saudi Arabia for organizing this event and for the great support provided for the success of the regional programme.

FAO Regional Farmer Field Schools (FFs) Master Trainers' and Curriculum Development Workshop, (28 Feb – 03 March 2022), Riyadh, Kingdom of Saudi Arabia

Under the framework of activities of the FAO RNE programme on Red Palm Weevil (RPW) eradication, the programme and the Ministry of Environment, Water and Agriculture, KSA organized a regional Farmer Field Schools (FFS) Master trainers' and curriculum development workshop in Riyadh from 28 Feb-03 March 2022, with the participation of RPW and FFS experts from Gulf countries. Trainers, researchers and technical experts in the field from FAO and the region (KSA, Oman, UAE, Bahrain, Kuwait).participated in the workshop. FFs is one of the main activities of technical working group 6 of the RPW programme. Under this programme, FFS on RPW will be conducted to enhance the participation of farmers in IPM of the RPW in the coming 2 years in Egypt Jordan, Saudi Arabia and Tunisia. A list of available trainers and facilitators in the region has been compiled. Workshop programme comprised technical presentations, participatory training, practical sessions, groups discussions a field day and OMBEA assessments. Participants shared experience on the concepts, identified important technical knowledge and critical information about the Integrated Pest Management of the RPW and agree on modality of RPW FFS implementation. Workshop participants discussed plan to execute FFS in the region in the next two years. In addition they reviewed 2 FFs manuals developed by the programme on "Farmer Field Schools Manual for Integrated Management of Red Palm Weevil in the Near East and North Africa Region - Part One" and "Farmer Field Schools-Part two, a facilitator manual on Good Agricultural Practices for RPW management". The programme will issue revised versions to be used by member countries in facilitating the farmer field schools. The regional workshop also discussed the selection of FFS implementation countries, geographical scope and regions in the selected countries, the number and criteria for selection of FFS facilitators, the number of FFS to be conducted and the number of target farmers in the first phase of the programme. Participants agreed to launch programme for the training of FFS facilitators (already started in Egypt) and launch FFS activities in the 4 countries. The workshop was well attended, successfully implemented as reflected by the positive interaction and effective discussion and feedback from participants.

Participated in the 1st International Conference on Food Security and Environmental Sustainability, King Faisal University Al-Ahsa, Saudi Arabia

7-9 March 2022, Al Hasa (Al-Hufof)- The kingdom of Saudi Arabia

Under the Ministry of Environment, Water, and Agriculture and the Arab Organization for Education, Culture and Science (ALECSO), King Faisal University hosted the 1st International Conference on Food Security and Environmental Sustainability from 7th to 9th March 2022. The conference comes in light of green Saudi Arabia and the green middle East initiatives launched by His Royal Highness Prince Mohammed bin Salman Bin Abdulaziz Al Saud for the sake of achieving food security and environmental sustainability. The conference was designed to address the current state of food security at the national, Arab, and global levels and to formulate strategic visions for the adoption of policies that would enhance food security and ensure its sustainability. The conference was attended by high-level personalities from Saudi Arabia along with representatives of Arab, regional, and international organizations. In one of the conference's sessions, Mr. Thaer Yaseen**,** the Regional Plant Protection Officer- at FAO Regional Office for Near East and North Africa, delivered a talk on"Environmental sustainability and its role in development". In his address to the conference, Yaseen stated that FAO has always placed food security issues at the forefront of its strategic plan and works on coordinating efforts to achieve the 2030 Sustainable Development Goals. He highlighted the significant unprecedented challenges to Achieve Sustainable Agriculture in the NENA region. Yaseen stated that the current agricultural production systems are unsustainable and emphasized that the new sustainability approaches require direct action to conserve, protect the natural resources, and enhance the resilience of people, communities, and ecosystems, especially to climate change and the market. Sustainable agriculture is knowledge-based, which requires a holistic view of managing the resources. Sustainable agricultural practices should adopt full use of technology, research, and the integration of local knowledge. This requires the development of technical, policy, governance, and financing frameworks that support this transformation

FAO and KFU Signed a Letter of Agreement to Support the Sustainable Management of the Red Palm Weevil in NENA Region. March 07-08, 2022, Al Hasa (Al-Hufof), Saudi Arabia

On the sidelines of the 1st International Conference on Food Security and Environmental Sustainability, hosted by the King Faisal University and held from 7th to 9th March 2022, the FAO, and King Faisal University (KFU) have signed a Letter of Agreement (LOA), to conduct field experiments aiming at finding practical solutions in the sustainable management of the Red Palm weevil. The agreement is part of the Regional Funds program to control the pest in the Near East and North Africa region.

The 7th International Date Palm Conference, Abu Dhabi, UAE, 14-16 March 2022

Khalifa International Award for Date Palm and Agricultural Innovation and the United Arab Emirates University in cooperation with FAO and several other organizations organized the 7th International Date Palm Conference from 14-16 March 2022 in Abu Dhabi to update the scientific knowledge on various aspects of the date palm production, protection and marketing. In addition to supporting the international technical cooperation in various fields of the date palm value chain. FAO ADG and technical officers participated actively in the event.

The FAO RPW Eradication Programme organized a technical session on 15th March "on "Global efforts for Red Palm Weevil (RPW) management". In this session, 14 presentations were delivered, 10 were by partners of the FAO Regional RPW Eradication Programme. Dr Thaer Yaseen, Regional Plant Protection Officer, the presentation covered the state-of-the-art techniques to combat the RPW and the strategies adopted by the FAO regional RPW eradication trust fund programme in the NENA region. He presented an update on the work of the technical working groups of the regional RPW eradication trust fund programme. FAO RNE organized another session on 16th March on "Date palm value chain development and regional collaboration", with the participation of distinguished experts in the field. RPW programme technical working group leaders presented a state of the art of RPW, each in his respective field. In addition, they shared progress reports on the status of RPW project implementation and planned activities. Several coordination meetings and discussions with programme partners and professionals took place during the conference. The conference witnessed the launch of the International Network for Sustainable Development of Date Palm in the Near East and North Africa (INSDDP-NENA). The Network will promote the date palm cultivation sector in producing countries and join the efforts of member organizations to develop programmes/projects with concerned countries, raise the necessary funds, and provide technical assistance for the implementation of the selected projects. Members of the network include FAO, KIADPAI, AOAD, ACSAD, ICARDA, ICBA and AARINENA. Follow up, and coordination will follow with INSDDP-NENA and the International Date Council. Several bilateral meetings were organized during the event, including a session with experts involved in the book on "sustainable date palm practices in Sudan".

The Closure of TCP/SUD/3703 Project in Sudan

All the activities of the TCP project on the development of date palm products and by-products Value Chains in Sudan were implemented. Seven Workshops have been conducted in different sites in the Northern States and River Nile State. The main activities included two training of Trainers (TOT) workshops on the serious pests & diseases affecting date palms in Sudan, training on IPM for date palms to assist selected IPM trainers to refine their states strategies for project implementation, helped them to develop FFS-based area-wide IPM. Training of Trainers (TOT) workshop for Date Palm Sudanese Producers Organizations (POs) and Supporting Staffs in (Date palm Production, Protection and Post-harvest in Sudan) was organized. TOT workshop on by-products and capacities of date Producers to meet market needs was conducted. The project activities improved the capacities for research and extension and promoted the knowledge transfer to foster sustainable production of date palm products and by-products.

The Closure of FAW Emergency Project (TCP/EGY/3706) in Egypt

All activities within the framework of the project (TCP/EGY/3706) entitled: "Emergency response to enhance the national capacity of Egypt for early warning, monitoring, and management of fall armyworm (FAW)", was successfully implemented to manage FAW in Egypt. The project was officially terminated after fully achieving all the objectives. Significant contributions to FAW control in Egypt were achieved under this project, which supported the Egyptian Government's programming framework. The results of the project are therefore expected to contribute to the protection of livelihoods and food security of smallholders, including women and youth, who live in FAW affected areas in Egypt through developing capacities in awareness, surveillance, monitoring, and IPM of the FAW. The project raised awareness among all stakeholders, including farmers, extension specialists, pest control specialists, researchers, agriculture directorates, sugarcane factories, the Rice Research and Training Centre, and other stakeholders. A total of 905 stakeholders was benefited from all implemented activities. Furthermore, the project assisted the Ministry of Agriculture and Land Reclamation (MALR) in setting up a national FAW network and an efficient monitoring and early warning system. The project also supported the MALR in building capacities for the mass production of biopesticides for FAW control. Moreover, the project succeeded in establishing Farmer Field Schools (FFSs) in the maize-infested areas as a successful model to be disseminated to other FAW-infested hosts and governorates. An environmentally friendly approach was recommended for controlling FAW in Egypt throughout the project activities. The project promoted the mass production of biopesticides and the conservation of FAW's natural enemies by enhancing the infrastructure of related laboratories and carrying out training programs on these topics.

Natural Enemies Rearing Unit

A laboratory for mass rearing of the natural enemies of FAW was inaugurated in Shandaweel village (Upper Egypt), which is considered the first laboratory equipped with materials and pieces of equipment in Egypt. The natural enemies unit started first surveying the bioenemies associated with FAW in corn fields and another crops.The experts were able to collect the most familiar egg parasitoid Telenomus remus and many other predators such as spiders and insects. Mass-rearing process was succeded and in field releasing started with great achievements.The bio unit considered to be a training center to promting the facilitators,technicians and others from Egypt and elsewhere. Several predators were also reared to face the population increase of fall armyworm. Upon closing the project, it was recommended that ongoing financial support be provided to MALR to ensure replication of the FFS model in other FAW-infested areas.

International Workshop on *Xylella fastidiosa* (XF) in the Mediterranean Region

FAO regional office of the Near East and North Africa participates in the International Workshop on "Xylella fastidiosa in the Mediterranean region"

28th - 30th March 2022 - Bari and Lecce in Apulia Region – Italy

The Mediterranean Agronomic Institute of Bari (IAMB- CIHEAM), in Bari, - Italy, is hosting the international workshop on *Xylella fastidiosa* (Xf) in the Mediterranean region: spread, socio-economic impacts, actions, and measures adopted to avoid or counteract its entry, establishment, and dissemination. FAO invites other NENA countries to be part of the international workshop. The Assistant Director-General, Regional Representative for Near East, and North Africa Mr. Abdul Hakim ELWAER will participate in the opening session of the workshop along with Mr. Maurizio RAELI, Director of CIHEAM Bari, and Mr. Teodoro MIANO, Italian Delegate and Vice President of CIHEAM Governing Board. During five days of the workshop, important topics will be reflected related to the State of the art of *Xylella fastidiosa* in the Mediterranean area, the Puglia Region strategies for the regeneration of areas devastated by *Xylella fastidiosa*, the Socio-economic impacts of *Xylella fastidiosa* in the Mediterranean region. Mr. Thaer Yaseen, the Plant Protection Officer in the Regional Office, presented the updates of *Xyllella fastidiosa* in the NENA Region (context and actions). Representative delegations from Albania, Algeria, Bosnia & Herzegovina, Egypt, Iraq, Jordan, KSA, Lebanon, Libya, Morocco, Oman, Palestine, Syria, and Tunisia shared their country's insights. The program of the workshop includes a visit to the conservation and production center at the University of Bari, a field visit to olive-growing areas infected by *Xylella fastidiosa*, and a visit to the Plant health laboratory - CIHEAM Bari.

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

The General Situation During March 2022 Forecast until mid-May 2022

Provided by the FAO Emergency Centre for Desert Locust (ECLO).

General Situation

Calm situation returns

The Desert Locust situation remained calm during March as little rain fell, vegetation was dry, and very few locusts were detected by surveys. In the Horn of Africa, a few small remnant immature swarms were present in southern Ethiopia, and aerial operations treated 400 ha. Any residual swarms that remain are not expected to mature and breed in the south; instead, they are more likely to move north towards the Somali region and eventually breed, but this may be limited by poor rainfall that is expected in the coming months. In any case, existing resources should be able to manage the situation. Locusts declined in winter breeding areas along the Red Sea coast in Egypt and Sudan, and a few adults were seen on the southern coast of Yemen. As very little rain is expected to fall this year in the spring breeding areas of northwest Africa, the Arabian Peninsula, and southwest Asia, no significant developments are likely between now and July. The longer-term outlook indicates an active early monsoon season along the Indo- Pakistan border and above-normal rainfall in the northern Sahel of Africa, the interior of Yemen, and northeast Ethiopia from July to September. This might eventually lead to a potential increase in locust numbers in about October

Western Region: CALM

SITUATION. No locusts present. FORECAST. Very small-scale breeding could occur in parts of Morocco and Algeria if more rains fall. No significant developments are likely.

Central Region: CALM

SITUATION. A few small remnant immature swarms in southern **Ethiopia** (400 ha treated). Scattered adults maturing in a few places on the Red Sea coast of **Egypt** and **Sudan** where breeding ended. Isolated adults in a few areas on southern Yemen's Gulf of Aden coast. No locusts were reported elsewhere in the region.

FORECAST. Any remnant adults in southern **Ethiopia** may move north to areas of recent rainfall in the Somali region. Locusts will decline further along the Red Sea and Gulf of Aden coasts as vegetation dries out. Low numbers of solitarious adults may appear in the interior of **Saudi Arabia** and **Yemen,** where breeding, if any, will be on a very small scale and limited by poor rainfall that is expected. No significant developments are likely.

Easter Region: CALM

SITUATION. No locusts present. FORECAST. Isolated adults are likely to appear in southeast Iran and southwest Pakistan where breeding, if any, will be on a very small scale and limited by poor rainfall that is expected. No significant developments are likely

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).

Other Activities Related to Desert Locust Commission

Inauguration of the Desert Locust Management Training Centre (DLMTC), Suakin - Red Sea State, Sudan:

On March 20, 2022, the first phase of the Desert Locust Management Training Centre (DLMTC), was inaugurated through the partnership between FAO and the Ministry of Agriculture and Forestry in Sudan and with funding from the European Union. In light of the completion of the first phase of the center, the first training course to train regional trainers in desert locust survey and control operations was held during the period 21-27 March 2022. The 16 trainees attended from Sudan, Egypt, Eritrea, Ethiopia, Oman, Saudi Arabia, Djibouti, Somalia and Yemen. The objective of the training course was to develop the training capacities in the region about Desert Locust biology, survey and control, and to empower the national trainers to conduct national or local regular staff training in the future. The training course covered all aspects of Desert Locust (DL) biology and behavior, survey and control operations. The use of field equipment, Global Positioning System (GPS) and eLocust3 and eLocust 3m. Use of drones in survey. Control strategy and technologies, drops and droplet behaviour, atomization, different sprayers, pesticide groups and formulations and swath width by handheld sprayers were demonstrated in the field. Calibration and measurement of flow rate were covered extensively. New control technologies, safety procedures in handling and storage of pesticides as well as an Environment and Health Standards (EHS).

Arab Impact Factor 2021 Report

The 2021 report issued jointly by the Arab Impact Factor and the Union of Arab Universities, which evaluates scientific journals written in Arabic, was recently published. The report included the evaluation of 455 periodicals that have the minimum requirements, and the *Arab Journal of Plant Protection* received the highest IF of 4.30. This is the second year in which AJPP has been ranked first among all evaluated journals in all disciplines. The following table shows the development of the Arab Journal of Plant Protection IF in the past seven years, that is, since the establishment of the **Arab Impact Factor**:

Report of the year	Impact Factor
2015	1.60
2016	1.69
2017	2.50
2018	3.00
2019	3.00
2020	3.42
2021	4.30

The values in the above table clearly show the continuous improvement in the IF value over the past period, and we sincerely hope that such progress will continue during the coming years.

ASPP Participation in The Seventh International Date Palm Conference, Abu Dhabi, UAE, 14-16 March, 2022

The 7th International Date Palm Conference was organized by Khalifa International Award for Date Palm and Agricultural Innovation during the period 14-16 March 2022 at the Emirates Palace, Abu Dhabi, UAE. The congress has been a great success in advancing knowledge and promoting international exchange and promotion. The conference was attended by more than 500 participants from 42 nations. The Scientific program included 126 oral and around 100 poster presentations. The oral presentations were divided into seven sessions covering the following titles: (I) Mejhoul cultivar: origin, distribution, cultivation, marketing and characteristics, (ii) Red palm weevil: present situation and control measures, (iii) Tissue culture, biotechnology and genetic engineering, (iv) Insect pests and diseases of date palm: the most critical pests affecting date palm and their management, (v) Technical practices of date palm, (vi) Genral topics on

date palm, (vii) Date palm value chain development and regional collaboration. The Conference Organizing Committee requested from the Arab Society for Plant Protection (ASPP) to organize a session on date palm pests. It included five presentations and chaired by Dr. Khaled Makkouk and Dr. Ibrahim Al-Jboory. Two presentations were of general nature and three presentations focused on specific date palm pests. The two general presentations were given by Dr. Mohamed Besri from Morocco. The first one entitled "The Montreal protocol and the methyl bromide phase-out in relation to the control of post-harvest date palm pests. In this presentation Dr. Besri shed light on the available methyl bromide alternatives as well as on the promising alternatives under evaluation. In his second presentation entitled "Impact of climate change on the future distribution of date palm" Dr. Besri clearly demonstrated how some areas which are suitable for date palm production at present will become unsuitable in the future, and reflected on the economic consequences of such shift. The three presentations on specific pests included a presentation on date palm green scale insect in in Libya given by Dr. Saleh Dipri and the second on the same insect in Sudan given by Dr. Mehdi Abdel Rahman. It was clear from these two presentations that this pest is a serious factor in limiting date palm production in these two countries and there is a great need for regional collaboration to reduce its impact. The last presentation was given by Dr. Ibrahim Al-Jboory from Iraq who reported for the first time in Jordan and the region the occurrence of a parasitoid which attack the giant date palm mealy bug. More studies are still needed on this natural enemy which has a potential as a bio-control agent to manage mealy bugs and scale insect pests. During the conference days, the Organizing Committee distributed for free a number of important books and booklets to all participants. Two of these books are important ASPP publications: (I) The Dictionary of Scientific Terms in Plant Protection, and (ii) Plant Protection Challenges in the Arab Countries: 2050 Vision. In addition, a booklet entitled "The Arab Society for Plant Protection and its Role in Strengthening and Disseminating Knowledge of Date Palm Pests Management" was also distributed to all participants. This generous act from the Conference Organizing Committee gave a great Visibility for ASPP and was appreciated by all participants of this important event

ASPP Participation in the 16th MPU Congress Held in Limassol, Cyprus

The 16th congress of the Mediterranean Phytopathological Union (MPU) was held in Limassol, Cyprus during the period 4-8 April, 2022at St. Raphael Resort. The congress was attended by 120 participants from different Mediterranean countries and beyond. The Arab Society for Plant Protection (ASPP) organized a session as part of the scientific program under the theme "Important diseases that affect major agricultural crops in the east and south Mediterranean countries". This session was chaired by Khaled Makkouk, with three oral presentations given by ASPP members Safaa Kumari, Elia Choueiri and Houda Bouraghda. Dr. Kumari gave a presentation entitled "Epidemiology and management of legume and cereal viruses in the Arab and Mediterranean region", Dr, Choueiri presented a talk entitled "Phytoplasmal and viral diseases of fruit crops in the East Mediterranean countries", and Dr. Bouraghda gave a talk entitled "Fusarium head blight and crown rot diseases of wheat in Algeria and other south Mediterranean countries: distribution, identification and pathogenicity of associated fungal species". In addition, Dr. Khaled Makkouk participated in a panel discussion on "What are the benefits of diversity and equal representation of genders in academia and industry: challenges and good practices. Furthermore, another ASPP member Mr. Abdul Rahman Mukahal gave a poster presentation entitled "Chracterization and distribution of Pseudomonas syringae pv. Syringe on wheat in Syria".

The 13th Arab Congress of Plant Protection 2022

Important Dates to note:

1-The new congress date is October 16-21, 2022.
2-Registration deadline: September 1, 2022.
3-Abstract's submission deadline (confirmation of earlier submitted abstracts or presenting new ones): April 30, 2022.
4-Acceptance of abstracts: 30 June 2022.
5-Deadline for submitting proposals for invited concurrent oral research papers sessions: March 31, 2022
6-Deadline for hotel booking: July 31, 2022.
7-The email address and the website of the congress info@acpp-aspp.com and www.acpp-aspp.com
We are looking forward to meeting you all in the fall of 2022 in Tunisia.

Partial Support to Attend the 13th Arab Congress of Plant Protection

The Congress Organizing Committee will provide partial financial aid to attend the 13th Arab Congress of Plant Protection, which will be held in Tunisia during 16-21 October 2022 to a limited number of participants. Those who are interested should apply for such aid and fill the attached application form and send it to the Organizing Committee by email (info@acpp-aspp.com). Participants who receive support from their institutions are not eligible to apply. The last date for application is May 15, 2022. The Organizing Committee will inform the applicants about the amount of support no later than June 30, 2022.

تونس - ACPP 2022 - Tunisia
PLANT HEALTH
For Secure and Safe Food

Continuous Pest Surveillance and Monitoring Constitute a Tool for Sustainable Agriculture: Case of *Xylella fastidiosa* in Morocco.

Climate and trade changes are reshaping the cartographic distribution of lethal pervasive pathogens. Among serious emerging challenges is *Xylella fastidiosa* (*Xf*), a xylem-limited phytopathogenic bacterium that produces losses and damages to numerous crops of high economic and agronomic importance. Lately, this grave quarantine pathogen has expanded its distribution by arriving to several European countries and infecting both wild and cultivated plants, and no cure has been identified so far. Countries without current outbreaks like Morocco need to monitor their crops frequently because detecting diseases in the early stages may reduce the huge losses caused by *Xf*. For that purpose, inspections were managed in different regions in Morocco from March 2020 to July 2021 to assess the presence of *Xf* in several growing areas of vulnerable economic crops (i.e., almond, citrus and olive). To extend the likelihood of detection, hosts have been inspected and sampled randomly over different environments, including symptomatic and asymptomatic plants. Each sample was screened for the existence of *Xf* by using the DAS-ELISA commercial kit, while, furtheranalyses were carried out for doubtful samples, by PCR. Results of both tests did not show any positive sample in the investigated areas. This finding updates the *Xf* situation in Morocco and confirms that this country is still a free territory from this bacterium, at least in the monitored regions. **[Kaoutar El Handi, Majida Hafidi, Miloud Sabri, Michel Frem, Maroun El Moujabber , Khaoula Habbadi, Najat Haddad, Abdellatif Benbouazza, Raied Abou Kubaa and El Hassan Achbani.(Morocco), Sustainability, 14, 1485. 2022].**
https://doi.org/10.3390/su14031485

Assessment of Ionomic, Phenolic and Flavonoid Compounds for a Sustainable Management of *Xylella fastidiosa* in Morocco.

Morocco belongs to the countries ranked at a high-risk level for entry, establishment, and spread of *Xylella fastidiosa*, which has recently re-emerged as a plant pathogen of global importance, causing olive quick decline syndrome (OQDS). Symptomatic infection by *X. fastidiosa* leads to devastating diseases and important economic losses. To prevent such losses and damages, countries without current outbreaks like Morocco need to first understand their host plant responses to *X. fastidiosa*. The assessment of the macro and micro-elements content (ionome) in leaves can give basic and useful information along with being a powerful tool for the sustainable management of diseases caused by this devastating pathogen. Herein, we compare the leaf ionome of four important autochthonous Moroccan olive cultivars ('Picholine Marocaine', 'Haouzia', 'Menara',and 'Meslalla'), and eight Mediterranean varieties introduced in Morocco ('Arbequina', 'Arbosana', 'Leccino', 'Ogliarola salentina', 'Cellina di Nardo', 'Frantoio', 'Leucocarpa', and 'Picholine de Langue doc'), to develop hypotheses related to the resistance or susceptibility of the Moroccan olive trees to *X. fastidiosa* infection. Leaf ionomes, mainly Ca, Cu, Fe, Mg, Mn, Na, Zn, and P, were determined using inductively coupled plasma optical emission spectroscopy (ICP-OES). These varieties were also screened for their total phenolics and flavonoids content. Data were then involved in a comparative scheme to determine the plasticity of the pathogen. Our results showed that the varieties 'Leccino', 'Arbosana', 'Arbequina' consistently contained higher Mn, Cu, and Zn and lower Ca and Na levels compared with the higher pathogen-sensitive 'Ogliarola salentina' and 'Cellina di Nardò'. Our findings suggest that 'Arbozana', 'Arbiquina', 'Menara', and 'Haouzia' may tolerate the infection by *X. fastidiosa* to varying degrees, provides additional support for 'Leccino' having resistance to *X. fastidiosa*, and suggests that both 'Ogliarola salentina' and 'Cellina di Nardò' are likely sensitive to X. *fastidiosa* infection. **[Kaoutar El Handi, Majida Hafidi, Khaoula Habbadi, Maroun El Moujabber, Mohamed Ouzine,Abdellatif Benbouazza, Miloud Sabri and El Hassan Achbani. Laboratory of Phyto-Bacteriology and Biocontrol, Plant Protection Unit-National Institute of Agronomic Research INRA, Meknès, Morocco. Laboratory of Biology, Moulay Ismail University, Meknès, Morocco. CIHEAM Bari, Istituto Agronomico Mediterraneo, Via Ceglie 9, Valenzano, 70010 Bari, Italy.Sustainability , 13(14), 7818; 2021].** https://doi.org/10.3390/su13147818

Within the Framework of the Project: Capacity building and awareness-raising in Europe and in third countries to deal with Xylella fastidiosa

which is funded by the European Union H2020 (Marie Skłodowska-Curie Actions (MSCA) Call for Research and Innovation Staff Exchange (RISE): H2020-MSCA-RISE- 2016). Project number: 734353; during the period from 7-21 March 2022, a number of Lebanese researchers and inspectors visited Italy with the aim of training in three research centres, including the Mediterranean Agronomic Institute of Bari (MAIB) and the National Research Council (CNR-IPSP Bari, Italy) and the Basile Carmia Research Center (CRFSA, Locorotondo, Italy). The training course included several activities, whether in laboratories or in the fields. The delegation could visit olive groves infected with Xylella fastidiosa in the southern part of Italy and could learn about methods of sampling and then analyse later in the laboratory by several serological and molecular methods. The training course also included several theoretical and practical lectures aimed at enhancing the ability of Lebanese researchers and inspectors to deal with this bacterial disease, especially when it enters Lebanon. It is noteworthy that Cure-XF project includes several partners in Europe and the Middle East and is coordinated by Dr. Maroun Al-Mujber from the Mediterranean Agricultural Institute of Bari.

Professor Abdullah Mohammed Al-Sadi

Prof. Abdullah Mohammed Al-Sadi received the Royal Order of Commendation from His Majesty Haitham Bin Tariq, Sultan of Oman, for excellent contribution to Scientific Research, Innovation, and 4th Industrial Revolution on the 11th of January 2022. In addition, he received Khalifa International Award for Date Palm and Agricultural Innovation (category: influential figure) on the 14th of March 2022. Prof. Abdullah is currently the Dean of the College of Agricultural and Marine Sciences and a Professor of Plant Pathology at Sultan Qaboos University (SQU), Oman. He received his PhD in plant pathology from the University of Queensland, Australia in 2007. Al-Sadi's research focuses on characterizing and managing plant diseases, especially fungal diseases. He led/participated in the description of 42 new plant pathogens/diseases to the world (33 fungal, 5 viral and 4 phytoplasma) and led the discovery of 20 new fungal species from Oman for the first time in the world. His research also focuses on the integrated management of plant diseases through improving the efficiency of quarantine, the development of biological and chemical control methods, and the use of genetic engineering to produce disease-resistant plants. In addition, he evaluated and developed diagnostic tools/techniques for the detection of fungal, viral, bacterial and phytoplasma pathogens in plants and agricultural products. Al-Sadi has over 380 publications, of which 270 are refereed journal papers, with a journal cumulative impact factor (WoS) of 748. He has supervised **27** PhD and **37** MSc students and taught 7 BSc and 2 MSc courses. He received 35 national and international awards, including the most productive researcher over the history of Sultan Qaboos University (1986-2021) in the cumulative number of refereed journal publications affiliated to SQU (Scopus). He has also been listed among the Top 2% influential scholars in the world according to Stanford Lists in 2020 and 2021. Al-Sadi is a member/representative in 5 international committees and a member/chair in 14 national committees and more than 30 committees at the university level. He is an editorial board member of 3 journals, including Scientific Reports (Nature Group, IF = 4.379). He participated in several scientific studies with researchers from different parts of the world.

Peromone New Production and Application Techniques

PHERA (https://www.phera.info) is a collaborative European project to develop sustainable and cost-effective pheromone-based solution to combat serious pests effecting food security such are Fall Armyworm, *Spodoptera frugiperda*. The consortium which includes several leading pheromone companies is focusing on the introduction of pheromone application in raw crops (Rice, Maze, soya, etc). One aspect of the project is to establish a novel method of producing pheromones by enzymatic fermentation instead of chemical synthesis. The other aspect is to develop simple, easy to apply and long-lasting mating disruption dispensers. Russell IPM has developed a novel dispenser which has shown a great promise in controlling rice stem borer and yellow stem borer in India and Bangladesh. Fall armyworm trials in Africa is still in progress but early indications are promising. The combination of efficient bio production and effective dispenser is making pheromone technology affordable and accessible for the first time to a wide range of raw crops farmers in Asia, Africa, and Latin America. Further information can be obtained from **[Dr Shakir Al-Zaidi (Russell IPM, 2022]** shakir@russellipm.com

In Bangladesh, Russell IPM has been working together with key partners to control the rice pest yellow stem borer, *Scirpophaga incertulas*. Recently, we have conducted a trial to combat rice yellow stem borer using a mating disruption system. In our trial, we used the pheromone which has been produced using a safe biological yeast fermentation process developed by BioPhero. The EU-funded PHERA project helps us to evaluate the effect of cost-effective pheromone produced by the affordable fermentation process. It could be a real breakthrough in reducing pheromone prices and delivering an effective control system for rice yellow stem borer.
#Rice Yello stem borer, #Russellipm, #project PHERA #Biophero, #Mating Disruption #Mazra, #banglade.

Converting Two Types of Table Salt (common and marine) from Normal size(Micro) to Nanoscale and using them to prevent the growth of mycotoxigenic fungi, the most important of them *Aspergillus flavus,* and reduce and adsorption mycotoxins Such as Aflatoxin B1 from cereal and Feed crops

The present work (the invention) introduces the use of (environmentally friendly and cheap natural materials) such as table salt in its two types of marine and regular (extracted from Iraqi soils) with the Nanoscale instead of its normal size to prevent mycotoxigenic fungi from growing on grains and forages, as well as the high ability of the salt with the Nanoscale on Adsorption of mycotoxins from grains such as Rice, Corn, Wheat, Barley, etc., as well as from forage rations, and by this, we protect food and forage crops from infection with stored cereal fungi, especially mycotoxigenic fungi that cause damage to crops, and their toxins cause diseases such as cancers, fetal deformities, and other diseases. Where marine and common table salt is milled with special mills located in the laboratories of the Ministry of Science and Technology to convert it from Normal size to Nano size. And its use in low concentrations prevents the growth of the fungus and reduces the toxin, and this conversion of salt and its use is for the first time in the world. The results of inhibiting the growth of *Aspergillus flavus* were recorded on the culture medium using the sea salt treatment with nanoscale at a concentration of 2.5%, an inhibition rate of 65.89%; as for the stored rice grains, the rate of inhibiting the growth of the fungus *Aspergillus flavus* was 95.80%, which is a very high level recorded by locally manufactured and environmentally friendly Nano materials. It is cheap compared to other Nano materials. The percentage of Aflatoxin B1 reduction from stored rice grains (Artificially contaminated) using the same concentration of marine Nano salt reached 84.96**%. [Prof. Dr. Halima Zugher Hussein, Professor of Mycotoxins Department of Plant Protection, College of Agricultural Engineering Sciences, University of Baghdad-Iraq. Kamal AbdulKarim Abbas Al-Hamiri, Senior Chief Agricultural Engineer, Master of Mycotoxins, Ministry of Agriculture, Iraq, 29/11/2021].** kamalaldaher333@gmail.com

The Team Working on the Cactus cochineal in Morocco won the "2021 Grand Prize Hassan II".

Dr. Mohamed Sbaghi, Dr. Rachid Bouharroud, Dr. Mohamed Boujghagh from the National Institute of Agronomic Research (INRA) and Dr. Mustapha El Bouhssini (Ex-International Center for Agricultural Research in the Dry Areas (ICARDA), won the first Prize of the 2021 Grand Prix Hasan II for Invention & Agronomic Research, category of Advanced Sciences and Technologies. The team won this prestigious award for their significant achievements in host plant resistance "Identification of the first sources of resistance to the cactus cochineal, *Dactylopius opuntiae,* in Morocco". This research was part of a joint project implemented by INRA and ICARDA since 2016. Eight ecotypes were found resistant to the cochineal and have been registered in the Moroccan cactus catalog. A timber park with these resistant ecotypes to *D. opuntiae* was established. These resistant genotypes are being multiplied in several platforms in Morocco and will be used to re-establish cactus plantations destroyed by the cochineal. *Dactylopius opuntiae* has also been reported in serval other countries in the region: Ethiopia, Jordan, Syria, and recently in Tunisia.

8th International Cereal Nematodes Symposium (ICNS), September 26 – 29, 2022

ICNS and its Objectives:

The **I**nternational **C**ereal **N**ematodes **S**ymposium (ICNS) is an extension of the International Cereal Nematode Initiative (ICNI) that was established in 2006. It aims to create a critical mass of scientific capacity and skills to deliver sustainable solutions by working at both the practical and theoretical levels. It was initially founded as the International Cereal Cyst Nematode Initiative (ICCNI) and later expanded to include all important genera of cereal nematodes (CN).

Cereal nematodes, including the Cereal Cyst Nematodes (*Heterodera* spp.; CCNs) and the Root Lesion Nematodes (*Pratylenchus* spp.; RLNs), are acknowledged as a global economic problem on wheat production systems in developing as well as in developed countries.

A large network of research groups has undertaken research over the last 20 years. This includes ICWIP (ICARDA-CIMMYT Wheat Improvement Program) which relates to wheat improvement research in Central Asia, West Asia and North Africa; the International Maize and Wheat Improvement Center (CIMMYT) and the Turkish Ministry of Agriculture and Forestry in collaboration with the International Center for Agricultural

research institutions in Australia and Europe. Their goals are to:

- **Understand the importance and distribution of CCNs and RLNs,** which are widespread in wheat production systems throughout West Asia, North Africa, parts of Central Asia, Northern India and China.
- **Investigate potential control options with a major emphasis on host resistance** through validation and integration of resistant sources (traditional and molecular) into wheat germplasm for global wheat production systems (particularly focused on rainfed or supplementary irrigation systems). Rotation has been partially explored.
- **Provide training for scientists from developed and developing countries.** Previous country hosts include Turkey (see proceedings from the 1st and 5th workshops), Austria, China, Morocco and India. These workshops were very successful in identifying the global status of the problem of cereal nematodes and forming networks and partnerships to continue working on these problems.

Currently, because of the successful precedents, this coming event will be held in Turkey with a very specialized session on fungal soil-borne diseases. Also, at the end of the meeting, the organizing committee will meet to explore ideas of changing the symposium name to the **International Symposium of Cereal Soil Borne Pathogens (1st ISCSBP),** taking place every three years.

Symposium Topics:

1. An update on the status of the global distribution of CN
2. Climate change impacting the importance and population dynamics of CN on wheat
3. Management strategies of CN in wheat using host-resistance and other strategies
4. Basic research trends in CN (such as pathogen diagnostics, phylogenetic studies and plant-nematode interactions)
5. CN genome and parasitism genes
6. Novel approaches for designing CN management strategies

The 1st International Conference on Food Security and Environmental Sustainability 7-9 March 2022

This conference comes in light of Green Saudi Arabia and the green middle East initiatives, launched by His Royal Highness Prince Mohammed bin Salman bin Abdulaziz Al Saud, the faithful Crown Price –may God Almighty Protect him- for the sake of Environmental Sustainability, based on the Institutional identity of king Faisal University that aims to contribute to achieving food security and environmental sustainability.

About the Conference

This conference will cooperate with its strategic partners, the Ministry of Environment, Water and Agriculture (MEWA), and the Arab Organization for Education, Culture and Science (Alexo). During the period from : 4 to 6 Shaaban 1443 Ah, 7-9 March 2022, at king Faisal University headquarters in Al-Ahsa, Saudi Arabia. The Conference aims of exploring the reality of national food security and in the Arab World, its challenges, ways to overcome them and to build future strategies and policies that contribute to its development and achieve environmental sustainability. The work to support food security and its progress steadily is the principal reason for improving access to food and addressing the challenges of environmental degradation, As this would lead to sustainable management of natural resources, inc. https://services.kfu.edu.sa/fsescon/en

Invitation to a Seminar on: "Why the Gender Dimension Plays an Important Role in Plant Pathology?"

The 16th Conference of the Mediterranean Phytopathological Union will be held in Cyprus, between April 4-8, at the St. Raphael Hotel in Limassol and is co-organized by the Department of Agricultural Sciences, Biotechnology and Food Science of the Cyprus University of Technology. In the context of gender mainstreaming and gender inequalities presented in this area, a special seminar will be offered on "Why does the gender dimension play an important role in plant pathology?". Gender equality has been recognized as one of the most important goals for achieving sustainable development. Nevertheless, research and professional development practices continue to ignore such an important factor. This special two-hour seminar aims to provide practical examples of gender mainstreaming in research and teaching, with particular emphasis on plant health and phytopathology. The experiences that the speakers will share with the public aim to contribute significantly to the emergence of gender-related challenges in the field of science, as well as to suggest good practices to alleviate the problem in the field of research, university and technology education and research funding. The seminar is offered by the Gender-SMART project. Find more information about the program below. The conference will be held hybrid, ie with both physical and online presence of the participants.

First International Conference on Plant Protection 5-7 December, 2022, Sultan Qaboos University, Oman

Developments in agricultural science and technology have contributed to a remarkable increase in food production since the mid-20th century. There have been tremendous discoveries and developments in pathogen discovery, insect taxonomy, diagnostics tools, host-pathogen interactions, genomics, and transcriptomic studies. Yet, plant pests and diseases remain the main challenges to plant growth and production. This emphasizes the need to develop innovative methods in plant pest and disease management. The Department of Plant Sciences is pleased to organize "The 1st International Conference on Plant Protection (ICPP)", which be held at Sultan Qaboos University, Oman, during December 5-7, 2022". We cordially invite you to participate in the conference, which will focus on issues related to plant pests and disease diagnosis and management. The

conference will host eminent scientists who will give keynote speeches in their fields of expertise. In addition, oral and poster presentations and social functions will provide participants with the opportunity to interact and establish future collaborations.

Conference topics

- Pests of economic importance
- Fungal diseases and their control
- Viral, Phytoplasma and bacterial diseases in plants
- Epidemiology of plant diseases
- Post-harvest pests, diseases and mycotoxins
- Integrated pest and disease management
- Insect-Host-Pathogen interactions
- Pesticides
- Biological control
- Biotechnology in plant protection
- Weeds and their management
- Quarantine and phytosanitary measures

Website https://conferences.squ.edu.om/icpp/Home, **Email** icpp@squ.edu.om , **online registration** https://squsys.squ.edu.om/ConfSys/Conference/ConfRegistration.aspx?cc=41

Diagnosis and Incidence of Honey Bee Pathogens in different Environments" (DIABEE)

In a collaboration between CIHEAM Bari represented by Dr. Khaled Djelouah, CNR represented by Dr. Maria Saponari and Dr. Raied Abou Kubaa &, University of Bari represented by Dr. Simona Sanzani & Dr. Rocco Adante, and Regional Association of Apulian Beekeepers (A.R.A.P), A kick-off meeting (online) was conducted on 22 February 2022, in the framework of the project "**Diagnosis and incidence of honey bee pathogens in different environments" (DIABEE)** which aims to study different pathogens threatening and decreasing honey bee populations like viruses and fungi, in different provinces of the Apulian region. Mr. Sabri Ala Eddine Zaidat, was involved as a Master's student to follow laboratory activities and fieldwork.

Strengthening the Resilience and Peaceful Coexistence of Lebanese and Syrian Refugees through Increased income Generation in the Agricultural and Food Production Sectors

Under the project **"Strengthening the resilience and peaceful coexistence of Lebanese and Syrian refugees through increased income generation in the agricultural and food production sectors**" funded by the Federal Ministry for Economic Cooperation and Development of the Federal Republic of Germany through the sponsor organization RET Germany (www.RETGermany.de), LARI and GATE Lebanon organized a series of Training of Trainers during a period of 5 months to the agricultural engineers of Gate Lebanon, engineers from the municipalities and the Ministry of Agriculture at the Governorate Baalbek-Hermel. The trainings were provided by experts from LARI on Integrated Pest Management, weed management, soil management, fertilization, mode of action of pesticides, Cereal and legume production. The objective of the training is to increase capacity building of the agricultural engineers and extension services in order to support farmers, increase awareness, improve crop production, livelihood and food security. **[LARI Project Coordination Zinette Moussa, 2022].**

CIHEAM Bari is Glad to Announce that the Application Campaign for CIHEAM Bari Master Programmes for the Academic Year 2022-23 is Open from 1st April to May 31st, 2022.

It will be possible to apply online **until May 31st, 2022** for the following Masters:

- **Sustainable Water and Land Management in Agriculture**
- **Innovative Approaches for Integrated Pest Management of Mediterranean Fruit Crops**
- **Mediterranean Organic Agriculture**
- **Sustainable Agro-Ecosystems and Resilience**
- **Open Innovation and Youth Entrepreneurship in the Mediterranean Agrifood System**

Courses will start in October 2022 at **CIHEAM Bari** campus. According to the pandemic evolution, the blended learning approach might be confirmed (first few months classes held in remote). Full or partial scholarships will be granted.

Please take a look at our dedicated website sections to collect more info about course programmes and apply online:

Keep your eyes on the **CIHEAM Bari** Website to apply online.

https://bit.ly/3M6N6f6

For further information please contact CIHEAM Bari Educational/Training office at: didattica@iamb.it

Youssef Khamis has been Promoted as a Professor of Plant Pathology in Egypt

The board of the Arab Society for Plant Protection sincerely congratulates **Dr. Youssef Khamis** at the Plant Pathology Research Institute - Agricultural Research Center in Egypt for being promoted to a professor of Plant Pathology. Dr. Youssef Khamis has recently received the title of Outstanding Editor from the British publishing house Taylor and Francis for his international scientific contributions. He has many research papers in plant pathology published in scientific journals of international weight and high impact factors. He also contributes to many professional associations and is a member of the editorial board of many specialized international journals, including the Journal of Plant Pathology issued by the Italian Plant Pathology Association and the Journal of Plant Diseases and Protection published by the German Society of Plant Protection and Plant Health and Folia Horticulturae issued by the Polish Society for Horticultural Sciences and others. Dr. Youssef Khamis is also a member of the Agriculture and Food Research Council of the Academy of Scientific Research and Technology and the Executive Committee of the Egyptian Young Academy of Sciences (EYAS) of the Academy of Scientific Research and Technology.

Selected Research Papers

- **Population Dynamics of African Palm Weevil (Rhynchophorus Phoenicis F.) on Breeding Sites of oil Palm (Elaeis Guineensis Jacq.) in Niger Delta, Nigeria.** Thomas N. Commander and Dimkpa O.N. Stanley. International Journal of Entomology and Nematology Research, Vol.6, No.1, pp.1-10, 2022.
- **Cold and freezing injury in insects: An overview of molecular mechanismsIvo Hodek special issueReview.** Jan Rozsypal. Eur. J. Entomol. 119: 43-57, 2022. DOI: 10.14411/eje.2022.005
- **The number of moths caught by light traps is affected more by microhabitat than the type of UV lamp used in a grassland habitat**. Julia Niermann and Gunnar Brehm, Eur. J. Entomol. 119: 36-42, 2022. DOI: 10.14411/eje.2022.004
- **Supplemental Fumigant Placement Improves Root Knot and Fusarium Wilt Management for Tomatoes Produced on a Raised-Bed Plasticulture System in Florida's Myakka Fine Sand**. Caroline J. Land, Gary E. Vallad, Johan Desaeger, Edzard Van Santen, Joe Noling, and Kathy Lawrence. https://doi.org/10.1094/PDIS-03-21-0543-RE
- **Effect of Pathogen Virulence on Pathogenicity, Host Range, and Reproduction of *Plasmodiophora brassicae*, the Causal Agent of Clubroot Disease.** Nazanin Zamani-Noor, Sinja Brand, and Hans-Peter Söchting. 16 Jan 2022. https://doi.org/10.1094/PDIS-02-21-0410-RE
- **Occurrence of a Novel Strain of Moroccan Watermelon Mosaic Virus Infecting Pumpkins in Kenya.** Naomi Nzilani Mumo, Elijah Miinda Ateka, Edward George Mamati, Fredah K. Rimberia, George Ochieng' Asudi, Eunice Machuka, Joyce Njoki Njuguna , Francesca Stomeo, and Roger Pelle. 21 Jan 2022. https://doi.org/10.1094/PDIS-02-21-0359-RE
- **Nematicidal Activity of Different Plants Extracts against Root Knot Nematodes.** Javeria Afzal, Muhammad Abid, Faisal Hussain and Alia Abbas. Pakistan Journal of Nematology, Volume 39, Issue 1, June 2021.
- **Antagonistic Potential of Moroccan Entomopathogenic Nematodes against Rootknot Nematodes, *Meloidogyne javanica* on Tomato under Greenhouse Conditions.** Ali ElAimani, Abdellah Houari, SalahEddine Laasli, Rachid Mentag, Driss Iraqi, Ghizlane Diria, Slimane Khayi, Rachid Lahlali, AbdelfattahA. Dababat & Fouad Mokrini, Scientifc Reports, 12:2915, 2022. https://doi.org/10.1038/s41598-022-07039-0
- **Genome-Wide Association Study of Root-Lesion Nematodes Pratylenchus Species and Crown Rot *Fusarium culmorum* in Bread Wheat.** Quahir Sohail, Gul Erginbas-Orakci, Fatih Ozdemir, Abdulqader Jighly, Susanne Dreisigacker, Harun Bektas, Nevzat Birisik, Hakan Ozkan,and Abdelfattah A. Dababat, Life, 12, 372. 2022. https://doi.org/10.3390/life12030372
- **Monitoring of Host Suitability and Defense-Related Genes in Wheat to *Bipolaris sorokiniana*.** Mehtap Alkan , Harun Bayraktar, Mustafa ˙Imren, Fatih Özdemir, Rachid Lahlali, Fouad Mokrini, Timothy Paulitz, Abdelfattah A. Dababat, and Göksel Özer. J. Fungi, 8, 149. 2022. https://doi.org/10.3390/jof8020149
- **Interactions among Cereal Cyst Nematode *Heterodera filipjevi*, Dryland Crown Rot *Fusarium culmorum*, and drought on Grain yield Components and Disease Severity in Bread Wheat.** Mahin Ahmadi, Neda Mirakhorli, Gul Erginbas-Orakci, Omid Ansari, HansJoachim Braun, Timothy Paulitz, Canadian Journal of Plant Pathology, DOI: 10.1080/07060661.2021.2013947

PAPERS pubLished in THE Arab Journal of Plant Protection (AJPP), Volume 40, issue 1, March 2022

ECOLOGY

Effect of Different Types of Iraqi Soils and Burial Depths of the Larvae and Pupae on the Adult Emergence Rate of the Mediterranean Fruit fly, *Ceratitis capitata* (Wiedemann), Under Laboratory Conditions
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ABSTRACTS

Abstracts of papers presented in a symposium entitled "2nd National Meeting for Biological and Integrated Management of Agricultural Pests" organized by the Biological Control Studies and Research Center, Faculty of Agriculture, University of Damascus, Syria, during the period 29-30 November 2021
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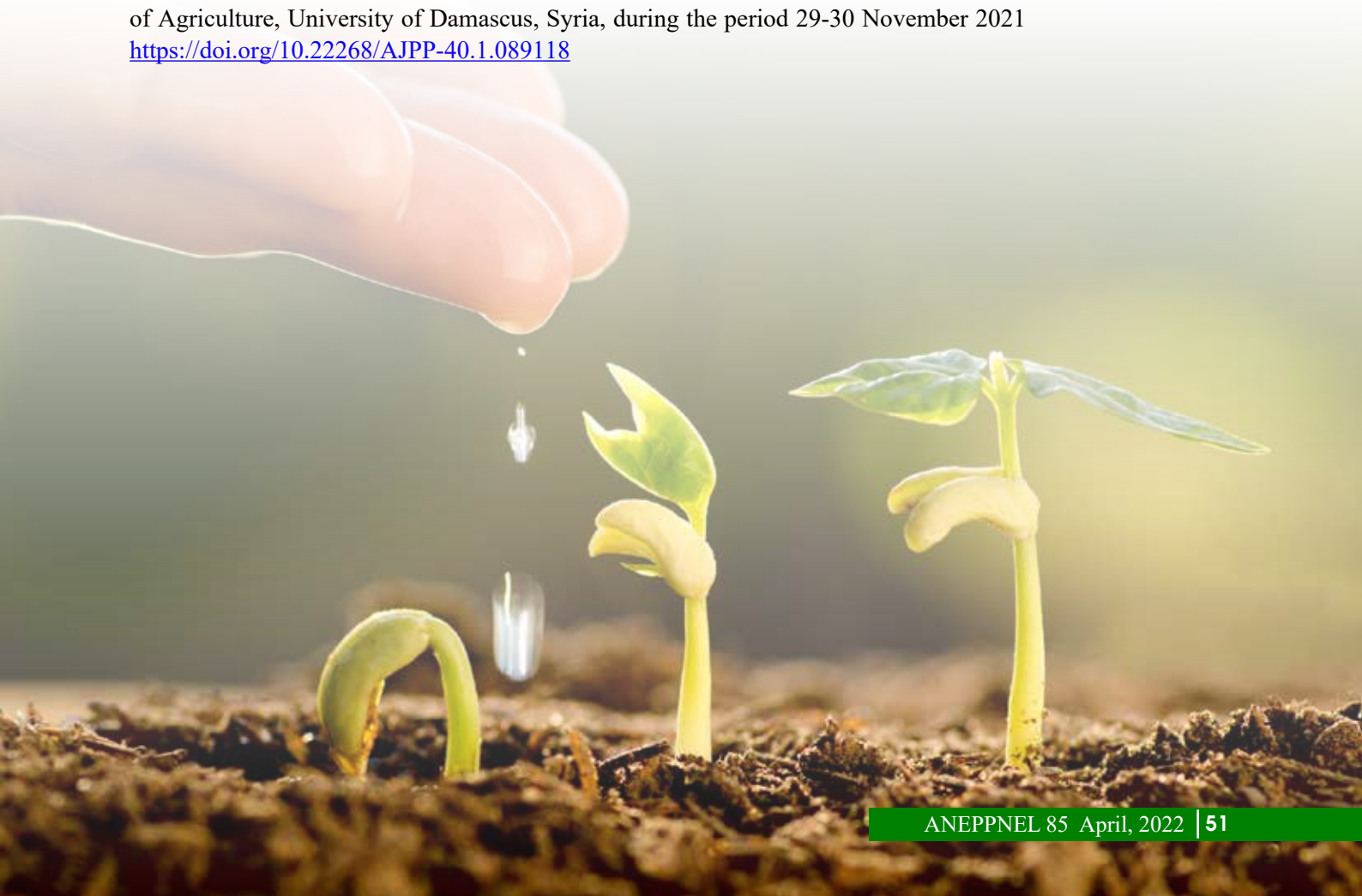

EVENTS OF INTEREST 2022-2023

11-12 May 2022	3rd International Conference of Agricultural Sciences. Sustainable Agriculture And Global Challenges. Sulaimani city/Iraq. https://sagc2022.univsul.edu.iq/
1-7 /8/ 2022	4th World Conference on Sustainable Life Sciences, Hotel Golden Tulip Istanbul Bayrampasa. https://www.wocols.com/
11-15/7/2022	IX EURAAC Symposium of the European Association of Acarologists in Bari- Italy, https://euraac2022.com/
18-23/7/2022	The 26th International Congress of Entomology, Helsinki, Finland, July 2022. https://ice2020helsinki.fi/
19-23/9/2022	The 11th International Scientific and Practical Conference "Biological plant protection is the Basis of Agroecosystems Stabilization http://events.fncbzr.ru/personal/apply/
28 /8–1 /9/2022	International Conference of the German Society for Plant Sciences. Bonn- Germany. https://www.botanik-tagung.de/
31/8 – 3/9/ 2022	IV. Balkan Agricultural Congress. Edirne, Turkey. https://www.agribalkan.net/
26 – 29/9/2022	8th International Cereal Nematodes Symposium (ICNS) Abant,Turky. https://www.cimmyt.org/events/8th-international-cereal-nematodes-symposium-icns/
6-9 /10/ 2022	XIII International Agriculture Symposium AGROSYM 2022 Jahorina , Bosnia and Herzegovina. http://agrosym.ues.rs.ba/
5-7/12/2022	First International Conference on Plant Protection in Sultan Qaboos University, Oman. https://conferences.squ.edu.om/icpp/Home

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News and announcements on any aspect of plant protection in the Arab world are welcome to publish in the bulletin. 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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Photos from 7th int. date palm conference Abu Dhabi







Photos from FFS training in Riydah KSA