ARAB AND NEAR EAST PLANT PROTECTION NEWSLETTER

Food and Agriculture Organization of the United Nations

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EDITORIAL

Does Climate Change Affect Pests in the MENA Region?

There is a consensus among modelers that North Africa and the Middle East will be negatively affected by climate change. All the proposed scenarios predict at least 2℃ increase in temperature and about 20-25% reduction in precipitation by the end of this century. These expected climatic changes will have big implications on pests in MENA. In fact, we have already started seeing some effects; there have been outbreaks of pests which were minor in the past. This is the case, for example, of cereal leaf miner (*Syringoparis temperatella*) on wheat and barley in the Middle East, especially in Jordan starting from early 2000's. The other striking example is the case of the barley stem gall midge (*Mayetiola hordei*), which has been known as a key pest of barley in North Africa (Morocco-Algeria, Tunisia, Libya). However, and starting from 2009, there have been several outbreaks of this pest in Syria inflicting heavy damage to barley in this country. When we examined the weather data during 2009-2012, there was significant decrease in the number of freezing days during winter (December-February). In other words, winters during these years were warm enough for the insect to continue to be active and reproduce with no usual diapause during these supposedly "cold" months.

The chickpea pod borer (*Helicoverpa armigera*) has been known historically as a major pest of several crops, including chickpea in the Indian sub-continent and sub-Sahara Africa. However, and because of climate change, *H. armigera*, has become an important pest of chickpea in several countries of MENA during this decade. Also, several aphid/BYDV outbreaks occurred recently on cereals in several countries (e.g. Lebanon, Syria, Tunisia). Early rain and warm winter led to high infestation with aphids and high BYDV incidence.

With warmer winters in MENA, we expect pests to have more generations/year and thus inflict more damage to crops. Because pests will be reproducing and increasing their populations size rapidly, there will be higher chances for new virulent biotypes to develop. Migratory insects such as Sunn pest, and because of warmer winters, could leave overwintering sites for cereal fields earlier in the season and thus could inflict heavier damage to crops. Several studies have shown that there are some resistance genes for pests, which lose their effectiveness under high temperature regimes. Thus, breeding strategies for insect's resistance in MENA will have to take into consideration the use of temperature stable resistance genes in developing and deploying new varieties.

To be well prepared and develop adaptation strategies to cope with climate change effect on pests, we need to focus on a number of issues: (i) continuous monitoring of pests and their natural enemies, (ii) development of prediction models for pests' outbreaks, (iii) use stable genes under variable temperature regimes in the breeding programs, (iv) develop new and appropriate management options: planting dates, improved formulations of pesticides/biopesticides (efficacy, persistence/stability), (v) make use of biocontrol agents adapted for hotter and drier environmental conditions.

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❖ Crop Protection News from Arab and Near East Countries

INVASIVE AND NEW PESTS

ALGERIA

The First Detection of the Olive Leaf Moth *Palpita vitrealis* (Rossi) (Lepidoptera: Pyralidae) as a Serious Pest in Biskra Province (Algeria).

In Algeria, little is known about the jasmine moth *Palpita vitrealis* (Rossi) [synonym *Palpita unionalis* (Hubner)]. It was not previously considered to have significant economic impacts on olives. However, during 2018, in several localities in Biskra province, Algeria, damage caused by larvae feeding on terminal buds, young leaves and shoots attracted the attention of farmers and researchers. In this province, this is the first time that *P. vitrealis* has been reported as a pest associated with olive trees. A morphological description of this species is given, as well as information on the symptoms and damage that have been observed. **[Souad Tahar Chaouche, Khalila Bengouga, Haroune Fadlaoui (Algeria), Bulletin OEPP/EPPO Bulletin, 49 (3), 593–596, 2019].** https://doi.org/10.1111/epp.12607

EGYPT

Five New Eriophyid Mite Species from Egypt (Acari: Eriophyidae) Associated with the Weeds of the Family Poaceae.

Five new eriophyoid mites infesting weeds of the family Poaceae are described and illustrated from Egypt. They are *Abacarus stagninis* sp. nov. from *Echinochloa stagnina* (Retz.) P. Beauv., vagrants in grooves between veins on the upper leaf surface, causing discoloration of the leaves; and four new species from genus *Aceria* (*A. echinochloae* sp. nov., *A. barnyardi* sp. nov., and *A. stagninis* sp. nov.) from *E. stagnina* and *E. crus–galli* (L.) Beauv., and *Aceria pennisetosa* sp. nov., from *Pennisetum purpureum* Schumach. These species are vagrants underneath inner surface of the leaf sheath around stem and no symptoms were observed. However, *A. barnyardi* sp. nov. is a vagrant underneath inner surface of the leaf sheath around stem and are endoparasitic inside tissue of leaves causing rusted leaves. **[Elhalawany, A.S.,(Egypt), Xiao-Feng Xue[2] Amrine, J. Wr., Systematic & Applied Acarology, 25(2):379-408,2020].** DOI: https://doi.org/10.11158/saa.25.2.13

IRAQ

First Report of *Alternaria alternata* Causing Leaf Spot on Quince (*Cydonia oblonga*) in Iraq.

Quince (Cydonia oblonga Mill) is an important fruit tree belonging to the family Rosaceae which is native to the Western Asia region. Currently, it grows widely in countries with moderate and subtropical ecological conditions, including Iraq. Its fruits are consumed directly or processed as jams, jellies or marmalade. Moreover, several medical phytochemicals have been identified in quince fruits that have received attention for exploitation in preventing and remedying various pathologies in humans (Lopes et al. 2018). In 2017, the total area harvested of quince trees in Iraq was 325 ha with total production 1.777 tones (FAOSTAT 2019). However, quince trees have been affected by several plant pathogens such as Erwinia amylovora, Sphaeropsis malorum, Venturia inaequalis and Podosphaera leucotricha causing a sharp decrease in yield and quality (Al-Jumaili and Al-dujaili 1989). In the spring of 2018, symptoms of circular to irregular dark brown necrotic spots surrounded with yellow haloes were observed on leaves particularly those old one located on bottom of quince trees of various ages in the Alhusseiniya region of Kerbala Province, Iraq (32.607498 °N; 44.006699 °E). During the disease progression, these spots gradually merged and produced large patches of necrotic tissues that ultimately leaded to the wilting, drying and

death of diseased leaves. These necrotic patches extended to the fruits causing a significant decrease in quality thereof. The disease incidence was approximately 10 to 20% in the 10 orchards selected randomly. Leaves showing leaf spots symptoms were excised (0.5-1 cm in length) and surface was disinfected with 2% sodium hypochlorite (NaOCl) for 2 min. before rinsing several times in sterilized distilled water. They were placed on water agar (WA) medium and incubated at 25°C for 3 days in darkness. Several fungal isolates associated with symptomatic tissues were obtained and purified using the hyphal tips method. The purified fungal colonies were preserved on potato dextrose agar (PDA). They initially produced white mycelia that turned to dark green or Page 1 of 4 olivaceous at the center while at the edge became light green after seven days. Microscopic analyses showed that the mycelium was septate and the conidia (n = 50) were olive to dark brown in color and obclavate to ovoid or elliptical in shape, measuring 11-30 µm long and 8.7 -13 µm wide with a short beak. They had 0-3 longitudinal septa and 1-4 transversal septa, sometimes formed long chains. The light brown conidiophores were short and branched or unbranched. These morphological features are similar to those of Alternaria alternata (Simmons 2007). To confirm this identification, a molecular diagnosis was required. Genomic DNA was extracted from pure culture of a representative isolate using a DNeasy Plant Mini Kit (Qiagen Inc., Valencia, CA, USA). The internal transcribed spacers (ITS) region, translation elongation factor 1-alpha (tef1), and Actin (actA) genes were amplified partially with primer sets ITS1/ITS4 (White et al. 1990), EF1-728 F/EF1-986R, and ACT-512 F/ACT-783R (Carbone and Kohn 1999) respectively. The resulting sequences were BLASTn analyzed, revealing 98 to 100% identity with those sequences of A. alternata (MN733022.1, KY094926.1, and MK451996.1 respectively). The sequences of ITS, tef1 and actA of the representative isolate were submitted to GenBank, and accession numbers were received MN094110.1, MN164691.1 and MN164690.1 respectively. In late April of 2018, the pathogenicity of the representative isolate, which was molecularly identified, in addition to three isolates of A. alternata fungus selected randomly were assessed individually by spraying healthy surface sterilized new and old leaves of quince trees (one year old; Khatuni cv.) with their conidial suspension (30µl per leaf) at a concentration of 1 × 106 conidia/ml, harvested from a 10 days old culture. At the same time, control leaves were sprayed with distilled water only. The leaves were then incubated at 25+1 °C in plastic boxes to maintain high relative humidity (Akhtar et al. 2011). This test was implemented in six replicates, each containing 10 leaves and repeated twice. One week post inoculation, the leaves showed brown necrotic spots similar to those observed in the original symptoms, and the same fungal pathogen was re-isolated. However, no symptoms appeared on the mock leaves, To the best of our knowledge, this is the first record of A. alternata as a fungal pathogen causing leaf spot in quince trees in Iraq. However, no such a study is available that indicates to effectiveness of this disease on quality and yield of quince tree in Iraq. Thus, further studies are demanded. **[Adnan A. Lahuf[1], Ali A. Kareem[1], Mushtak T. Mohammadali[1], Junmin Li[2], Hasan M. Mohsen[1] (Iraq), 1Department of Plant Protection, College of Agriculture, University of Kerbala, Kerbala Province, Iraq, [2]Institute of Plant Virology, Ningbo University, Ningbo, 315211, China, Plant disease, Published Online: 21 Jan 2020].** https://doi.org/10.1094/PDIS-12-19-2566-PDN

First Molecular Identification of *Fusarium oxysporum* Causing Fusarium wilt of Armenian Cucumber in Iraq.

Cucumis melo var. *flexuosus*, which is commonly known as Armenian cucumber is one of the most economically important species of the family Cucurbitaceae. In June of ,2018wilt symptoms were observed on Armenian cucumber plants in Fadhilia, Ninevah governorate, North of Iraq. The fungus was isolated from diseased tissues and initially identified based on, its morphological characterizations using conidial and hyphal structure. Pathogenicity of the fungus was also confirmed by Koch's postulates. Molecular identification of the fungal pathogen was done by amplifying the internal transcribed spacer (ITS) region of the conserved ribosomal DNA. All these ITS sequences showed homologous to those of *Fusarium oxysporum* isolates in the GenBank database with a similarity percentage of 99%.The Iraqi isolate has been assigned in the GenBank with Accession No. MN128597.1 To the best of our knowledge, this is the first molecular record of *F. oxysporium* on the Armenian cucumber in Iraq. **[Huda Hazim Wafi AL-Taae and Ali Kareem Al-Taae (Iraq), Plant Protection Department., College of Agriculture and Forestry, University of Mosul, Iraq, IOP Conf. Series: Earth and Environmental Science 388 (2019) 012005].**

JORDAN

First Report of Tobacco Mild Green Mosaic Virus and Tomato Brown Rugose Fruit Virus Infecting *Capsicum annuum* in Jordan.

Pepper (*Capsicum annuum* L.) is one of the major vegetable crops in Jordan. During the winter growing seasons of 2015 and 2016, virus symptoms including stunting of young plants, puckering, and yellow mottling of leaves in sweet pepper plants grown under plastic houses in Jordan Valley were observed. The most obvious symptoms were the misshapen fruits that affected the market value of the crop, which resembled recent descriptions of tomato brown rugose fruit virus (ToBRFV) on tomato fruits **(Salem *et al.* 2016**). Symptoms on mechanically inoculated indicator hosts including *Chenopodium quinoa*, *Datura stramonium*, *D. metel*, *Nicotiana glutinosa*, and *N. tabacum*, and serological testing using double-antibody sandwich ELISA (antiserum A128 of the PLAVIT collection at IPSP-CNR, Italy) suggested the presence of a tobamovirus. Total RNA was extracted from fruits and leaves of 39 symptomatic pepper plants, using an SV-Total RNA Extraction kit (Promega, U.S.A.). Samples were tested by reverse transcription polymerase chain reaction (RT-PCR) for the most common tobamoviruses infecting pepper, including tomato mosaic virus, tobacco mosaic virus, tobacco mild green mosaic virus (TMGMV), and pepper mild mottle virus (**Takeuchi *et al.* 2005**). In addition, generic primers for detection of tobamoviruses were also used (**Dovas *et al.* 2004**). In RT-PCR, amplicons of the expected product size (400 and 728 bp) using the generic tobamovirus and TMGMV-specific primers, respectively, in all symptomatic plant samples were obtained, but such amplicons were not obtained from healthy plant extracts or water negative controls. RT-PCR products of the RdRp (400 bp) and CP (728 bp) partial regions were purified and ligated into pGEM T-Easy Vector (Promega), and two clones for each PCR product were sequenced and deposited in NCBI GenBank (accession nos. MK816313 to 16). BLASTN analysis showed that these nucleotide sequences had 96 to 99% identity to TMGMV genome sequences (JX534224 and MH730962) in NCBI GenBank. Furthermore, total RNA was extracted with TRIzol reagent (Invitrogen, U.S.A.) according to the manufacturer's specifications. After ribosomal RNA depletion, the cDNA library was constructed using a TruSeq RNA Sample Prep kit (Illumina, U.S.A.) and sequenced by Illumina HiSeq X-ten platform (Biomarker, China). Raw sequencing data were analyzed using CLC Genomics Workbench 9.5 (Qiagen, Denmark). After raw reads were processed, a total of 80,818,734 paired-end reads of 150 bp were obtained, generating 266,412 contigs (>200 nt) with de novo assembly by CLC Genomics Workbench 9.5. BLASTN analysis of the assembled contigs revealed the presence of two virus-derived contigs: TMGMV (6,414 nt, MK648158) and ToBRFV (6,388 nt, MK648157), which represented a nearly full-length genome. To confirm the ToBRFV identity, all samples were tested by RT-PCR using two pairs of primers: ToBRFV F1 (5′-GTATTTTTGTTTTACAACATATACCAAC-3′) and ToBRFV R1 (5′-AGTGCGAATGTGATTTAAAACTGTGAA-3′),and ToBRFV F7 (5′-GGAAGAAGTCCCGATGTCTGTAAGGCTT-3′) and ToBRFV R7 (5′-GATGCAGGTGCAGAGGACCATTGTAAAC-3′), designed on ToBRFV genome (KT383474; **Salem et al. 2016**). Twenty-two out of 39 tested samples originated specific amplicons (1,300 and 697 bp for RdRp and CP, respectively). RT-PCR products of two samples were purified and sent for direct sequencing, and results were deposited in NCBI GenBank (MK834288, MK834289, MK834294, and MK834295), revealing nucleotide identity of 99 to 100% to ToBRFV for both RdRp and CP (KT383474 and KX619418). To our knowledge, this is the first report of TMGMV and ToBRFV infecting pepper in Jordan. The occurrence of these tobamoviruses that are transmitted through seeds, in Jordan Valley, the main area for pepper production, may represent a potential threat to other susceptible vegetables and requires careful monitoring to avoid future outbreaks and significant yield losses. **[N. M. Salem, M. J. Cao, S. Odeh, M. Turina, and R. Tahzima , Published Online: 9 Dec 2019,** https://apsjournals.apsnet.org/doi/10.1094/PDIS-06-19-1189-PDN

SYRIA

First Record of *Listroderes costirostris* Schoenherr, 1826 (Insecta: Coleoptera: Curculionidae) on Spinach *Spinacia oleracea* L. in Syria.

The presence of the vegetable weevil *Listroderes costirostris* Schoenherr, 1826 (Insecta: Coleoptera: Curculionidae) on Spinach *Spinacia oleracea* L. (Chenopodiaceae) is reported for the first time from Damascus and Damascus Countryside in Syria. Samples were collected from 2 out of 15 locations during routine survey of diseases and insects affecting vegetables (Spinach) conducted in early November 2019. Vegetable weevil *L. costirostris* is polyphagus and parthenogenetically. Egg is spherical or slightly elliptical and is approximately 1 mm in diameter, and cream-white in color to dark yellow and black color near hatching with a smooth and shiny surface with a short holder as a result of a glutinous secretion exuded at the time of oviposition, Eggs are distributed individually on the lower surface of leaves and stem. Number of eggs were ranges between 300-1500 per female and incubation period ranges between 15-20 days under laboratory temperature 18-25°C. Larvae feed on the aerial parts of plants, the mature larvae burrow into the soil and feed at night on the roots. Larva body is cylinder, slightly curved, flat abdomen, with a bright greenish cream color, and length ranges between 11.5-15 mm. There are four molts. Pupa is white to pale, body length ranges between 7.5-10 mm. Adults are integument brown, antennae and tarsi reddish brown, head and rostrum without scales, their snouts (beaks) are short and stout and curved beneath the body, pronotum with indistinct, median stripe of pale grey-brown scales. Eyes oval, clearly separated, Pronotal disc slightly convex. Prothorax with two yellowish lines. The adult has two pairs of wings. The outer pair is hardened and covers the membranous pair. Each wing cover is marked with a pale, short band about two-thirds of the distance from the front of the wing. Body length 6.4-10 mm. Adults usually feed on the foliage of plants during the night. Females and eggs were classified and compared with taxonomic references. This is the first record of *L. costirostris* in Syria. **[Houda Kawas, Abdulnabi Basheer (Syria), Plant Protection Department, Faculty of Agriculture, Biological Control Studies and Research Center, Damascus University, Syria 2019]**

First Record of Powdery Mildew caused by *Leveillula taurica* (Lév.) G. Arnaud on Caper *Capparis spinose* L. in Syria.

Caper, *Capparis spinosa* L. (Capparaceae) is shrub of importance for its medicinal, pharmacological and nutritional properties with a adaptability to environments. Causal agent of powdery mildew Teleomorph *Leveillula taurica* (Lév.) G. Arnaud, (1921) (Ascomycota: Erysiphales: Erysiphaceae) and Anamorph fungus (asexual stage) *Oidiopsis taurica* (Lév.) Salmon was recorded for the first time in Syria on wild Caper during the periodic survey of diseases and insects that afflict it in Damascus, Damascus countryside and Lattakia Governorates during 2016-2019. Powdery mildew disease was found in 6 out of 33 locations, disease incidence were ranged between 15 to 90% and spread in shaded more than exposed plants to sun in the surveyed sites, the disease is not observed in Lattakia Governorate, Teleomorph was accompanied by the progression of the fungus in all six locations. Symptoms of infection appeared as white circular patches on lower leaves with 1.3 cm in diameter, as the disease progressed, both leaf surfaces were infected, and the chlorotic areas turned into necrotic lesions, in shaded and humid areas it covers all calyx, stem and fruits. Conidiophores of *O. taurica*, appeared simple 48.8-153.72X7.3-9.76 µm, primary conidia lanceolate pyriform 14.64-19.52X43.92-61 µm, Secondary conidia ellipsoid to cylindric 11-15X48-35 µm, mature conidia were transparent and their outer wall is decorated with angular/reticulated wrinkling. Chasmothecia *L. taurica*, were spherical to oval, yellow to reddish brown then black color 176X192 µm colorless mycelial appendages 35-80 µm, containing 3 to 27 broadly oval to ellipsoidal asci 25-45x53-98 µm each containing two ascospores 15-23x25-44 µm. On the basis of morphological characteristics of both anamorph and teleomorph, the causal agent was identified and classification compared with taxonomic references**. [Houda Kawas, Nawal Ali, (Syria), Faculty of Agriculture, Damascus University, Faculty of Science, Tishreen University, Syria 2020].**

First Record of Predator *Hemicheyletia wellsina* (De Leon) on Two-spotted Spider Mite *Tetranychus urticae* (Koch) as Pest on Strawberry in Syria.

First record of predator *Hemicheyletia wellsina* (De Leon) (Acari: Cheyletidae) on two-spotted spider mite *Tetranychus urticae* Koch (Acari: Tetranychidae) is reported in Syria. Adults, larvae and eggs were found on strawberry *Fragaria ananassa* L. (Rosaceae) leaf prey two-spotted spider mite *Tetranychus urticae* (Koch) also as a complex infection with strawberry spider mite *Tetranychus turkestani* Ugarov & Nikolskii, 1937 (Acari: Tetranychidae) in some locations during the routine survey of diseases and insects affecting strawberry 2019 in Damascus and Damascus countryside's. *H. wellsina* is a small and round mite, in bright red to dark color. Adults females has about 0.3 mm length and 0.25 mm width, and is generally larger than the male, they have short stylet-

like mouthparts called chelicerae and large pincer-like palps, the newly hatched larvae have six legs after molting, both nymphs and adults have eight legs. Predator *H. wellsina* life cycle from hatching to death were ranged between 15 and 43 days under laboratory conditions 18-25 C°. The duration from laying eggs until they hatch ranges from 3 -5 days. Adult females lay about 20 eggs in two to three groups or clutches between 6 and 8 in the group that are covered with silk webbing. *H. wellsina* captures and feeds on two-spotted spider mite by grasping the front leg of the prey when contact with the palps of *H. wellsina* remains stationary on the leaf surface with its palps opened wide. When an arthropod comes into contact with the palps, they rapidly close, trapping the prey, within seconds the prey becomes immobile. This predator fed on Adults/Nymphs, all active stages but did not feed on eggs. Females and eggs were classified and compared with taxonomic references. This is the first record of predator *H. wellsina* in Syria. **[Houda Kawas, Mohamad Kanouh,(Syria), Plant Protection Department, Faculty of Agriculture, Damascus University, Syria 2020]**

First Documented Record of Dogtooth Grouper *Epinephelus caninus* (Valenciennes, 1834), Perciformes, Serranidae, in the Syrian Marine Waters.

In this work, the first documented record of dogtooth grouper *Epinephelus caninus* in the Syria coast. A specimen (181 mm TL) was captured on 20th February 2018 using a trap-net at a depth 30 m. The capture site was located 50 m off coast of Tartous city (35° 91´ E, 35° 87´ N). The identification of the present specimen of *Epinephelus caninus* was based on morphological features, colour, and morphometric measurements and meristic counts**. [Adib Ali Saad, Ahmad Kamel Solaiman and Hasan Haitham Alkusairy (Syria), Syrian Journal of Agricultural Research – SJAR 7(1): 465-470 February 2020].**

First Report of *Fusarium torulosum* Associated with Root and Crown Rot of Wheat in Syria.

Fusarium root and crown rot and head blight are the most important diseases limiting wheat production. Although there are many studies related to these two diseases in the world, few studies were conducted in Syria, where many species have been identified from different regions, based on morphological characteristics and some molecular methods. However, this study is the first report of *F. torulosum* associated with root and crown rot on wheat in Syria. The morphological characteristics of two isolates were accurately described on potato dextrose agar (PDA) and carnation leaf agar (CLA) medium. Partial TEF-1α gene sequence was amplified using primers ef1 / ef2. Successful PCR amplification of TEF-1α, showing a single band of ~ 700 bp, was obtained. Amplified products were subjected to automated DNA sequencing, and the sequence was compared with the sequences published on the National Center for Biotechnology Information (NCBI) website, where our isolate FH3 showed 98.04% similarity with the isolate KY659169 of F. torulosum. **[Laila Zidan, Walid Naffaa and Dana Jawdat (Syria), Syrian Journal of Agricultural Research – SJAR 7(1): 433-441 February 2020].**

Notice

Clarification Related to Reporting the Opuntia Cochineal Scale *Dactylopius coccus* (Costa) (Hemiptera: Dactylopiidae) in Syria.

The new record of the cochineal scale insect was first recorded as a new pest on coccus in Syria was published in the Arab and Near East Plant Protection Newsletter No. 69 in 2016, page 5. Unfortunately, by mistake other authors published an article titled "First report of the Opuntia cochineal scale *Dactylopius opuntiae* (Cockerell, 1896) (Dactylopiidae :Hemiptera) in Syria" in the Arab Journal of Plant Protection, vol. 38(1) published in 2020, that is four years later. This notice was written to clarify this fact. **[Abdulnabi Basheer- Loay Aslan, Hisham Al-Raz, Alaa Saleh and Nadia Al-Khatib (Syria), 2020].**

First Record of Tomato Leaf Miner *Tuta absoluta* Povolny (Lepidoptera: Gelechiidae) on Potato in Lattakia, Syria.

In 21/4/2020, symptoms of digging leaves caused by *Tuta absoluta* were observed on potato plants var. spunta, in Lattakia-Syria. Observed larvae were feeding between the two skins of potato leaves. Developed symptoms were characterized by irregular pits on the middle and upper leaves, as well as larvae feeding on the apical parts of the plant. Furthermore, black eggs were observed in the infected parts of the plants. By characterization, and in comparison, we concluded that it was the larva of tomato leaf miner (*T. absoluta*). Infected potato plants were

planted on February10, 2020, in a plant nursery located in Tishreen University, Lattakia, with an area of 250 m^2. Our experiment was registered as a scientific research at Tishreen University Nr.2535 dated 7/5/2019 entitled " The effect of foliar feeding with some micro elements on some growth and production indicators for potato plants, and for another research entitled " The effect of treatment with mycorrhizal and Trichoderma on growth and productivity of potatoes". A total of 20 plants out of the entire cultivated area were found infected, taking in consideration that near the potato, there are several tomato plants inside a greenhouse are infected with same insect. It is known that *T. absoluta* is a dangerous and destructive pest of the tomato crop which is considered the preferred species for it and it can harm both field and protected crops. Damages caused by this insect are continues throughout the season growth due to its rapid reproduction, as the number of generations per year reaches 12 generations. The female lays about 260 eggs, which hatch into larvae after about 11 days. Small larvae begin to infect leaves, flowers; buds and fruits. The larvae penetrate into mesophyll tissue leaving black stools behind. It is known also that the moth travels by the wind several kilometers and consider one of the strongest insects to fly and spends overwintering in the form of eggs, pupae and whole insects. Finally, the harmful phase of this moth is the larva stage, where it feeds on all the aerial parts of plants, especially on leaves. **[Jenan Youssef Othman, Tishreen University, Muhammad Imad Khreibrh, (Syria), Public Authority for Biotechnology, Damascus, Mohamd Sabri Khalil, Aleppo Agriculture Directorate,2020].**

TUNIS

Cystiphora sonchi (Vallot, 1827) (Diptera: Cecidomyiidae), First Record for Tunisia and Africa.

During 2017 and 2018, from June to October, leaf galls were observed for the first time on *Sonchus oleraceus* L. (Asteraceae), sow thistle, in Akouda-Sousse, Tunisia. Leaves with galls were collected and brought to the laboratory. After a few days, adults emerged from the leaf galls. Morphological identification showed the emerged gall midges to be *Cystiphora sonchi* (Vallot, 1827) (Diptera: Cecidomyiidae). This is the first record of this species in Tunisia and Africa**. [M. Ben Halima Kamel , L. Mdellel, S. Zouari, V. Balmes,(Tunisia), https://doi.org/10.1111/epp.12608**

RESEARCH HIGHLIGHTS

ALGERIA

Preliminary Characterization of Potato Virus Y (PVY) Populations in Algerian Potato Fields. To date, only limited data are available concerning the viral pressure present in potato crops in Algeria. For three consecutive years, surveys were conducted in potato fields in the main Algerian potato-growing regions during the mid-season crop cycle (January to March). A total of 285 potato samples were characterized to define the prevalence of the five most common virus species: Potato virus Y (PVY), Potato leaf roll virus (PLRV), Potato virus X (PVX), Potato virus A (PVA) and Potato virus S (PVS). The results showed a higher incidence of PVY compared to the other four viruses. Because of this predominance of PVY and its distribution in all of the scouted regions, an analysis was carried out on the diversity of PVY populations. From a panel of 185 samples, serologically confirmed as being solely infected by PVY, 96.7% were found to be of serotype-N,andonly 3.2 % of serotype-O. A set of 31 PVY isolates was further analyzed by biotyping on tobacco and by molecular typing (RT-PCR, sequencing), targeting the nucleotide sequence polymorphism in the 5'NTR/P1 region and the three recombination junctions within the HC-Pro/P3 (RJ2), VPg/NIa (RJ3) and CP(RJ4) regions. All 28 PVYisolates from serotype-N inducing vein necrosis on tobacco were recombinant PVYNTN isolates. Among the three PVY isolates of serotype-O, two were typed as PVYN-Wi and induced vein necrosis on tobacco. This is the first report of the identification of NTN and

Wilga type isolates in Algeria. **[Linda Allala-Messaoudi, Laurent Glais, Mohamed Kerkoud, Sonia Boukhris-Bouhachem & Zouaoui Bouznad (Algeria), Journal of Plant Pathology, (101) 1-14 ,2019].**

Update on the revelation of two viruses responsible for the vine knotted vine disease of the genus Vitis in the Central and Western region of Algeria by serological and biochemical means. In this study, 300 samples were collected from three departments in the center and seven departments in the west of the country, on 12 grapevine varieties. The samples were subjected to two serological tests, one using anti-GFLV monoclonal serum and the other using anti-GFLV/ArMV serum. The results obtained showed that 47% of the samples collected responded positively to the first serum, while 45% reacted with the second. In a second step, 16 viral extracts were subjected to an SDS-PAGE to determine the molecular weight of the capsid protein. A protein band with a molecular weight of 55,559 Dalton has been identified. This molecular weight is close to those of the capsid proteins of GFLV (56,000 Dalton) and ArMV (54,000 Dalton). **[M. Tahirine, M. Louanchi, M. Aitouada (Algeria), Algerian Journal of Arid Regions (JARA), 14 (1): 150-158 ,2020].**

EGYPT

Biological Aspects of Date Palm Dust Mite *Oligonychus afrasiaticus* (McGregor) (Acari: Tetranychidae) on Fronds of Three Date Palm Cultivars. For several years the palm dust mite, *Oligonychus afrasiaticus* (McGregor) has been an economically important pest of date palm. Biology and life table parameters of the date dust mite, *O. afrasiaticus* were studied on fronds of three date palm cultivars: Bartamoda (dry), Sewi (semi dry) and Zaghlol (soft) at laboratory conditions of 30 and 35°C &60 ±5% R.H. and 16L. The results revealed that, the longest and shortest oviposition period and total longevity of *O. afrasiaticus* females were recorded at 30°C (22.5& 26.90 days) on Sewi and 35°C (6.9& 10.0 days) on Zaghlol variety, respectively. The fecundity increased as temperature decreased from 30.5, 37.45 and 25.5 eggs at 30°C to 27.8, 29.15 and 15.94 eggs at 35°C on Bartamoda, Sewi and Zaghlo varieties, respectively. The lowest and highest values of the intrinsic rate of increase (r_m) were 0.107 and 0.229 individuals/ female/day that obtained at 30 and 35°C on Zaghlol and Sewi varieties, respectively. The mean generation time (T) significantly decreased from 23.6, 22.4 and 22.76 days to 13.08, 11.90 and 12.26 days with increasing temperature from 30°C to 35°C, on Bartamoda, Sewi and Zaghlo varieties, respectively. The results of this study indicate that *O. afrasiaticus* could increase rapidly when Sewi and Bartamoda fronds serve as a food source more than Zaghlol date palm variety. **[Ashraf, S. Elhalawany; Ahmed, N.F. and Amer, A.I., (Egypt), Egyptian Academic Journal of Biological Sciences A. Entomology, 13(1):89-98, 2020].** DOI: https://doi.org/10.21608/EAJBSA.2020.74534

Biodiversity and Population Dynamics of Mites Inhabiting Date Palm Trees in Qalyubia and New Valley Governorates, Egypt. Incidence and population dynamics of mites inhabiting date palm trees were studied at two localities (Tanan village in Qalyubia and Paris oasis in the New Valley Governorate) from March to November during two seasons 2017-2018. Obtained results indicated that 22 mite species belonging to 21 genera under 15 families. These mites were classified according to their feeding habits into three categories: eight species are phytophagous mites (Tetranychidae, Tenuipalpidae, Eriophyidae and Phytoptidae), nine species are predacious mites (Bdellidae, Cheyletidae, Cunaxidae, Eupalopsellidae, Hemisarcoptidae, Phytoseiidae and Stigmaeidae), while the remaining five species are miscellaneous feeding behaviors (Acaridae, Tarsonemidae, Tydeidae and Oribatulidae). The date palm dust mite, *Oligonychus afrasiaticus* (McGregor) has become an important pest of immature date palm fruits on Sewi variety in the New Valley Governorate. Whereas, *Raoiella indica* and *Phyllotetranychus aegypticus* are an important pest on fronds on Zaghlol variety in Qalyubia Governorate. Results indicated that, the population dynamics of *O. afrasiaticus* started with attacks fruits at second week of April and reached its peak in mid June in the first year and in late of June in the second year on Sewi date palm variety. After that the mites migrate from fruits to fronds and weeds. The population density of phytophagous and predaceous mites as well as weather factors was studied at the two governorates. The dust mite, *O. afrasiaticus* and tenuipalpid mites and their relatives, were more dangerous mites; therefore, more studies were carried out. Recognize the time of the annual peaks of seasonal abundance for each phytophagous mite species, concerned with the time of starting the application of the suggested control program. **[Elhalawany, A.S.; Sayed, A.A. and Khalil, A.E. (Egypt), Egyptian Academic Journal of Biological Sciences A. Entomology, 3(1):346-364, 2020].**

Impact of Combine Releases of the Egg Parasitoid, *Trichogramma euproctidis* (Girault) and the Entomopathogenic Nematode, *Heterorhabditis bacteriophora* to Control *Tuta absoluta* (Meyrick) in Tomato Greenhouses in Egypt. In greenhouses, tomato plants are subject to attack by several pest species. The present study aimed to investigate the compatibility of releasing the egg parasitoid, *Trichogramma euproctidis* (Girault) (Hymenoptera: Trichogrammatidae), and the entomopathogenic nematode, *Heterorhabditis bacteriophora*, strain HP88 against the tomato leaf miner, *Tuta absoluta* (Meyrick) (Lepidoptera: Gelechiidae), in commercial tomato greenhouses (Cherry and Bushra varieties) at winter plantation of 2018–2019 in Egypt. Three commercial plastic greenhouses were used. The first plastic greenhouses were treated by the two tested biological control agents (BCG), the second sprayed by certain recommended pesticides (PG), and the third used for control. Pheromone traps were used for monitoring the appearance of *T. absoluta* moths. The combined use of *T. euproctidis* and *H. bacteriophora* resulted to reduce the population density of the *T. absoluta* gradually until the end of the season in BCG. In the 17th week of treatments by *T. euproctidis* and *H. bacteriophora*, the population density of *T. absoluta* was estimated as leaf mines/ plant (0.8 and 1.26 mines/leaf, in Cherry and Bushra varieties, respectively) in BCG. Also, in the 17th week of treatments by recommended pesticides, the population density of *T. absoluta* reached) 12.73 mines/leaf and 18.33 mines/leaf) in CG. Early use of pesticides, by the appearance of *T. absoluta* infestation, could not suppress its population density that continued to increase until the end of the season in PG. Results revealed that the combination of the tested biological control agents against *T. absoluta* is recommended to be a main part in pest management practices in tomato greenhouses. [**D. Adly and Gehan M. Nouh (Egypt), Egyptian Journal of Biological Pest Control vol. 29:91, 2019]**

Efficacy of the Fungus *Beauveria bassiana* (Balsamo) Vuillemin on the Red Palm Weevil *Rhynchophorus ferrugineus* Olivier (Coleoptera: Curculionidae) Larvae and Adults under Laboratory Conditions. The efficacy of a local isolate of the entomopathogenic fungus *Beauveria bassiana* was tested against the red palm weevil (RPW) *Rhynchophorus ferrugineus* Olivier (Coleoptera: Curculionidae) larvae and adults by direct spraying of the fungus conidiospores on the targeted stages under laboratory conditions. Larvae and adults were offered their natural food as tissue cuts from inside the same infested date palm trees from which they were collected. Six successive increased concentrations from 6×10^2 to 6×10^7 spores/ml were tested. Results revealed that the maximum mortality rates were for the treated larvae of 3rd instar. Whatever the tested concentration was, the end mortality reached (100%). In case of the treated larvae of L7, the mortality rate ranged between 45 and 75% with the remaining individuals survived and formed cocoons in which they all died in the pupal stage. Also, all treated adult weevils died showing that the highest tested concentrations of *B. bassiana* killed the weevils in a shorter time (7 days) than in the tested lower concentrations (11 days). Meanwhile, mortality rates in the control for L3, L7, and adult weevils were always (0.0%). **[Monir M. El Husseini (Egypt), (Egyptian Journal of Biological Pest Control vol. 29:58, 2019].**

IRAQ

Effect of Manufactured Iron Oxides in Control of Tomato Yellow Leaf Curl Virus (Tylcv). The aim of this study was to evaluate the antiviral activity of four concentrations of iron oxides 0, 0.5, 1 and 1.5% against Tomato yellow leaf curl virus (TYLCV) -infecting tomato plants. The results of experiments showed that no significant differences in plant height and branches number among treatments, while the disease severity of TYLCV virus was decreased by using concentrations of iron oxides 0.5, 1.0, 1.5 % to 0.5, 0.3, 1.6 %, respectively, compared with control 2.8%, where concentrations 1.0% and 0.5% were significantly superior in decreasing of disease severity with no significant differences between them followed by concentration 1.5%**. [Abdulkareem Kassim Jabar, Hashim Haneen K. Aldhahi and Hussein Ali Salim (Iraq), Plant Archives Vol. 20 Supplement 1, pp. 2131-2134, 2020].**

The Role of (*E*)-2-octenyl Acetate as a Pheromone of Bagrada hilaris (Burmeister): Laboratory and Field Evaluation. The pentatomid bug Bagrada hilaris is a key pest of brassicaceous crops in several areas of the world. Previous studies suggest that mate location of this species is mediated by volatile chemicals produced by males, among which the main compound is (E)-2-octenyl acetate. However, the possible attraction of males, females, and nymphs to this compound has not yet been specifically tested. In this study, we tested the response of B. hilaris females, males, and nymphs to (E)-2-octenyl acetate using an electroantennogram (EAG) and olfactometer in the presence or absence of a host plant. Moreover, (E)-2-octenyl acetate as an attractant lure in field trap bioassays was

evaluated. EAG recordings showed that this compound evokes antennal responses in B. hilaris females. Olfactometer behavioral responses showed that females and nymphs were attracted to (E)-2-octenyl acetate, while males showed no attraction. In the field trap bioassays, captures were obtained in traps baited with 5 and 10 mg of (E)-2-octenyl acetate, while in traps loaded with 2 mg and control traps, there were no recorded catches. These results suggest the involvement of (E)-2-octenyl acetate in intraspecific interactions of this species. **[Mokhtar Abdulsattar Arif (Iraq) [1], Salvatore Guarino [2], Stefano Colazza [1] and Ezio Peri [1], Dipartimento di Scienze Agrarie, Alimentari e Forestali, Università degli Studi di Palermo, Palermo, Italy, stefano.colazza@unipa.it (S.C.);ezio.peri@unipa.it (E.P.)[2] Institute of Biosciences and Bioresources (IBBR), National Research Council of Italy (CNR),Corso Calatafimi 414, 90129 Palermo, Italy, Insects.11(2): 109, 2020].** doi: 10.3390/insects11020109

HPLC Fractionation and Comparative Analysis of Antifungal Compounds from Different Streptomyces Isolates that Inhibit *Colletotrichum acutatum*. Rhizosphere microorganisms play an important role in the soil ecosystem. Thirty-three different isolates of Streptomyces isolated from healthy tomato rhizosphere soil. Antifungal activities against *Colletotrichum acutatum* were checked by streak method. Isolate TS9 displayed better outcomes against *C. acutatum* as compared to other isolates. High Performance Liquid Chromatography was used for antifungal compounds from isolate TS9 by comparing with other six isolates that did not showed antifungal activity. The active compound was between (50-60) retention times other picks did not chosen because the picks were available in the other isolates, which they did not show any effect on the *C. acutatum*. 10 fractions, named as F1 to F10, came from the preparative HPLC separation of the selected crude extract. One fraction showed highest inhibition to *C. acutatum* and it was at the retention time (56.232). The selected pick was compared with the 8 standards and was identified as (quercetin) when completely matched with the standard. The present study reports the purification of potential antifungal compound from *Streptomyces zaomyceticus* isolated from the tomato rhizosphere can be used as a promising fungicide in the near future. **[Hayman Kakakhan Awla[1], Tavga Sulaiman Rashid[2], (Iraq-Erbil), [1]Department of Horticulture, Khabat Institute, Erbil Polytechnic University, Erbil, Iraq, [2]Department of Plant Protection, Faculty of Agriculture, Salahaddin University, Erbil, Iraq, Submitted to: Biocatalysis and Agricultural Biotechnology, April 2020].**

Mexican Black Scale, *Saissetia miranda* (Hemiptera: Coccidae) is an Alien Pest in the Iraqi Agroecosystem. The Mexican black scale, *Saissetia miranda* (Cockerell and Parrott) was first detected on fig trees (*Ficus carica*) during 2017 and 2018 South of Baghdad. The insect was identified by a scale insect specialist. It has several generations per year, one during the spring then enter the aestivation(dormant phase) when the temperature exceeded 45^{o} C ,another two generations were during the autumn and then hibernates as an egg under the female shield when the temperature ranged between 12 -18 ^{o} C .The population of the insect showed high individuals in autumn compared to low in spring. The insect preferred the new branches than leaves and fruits. The female body shape of *S. miranda* was convex and the shell color changes gradually from white to dark brown then black. Body width was 3.69 mm and length were 2.01 mm. The female lays an average number of 920 eggs under field conditions. The eggs color is pale yellow gradually turns to reddish orange, hatch in to crawling nymphs have the same color of eggs and four pairs of legs then turn into dormant nymphs. It was noticed that there is an incidence in the appearance of the Mexican black scale with the *Planococcus ficus* on in fig. Parasites of to the families of Encyrtidae and Cecidomyidae were recorded. The results of this trial encourage other researchers for more investigation on this alien pest. **[Mohammed Z. Khalaf, Ibrahim J.A l-Juboory, Ahmed M. Tareq and Adnan H. Salman, (Iraq), Biochem. Cell. Arch. Vol. 20, No. 1, 2020]**

Some Aspects of Banded Conical Snail *Cochlicella Barbara* Linnaeus, 1758 (Gastropoda: Cochlicellidae). Laboratory and field experiments were conducted during 2018 -2019 to investigate some biological and behavioral aspects of Banded Conical Snail *Cochlicella barbara* (Linnaeus, 1758) in the gardens and fields in Baghdad /Almadain. Taxonomic studies, phenotypic traits and attractive baits [contains Sour Orange, potatoes and apple fruits slices] were investigated. The identification of the species was confirmed by the British Natural History Museum. The snail was active in the house gardens starting in December and reached the highest density during February and March. The snails appeared on the top of plants and weeds at night and descended under plants in the soil during the day. The results of the morphological measurements of the snail indicated that the shell length was 8.95 mm and diameter 4.92, 1.43 mm at the upper opening and pointed end respectively, the diameter of the exit of the shell body is 3.02 mm and its weight reached 406.3 milligrams. The shell (cochlea) consists of 7 convex rings with two brown and light brown colors. As for the attractive baits, the results indicated that the snails were more

likely to be present on the bait at night than during the day and recorded significant differences between the baits in the extent of attraction to the snail. The Narang fruits was the most attractive, their number reached 25.1 and 82.3 during day and night respectively, compared to 7.3, 24.0, 2.0 and 4.0 days and nights respectively for potato and apple slices. The results of this research can serve in biological studies and control using combination of molluscicides with attractant bait within the integrated control programs of this type of snail. **[Mohammed Z. Khalaf, Ahmed M. Tareq, Falah H. Nahar, Adnan H. Salman and Bushra H. Abul Hamza, (Iraq), Biochem. Cell. Arch. Vol. 20, No. 1, 2020]**

SYRIA

Controlling the Population of *Tetranychus urticae* Koch on Tomato under the Greenhouse Conditions Using some Chemical and Biological Treatments. Research was conducted to evaluate the efficacy of integration between using the pesticides Acetamiprid, Abamectin and Pyridaben and the aqueous extracts of both *Melia azedarach* L. and *Sytrax officinalis* L. then releasing the predator *Stethorus glivifrons* Mulsant with to manage the population of *Tetranychus urticae* Koch on Tomato *Lycoersicon esculantmin* at the greenhouse in 2018. The Experiment was conducted using the complete randomized block design, where the results of the research showed that the extracts of both *M. azedarach* L. and *S.officinalis* L. had efficacy recorded 62.29 and 50.93 % respectively in the first week. The efficacy decreased in the first and the second week after releasing the predator, then it raised again in the third and the fourth weeks to record 62.54, 54.72 % for each of them. Thus, it could be stated that the extracts efficacy coincided with the release of the predator *S. glivifrons*. A decrease in the influence of the specialized insecticide Acetamiprid was recorded, while it reached its top after the release of the predator in the fourth week 33.77 % due to the negative influence of the pesticide on the predator and the population was incapable to be adequate to control the harmful population of *T. Urticae*. The specialized acaricide Pyridaben was superior and recorded an efficacy exceeded 84% in the first week before the application and decreased in the first, the second and the third weeks after the release of the predator without a significant difference between them, then increased in the fourth week after the releasing where it reached 73.72 % with a significant difference in all the times of the readings. Mortality percentage when acaricide Abamectin was used, recorded 61.14 % after 24 hours of the treatment, then highly increased to 70.72 % in the first week after the release of the predator. The efficacy decreased in the first and the second weeks after the release which recorded 70.72 and 65.21 % respectively with a significant difference between them. Then it increased again in the third and the fourth weeks after the release to reach 79.62 and 80.70% without significant differences between them. Thus, the predator was capable to re-raise the mortality percentage after falling in the first and the second weeks after the release to get it back to where it was when the predator efficacy reached the highest influence in the first week. **[Ibrahem Azez Sakr, Majeda Mhamed Mofleh and Randa Ahmed Suliman (Syria), Syrian Journal of Agricultural Research (SJAR) 6(4): 433-447, December 2019].**

Plant Extracts Use Importance in Controling *Tetranychus urticae* Koch on Eggplant *Solanum melongena* L. Under Protected Farming Conditions. Within the efforts to control the harmful mites using environmentally safe methods, a study was carried out at a greenhouse planted with eggplant in AlBassa area, in Latakia governorate during the agricultural season 2016/2017 to evaluate the effectiveness of a number of plant extracts on *Tetranychus urticae* Koch 1836 (Acari: Tetranychidae) worldwide and very harmful to many hosts in greenhouse and field. The study included the seeds and leaves of Chinaberry, seeds and leaves of Cypress Lemon, seeds and fruits of River Red Gum, flowers and leaves of Oleander, and corms and leaves of Wild Arum. The Vaseline rings method was adopted and criteria: the average of mortality for the treated stage and fertility were calculated. The results showed that the highest efficacy was found when using the extract of the seeds of Chinaberry on adult females and on the first nymphs (65.4 and 69.3%, respectively). The lowest fertility was recorded with the extract of Oleander leaves (8.17%), which had the most effect on egg hatching (87.4%). It is worth to mention that the extracts of seeds, fruits and corams gave higher efficiency than the leaves extracts, and leaves extracts were higher than the efficiency of floral extracts against *T. urticae* phases**. [Ibrahim Aziz Sakr and Usama Sagee Sheban (Syria), Syrian Journal of Agricultural Research – SJAR 6(4): 418-432 December, 2019].**

Testing the Efficiency of Mixing Natural Plant Extracts with Some Synthetic Organic Pesticides on the Female Adults of Tetranychus Urticae Koch (Acari: Tetranychidae) Under Lab Conditions. Biological

experiments were done under the conditions of Plant Protection Laboratory, Faculty of Agriculture, Tishreen University, to show the possibility of increasing the efficacy of the natural plant extracts on the *T.urticae* by mixing them with a half dose of synthesis pesticide which recommended, to decrease of the amount of pesticides which are used and spread in the environment, and to decrease the economic cost and the environmental pollution. A mixed mother extracts were used of leaves of six plant species viz. Melia azedarach, Smilax aspera, Styrax officinalis, Eucalyptus camaldulensis, Ecbalium elaterium and Lantana camara, with half dose which were recommended of six synthesis pesticides viz. Neoron, Ortus, Nissorun Vertimec, Talastar and Magister. Demodulations of extracts were done by dipping the phaseuloues leaves disk in the mixed solutions to treat the individuals. The mixed Neoron, Talastar, Vertimec and Magister had achieved a good effect to the efficiency of the extracts and the maximum value reached 100% or close to max in many cases particularly with Smilax aspera, Styrax officinalis and Melia azedarach extracts. The differences between mortality ratio had become high between most of the mixed solutions and the mother solution extracts, and also between most of the tested compounds and mixed extracts with Ortus compound which had low impact with the plant extracts**.[Ibraheem Saqr and Suhair Ghalia (Syria), Syrian Journal of Agricultural Research – SJAR 6(4): 460-473 December, 2019].**

Identification the Damage and Species Structure of Root-Knot Nematode *Meloidogyne* spp. on Cucumber in Greenhouses. A field survey was carried out in 34 greenhouses of cucumbers in the Syrian coast in 16 villages belonging to the governorates of Latakia and Tartous, in order to determine the incidence and severity of root-knot nematode, in addition to determinate the structure of the species in the adult female by perineal patterns morphology and taking the biometric measurements of the larvae at the second stage, since March until the end of June of the season 2014/2015. The results of the study on root samples showed that the incidence of root-knotted nematodes ranged between (20- 100%) with an average of 59%. The severity of the injury according to the scale (Bridge and Page, 1980) was 0.4- 4.2 with an average of 1.67. The results showed the presence of three main species belong to the species Meloidogyne: *M. incognita*, *M. javanica M. arenaria*, and the percentage of the prevalence of 50.98%, 47.55%, 1.47% respectively. While *M. hapla* species was not recorded in the study area. [**Mazen Y. Al Body, Reem Yousef and Hossam Saliba Malas (Syria), Syrian Journal of Agricultural Research- SJAR 6(4): 484-497 December, 2019].**

A Comparison between Artificial Medium and Potato Tubers for Potato Tuber Moth, *Phthorimaea operculella* (Zeller) Rearing Based on Life Table Parameters. Life table studies for potato tuber moth, *Phthorimaea operculella* (Zeller) were carried out to compare an artificial medium to potato tubers, *Solanum tuberosum* L. for rearing *Ph. operculella* larvae. The calculated biological parameters were: Net reproductive rate of increase (R0), Generation time (Gt), Intrinsic rate of increase (rm), Finite rate of increase (λ) and Population doubling time (Dt). The obtained results indicated that potato tubers proved to be more favorable for achieving the highest developmental and multiplication rates of *Ph. operculella*, than artificial diet. The natural mortality figures; Apparent Mortality (AM), Real Mortality (RM) and Indispensable Mortality (IM) for larvae reared on potato tubers were 46.77, 29 and 20.21%, respectively. Meanwhile, the highest mortality rates were 51.72, 30 and 19.29% when larvae were fed on artificial diet. It is quite worth to mention out here that potato tubers are more attractive feeding source than artificial diet for rearing *Ph. operculella* for research purposes**. [Gassan Youssef (Syria), Syrian Journal of Agricultural Research – SJAR 6(4): 538-548 December, 2019].**

Chemical and Biological Control of Radish Leave Miner Insect Scaptomyza Flava Fallen (Diptera: Drosophilidae) under the Conditions of Basrah Province. This study was conducted at the district of Shatt Al-Arab in Basra province in order to evaluate several pesticides and *Beauveria bassiana* fungi against radish leaves miner and to estimate the severity of the injury and damage to this insect. Results showed that the highest population density was in March 2016 (1.78 larva/leaf), where the highest infection rate was (76%), and the injury severity showed a significant differences among study intervals, where the injury locations recorded a significant differences among them represented by surpass of outer leaves on other locations (1.8%). All examined pesticides showed high affectivity in controlling the pest with a simple significant difference killing percentage performed by Super Saqr followed by Dragon and Sakhuy (92%, 85.6%, 82.2%) respectively where the lowest killing percentage was performed by biocontrol agent (54.4 %) after 72 h of treatment. **[Hussain A. Mehdi, Shurooq A. Najim and Baidaa G. Aufi (Syria), – Syrian Journal of Agricultural Research – SJAR 6(4): 549-556 December, 2019].**

Evaluation the Efficiency of the Predator Serangium Parcesetosum Sicard (Coleoptera: Coccinellidae) in Controlling Bemisia Tabaci Genn. (Homoptera: Aleyrodidae) on Cucumber and Tomato Plants. The study

was conducted to evaluate the efficacy of the predator *Serangium parcesetosum* Sicard (Coleoptera: Coccinellidae) in controlling *Bemisia tabaci* Genn. on tomato and cucumber plants in cages. The experiment included four treatments and 12 replications. The first and third treatments were conducted on cucumber plants and second and fourth treatments were experienced on tomato plants. Adults of *B. tabaci* were introduced in cages on plants that have six true leaves. Two weeks later, adults of *S. parcesetosum* were introduced in the first and second treatments at a rate of two adult predators/plant. The release was done three times at weekly intervals. The third and fourth treatments remained predator-free. Leaves were examined weekly, the population of immature stages were recorded (eggs, L1, L2, L3, L4\ 1 cm2 leaf) which were taken randomly from the top, middle and bottom of the plants. The predator was not recorded on tomato. The number of whitefly stages increased in treated cages until the sixth week, and then began to decrease from about 20 eggs and 39 nymphs/1 cm2 of leaf surface to 11 eggs and 3 nymphs after ten weeks. Population density of the whitefly in the control increased to 219 eggs and 145 nymphs/1 cm2 of leaf surface during the same period. Mortality rates of old nymphs were 93.3 and 4.1% after nine weeks for the predator treatment and control, respectively. Results indicated that, *S. parcesetosum* could be recommended for the control of *B. tabaci* on cucumber in protected cultivation in Syria. **[Rafik Abboud, Majedah Mofleh and Ahmad Mohammad (Syria), Syrian Journal of Agricultural Research– SJAR 6(4): 448-459 December, 2019].**

Effectiveness of Kaolin, Silica and Zeolite Dusts against Cowpea Beetle *Callosobruchus maculatus* (F.) under Laboratory Conditions. Three types of inert dusts i.e. Kaolin, Silica and Zeolite, was tested against cowpea seed beetle *Callosobruchus maculatus* (F.) (Coleoptera, Bruchidae) adults at five concentrations viz. 5, 10, 20, 40 and 80 g/kg cowpea seeds. The study was carried out at Biotechnology Research Center, Al-baath University. mortality rates were calculated after 72 hours and effectiveness to reduce loss of seed weight damage rate and the reduction of adult emergence were calculated. The results showed the effectiveness of three dusts in increasing mortality rates with superiority to Kaolin which increased by 85.49% and with significant deference P≥0.01 compared to both dusts Silica 81.72% and Zeolite 82.93%, and the effectiveness increased with increasing the concentration. The maximum value was 85.58% at a concentration of 80 g/kg and the lowest value was 76.36% at a concentration of 5 g/kg. The relationship was positive between increasing concentration and increasing effectiveness of dusts in reducing seed loss, damage ratio and adult emergence, where the effectiveness at a concentration of 5 g/kg were 88.11, 88.59 and 89.07% respectively, and the effectiveness increased at a concentration of 80 g/kg were 98.54 and 98.14 and 98.28% respectively. Kaolin dust was superior over Silica and Zeolite where Kaolin effectiveness in reducing weight loss, damage and adult emergence were 99.71, 99.70 and 99.77%, respectively, while it was 87.06, 87.76 and 86.56%, respectively in case of Zeolite. The results of the study showed that Kaolin dust is the most effectiveness compared to Silca and Zeolite against Cowpea seed beetle. **[Ziad Chikh-Khamis, Ebraheem Al-Jouri and Rehab Esber (Syria), Syrian Journal of Agricultural Research– SJAR 7(1): 385-394, February, 2020].**

Spot Diseases Survey on Barley in North Eastern of Syria and Evaluation the Response of Some Varieties Against Spot Blotch. Barley is an important crop in Syria, many fungal pathogens caused barley foliage diseases. So this study aimed to survey the main diseases in the region, identify the most frequent pathogenic fungi, and evaluate reaction of some released varieties of barley against Helminthosporium sativum at two stages, the first was at both tilling and extension, while the second was at the extension stage only, therefore, barley fields in the North Eastern Syria were surveyed during the two growing seasons 2013 and 2014. The results showed spread some barley diseases such as Helminthosporium sativum, Alternaria alternate and Rhynchosporium secalis, in the region, and the most frequent pathogen was Helminthosporium sativum. Arabi Aswad variety was the most susceptible variety to H. sativum, while Furat 2, Furat 3 and "Furat 6" were the most resistant/tolerance at tiller stage, and Furat 7 was the most susceptible, while, Furat 2 and Furat 6 were the most resistant/tolerances cultivars in the extension stage. [**Alan Remo (Syria), Syrian Journal of Agricultural Research – SJAR 7(1): 11-11 February, 2020]**

Influence of Plant Density and Cucumber Mosaic Virus Infection on the Productivity Traits of Beans *Vicia faba* L. The research was carried out during 2017/2018 growing season at Buqa Farm, Faculty of Agricultural Engineering, Tishreen University in Lattakia, to study the effect of plant density and infection with mosaic cucumber virus on the productivity of beans (*Vicia faba* L.). The local bean variety was used with three plant densities (5, 10 and 20 plants/m2). Virus infection was made when the length of the plant reached 15 cm. The

design of the experiment was carried out according to the Randomized Complete Block Design (RCBD) with the arrange of split plot with three replicates. The treatments of infection were distributed to the main plots while the sub plots included the density treatments. Results showed that the plant density of (5 plants/m 2) surpassed the plant densities of (10, 20 plants/m2) in number of branches per plant and fresh green weight of the plant at pods formation stage and the number of pods per plant. The plant density of (20 Plants/m 2) surpassed the other densities (5 and10 plants/m2) in seed yield and weight of 100 seeds, and the height of the plant. The infected plants (E0) when planted at high density (20 plant/m2) had the highest seed yield and weight of 100 seeds. The infection with mosaic virus did not affect the height of the plant, and the healthy plants (E1) were superior to infected plants (E0) in all studied traits (The plant height had declined by 10.23- 12.17% and fresh green weigh for each plant by 0.76-1.77% and the number of pods per plant had declined by 14.08- 31.76 % and the seed yield by 13.80 - 19.84 % and weight of 100 seeds by 1.77-5.50 % in the infected plants by mosaic cucumber virus compared to the healthy plants **.[Yousef Mohamad, Emad Daoud Ismail, and Khaled Farid Al-Janad(Syria), Syrian Journal of Agricultural Research SJAR 7(1): 410-424 February 2020].**

Host Susceptibility of Some Eggplant Cultivars Planting in Syria to Root-Knot Nematode *Meloidogyne incognita*. Six eggplant cultivars (Ramses, Rayan, Yakut, Black beaty, Aydin siyoahi and Toros) were evaluated for their host suitability to *Meloidogyne incognita* in a completely randomized design experiment, with five replicates, for tow growing seasons 2015 and 2016 in outdoor pot experiments at the General Commission for Scientific Agricultural Research, Syria. 40 days after planting, seedlings were inoculated with 5,000 eggs and freshly hatched J2 /plant of M. incognita. Results showed that all cultivars were damaged by root-knot nematode infection (Gall index=5) and were supportive for nematode reproduction (RF> 1), ranging from susceptible to highly susceptible to the M. incognita. Cultivar Toros was the most supportive for multiplication of nematodes (RF = 4.7; 198.6 egg bags / 1 g root), while Aydin siyoahi was the lowest (RF = 1.3; 198.6 egg bags / 1 g root). A positive correlation was noticed between the nematode reproduction factor and both the number of root gall and egg masses/root (r = 0.55 and 0.99, respectively). There was also a significant decrease in plant height and vegetative weight compared to the control. **[Maimounh Almasri, Sobhia Alarabi and Roudaina Albaka (Syria), Syrian Journal of Agricultural Research– SJAR 7(1): 425-432 February, 2020].**

Genetic Analysis of Some Productivity Traits and Earliness in Upland Cotton (*Gossypium hirsutum* L.). Genetic potential, combining ability, heterosis effects and heritability were studied in F1 genotypes of *Gossypium hirsutum* L., at Cotton Research Station in Deir Ezzor, Syria. Four parental genotypes (Aleppo 33/1 (P1), Deir Ezzor 22 (P2), Line 106 (P3) and Line G73 (P4)) and their six F1 half diallel progenies were grown in a randomized complete block design with three replications in 2011 season to study seed cotton yield (S.C.Y.kg/don.); lint percentage (L.P.%) and earliness percentage (E.P.%). Results showed significant ($p \leq 0.01$) differences among the genotypes, parents and crosses for seed cotton yield and lint percentage. Significant ($p \leq 0.05$) differences were observed for parent vs. crosses indication to average heterosis over all hybrids for the above two traits. For earliness, insignificant differences were showed among genotypes, crosses and parent vs. crosses, but significant ($p \leq 0.05$) differences were showed among parents. Results indicated that best genotypes which performed highest mean and general combining ability were: lines 106 and G73 for seed cotton yield; Deir Ezzor 22 for lint percentage and Aleppo 33-1 for earliness percentage. Thus, it could be suggested that these parental varieties could be utilized in a breeding program for improving these traits to pass favorable genes for improving hybrid and subsequently producing improved genotypes through the selection in segregating generations. Best crosses based on mean performance and/or heterosis and/or specific combining ability were Aleppo 33-1*G73 followed by Aleppo 33-1*line 106 for seed cotton yield; Aleppo 33-1*G73 for lint percentage and Line 106*G73 for earliness percentage. Suggesting that these crosses could be used in breeding program to improve such traits. On the other hand, results showed high value of H2 b % and low value of H2 n%for seed cotton yield, ascertained that dominance effects had great role in the existence of the variability of this trait, which insure that the expected gain from recurrent back crossing for seed cotton yield would be high in the breeding program. However, estimates of H2 b % and H2 n% for both of lint percentage and earliness percentage were high. Theses convergence of narrow and broad heritability values revealed that both additive and non-additive gene actions played important roles in the inheritance of these two above traits, so breeding program should contain selection and hybridization for improving these traits. **[Rawaa El-Shiekh Attiea (Syria), Syrian Journal of Agricultural Research – SJAR 7(7): 442-457 February, 2020].**

The Effect of Feeding *Chrysoperla carnea* Steph Adults with Some Nutritional Diets on Some of its Life and Reproduction Characteristics. Green lacewing predator (*Chrysoperla carnea*) is polyphagous predator. It is currently mass-reared and used in biological control of insect pests. The experiment was carried out under laboratory conditions at 25±2°C and 65±5% RH at Hama Biological Control Center, during 2017, to find out a better and high efficiency nutritional diet for mass-rearing of adult of C. carnea. Four adult diets were tested under the laboratory conditions. Fertility, larval period, pupal period and adult longevity were studied. The results showed that the 1st diet that contained of water, honey, yeast and pollen in a ratio of (9:3:1:1) respectively was better than all other diets, that contain a ratio of (1:1:1/ 6:2:1/ 9:3:1) of water, honey and yeast respectively. When the adults fed on 1st diet the fertility of females was 409.33 eggs, larval period was 9.92 days, pupal period was 7.92 days and longevity of female and male were 51.5, 38.5 days. **[Ammar Jloud, Nawal Kakeh, Nayef Alsalti and Munir Alnabhan (Syria), Syrian Journal of Agricultural Research – SJAR 7(1): 458-464 February, 2020].**

TUNIS

The Pomegranate Butterfly *Deudorix livia* (Lepidoptera: Lycaenidae): an Emerging Pest on Dates in Tunisia. The pomegranate butterfly *Deudorix* (=*Virachola*) *livia* Klug 1834 (Lepidoptera: Lycaenidae) was encountered for the first time infesting dates (*Phoenix dactylifera*, variety Deglet Nour) in the oasis of Gafsa, Southern Tunisia in September 2011. Larvae of *D. livia* only caused damage on date fruits at the phenological stages kimiri (green fruits) and khalal (yellow fruits). The average infestation rate of dates was 10%. In addition, 7.1% of the infested fruits dropped to the ground. Damage caused by this insect on dates is described, the current situation in Tunisia is provided and possible control methods in Tunisia are briefly discussed. Although this pest has previously been reported in Tunisia on pomegranate this is the first report of *D. livia* on dates in the country**.[K. Abbes, A. Zouba ,A. Harbi , N. Ghrissi, M. Ksantini , B. Chermiti.(Tunisia), Bulletin OEPP/EPPO Bulletin , 0 (0), 1–6, 2019].** https://doi.org/10.1111/epp.12645

Observations of some Biological Characteristics of *Helicoverpa armigera* Reared under Controlled Conditions. *Helicoverpa armigera* is a polyphagous pest causing significant economic losses on different host crops. Investigating the biological characteristics of this pest is essential to develop efficient integrated pest management strategies. Several collections of larvae were taken from pepper field crops in the governorate of Kairouan, Tunisia. Larvae were reared on semi artificial diet under laboratory conditions till adults' emergence. Thirty newly emerged couples were chosen for the oviposition and the rearing starting-up. A mean number of 226 eggs were laid per female and 37% of the eggs have hatched. After hatching, 100 larvae were chosen to follow and describe the different stages of the insect development. Duration of 32 days has elapsed between the egg stage and the adult emergence. Neonate mortality was higher than the other stages of the insect development. A cannibalism test was performed on first-instar and third-instar larvae of *H. armigera*. The test showed that third-instar larvae have the most cannibalistic behavior. This test has also shown that cannibalism increases with crowding. **[Bouslama, T., Chaieb, I., Jerbi-Elayed, M., and Laarif, A. (Tunisia), Tunisian Journal of Plant Protection, 14 (2): 17-27, 2019]**

Mites Associated with the Red Palm weevil (*Rhynchophorus ferrugineus*) in Tunisia. The red palm weevil (*Rhynchophorus ferrugineus*) is one of the main pests on Canary palm trees in Tunisia. Adults of this pest were captured in pheromone-baited traps in Canary infested palm orchards then dissected. Three mite species were found associated with this beetle: *Centrouropoda almerodai* attached to the underside of elytra, *Uroobovella marginata* adhered to the pygidium, thorax and head, and Uro*obovella javae* fixed to the antenna, thorax and legs. The highest deutonymph load was found in the elytral space of red palm weevil adults. This study was carried out, for the first time in Tunisia, to identify mite species associated with the red palm weevil and to study the distribution pattern of these mites on the pest adult's body. **[Slimane-Kharrat, S., and Ouali, O. (Tunisia), Tunisian Journal of Plant Protection, 14 (2): 29-38, 2019].**

Consumption Risk Assessment of Pesticides Residues in Yam. Chemical pesticides have contributed significantly to agriculture production throughout the world. However, human exposure to pesticides remains a critical concern. One important source of human exposure to pesticides is through food consumption. The potential negative effects of pesticides have resulted in stringent regulation in the production and use of the products,

especially in the developed countries. To limit the potential negatives effects of pesticides, risk assessments are usually conducted by scientific experts to establish the risk levels and to offer risk management strategies. Yam is a food commodity widely consumed by Africans both home and by the diaspora. Yam farmers have been using pesticides in yam production over years. The public is concerned about the health impacts that may result from exposure to residues. This study was designed to assess the risk of dietary intake of 12 pesticides, including five insecticides (cadusafos, fenitrothion, imidacloprid, profenofos and propoxur), four fungicides (carbendazim, fenpropimorph, metalaxyl, propiconazole) and three herbicides (bentazone, glyphosate and pendimethalin) in yam cropped by farmers in the Nanumba traditional area of Ghana. Residue and consumption data were collected and combined to derive Estimated Daily Intake (EDI). Three approaches were adopted in the calculation of EDI (deterministic, simple distribution and probabilistic) and the EDI values were compared with Acceptable Daily Intake (ADI) values. The study revealed that farmers' EDI to the twelve pesticides, according to the deterministic and the simple distribution approaches were lower than their respective ADI set by the EU Commission. However, the EDI of about 10% of the farmers to fenpropimorph and fenitrothion were higher than their ADI. [**Wumbei, A., Issahaku, A., Abubakari, A., Lopez, E. and Spanoghe, P. (Ghana/Belgium-Tunisia), Tunisian Journal of Plant Protection 14 (2): 49-64, 2019].**

PLANT PROTECTION NEWS IN THE ARAB AND NEAR EAST COUNTRIES

❖ Graduate Students Thesis (Master and Doctorate)

Evaluation of some organic matters and Biochar efficacy to Protect cowpea from *Rhizoctonia solani* infection.

The study was conducted in the Laboratories and research station of plant protection department / College of Agriculture Engineering/ University of Baghdad from in 2017- 2018 to evaluate the efficiency of some organic compounds and plant charcoal in controlling bean seedling damping - off caused by *Rhizoctonia solani* Results of isolation from infected plant parts showed The presence of 8 different isolates with high pathogenicity on bean seedling . The disease incidences were found to be between 33.3- 96.7 %. The nucleus staining showed the presence of 8 nucleus in hypha terminal in the more pathogenic Isolate (Rh5) .The results of addition of organic compounds(Coumaric acid) at 600 mg/ L Showed 100% inhibition in fungal growth compared with Fulvic acid 83.63% at the same concentration while addition of the palm charcoal 5% showed 89.26 % inhibition in fungal growth compared with eucalyptus charcoal showed 66.25% inhibition in fungal growth at the same concentration. All the organic treatment separately and in combination was significantly reduced disease incidence and severity compared with control. The combination of Coumaric acid or Fulvic acid with palm charcoal and the combination of coumaric acid with eucalyptus charcoal were found the more efficient with disease incidence and severity of with 0% compared with 77.33 and 69.99 % in control (fungus only) . The restriction of disease development was found associated with increase in peroxidase activity that attained to 63.2956.17 ، 58.02 ، unit variation in light absorption / min / g fresh weight respectively and 66.4560.19، 60.86 ، unit variation in light absorption /min / g fresh weight respectively after 6 and 12 days .The results showed the ability of certain treatments to induce systemic resistance in bean plants against the pathogen *R. solani* as proved by increasing gallic acid concentration that attained to 88.90 and 62.30% respectively compared with 18.90 and15.30 % respectively in control(Fungus only and without Fungus . The results of field experiment were found in accordance with pot experiment results ، where the combination of coumaric acid with palm charcoal was the more effective with disease incidence and severity 0.00 and 0.00% respectively compared with 77.50 and 76.67 % respectively in control ،followed by the combination fulvic acid with palm charcoal with disease incidence and severity 3.33 and 2.67 % respectively . The activity of some treatments in restriction of disease development was accompanied with plant growth promotion as shown by increase in fresh and dry weights and yields compared with control (Fungus only). The combination of coumaric acid with plam charcoal and fulvic acid with palm charcoal were found the more effective with plant Length 68.76 ، cm / plant compared with 37.94 cm / plant in control. the fresh and dry weights were 3573.3 and 1504.7 gm/plant ،compared with control (Fungus only) 1280,520 gm/plant 3100.0 and 1295.7 gm/ plant respectively ,and yields was the highest in the combination of coumaric and eucalyptus coal and fungi with 340 gm/plant ،compared with control (Fungus only) with 123.30 gm/plant.[

Aqell Asaad Khudhair , Unversity of Baghdad, Collage of Agricultural Engineering Sciences (2020,Master)].

Comparison between Electrostatic Spraying and Traditional Ground Spraying Techniques by Using Certain Insecticides on *Thrips Tabaci* (Thysanoptera: Thripidae) Infesting Onion In Qalubiya Governorate.

The present work was carried out to determine quality, spray deposited on the plant, lost spraying by drift and lost spraying on ground between plants. As well as the biological efficiency produced with possibility of using the least amount of pesticides to reach the highest efficiency against controlling *Thrips tabaci* Lindeman (Thysanoptera: Thripidae) on onion crop. The used ground equipment were knapsack motor mist blower sprayer with shear unit (79 L/fed.), knapsack blower sprayer with electrostatic charging unit (42 L/fed.), rotary hand held sprayer (18 L/fed.), knapsack hydraulic hand held sprayer (56 L/fed.) and conventional ground motor sprayer with two spray guns (578 L/fed.). Marshal insecticide was used for controlling onion thrips (*T. tabaci*) infesting onion fields with recommended dose during season 2017. In the second season 2018 marshal and chinook insecticides were used with recommended doses and 3/4 recommended dose during season 2018. In the second season 2018 experimental results showed that, the highest mortality rate for *T. tabaci* infesting onion was revealed by knapsack motor mist blower with electrostatic unit spraying 95 %, the lowest drift spray, the best equipment saving lost spraying on ground 15.5% from spraying volume.**[Ahmed Eita(Egypt), Researcher, Plant Protection Research Institute, Egypt, Faculty of Agriculture, Menofia University(Master,2020)].**

Ecological and Biological study of bee-eater *Merops* spp (Meropidae: Coraciiformes) in the Middle of Iraq and assay some of control methods.

Percian bee-eaters *Merops persicus* palls, 1773 is one of the most importent pests fed on honeybees in many countries of the world. They attacking heavy economic losses among honeybee breeders. the found in most provinces of Iraq, Therefore, the study aimed at the life and environmental aspects of the bird and its impact on the activity internally and externally and to evaluate some control methods of combating it in order to reduce the bird damage to the beekeepers in the study areas Baghdad / Al-Jadriya and Babylon for 2018 and 2019. The results showed that all aspects of the bird life are similar in the Babylon and Baghdad from the construction of the nest until the emergence of the chicks, from 73 -79.5 days respectively, the highest construction time for the nest was 17-16.6 days in Baghdad and Babylon respectively, while the average number of eggs placed was 5.6-6b. in Babylon and Baghdad, respectively. The lowest amount was 5-4.5 eggs respectively; the eggs were placed in a time ranging from 1 to 3 days. The average incubation period of one egg was 21 days for both sites, while the highest rate for the period of laying eggs was 7-6.5 days Babylon and Baghdad respectively. The bird builds its nest in different types of soils whose chemical and physical components differed between the outside of the nest and the inside, as the presence of the bird sometimes changes the texture of the soil. The results of GPS in the Babylon for 2018 and 2019 showed that the closest nest of the *merops* bird from the bee cobnies was 336m and the farthest nest was 5173m, while in Baghdad were 422 and 1130 m respectively. Bird fed on 7 insect orders Hymenoptera was the two dominants in study sites with 8.6, 9.6, 9 in Babylon while it was in Baghdad reached 8.6, 9.6, 7.3. Odonata was the most order with 10 and 7 insects for the morning period and 7-5.3 insects for the afternoon and 8.4-6 insects for the evening period for each of Babylon and Baghdad provinces respectively, and the lowest order Orthoptera. The results of the mechanical method using fishing nets in Babylon .The highest number of birds caught was on the right side of the apiary 9 birds at 19-26/8/ 2018 while the lowest the left. The highest number of birds caught was 1 bird for the duration 5-26/8/2018 and 14-21/10/2018 respectively. The highest number of birds caught in Baghdad was front of the apiary was 6 birds for the duration of 6-27/8/2018, the highest number of birds caught was 1 for the period of 23-30/7/2018 and 20-27/8/2018 respectively. Regarding the chemical method using baits, the highest number and missed baits was 5 for the duration of 31/7-7/8/2018, while the least number was 1. For the duration of 3-24/7/2018 and 14/8/-4/9/2018 respectively. While in Baghdad, the highest number of was 4 for the period of 18-25/7/2018 and 15-22/8/2018, while the lowest number was 1. **[Adel Khadir Abdul Hamza Rabiiei (Iraq), University of Baghdad, College of Agricultural Engineering Sciences, Supervised by Dr. Kameela Ward Shaher (Doctorate, 2020)].**

Evaluation of Certain Ecofriendly Approaches for Management of Root-knot Nematodes in Sugarbeet fields.

The experiments were conducted to evaluate the efficacy of certain bio-agents; i.e. *Bacillus thuringiensis kurstaki*, *Trichoderma asperellum* strain T34 and *Beauveria bassiana* + *Metarhizium anisopliae* with molasses and without compared with Fornem X 5®, Alfaprotec®, Tervigo® (Abamectin 2% SC) and Canatol® (oxamyl 24% SL), against the root-knot nematode, *Meloidogyne javanica* on growth parameters and juice quality characters of sugarbeet intercropped with garlic and without. The results showed that *T. asperellum* strain T34 + molasses increased growth parameters; root weight, total soluable solids, purity, sucrose and root yield without intercropping, also oxamyl increased plant weight, biological yield and top yield with intercropping. The treatments of *T. asperellum* strain T34 + molasses and oxamyl gave the highest reduction of reproduction factor, gall index and number of juveniles (J_2). **[Mohamed El-Nasharty Abdel-Aal El-Nasharty, College of Agriculture Saba Basha, Alexandria University, Egypt, (Doctorate,2020)].**

Isolation, Identification, Pathogenicity and Toxicity of some Fungi associated with Head Blight and Crown Rot Diseases on Wheat in Basrah.

This study was conducted in the south of Iraq to achieve several aims: Firstly, surveying the most fungal microflora in seven cultivars of winter wheat in 14 field distributed on Basra province. According to morphological and molecular identification, 46 genera with 66 species of different fungal groups were found. The prevalent fungal group on all examined sources was the anamophic Ascomycota 85.34%, followed by Zygomycota 5.46%. Telemorphic Ascomycota was only at 3.64% and Basidiomycota was in less than 1%. Secondly, identifying an 88 *Fusarium* isolates that detected during this study. Based on morphological and molecular identification methods as well as the analysis of phylogenetic trees, the results of this study has verified that the main species belonging to the genus *Fusarium* causing FHB and FCR diseases on wheat in the studied areas are *F. pseudograminearum, F. graminearum, F. equiseti, F. culmorum, F. solani, F. avenaceum, F. chlamydosporum, F. cerealis and F. nygamai*. This is the first record of the last six *Fusarium* species from wheat crop in Iraq as causative pathogens of FHB and FCR. Thirdly, three mycotoxins (Dioxynivalenol (DON), Nivalenol (NIV) and Fumonisin B2 (FB2)) were detected in seeds of seven wheat cultivars planted in the examined wheat fields by using HPLC analysis. Fourthly, the pathogenicity of nine *Fusarium* species identified in this study was assessed. Fifthly, FHB and FCR disease incidences were estimated on wheat and their interaction with cultural methods that used in wheat cropping system in the studied areas. Finally, the interaction between FHB and FCR disease incidences and physiochemical parameters for soil samples and environmental factors was evaluated in the studied areas. [**Mohammed Hussein Minati, (Iraq), Biology Department, College of Science, Basrah University, in Plant Pathology, Supervised by Dr. Mohanad Khalaf Mohammed-Ameen, (Doctorate, 2019)]**

Evaluation of some Integrated Pest Management Elements for Control of the Stem Palm Borer *Jebusaea hammerschmiditi* (Coleoptera: Cerambycidae) in Central of Iraq.

Environmental and biological studies were conducted on *Jebusaea hammerschmiditi* (Coleoptera: Cerambycidae) in middle of Iraq during 2017- 2019 for assessing some elements of integrated pest management using for their control. The results showed that the insect was one of the most important economic pests that caused massive damages on palm trees which could lead to gradual deterioration of tress. The infestation rate was 43.5 - 49.5% that collapsed and destroyed around 9.8 - 11.2. Under the field conditions, the results of current study illustrated that the females lay their eggs singly on the bases of dry fronds and into the creak of the stem, this were 54 eggs during per 6 days. The percentage of egg hatching was 84% of eggs hatched between 10-18 days of incubation period after that the larvae completed its stage within five instars. The first instar completes its period during 14 days, the second was 95 days, the third was 138 days, and the fourth was 30 days, while the fifth was in two phases within 45 days. The total period of larval stage required 332 days which was 94.32% of insect life cycle. The average of females was 22 days, while and the males was 21 days and the insect had one generation per year which was around 285-375 days with an average of 330 days. The life cycle of the insect 303 – 425. The first appearance of adult in 20, 21, 28, 28 May and 2 June in Najaf, Wasit, Babil, Karbala and Diyala respectively,

while the insect was not found in Baghdad. showed two species for genus *Jebusaea* Reich were identified which included *J. hammerschmidti* Reich and *J.persica* Reitt.The number of adults in the field was low at the beginning of their emergence during the end of May and began to increase gradually during June which reached its peak in mid-June. Adult insects were attracted to light traps of violet, blue and white color, it was diagnosed with first time species for entomopathogen nematode *Steinernema carpocapsae* and *Heterorhabditis bacterophora* on insect larvae. For the first time recording in Iraq the species of nematode *Rhabditis blumi*. The bacteria, *Bacillus thuringiensis subsp. tenebrionis* was recorded for the first-time infected larvae in Iraq. The pathogenic fungus and *Beauveria bassiana, Metarhizium anisopliae, Fusarium secnitectum* and *Isaria* sp, the fungus *Gliocladium* sp. was recorded at the first-time infected larva. The presence of the virus particles belonging to the family infected larva which diagnosis by Entomoxviridae using a scanning electron microscope. Also recorded two types of mites, one of them predator *Amblyseius swirskii* which correlated their abundance on larva infected with nematodes insect larvae and beetle mite of the genus Poecilochirus parasite on the larvae of the first instar and cause additional moultig of the larva skin. [**Hasan Moomin Lilo Al-Saeedi (Iraq), Supervised by Dr.Radhi Fadhil Al-Jassany, College of Agricultural Engineering Sciences, University of Baghdad, Plant Protection, Deparment, (Doctorate, 2019)].**

In spite of Covid-19 Pandemic, a Group of PhD Students Successfully Delivered Their Dissertations

Chemical Ecology of *Bagrada hilaris* (Burmeister) (Heteroptera: Pentatomidae): Intraspecific and Interspecific Chemical Cues.

The chemical ecology of Heteroptera insects is determined by a wide array of chemical signals (semiochemicals) that drive their behavior at intra- and inter-specific level. Intraspecific semiochemicals are called pheromones, interspecific chemicals are named allelochemicals. In the case of stink bugs, sex-pheromones and aggregation pheromone are produced by adult males. Furthermore, phytophagous stink bugs exploit chemical cues emitted from plants to find a suitable food and oviposition source. The semiochemicals involved in this process are named kairomones and are generally formed by specific blend or key odorants emitted from host plant. The chemical ecology of the phytophagous Pentatomid species *Bagrada hilaris*, or Painted bug, native from Asia and invasive in the Americas is characterized by similarities and differences with the other stink bugs. In particular at intraspecific level is been observed that males volatiles attract females, and chemicals analyses showed that both adults produced a similar pattern of chemicals, with the only quantitative difference related to (*E*)-2-octenyl acetate, produced in higher amounts from males. However, the possible attractant role of this compound at intraspecific level is still to be assessed. Moreover, at interspecific level, although *B. hilaris* is reported to be highly attracted to brassicas, few studies have attempted to elucidate the chemicals cues exploited in its host location process. In the specific, the chemicals cues exploited from this pest in the location of host plant at seedling stage, the stage more vulnerable and subjected to the attack from *B. hilaris* have still never been investigated. [**Mokhtar Abdulsattar Arif,University of Palermo, (Italy-Iraq), Supervisors: Prof. Stefano Colazza, and Prof. Ezio Peri (Doctorate, 2020)].**

Development and Application of Alternative Control Means to Control Postharvest Rots of Fresh Fruits and Vegetables

Dr. Imen Belgacem successfully defended her PhDThesis entitled "Development and application of alternative control means to control postharvest rots of fresh fruits and vegetables" at the Mediterranean University of Reggio Calabria (Italy). Her work focused on the evaluation of the efficiency of a pomegranate peel extract called PGE, under large scale commercial conditions, as pre- and post-harvest treatment against citrus rots. A deep investigation on the extract mechanism of action was also conducted together with an evaluation of its antimicrobial activity against major foodborne pathogen. The results of her study showed that PGE treatments proved high

antimicrobial activity and long persistence resulting in high reduction in losses, longer shelf life and enhancement of the citrus fruit quality. The transcriptomic analysis showed very quick response of gene expression accompanied by high up-regulation of resistance genes. Overall, the findings of her work incorporate new knowledge on the potential use of PGE as a safe and potent alternative control mean against a wide range of pathogens and will contribute to the already ongoing process to register a commercial formulation**.[Imen Belgacem(Tunisia), University of Reggio Calabria (Italy), (Doctorate, 2020)]**

Insect Pests and Wood Nematodes Threatening Pine Forests in Lebanon and South Italy and New Insights into Biocontrol.

Dr Yara El-Khoury, received her PhD in "Agricultural Sciences, Biodiversity and the Environment" after she discussed her thesis in March 2020. She was enrolled in her postgraduate studies at the University of Bari Aldo Moro in Italy "Università degli studi di Bari Aldo Moro" in codirection with the National Council for Scientific Research – National Center for Marine Sciences -Jounieh, Lebanon. Her thesis was entitled: "Insect pests and wood nematodes threatening pine forests in Lebanon and south Italy and new insights into biocontrol". In the thesis, Dr Yara addressed topics related to insect pests specifically *Leptoglossus occidentalis* that attacks the reproductive system of *Pinus pinea* pine tree and xylophagous insects such as bark beetles and cerambycids threatening pine forests. In addition, the nematodes associated with pine wood were studied. Studies on some biological control methods against the pests that threaten pine forests were also carried out. As per the main results of her thesis, the extent of damages of pests was evaluated and new pests were recorded. The western conifer seed bug *L. occidentalis* could be the main culprit behind the nut production decline in Lebanon. Concerning xylophagous insects, five species of Scolytinae new to Lebanon were recorded: *Hylurgus ligniperda* and *H. micklitzi*, *Hylastes angustatus* and *H. attenuates*, and lastly *Carphoborus pini*. Their ecology, distribution and potential phytosanitary risk were discussed. In the survey of pinewood nematode, nine taxonomic families of nematodes were found in wood samples from Italy, and six were also detected in Lebanon. The quarantine pine wilt nematode *Bursaphelenchus xylophilus* was absent from all samples. Regarding the studies on the biocontrol agents, the entomopathogenic fungus *Beauveria bassiana* was found pathogenic against *L. occidentalis* eggs and immatures. Also, an optimization of the infestation temperature of potential biological control agent, entomopathogenic nematode EPNs was conducted *in vitro* to determine their thermal niche. It is noteworthy that Dr Yara obtained a degree in agricultural engineering from the Holy Spirit University of Kaslik in 2016, and she was able to continue her postgraduate studies after receiving a fellowship grant from the National Council for Scientific Research-Lebanon**. [Yara El-Khoury, National Council for Scientific Research in Lebanon, National Center for Marine Sciences -Jounieh, Lebanon, (Doctorate, 2020)].**

Inhibitory Effect of some Plant Extracts on Toxins Production by Mycotoxigenic Rotting Fungi in Local and Imported Corn Grains during Storage.

The present study aims to determine the efficacy of some plant extracts on growth and aflatoxin production by the mycotoxigenic fungus *Aspergillus flavus*, as alternative of fungicide application. Extracts of nine edible and herbal plants were evaluated for their antifungal and antiaflatoxin efficacies, as compared with the two tested fungicides. All the tested plant extracts were active against AFB1 production and growth of the tested mycotoxigenic isolate of *A. flavus*, however, out of the nine tested plant extracts, turmeric (*Curcuma aromatica*), licorice (*Glycyrrhiza glabra*), pomegranate fruit peels (*Punica granatum*), and eggplant fruit peels (*Solanum melongena*) exhibited the highest inhibitory effects, both on stored local and imported corn grains. The fungicides, thiram and topsin were less effective than most of the tested plant extracts in reducing aflatoxin under the prevailing experimental condition. Fumes of the plant extracts significantly inhibited growth of *A. flavus.* growth inhibition rates were significantly higher in licorice, eggplant, and turmeric (98.756%, 98.480%, and 97.927% respectively). Moreover, Fumes of the tested plants significantly reduced AFB1 production. The highest

inhibition rate was obtained by licorice (96.5149%), followed by eggplant (80.8097%, then turmeric (77.748%). All the applied bioagents, significantly reduced radial growth of *A. flavus*. The highest growth inhibition ratios were realized by both *Trichoderma konningii*. The highest aflatoxin inhibition rate was attained by *T. viride* (49.231%). Transcriptional expression was detected through the RT–PCR studies, in addition of relative amounts of mRNA of the *afl*D, *afl*P, *afl*Q and two regulatory *afl*R and *afl*S genes in corn grains treated with the nine tested extracts, compared with two pesticides thiram and topsin, and infected control inoculated all with *A. flavus.* **[Najwa Abdel-Sattar Ibrahim Hamad (Egypt), College of Agriculture Saba Bash, Alexandria University, Egypt, (Doctorate, 2020)].**

Ecological and Biological Study of the genus *Microterys* T. (Hymenoptera: Encyrtidae), a Parasitoid of Scale Insects in Syria.

The species of the genus *Microterys* (Thomson 1878) (Hymenoptera: Encyrtidae) were identified on soft scales in citrus orchards in the Syrian coast, and almond orchard in Quneitra Governorate during the period between 2016 and 2017. Two species were recorded, the first is *Microteyrs hortulanus* (Erdös) that parasite *Sphaerolecanium prunastri* (Fonscolombe) infesting the almond orchards in Quneitra Governorate. Both (insect and parasitoid) are registered for the first time in Syria, and the second is *M. nietneri* (Motschulsky) that emerged from *Coccus pseudomagnoliarum* (Kuwana) infesting The Jaffa Orange orchards. Six parasitoides of superfamily Chalcidoidea were recorded as parasitoides associated with the genus *Microterys* In the study areas. The parasitoids are recorded for the first time in the study area in Syria. Three of predators of family Coccinellidae were identified depending on the color pattern, dorso-lateral groups of abdomen and Armature structure of 4th instar larval. Results showed that the 4th instar larval of coccinellid larvae, has color pattern and special Armature structure. Four types of predators were recorded associated with the genus *Microterys* at Al-Sanobar and Dabba and Al-Sanobar and Dabba locations in Lattakia Governorate, and two predators in the Jaba site in Quneitra Governorate, and all recorded predators were registered for the first time in the study sites. **[Alaa Turky Saleh, (Syria), Ph.D. thesis was discussed 12/15/2019 at the Faculty of Agricultural Engineering, Damascus University. Supervisors, Prof . Dr. Abdulnabi Basheer & Prof. Dr. Hicham Alrouz].**

Novel Monitoring and Biological Control of Invasive Insect Pests.

Invasive species are alien to the ecosystem under consideration and cause economic or environmental damage or harm to human health. Two alien insects that fit this description are the brown marmorated stink bug, *Halyomorpha halys* and the spotted lanternfly, *Lycorma delicatula*. Both invaders are polyphagous pests that feed on a myriad of plant species and inflict severe crop losses. As sustainable control methods depend on the accurate monitoring of species' invasion and involve the use of natural enemies, we addressed these two facets by exploring novel monitoring techniques and deciphering host-parasitoid interactions for improved integrated pest management. Thus, we adopted 'BugMap', a citizen science initiative that enables students, farmers and everyday citizens to report sightings of *H. halys* from Italy, with emphasis on Trentino-Alto Adige. Aside from fostering citizen participation in scientific endeavors and the enhanced literacy that ensues, BugMap helped uncover the invasion dynamics of *H. halys* and forecast its potential distribution in Trentino, all while coordinating technical monitoring and informing management strategies. The most promising agent currently under study for the classical biological control of *H. halys* is the Asian egg parasitoid *Trissolcus japonicus*. To assess the wasp's potential non-target impacts, we investigated its foraging behavior in response to chemical traces 'footprints' deposited by its main host *H. halys* and by a suboptimal predatory species, the spined soldier bug, *Podisus maculiventris*. Wasps exhibited a 'motivated searching' when in contact with footprints originating from both species. However, *T. japonicus* arrestment was significantly stronger in response to *H. halys* footprints, compared with *P. maculiventris*, implying the presence of underlying chemical cues that shape its natural preferences. A series of GC-MS chemical analyses revealed that *n*-tridecane and (*E*)-2-decenal were more abundant in *H. halys* footprints and are probably the key components utilized by the wasp for short range host location. The function of the aforementioned compounds was studied, *n*-tridecane acted as an arrestant, prolonging *T. japonicus* residence time, whereas (*E*)-2-decenal fulfilled its presumed defensive role and repelled the wasp. These results shed new light on the chemical ecology

of *T. japonicus* and help expand the understanding of parasitoid foraging and its implications for classical biological control. Moving to the other invader *L. delicatula*, an egg parasitoid *Anastatus orientalis* was reported attacking it at high rates in its native range in Eastern Asia and may play a key role in reducing its populations there. A series of bioassays revealed that wasps responded to footprints deposited by *L. delicatula* gravid females by initiating a strong searching behavior. Moreover, *A. orientalis* preferred to oviposit in egg masses with intact oothecae, suggesting that the host's egg covering functions as a trigger for *A. orientalis* probing and oviposition. Thus, *A. orientalis* not only overcomes, but also reverses an important line of host structural defense for its own fitness gains. This dissertation discusses the benefits of combining citizen science with traditional monitoring, and the usefulness of decoding host-parasitoid interactions to design more efficacious management strategies of invasive insect pests. **[Robert Nehme Malek, PhD in Agricultural Entomology, (Lebanon) supervised by Prof. Gianfranco Anfora and Prof. Marco Ciolli, Department of Civil, Environmental and Mechanical Engineering, University of Trento, Trento, TN, Italy and Research and Innovation Center, Fondazione Edmund Mach, San Michele all'Adige, TN, Italy (Doctorate, 2020)]**

Understanding the morphology, neurophysiology and behavior of the invasive *Halyomorpha halys* for its management in agricultural ecosystems.

The rate of introduction of invasive alien species has been increasing dramatically over the past few decades, as a result of growing global trade and climate change. One successful invader in both agricultural and domestic settings is the brown marmorated stink bug, *Halyomorpha halys* (Stål) (Hemiptera: Pentatomidae). Originating from East Asia, this polyphagous pest has been expanding its range since the early 2000's in North America and Europe, where it is known to feed on over 170 host plants, many of which are of economic importance. Currently, the control of *H. halys* relies on broad-spectrum insecticides that provide short term protection of crops and negatively impact the environment and non-target organisms. Despite the numerous studies conducted so far on this species, some gaps of knowledge related to its chemical ecology and vibrational communication still exist. In this light, the aim of this doctoral dissertation was to investigate the morphology, neurophysiology and behavior of *H. halys*, to enhance its sustainable management strategies. We identified five types of sensilla on the antennae of *H. halys* adults and fifth instar nymphs, using scanning and transmission electron microscopy techniques. The examined sensilla were assigned putative functions based on their morphological characteristics. We found that the majority of these sensory structures are located on the flagellomeres and are thought to have an olfactory role. On another front, the morphological and physiological properties of some of the neurons involved in the vibrational communication of this pest were explored using intracellular recording and electrophoretic staining techniques. Four types of neurons were identified in the thoracic ganglion of *H. halys* adults, all of which are intersegmental with axons projecting anteriorly towards the prothoracic ganglion. The presumed roles of these neurons in processing the vibrational signals are discussed according to their sensitivity and location. Concerning the third and last objective of this dissertation, long-lasting insecticide nets were used under laboratory conditions to assess their effect on the behavior and survivorship of *H. halys* nymphs and adults. The nets showed promising potential for reducing the mobility and inflicting high mortality rates even after short exposure durations. Findings from these various studies are herein presented in the context of the chemical ecology, vibrational signaling and behavior of *H. halys*. Moreover, the future implications of this novel contribution and its relevance for integrated pest management strategies are highlighted. [**Aya Ibrahim, PhD in Agricultural Entomology, (Lebanon), supervised by: Prof. Gianfranco Anfora, Department of Agricultural, Food, Environmental and Animal Sciences, University of Udine, Udine, Italy and Research and Innovation Centre, Fondazione Edmund Mach, San Michele all'Adige, Italy, (Doctorate, 2020)]**

❖ Some Plant Protection Activities of FAO and Other Organizations

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

Closing FAO Project in Sudan on Implementation of Sanitary and Phytosanitary Agreement

Food and Agriculture Organization has concluded the project "Improving the implementation of sanitary and phytosanitary standards and norms for domestic animal and plant health in Sudan" by wrap-up workshop in Khartoum. The project aimed to harmonise the legislation and regulations of national authorities in Sudan to fulfil the technical requirements of joining the World Trade Organisation (WTO) by applying the Sanitary and Phytosanitary agreement. The phytosanitary component in the project covered 4 different aspects: assessment of the phytosanitary system, establishment of Pest Risk Analysis (PRA) unit, training on the International Standards of Phytosanitary Measures (ISPMs) and upgrading the phytosanitary laboratory.

The assessment of the phytosanitary system was performed based on similar principles to the International Plant Protection Convention tool: Phytosanitary Capacity Evaluation (PCE). The data were collected by questionnaire that was sent to General Directorate of Plant Protection, in addition to personal interview and site-visits. The data were analysed and used to provide recommendation for updating the current legislation system, as well as establishment of general surveillance network, update the phytosanitary certification system, fulfilling the National Reporting Obligations, and harmonizing the pest lists with ISPM #16 and #19 guidelines.

The project has successfully supported the establishment of new PRA unit by delivering the required expertise through intensive training by FAO expert, and provide tools and equipment needed for routine work on the unit. Meanwhile, two training sessions were held in Khartoum and PortSudan on some selected ISPMs.

The project promoted the adoption of evidence-based decisions in terms of phytosanitary measures and regulations, in addition to commitment of national authority to harmonise procedures with international requirements. That will improve the market access of Sudanese plant commodities, protect from pest risks that may be associated with traded plant, and ensure smooth move of consignments for the benefit of economic growth and human welfare, as per WTO vision.

Strengthen the National capacity to Reduce the Impact of Fall Armyworm Spread in Egypt

Since the reporting of the devastating pest "Fall Armyworm" (FAW) in south of Egypt the last year (2019), Food and Agriculture Organisation of the United Nations (FAO) has provided emergency support for national authorities to reduce the impact on food security and income of smallholder farmers. The project "Emergency response to enhance the national capacity of Egypt for early warning, monitoring and management of Fall Armyworm" was launched in 2019 to support the technical capabilities of Ministry of Agriculture and Land Reclamation (MALR) to establish national wide system for monitoring of the pest, and to provide required equipment and training to update the national system of production of biological control agents. Within that framework, FAO has contracted the international centre for insect physiology and ecology "icipe" based in Kenya, to provide their expertise in assessing the current capacity of the natural enemy's production system in Egypt and provide technical recommendations in terms of training needs and equipment. The icipe experts has visited 5 laboratories in Giza, Banha (Qalyubia Governorate) and Shandawel (Sohag Governorate) and prepared technical report that was used to identify the required equipment and topics for training.

As part of the NENA regional office efforts to support NENA countries to manage FAW, it has been planned to conduct regional training in Cairo in April for biological control experts from more than 18 countries in NENA region, in addition to experts from European Mediterranean countries. The training was intended to develop the national capacities in inventorying the native natural enemies, and the modern techniques for rearing and releasing of biological control agents. The training would have important impact on strengthen the national system of FAW affected countries to cope with the pest damage, and retard the spread to new areas, within the

country or across the borders. That is of particular importance because FAW has expanded their distribution in the region, and in 2020, three (3) more NENA countries has reported the pest; Mauritania, UAE and Oman. Unfortunately, the training was postponed because of the global pandemic of COVID-19 that has caused international disruption to many training activities. On other hand, FAO has organized a tele-training to pest control specialists from MLAR on data validation and FAW platform. The training will enable the authorities in Egypt from reviewing and validating the data - collected through "Fall Armyworm Monitoring and Early Warning System FAMEWS" smart phone application developed by FAO - on field scouting and traps data, before being globally shared through FAW global platform. The training will strengthen the national capacity on pest surveillance and will improve data sharing between Egypt and the world on FAW.

Supporting Iraq and Syria Plant Quarantine to Protect Domestic Production from Transboundary Pests and Diseases

During 2019, the Regional office of Near East and North Africa of the Food and Agriculture Organization of the United Nations has supported the phytosanitary system in **Syria and Iraq** within the framework of the regional project "Strengthening Control of Trans-boundary Animal and Plant pests and diseases through improved Quarantine Services in Countries Affected by Crises in Iraq and Syria". The project aimed to contribute toward restoring the plant quarantine system in Iraq and Syria, considering the different aspects like legislative and regulatory framework, the current administrative structure, knowledge on International Plant Protection Convention (IPPC) requirements and the International Standards of Phytosanitary Measures (ISPMs), ability to perform Pest Risk Analysis (PRA) and quality assurance system. In Iraq, the international and national experts have collected data on the current phytosanitary system through questionnaire, interview and site-visits. The data were analyzed to identify opportunities for improvement and concluded by drafting new legislation and strategic development plan. In addition, training on PRA and ISPMs on inspection, import regulation system, sampling, notification of non-compliance,post-entry quarantine stations, phytosanitary certification system, pest surveillance, determination of pest status, pest eradication, establishment of pest free areas, lists of regulated pests, and regulated-non-quarantine pests was conducted. In addition to training and capacity evaluation, the project has supported the national authorities in Iraq by essential tools and equipment required for routine inspection and testing of imported and exported plant commodities.

In Syria, evaluation of the current phytosanitary system is performed on bases of self-assessment by Plant Protection Directorate. The assessment includes the legislations, the national regulations, SOPs and laboratory manuals. In addition, two training sessions were held in Latakia, as it represents the main point of entry for plant commodities. The training covered topics related to inspection, sampling, fumigation and laboratory testing.
The project has aided the national authorities in Iraq and Syria to improve their phytosanitary system to protect their domestic agriculture production from invasive pests, while ensuring smooth movement of commodities according to free-trade obligations in the IPPC.

The Efforts of the Regional office of Near East and North Africa of Food and Agriculture Organization of the United Nations to Face Fall Armyworm in the Region

The introduction of Fall Armyworm (FAW) to Africa in 2016 has caused devastating damage to many important crops but particularly to maize. Invasive plant pests are usually triggering wider and deeper impact on plant production because preparedness of countries to that specific pest is not complete, and lacking knowledge and essential tool hinder the efficiency of risk mitigation measures.
The regional office (RNE) of Near East and North Africa (NENA) of Food and Agriculture Organization of the United Nations (FAO) has provided technical support to many countries in the region. Since 2017, the RNE organizated a side event to the IPPC regional workshop in Tunis, Tunisia dedicated to raise awareness of IPPC contact points in NENA countries on FAW. Meanwhile, RNE has supported countries at higher risks, like Sudan, by providing tools and expertise required for establishment of monitoring system, including bucket traps, lures and training of specialists. During 2018, the pest has increased its geographic distribution in NENA regions, and was reported in Yemen. FAO has initiated Technical Cooperation Programme with Yemenite government to strength the national capacity to monitor and manage the spread of FAW. The programme included different components like establishment of monitoring system, providing pheromone tarps, data collection and management using Fall Armyworm Monitoring and Early Warning System (FAMEWS) smart phone application and support the small-scale local production of biopesticides. In 2019, FAO has launched new project in Egypt

after first report of the pest in May 2019. In addition to projects, RNE has held training session in Saudi Arabia and UAE for plant protection specialists, in which technical and scientific knowledge was transferred to trainee though theoretical sessions and field training. Meanwhile, FAO has supported Mauritania monitoring programme by providing tools, and assist in identification of suspected specimen through the diagnosis service of CABI. The larvae specimen sent for identification has proven to be FAW, and Maurtaina was announced as new infested country. FAO has upscaled the efforts to combat FAW to global level, by started GLOBAL ACTION against FAW in three regions; NENA, Asia and Pacific and Africa. Within that framework, RNE has coordinated the nomination of national focal points for every country in NENA region, and organized first tele-conference meeting with national focal point in May 2020.

During the conference, the national focal points of UAE and Oman has announced reporting FAW on their territories for the first time.

RNE will continue to coordinate with FAO regional offices in Asia and Africa, FAO HQ, Arab Society of Plant Protection (ASPP), Near East Plant Protection Organization (NEPPO), and other key players toward developing and implementing sustainable strategy to manage FAW in the region.

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

DESERT LOCUST SITUATION

Warning level: THREAT

General Situation of the Desert Locust during April 2020 and Forecast until mid-June 2020 provided by the FAO Emergency Centre for Desert Locust (ECLO).

General Situation

Widespread of Desert Locust in Horne of Africa and South West Asia and Locusts will increase further and extend to other areas

The current situation and forecast are alarming as locust infestations are expected to extend to other areas in the Horn of Africa and southwest Asia. Widespread rains fell in East Africa for the second consecutive month in April. Although control operations have reduced locust populations, another generation of breeding will cause locust numbers to increase further as new hopper bands and swarms form in Kenya, Ethiopia and Somalia during May and June. Swarms are expected to move further north in Ethiopia and Somalia with a risk that a few swarms may reach Eritrea and Sudan in mid-June. The situation is very worrisome in Yemen because several swarms laid eggs in the interior where widespread, heavy rains fell, which will allow hatching and hopper bands and swarms to form. Breeding in the Arabian Peninsula caused hopper bands to form in parts of Saudi Arabia, Iraq and UAE, and hopper and adult groups in northern Oman. Any swarms that form can move to the summer breeding areas in Yemen, Sudan and along the Indo-Pakistan border. Some swarms could perhaps continue to Chad and Niger. In southwest Asia, more hopper groups and bands formed in Iran and to a lesser extent in Pakistan. Adult groups and small swarms from breeding in Baluchistan, the Indus Valley, and Punjab in Pakistan are likely to move to desert areas along both sides of the Indo-Pakistan border from early May onwards. This is expected to be supplemented by several waves of swarms coming from the spring breeding areas during June.

Western Region: CALM

SITUATION. Isolated locusts in Algeria, Morocco, and northern Mali.

FORECAST. Very limited breeding possible in Morocco and Algeria. Low risk of swarms appearing in the eastern Sahel and moving westwards in June.

Central Region: THREAT

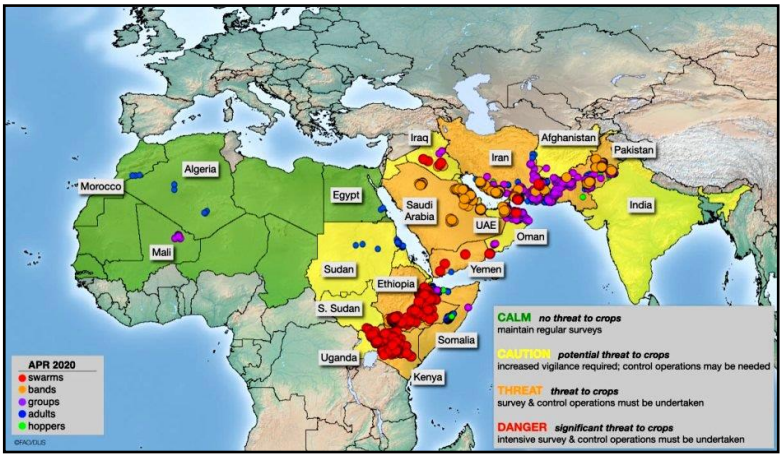
SITUATION. Control operations against hopper bands and new-generation swarms in Kenya (14 637 ha treated) and Ethiopia (99 948 ha); a few swarms in South Sudan, Uganda, Djibouti; hopper groups in northern and central Somalia (600 ha). Hopper bands in northeast Saudi Arabia (29 868 ha) and UAE (1 320 ha); swarms and bands

in Iraq (815 ha); hopper and adult groups with breeding in Oman (4 147 ha); swarm breeding in Yemen interior; a few swarms on Yemen/ Oman border; scattered adults in Sudan and Egypt.

FORECAST. Second-generation hatching and band formation in Kenya, Ethiopia, and Somalia with new swarms in mid-June. A few swarms may invade South Sudan and Uganda and move north. Immature adult groups and swarms to form in Saudi Arabia and Oman and move to summer breeding areas. Bands and swarms to form in Yemen. Swarms from East Africa may arrive in Eritrea and Sudan from mid-June onwards.

Easter Region: CAUTION

SITUATION. Hopper bands in southwest Iran and adult group laying in southeast (98 658 ha treated). Hopper and adult groups in Baluchistan, hopper bands in Indus Valley and Punjab, Pakistan (50 289 ha treated). Adult groups laying in southwest Afghanistan (20 ha). FORECAST. More band and swarm formation in southern Iran and southwest Pakistan. A few swarms likely to reach Indo-Pakistan border area in early May followed by several waves of swarms later in May and June.



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).

ACTIVITIES OF FAO COMMISSION FOR CONTROLLING THE DESERT LOCUST IN THE CENTRAL REGION (CRC)

FAO Commission for Controlling Desert Locust in the Central Region – Publications

Recently, the Commission published six factsheets in booth Arabic and English languages. This factsheets designed to keep the member countries in the region, and other interested parties informed of the commission activities, new developments and achievements. Its focus on the role of the Commission to support member states to manage and control Desert Locust.

Title: The Commission for Controlling the Desert Locust in the Central Region-"Our story"
: http://www.fao.org/3/ca6801en/ca6801en.pdf

Title: Preventive control strategy: Be prepared
: http://www.fao.org/3/ca3236en/ca3236en.pdf

Title: Building national capacity
: http://www.fao.org/3/ca4311en/ca4311en.pdf

Title: Management of Desert Locust information
: http://www.fao.org/3/ca6075en/ca6075en.pdf

Title: Human health and environmental safety in desert locust control operations
: http://www.fao.org/3/ca4300en/ca4300en.pdf

Title: Future orientation and challenges
: http://www.fao.org/3/ca6643en/ca6643en.pdf

ARAB SOCIETY FOR PLANT PROTECTION NEWS

Workshop at the Faculty of Agriculture, Tishreen University, Lattakia, Syria

The Arab Society for Plant Protection (ASPP) in collaboration with the Faculty of Agriculture, Tishreen University, Lattakia, Syria organized a workshop during the period 7-8 January, 2020 entitled "Detection, distribution and management of invasive and new emerging pests in Syria and neighboring countries". In the opening session, welcome addresses were presented by Dr. Ibrahim Jboory, ASPP President, Dr. Talal Amin, Dean of the Faculty of Agriculture, Tishreen University and Dr. Bassam Abdelkarim Hasan, Tishreen University President. The workshop scientific program included 31 oral presentation distributed in five sessions, in addition to 20 posters which were the focus for discussion among the participants during coffee breaks. Around 130 scientists from all over Syria and from Iraq, Jordan and Lebanon, actively participated in this event. There was great interest in the topics presented expressed in the lively discussion that followed each presentation.

On the third day, and before departing Lattakia, the group of participants from outside Syria paid a courtesy visit to the Tishreen University President Dr. Bassam Abdelkarim Hasan to thank him for his sincere interest in supporting the workshop and for the university generosity expressed during the event. The group also paid a courtesy visit To Dr. Nabil Abou Kaf, Lattakia Mayor at the City Hall to thank him for his efforts in support of the workshop, as an ex-chairman of the Plant Protection Department, Faculty of Agriculture, Tishreen University and as the chairman of the Workshop Organizing Committee. In addition, Dr. Abou Kaf is an old active ASPP member and reviewer of articles submitted for publication in the Society journal, Arab Journal of Plant Protection.

A New Edition for the Glossary of Biotechnological Terms in Food and Agriculture

FAO published in 2006 a glossary for biotechnological terms in food and agriculture, which included 3200 terms. In an effort to review and update the glossary, in 2019 an agreement was reached between the Near East and North Africa Regional Office of FAO and the Arab Society for Plant Protection (ASPP) to review and update the glossary. A team composed of Dr. Wafaa Chouman, Faculty of Agriculture, University of Aleppo, Syria, Dr. Nader Asaad, Agriculture Research Authority, Hama, Syria and Dr. Wasim Habib, Agriculture Research Institute, Fanar, Lebanon was established to implement this task. In addition, a committee of six members from FAO and ASPP was established to revise the new edition of the glossary. It is expected that the second edition will include 6700 terms, that is double the size of the first edition, and it is hoped that it will be available for distribution in late 2020.

Lockdown Imposed by Corona Paved the Way for ASPP to Produce A New Book

Corona's house arrest permitted ASPP to finalize producing a new book on the occasion of the International Year for Plant Health announced by the UN for the year 2020. On this occasion, the Executive Committee (EC) of the Arab Society for Plant Protection (ASPP) decided to publish a book entitled "Challenges for plant protection in the Arab countries: vision of 2050". Twenty-seven colleagues and ASPP members volunteered to participate in this effort, and the EC of ASPP selected Dr. Khaled Makkouk to coordinate this task. The work on this book was initiated in early 2019, however the house arrest imposed by the COVID 19 pandemic gave more time to the participants to speed up the process over the past three months. The first draft of the book will be ready in mid-May, 2020. The book includes 12 chapters. A general introduction, followed by a chapter on crop losses due to pests, followed by a third chapter focusing on the present status of pests, with emphasis on invasive and new emerging pests. The fourth chapter covered agricultural quarantine in the Arab countries and how to improve it, the fifth chapter focused on the production of healthy plant propagation materials, the sixth chapter on wise use of chemical pesticides and the seventh chapter centered around the main research challenges in plant protection facing the Arab countries in the coming decades, which is the main focus of this book. The eighth chapter focused on the potential of using molecular biotechnology and bioinformatics in relation to plant health. The ninth chapter focused on how to improve agricultural extension, because of its

significant role in empowering farmers with the right knowledge to make them a better decision maker in dealing with crop pests in their own fields. The tenth chapter covered national, regional and international collaboration in plant health issues, and the 11th chapter dealt with the importance of developing national and regional strategies for plant health issues in the Arab countries. The 12th and last chapter included general conclusions to outline the major issues in crop protection need to be addressed in the coming three decades.
It is hoped that the book will become ready for printing in the coming few weeks, and ASPP will make sure that the book will be ready for distribution during the coming 13th Arab Congress of Plant Protection that will be held in Hammamat, Tunisia during the period **1-6 November, 2020.**

Dr. Safaa Kamari in the International Media

During last few weeks, our Colleague, Dr Safaa Kumari was interviewed by the International British media. Dr Kumari is a Plant Virologist at International Center for Agricultural Research in the Dry Areas (ICARDA); Member of ASPP Executive Committee and Chairman of Publication Committee, and Associate Editor of the Arab Journal of Plant Protection.

- **The Guardian published on March 31, 2020, an article about Dr Kumari Entitled "Planting hope: the Syrian refugee who developed virus-resistant super-seeds".**
- **On May 6, 2020, Dr Kumari talks in the BBC World Service program "Outlook" describing her journey as a woman in the world of plant virology, culminating in the development of virus-resistant seeds and her life-risking journey to save them.**

Dr Kumari talks about the development of faba bean seeds resistant to *Faba bean necrotic yellows virus* infection that could safeguard food security in the region and how she risked her life to rescue them from Aleppo. Dr Kumari's work focuses on a quiet yet devastating development crisis. Fuelled by climate change, virus epidemics affecting faba beans, lentils and chickpeas are spreading from Syria to Ethiopia, gradually destroying the livelihoods of low-income farming communities. Known as "poor man's meat", these pulses are vital for both income generation and food security in many parts of the world. Dr. Kumari explained that finding a solution was urgent. Hopeless farmers were seeing their infected crops turning yellow and black because of the virus epidemic. In addition, Dr Kumari describes ICARDA's mission, as a non-profit organization, provide farmers free of charge, innovations that contributes towards food security and improved livelihood of farming communities in the region.
You can read the full Guardian paper on:
https://www.theguardian.com/global-development/2020/mar/31/planting-hope-the-syrian-refugee-who-developed-virus-resistant-super-seeds

You can listen to BBC interview using the following link:
https://www.facebook.com/166091433517809/posts/2690288501098077/

ASPP Pathologists Can Add their Profile to the World Directory of Plant Pathologists

Since the Arab Society for Plant Pathology (ASPP) is a member of the International Society of Plant Pathology (ISPP), pathologists who are ASPP members have the privilege to add their profile to the World Directory of Plant Pathologists by using the following link: http://worldwidedirectory.apsnet.org/
Interested individuals can provide the needed information by following the steps provided by the above link. All pathologists who are members of ASPP are encouraged to have their profiles listed in such an important directory. Having listed in such a directory will enhance communications with the world community of plant pathologists.

13th Arab Congress of Plant Protection, Hotel Le Royal, Hammamet, Tunisia, 1-6 November 2020

"Plant Health for Secure and Safe Food"

Organized by
Arab Society for Plant Protection
ACPP2020
www.acpp-aspp.com

In collaboration with Ministry of Agriculture and Water Resources and Fisheries in Tunisia represented by National Agricultural Research Institute of Tunisia

First Announcement

Welcome to Green Tunisia

Invitation to join

The Arab Society for Plant Protection (ASPP) in collaboration with the Tunisian Ministry of Agriculture and Water Resources and Fisheries represented by the National Agricultural Institute of Tunisia (INRAT) are honored in inviting researchers and scientists interested in plant protection scientists working in public institutions or in the private sector, whether in Ministries, Universities, research centers and local or international organizations to present their recent findings and exchange knowledge and expertise in all aspects of protecting plants from the attack of different pests of common interest, with special emphasis on new developments in adopting environment friendly integrated pest management strategies.

Congress Themes

1. Insects, mites and rodents' economic pests
2. Plant diseases and their control
3. Ecology and epidemiology of plant diseases
4. Natural enemies and their role in pest control
5. Weeds and their control
6. Pesticides
   - Biopesticides and food chain
   - Compatibility between biopesticides and biological control components
   - Safe use of Agricultural chemicals
7. Postharvest pests
8. Quarantine and phytosanitary measures
9. Integrated pest management
10. Genetic engineering and pest control
11. Beneficiary insects (bees and silk worm)

Organizing Committee

Asma Najar (Chairperson), Tunisia
Sonia Bouhachem, Tunisia
Naima Mahfoudhi, Tunisia
Thouraya Souissi, Tunisia
Kaouthar Lebdi Grissa, Tunisia
Ben Jamaa Mohamed Lahabib,
Noura Omri, Tunisia
Ikbal Chaieb, Tunisia
Mejda Daami, Tunisia
Anis Ben Rayana, Tunisia
Mondher Ben Salem, Tunisia
Bechir Allagui, Tunisia
Hajer Ben Ghanem, Tunisia
Riadh Gabsi, Tunisia

General Congress Program

The general congress program includes the following:

Sunday November 1, 2020	• Arrival and registration
Monday November 2, 2020	• Registration, opening session and a symposium in the morning and two oral concurrent sessions in the afternoon. • First poster session
Tuesday November 3, 2020	• A symposium and two oral concurrent sessions in the morning and two oral

	concurrent sessions in the afternoon, followed by the ASPP general assembly meeting in the evening. • First poster session
Wednesday November 4, 2020	• Field trip
Thursday November 5, 2020	• A symposium and two oral concurrent sessions in the morning and two oral concurrent sessions in the afternoon, followed by new ASPP Executive Committee election and gala dinner in the evening • Second poster session
Friday November 6, 2020	• A symposium and two oral concurrent sessions in the morning and two oral concurrent sessions in the afternoon. • Second poster session

Congress language

Arabic (official language), English (symposia sessions)

Registration fees (do not include hotel accommodations)

Type of participation	Participants from Tunisia (Tunisian Dinar)	Participants from outside Tunisia (Tunisian Dinar)
Regular (with or without abstract)	300	600
Graduate students	200	450
Accompanying persons	150	300

- Registration fees cover congress participation, congress printed materials, lunches, coffee/tea breaks, field trip and registration fees for three years in the Arab Society for Plant Protection.
- Graduate students should provide a certificate from credible education institutions confirming their status.
- Fees of accompanying persons cover the field trip and the gala dinner.

Correspondence

13th Arab Congress of Plant Protection Secretariat (ACPP 2020)
Email: info@acpp-aspp.com
Mobile/WhatsApp: 00216-58461273
Congress website: www.acpp-aspp.com

Important dates

✓Last date for registration	September 1, 2020
✓Sending abstracts approval letters	May 30, 2020
✓Last date for hotel booking	September 30, 2020
✓Deadline for submission of proposals for invited research sessions	December 31,2019

Registration

13th Arab Congress of Plant Protection (ACPP2020) you can refer to the site below www.acpp-aspp.com

In order to receive all information related to the congress, participants are encouraged to send their completed registration form to the congress secretariat soonest (info@acpp-aspp.com)

As of the end of April, the number of those registered in the conference reached 452 participants from 38 scientific and academic institutions, and the number of accompanying persons reached 114. The conference has a scheduled date of 1-6 November 2020 if everythings going well. At the time, the organizing committee is working hard to complete the abstracts book, and it is currently in progress.

Hotel Accommodations

The Congress will be held at Le Royal Hotels & Resorts

Address: BP 237-Yasmine Hammamet 8050 - Tunisia
Phone :(+216) 72 244 999
Mobile :(+216) 98 747 899
Link: www.leroyal.com
For the ACPP 2020 participants, Le Royal Hotel 5* provides special standard room rates for the period 1-6 November 2020:

	Le Royal Hotel 5*		
1	**Double Room Bed and Breakfast**	**150 TND**	**room/night**
2	**Double Room Half Board**	**180 TND**	**room/night**
3	**Single Room Bed and Breakfast**	**120 TND**	**room/night**
4	**Single Room Half Board**	**144 TND**	**room/night**
5	**Additional buffet meal**	**A special rate of 56 TND Including tax per meal.**	

TND = Tunisian Dinar

Please note that according to a government law a stay tax of 3 TND per person per night has to be paid by all guests who will be accommodated in the hotel. At present one USD=2.8 TND.

To book your room, please contact the reservation office: reservation-ham@leroyal.com and maher.mokaddem@leroyal.com and mention in the reservation request the congress code "ACPP 2020".
Participants are encouraged to make their room reservation no later than September 30, 2020.

The Second Proposed Hotel which is very close to the congress venue is Concorde hotel Marco Polo 4*.

Address: B.P. 35, Hammamet 8065 - Tunisia
Phone. : (+216) 36 030 018
Mobile: (+216) 99,000 856
Link: **www.concorde-tunisia.com**
For the ACPP 2020 participants, special standard room rates for the period 1-6 November, 2020 are provided:

	Hotel Marco Polo 4*		
1	**Double Room Bed and Breakfast**	**150 TND**	**room/night**
2	**Double Room Half Board**	**180 TND**	**room/night**
3	**Single Room Bed and Breakfast**	**95 TND**	**room/night**
4	**Single Room Half Board**	**110 TND**	**room/night**
5	**Additional buffet meal**	**A special rate of 45 TND Including tax per meal.**	

TND = Tunisian Dinar

Please note that according to a government law a stay tax of 3 TND per person per night has to be paid by all guests who will be accommodated in the hotel. At present one USD=2.85 TND.

To book your room, please contact the office:
reservation.hmp@concordetunisia.com and sales2@concorde-tunisia.com and mention in your reservation request the congress code "ACPP 2020".
Participants are encouraged to make their room reservation no later than June 30, 2020.

KEYNOTE ADDRESS AND SYMPOSIA PROGRAM -13TH ACPP 2020, HAMMAMET, TUNISIA

Monday, November 2, 2020 (Opening Session)
Keynote address: Plant health and food security: the burden of pests on major food crops. Suggested speaker: Dr. Serge Savary, INRA, France.

Symposium I: Plant Health for Food Security and Safety (In celebration of the Plant Health Year 2020)

1- Plant health vision for the 21st century: new knowledge and approaches. Sophien Kamoun, The Sainsbury Laboratory, Norwich, UK.
2- Mycotoxins as a hidden threat for food and feed safety: risks and challenges. Dr. Antonio Logrieco, CNR, Bari, Italy.
3- Importance of compliance to international phytosanitary regulations for seeds and plants to enhance food security. Dr. Nico Horn, Director General, EPPO, Paris, France.
4- Conservation and use of global plant genetic resources for enhancing insect pests and disease resistance. Suggested speaker: Dr. Ahmed Amri, ICARDA, Rabat, Morocco.

Tuesday, November 3, 2020
Symposium II: Research and Innovation for Sustainable Crop Protection
1- Wheat stem rust: How to meet the challenges of a re-emerging threat to wheat production. Dr. D. Hodson, CIMMYT, Addis Ababa, Ethiopia.
2- The challenges of automatic counting and identification of insect threats using smart technology. Dr. James Bell, Rothamsted Experimental Station, UK.
3- Parasitoid pre-adaptation improves biological control of symbiont-protected aphids. Dr. Christoph Vorburger, EAWAG, Swiss Federal Institute of Aquatic Science and Technology and Institute of Integrative Biology, Switzerland.
4- How to cope with resistance to insecticides to improve pest management. Dr. Emanuele Mazzoni, Istituto di Entomologia e Patologia Vegetale, Universita Cattolica del Sacro Cuore, Italy.

Thursday, November 5, 2020
Symposium III: Advances in Molecular Plant Protection and its Applications in Pest Management
1- Molecular interaction between plants and beneficial microbes and its application on development of new bio-pesticides and bio-fertilizers. Dr. Mateo Lorito, University of Naples Federico II, Naples, Italy .
2- The use of RNA interference approach to protect agricultural crops against fungal pathogens. Dr. Mark Belmonte, University of Manitoba, Canada.
3- Metabolic approaches for citrus greening management. Dr. Nabil Killiny, University of Florida, USA
4-Moleular techniques for mites characterization and their use in the biological control of pests. Dr. Marie-Stephane Tixier, Montpellier SupAgro, France.

Friday, November 6, 2020
Symposium IV: Application of Behavioral control Tools as a Safe and Effective Alternative in Pest Management

1- SPLAT semiochemical technology for behavioral manipulation of insect pests. Dr. Agenor Mafra-Neto, CEO of ISCA Technologies, Riverside, California, USA.
2- Manipulation of plant pests host-finding and acceptance behavior: Practical applications in IPM. Dr. Baldwyn Torto, ICIPE, Nairobi, Kenya.

3- Application of tritrophic interaction strategies in pest management systems. Dr. Stefano Colazza, University of Palermo, Palermo, Italy. www.acpp-aspp.com, www.asplantprotection.org

ASPP MEMBERS NEWS ABROAD

Electrolysed Water and Salt Solutions can Reduce Green and Blue Molds while Maintain the Quality Properties of 'Valencia' Late Oranges. The effect of four salt solutions; sodium metabisulfite (SM), potassium sorbate (PS), potassium carbonate (PC) and sodium chloride (SC) as electrolyte to generate alkaline (alEW) and acidic (acEW) electrolysed water was assessed *in vitro* and *ex vivo* under artificial and natural infection against *Penicillium digitatum* and *P. italicum*, the causal agents of green and blue molds, respectively. Generally, both components of the electrolysed water have exhibited decontaminating activity against the two tested Penicillium species, with clear stronger effect for the acidic component. The effect of alEW and acEW on physical and chemical properties of 'Valencia' sweet orange quality, including mass loss, total soluble solids (TSS), citric acid, pH, ascorbic acid and fruit color index was investigated. The results suggest that neither alEW nor acEW may have any negative impact in term of orange quality as compared to control treatments. alEW produced by PS and PC have increased citric acid content of orange fruits. The inhibitory effect of alEW and acEW against naturally occurring microbial population of filamentous fungi in the fruit washing tank was recorded. The direct effect of alEW and acEW on radial growth, conidial germination, germ tube elongation and the morphological changes of both pathogens by scanning electron microscopy (SEM) was examined. Results have shown that treatments have caused abnormal mycelia growth, irregular branching of hyphae in the apical part and loss of linearity in the tested fungal structures. Some salts, as electrolytes, have shown potential to produce robust electrolysed water that may represent valuable ecofriendly tool in controlling citrus postharvest decay **[Khamis Youssef, Ahmed Hussien. Postharvest Biology and Technology 159 (2020) 111025, Plant Pathology Research Institute, ARC, Egypt; Regional office for Near East and North Africa, FAO, Egypt].**

Synergistic Effect of a Novel Chitosan/silica Nanocomposites-based Formulation against Gray mold of table Grapes and its Possible Mode of Action. Ecofriendly nanostructured materials have been proposed as promising alternative control means to prevent plant diseases. Chitosan nanoparticles (CN), silica nanoparticles (SN) and chitosan-silica nanocomposites (CSN) were synthesized and their morphology and structure was characterized by transmission electron microscope (TEM), scanning electron microscopy (SEM), infrared spectra (FT-IR) and Raman spectroscopy. Their antifungal efficiency against Botrytis cinerea, the causal fungus of gray mold disease of table grapes, was tested in vitro and in vivo (under artificial and natural infections). In vitro tests showed that CN, SN and CSN reduced fungal growth by 72, 76 and 100%, respectively at 1% as compared to control. Under natural infection, at the end of cold storage, CSN was the most effective treatment, and reduced the development of gray mold by 59 and 83%, for 'Italia' and 'Benitaka' grapes, respectively as compared to the water control. Results indicate that a synergistic effect of CSN against gray mold was observed. The impact of tested nanocomposites on soluble solids - TSS, titratable acidity - TA, TSS/TA, berry color, mass loss, stem browning and shattered berries was investigated. No negative effect of tested nanomaterials in term of grape quality was observed. For 'Italia' table grape, CN and CSN can preserve bunches from mass loss as compared to control. Also, the effect of CSN on reactive species of oxygen (ROS), ATP content and mitochondrial membrane potential (MMP) of B. cinerea spores was determined to verify its mode of action. The obtained results suggested CSN, as alternative control means, to reduce/substitute the use of fungicides to control gray mold of table grapes while maintaining grape quality **[Khamis Youssef, Admilton G. de Oliveira, Cesar Augusto Tischer, Ibrar Hussain, Sergio Ruffo Roberto. International Journal of Biological Macromolecules 141 (2019) 247–258, Plant Pathology Research Institute, ARC, Egypt; Londrina State University, Parana, Brazil].**

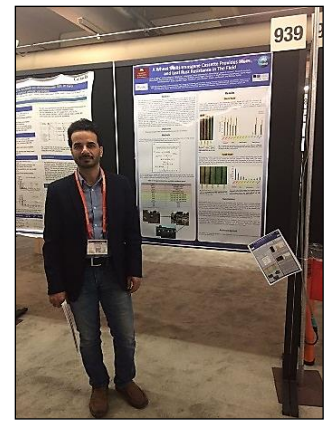
Postharvest Preservation of the New Hybrid Seedless Grape, 'BRS Isis', Grown Under the Double-Cropping a Year System in a Subtropical Area. 'BRS Isis' is a new hybrid seedless table grape tolerant to downy mildew with a good adaptation to the tropical and subtropical climates. Gray mold, caused by Botrytis cinerea Pers. ex Fr. is known as the most important postharvest mold in table grapes, causing extensive losses worldwide. As the postharvest behavior of 'BRS Isis' is still unknown, the objective of this work was to evaluate the postharvest preservation and B. cinerea mold control of this new grape

cultivar, grown under the double-cropping a year system. Grape bunches were purchased from a field of 'BRS Isis' seedless table grapes trained on overhead trellises located at Marialva, state of Parana (South Brazil). Grapes were subjected to the following treatments in a cold room at 1±1 ºC: (i) Control; (ii) SO_2-generating pad; (iii) control with bunches inoculated with the pathogen suspension; (iv) SO_2-generating pad with bunches inoculated with the pathogen suspension. The completely randomized experimental design was used with four treatments, each including five replicates. The incidence of gray mold and other physicochemical variables, including bunch mass loss, shattered berries, skin color index, soluble solids (SS), titratable acidity (TA), and SS/TA ratio of grapes, were evaluated at 50 days after the beginning of cold storage and at seven days at room temperature (22±2 ºC). The 'BRS Isis' seedless grape, packaged with SO2-generating pads and plastic liners, has a high potential to be preserved for long periods under cold storage, at least for 50 days, keeping very low natural incidence of gray mold, mass loss, and shattered berries **[Saeed Ahmed, Sergio Ruffo Roberto, Khamis Youssef, Ronan Carlos Colombo, Muhammad Shahab, Osmar José Chaves Junior, Ciro Hideki Sumida and Reginaldo Teodoro de Souza. Agronomy 2019, 9, 603; doi: 10.3390/agronomy9100603, Plant Pathology Research Institute, ARC, Egypt; Londrina State University, Parana, Brazil].**

The Potential of *Citrullus colocynthis* Oil as a Biocide against Phytoparasitic Nematodes. The high content of nematicidal fatty acids in *Citrullus colocynthis* seed oil could result in a novel product with a nematicidal potential. In this study, *C. colocynthis* oil was evaluated for its *in vitro* activity both against infective juveniles and eggs of the root-knot nematode *Meloidogyne incognita* and against infective specimens of the lesion nematode *Pratylenchus vulnus*, as well as against the suppressiveness of *M. incognita* in an experiment on potted tomatoes. The fatty acid composition of the tested oil was determined by gas chromatography analysis. Linoleic acid methyl ester (44.63%) and oleic acid (26.48%) were the two main fatty acid components, but there were also consistent percentages of erucic acid methyl ester (10.08%), palmitic acid (7.88%), and stearic acid (5.86%). *C. colocynthis* oil was highly toxic to *M. incognita* juveniles (>73% mortality) after a 24-h exposure to a 25 µg mL^{-1} solution, whereas infective specimens of *P. vulnus* were less sensitive with 46.6% mortality after a 24- h exposure to a 100 µg mL^{-1} oil solution. The viability of *M. incognita* eggs was strongly affected by *C. colocynthis* oil treatments with more than 64% egg mortality resulting from a 72-h immersion in a 250 µg mL^{-1} oil solution. Soil treatments with *C. colocynthis* oil resulted in a significant reduction of both *M. incognit*a eggs and gall formation on tomato roots, as well as of nematode density in the soil, in comparison to the non-treated control. Tomato plant growth was not negatively affected by *C. colocynthis* oil treatments, though a slight increase in plant biomass was recorded at just the highest concentrations of oil. This research demonstrates the nematicidal properties of *C. colocynthis* oil and, thus, its potential for the formulation of new products that could be applied in the context of organic or integrated management of phytoparasitic nematodes. **[Waed Tarraf (Syria), Sebastiano Laquale, Giuseppe De Mastro, and Trifone D'Addabbo. Crop protection, 124, 104843, 2019**

A Wheat Multi-Transgene Cassette Provides Stem and Leaf Rust Resistance in the Field.

Stem rust (*Puccinia graminis* f. sp. *tritici*, Pgt) and leaf rust (*Puccinia triticina*, Pt) are two of the most devastating diseases of wheat worldwide. Plant breeder around the world straggling to keep a single gene resistance source against rust decreases for long time, just matter of time the pathogen will produce a new race overcome a single gene. Genetic resistance offers the best means of control for plant diseases, but often lacks durability due to changes in pathogen virulence. The aim of this revolution project is to stack a multi-gene cassette of resistant genes in a wheat line to convert resistance against many to more than one rust diseases or multi-race resistance, also make it challenging for the pathogen to overcome multi-resistant gene onetime. This project is fully funded by 2Blades Foundation and operated by the cooperation between University of Minnesota, and John's Innes Center, and CSRIO. To enhance durability of rust resistance in wheat, a multi-transgene gene cassette consisting of four all-stage resistance genes (Sr22, Sr35, Sr45 and Sr50) and one multi-pathogen adult plant resistance (APR) gene (Sr55/Lr67) was introduced in cultivar Fielder using Agrobacterium-mediated transformation. Five transgenic lines with the cassette plus Fielder were grown and inoculated with Pgt race QTHJC (virulent on Fielder) in Minnesota in 2018 and 2019. Disease pressure was high in both years as Fielder exhibited disease severities of



60 and 96%, respectively (figure 1). In contrast, each of the five multi-transgene lines was highly resistant showing only hypersensitive flecks and no pathogen sporulation whatsoever. To assess the level of leaf rust resistance in the transgenic lines in the field, an epidemic was initiated with Pt races MNPSD, MBDSD and MPPSD in 2019. Area under Disease Progress Curve (AUDPC) values for the transgenic lines were significantly lower (43 to 117) than for Fielder (456). The reduced leaf rust progression is consistent with Sr55/Lr67 being functional and providing characteristic partial APR to Pt (figure 1). The pyramiding of all-stage and APR genes in wheat by transformation provides a means to extend the durability of rust resistance and also simplify the breeding process since the cassette segregates as a single locus.**[Oadi N. Matny[3],(Iraq-USA), Mehran Patpour[4], Ming Luo1, Liqiong Xie[2], Soma Chakraborty[1], Aihua Wang[1], James A. Kolmer[3], Terese Richardson[1], Dhara Bhatt[1], Mohammad Hoque[1], Chris Sorenson[4], Burkhard Steuernagel[5], Brande B. H. Wulff[5], Narayana Upadhyaya[1], Rohit Mago[1], Sam Periyannan[1], Evans Lagudah[1], Roger Freedman[6], Lynne Reuber[6], Brian J. Steffenson[3], Michael Ayliffe[1] [1]CSIRO Agriculture and Food, Box 1700, Clunies Ross Street, Canberra, Australia, 2601, [2]School of Life Science and Technology, Xinjiang University, Urumqi, Xinjiang, 830046, [3]Department of Plant Pathology, Stakman Borlaug Center for Sustainable Plant Health, University of Minnesota, St. Paul, MN 55108, USA James A. Kolmer: USDA-ARS Cereal Disease Laboratory, St. Paul, MN 55108 USA, [4]Dept. of Agroecology, Aarhus University, Forsøgsvej 1, DK-4200 Slagelse, Denmark, [5]John Innes Centre, Norwich Research Park, Norwich, NR4 7UH, United Kingdom , [6]2Blades Foundation, 1630 Chicago Avenue, Suite 1901, Evanston, IL 60201 USA] (Doctorate, 2020)**

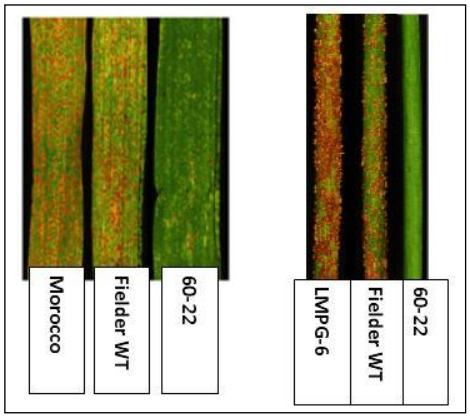


Figure 1. Left picture represented leaf rust disease, Big5 60-22 resistant, Fielder-WT and Morocco susceptible controls. Right picture represented stem rust disease Big5 60-22 resistant, Fielder-WT and LMPG-6 susceptible controls.

XYLELLA NEWS

During the 1st CURE-XF International Workshop on "*Xylella fastidiosa* "held in Morocco

The 1st CURE-XF International Workshop on "*Xylella fastidiosa* – diagnosis, control, and management measures" was organised in Morocco (Meknes and Marrakech) from 2 to 8 February 2020 by CIHEAM Bari (Italy), as a Project Coordinator and the Moroccan Ministry of Agriculture and INRA Maroc, the Moroccan partner of the project. The workshop was carried out at the conference hall of the Food Quality Pole of Meknes and extended until February 8 2020 in a hotel (Theorical session) and the regional center Agricultural Research (Pratical session) in Marrakech.

The International Workshop objectives were: - Providing basic scientifique knowledge and practical experiences on different aspects underlining the complex pathogen-hosts-vectors interactions; - Promoting research capacity building in Third Countries; - Raising awareness on the emerging threats posed by *Xylella fastidiosa*; - Supporting pest risk assessment. The

programme included lectures and practical sessions on: - Biology (host range and symptomatology) and genetics; - Diagnosis and strain characterization (isolation and culturing, serological and innovative molecular approaches); - Novel applications to support monitoring programs and surveys; - Identification of insect vectors and monitoring approaches. Laboratory work focused on bacterial diagnosis techniques using PCR techniques and LAMP. About 400 participants attended both workshops, representing all most important stakeholders and institutions in Morocco: Ministry of Agriculture, INRA, ONCA, ONSSA, Universities, Chambers of Agriculture, Private sector, Master and PhD's students, and participants from other countries, especially Tunisia and Serbia. It should be noted that this pest has not yet found in Morocco, but it is one of the most destructive diseases of many types of crops, numbering approximately 560 species globally, including olive tree, vineyard, citrus, medicinal and aromatic plants and others. [**Dr El Hassan Achbani National Institute for Agricultural Research, Morocco, 2020].**

General News

Arab countries participation on the 15th European Conference on Fungal genetics (ECFG15)

The 15th European Conference on Fungal genetic (ECFG15) is an international conference on fungal genetics, biology, host pathogen interaction and evolutionary ecology. This event was organized by Sapienza University of Rome and held at Rome (Italy), from 17 to 20 February 2020. The aim of ECFG15 is to showcase recent advances in fungal genetics and molecular biology, including cellular biology, omics technology, host-pathogen interactions, evolutionary genomics, and molecular ecology.

In the first day of the conference, February 17th, 6 satellite workshops on the following topics were held concurrently: *Aspergillus, Trichoderma, Fusarium, Neurospora, Colletotrichum and Magnaporthe*. These workshops took place at Sapienza University Main campus. The conference includes four keynote lectures, three plenary sessions, thirteen concurrent sessions, and three poster sessions and took place from 18th to 20th February at Frentani Convention Center close to Sapienza University of Rome. The conference was attended by 650 participants from 39 countries around the world. The Arab countries were represented by three countries, Algeria (3 participants), Tunisia (1 participant), and the United Arab Emirates (1 participant).

Care and Management of Date Palm Trees in Parks.

The palm trees ***Phoenix dactylifera*** are considered one of the basic elements in beautifying gardens and streets, especially in the Arab world. One of the regular maintenances of palm trees that gives a special aesthetic is the cleaning trunk process. cleaning trunk process is to remove the bases of fronds on the trunk, as well as removing the fibers that surround them, the purpose of the process is to give the palm a good look, make the stem look organized and help the worker climb to do various palm operations as pollination, spine removal ,harvesting the dates and pest control . The time of the process must not exceed three dates: (1) in the fall immediately after the collection of the fruits, (2) in the early spring at the time of pollination, (3) during the process of organizing the dates in the summer. Negligence in performing this process in due time will collect insects on palm trees under fibers such as stem borers and RPW, that damage and distort their external appearance. In general, public parks suffer by default in this process due to missing the date palm expertise to perform all the management operations. The photo shows a palm tree before and after trimming process. [**Anas Samour, Agricultural Engineer, Kingdom of Saudi Arabia, Riyadh].**

Potato Late Blight Fungus

The scientific name: *Phytophtora infestans.* This disease is considered one of the most deadly diseases on the potato plant and it is easy to move from one plant to another. Symptoms appear on the vegetative part of the plant in the form of dark spots surrounded by a yellow ring and then spread out the entire leaf. In high humidity, spots containing white fluff appear on the lower surface of the leaf. On the fruits, watery spots appear greenish –gray and sometimes appear as overlapping rings**. To prevent this disease**: (1) Applying an agricultural cycle every two years, (2) Avoiding cultivation on affected or heavy soils, (3) Removing agricultural waste, (4) Using of healthy seeds and choosing of resistant varieties, (5) Observing the field constantly and regulating irrigation periods, (6) applying o balanced fertilization and (7) Sorting potatoes after harvest**. Chemical controls**: (1) Spraying a preventive fungicide when the appropriate climatic condition are favorable for the spread of the disease (Mancozeb 80% or Copper oxychloride 50%), (2) Re-spyring in case the disease continues, (3) If it rained for more than 72 hours and the appropriate weather conditions for the disease has continued, a preventive systemic fungicide (Cymoxanil 5% + Mancozib 68 % can be used, (4) Rotation in the use of pesticides and the adherence to the safety period of the pesticide. **[Zeina Tarek Balady (Syria), Diploma in Agricultural Engineering. Department of Plant Protection Ministry of Agriculture and Agrarian Reform, Damascus-Syria, 2020]**

MedForum2018 "Research and Innovation: Tools for Sustainable Agriculture and Food Security"

After the success of the 1st edition of Montpellier in 2016, CIHEAM organized the 2nd edition of the Mediterranean initiative for PhD students and young researchers (MedForum2018) at CIHEAM Bari (Italy) from 18 to 20 September 2018. MedForum2018, entitled "Research and Innovation: Tools for Sustainable Agriculture and Food Security", focused on the CIHEAM Strategic Agenda 2025 (CAPMED2025) and its Action Plan developed for the implementation of the United-Nations 2030 Agenda for Sustainable Development, in specific fields across the Mediterranean area.

Through the research work of PhD students and young researchers, MedForum2018 aimed at:
- Fostering entrepreneurship, women and youth employment;
- Identifying and sharing potential innovation tools geared towards integrated solutions for sustainable agriculture, food and nutrition security;
- Enhancing research and innovation impact at national and regional level;
- Proposing alternatives to prevent young researchers' migrations. MedForum2018 was organized by CIHEAM in partnership with MAECI-Italy (Ministry of Foreign Affairs and International Cooperation), CMI (Center for Mediterranean Integration of the World Bank), UfM (Union for the Mediterranean), Agreenium (Institut Agronomique, Vétérinaire et Forestier de France) and with the technical collaboration of the Food and Agriculture Organization of the United Nations (FAO).

The book contains 28 contributions (7 extended abstracts and 21 full papers) from over 80 young researchers from the Mediterranean basin.
The book and the individual papers, all in Open Access, can be downloaded by clicking here.
https://om.ciheam.org/option.php?IDOM=1035

SELECTED RESEARCH PAPERS

- **Application Technology of Imidacloprid in Wheat: Effects on Schizaphis Graminum Management and Natural Enemies.** William A. Machado, Stephan M. Carvalho, João Paulo A. R. da Cunha, Sérgio M. Silva and Ernane M. Lemes, Vol.14(1), pp. 36-44, January 2020. https://doi.org/10.5897/AJPS2019.1884

- **An Assessment of the Transmission Rate of the *Tomato Black Ring Virus* through Tomato Seeds.** Henryk Pospieszny, Natasza Borodynko-Filas, Beata Hasiów-Jaroszewska, Bartosz Czerwonka, Santiago F. Elena. Plant Protection Science, 56, (1): 9–12, 2020. https://doi.org/10.17221/33/2019-PPS

- **The Efficacy of Novel Diamide Insecticides in *Grapholita molesta* Suppression and their Residues in Peach Fruits.** Antonije Žunić, Slavica Vuković, Sanja Lazić, Dragana Šunjka, Dragana Bošković, Plant Protection Science, 56, (1): 46–51, 2020. https://doi.org/10.17221/71/2019-PPS

- **The Biological Control of the Grapevine Downy Mildew Disease using *Ochrobactrum* sp.** Chaoqun Zang, Qiujun Lin, Jinhui Xie, Ying Lin, Shuyi Yu, Kuihua Zhao, Chunhao Liang, Plant Protection Science, 56, (1): 52–61, 2020. https://doi.org/10.17221/87/2019-PPS

- **New Reports on Locality and Host Relationship of *Ganoderma resinaceum* from Iran.** Somayeh Keypour and Mohammad Reza Asef, Australasian Plant Pathology, pp 1–4, 2020. https://link.springer.com/article/10.1007/s13313-020-00688-7

- **Prevalence of Plant Parasitic Nematodes Associated with Grapevine in Minia Governorate, Egypt.** H. M. Hassan, M. M. Tantawy, A. M. Younes and M. O. Sayed, Pakistan Journal of Nematology, 37(2): 117-122, 2019. https://pjn.com.pk/papers/1569494717.pdf

- **Evaluation of Some Plant Species for Their Resistance against Root-Knot Nematode Meloidogyne Spp.** I. K. A. Ibrahim, Z. A. Handoo, A. M. Zid and M. R. Kantor, Pakistan Journal of Nematology, 37(2): 135-140, 2019. https://pjn.com.pk/papers/1569494910.pdf

- **Dissecting the Genetic Complexity of Fusarium Crown Rot Resistance in Wheat.** Shree R. Pariyar, Gul Erginbas-Orakci, Said Dadshani, Oyiga BenedictChijioke, Jens Léon, AbdelfattahA. Dababat & Florian M.W.Grundler , Scientific Reports, 10:3200, 2020, https://doi.org/10.1038/s41598-020-60190-4

- **Plant-parasitic Nematodes on Cereals in Northern Kazakhstan.** Abdelfattah Dababat, Mustafa İmren, Mikhail Pridannikov, Göksel Özer, Rauan Zhapayev, Fouad Mokrini, Ainur Otemissova, Aigerim Yerimbetova and Alexey Morgounov , Journal of Plant Diseases and Protection, 2020. https://doi.org/10.1007/s41348-020-00306-0

PAPERS PUBLISHED IN THE ARAB JOURNAL OF PLANT PROTECTION (AJPP) VOLUME 38, ISSUE 1, MARCH 2020

ECOLOGY

The influence of some environmental factors on the biological performance of the Eucalyptus gall wasp, *Ophelimus maskelli* (Ashmead) on the leaves of *Eucalyptus camaldulensis* under field conditions in Kerbala, Iraq

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ABSTRACTS

Abstracts Presented during a Workshop Entitled "Detection, Spread and Management of Invasive and New Emerging Pests in Syria and Neighbouring Countries", Organized by the Arab Society for Plant Protection and Faculty of Agriculture, Tishreen University, held in Lattakia - Syria during 7-8 January 2020

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PAPERS, WHICH WILL BE PUBLISHED IN THE ARAB JOURNAL OF PLANT PROTECTION (AJPP), VOLUME 38, ISSUE 2, JUNE 2020

- **Red gum lerp psyllid, *Glycaspis brimblecombei* Moore, 1964 (Hemiptera; Psyllidae) and its natural enemies in the province of Lattakia, Syria.** Nabil Abo Kaf and Eyad Mohamed (SYRIA).
- **Isolation and identification of local isolates of *Lactobacillus plantarum* and evaluation of their efficacy in controlling tomato Fusarium wilt disease.** Abdullah Abdulkareem Hassan, Abier Raouf Mahmoud Al-Qaissi and Lena Qasim Mohammed (IRAQ).
- **Comparison of three cultivars of climbing bean as host of *Tetranychus urticae* Koch and its predator mite *Phytoseiulus persimilis* Athias-Henroit.** Mohammad Ahmad, Riad Zidan and Alisar Shaabow (SYRIA).
- **Role of organic acids in chickpea plant resistance to leaf miner, *Liriomyza cicerina* Rondani.** Lina Ali, Abdelnaser Tressi, Nawal Kaaki, Khaled El-Shamaa and Mustapha El-Bouhssini (SYRIA & MOROCCO).
- **Molecular diagnosis of a local *Cucumber mosaic virus* (CMV) isolate and its biological control using the algae *Spirolina platensis* and bacterium *Pseudomonas fluorescens* and some herbal extracts in three cucumber varieties under field conditions.** Maaz Abdelwahab Al-Fahd, Mohamed Ghazi Abdelmagid and Okayl Najm Abboud (IRAQ)
- **Effect of the bacterial strain *Bacillus subtillis* FZB27 in controlling *Cucumber mosaic virus* (CMV) in pepper plants grown under greenhouse conditions**. May Moalla, Ahmed Ahmed, Omar Hammoudi and Emad D. Ismail (SYRIA).
- **Study the effect of insecticides used in the control of insect pests in tomato fields in Quneitra governorate In Syria on some insect predators.** Reda Hussein, Hayfaa Khaled El-Saydeh and Abdelnabi Bachir (SYRIA).

EVENTS OF INTEREST 2020-2021

1-6 November, 2020	The 13th Arab Congress of Plant Protection in Tunis (2020), Hammamat, Le Royal Hotel, Tunisia. www.acpp-aspp.com
22-29, November, 2020	3RD World Conference on Sustainable Life Sciences, Hilton Garden Inn, Mardin, Turkey. https://www.wocols.com
15-18, March, 2021	The 10th International Integrated Pest Management (IPM) Symposium in Denver, Colorado, USA. https://ipmsymposium.org/2021/call_for_proposals.html
12-16 JULY 2021	IX EURAAC Symposium of the European Association of Acarologists in Bari- Italy, https://euraac2020.com/
18-23 July 2021	XXXVI International Congress of Entomology, Helsinki, Finland. www.ice2020helsinki.fi

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

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

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