ARAB AND NEAR EAST PLANT PROTECTION NEWSLETTER

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EDITORIAL

Soil Borne Diseases of Cereals: Their Impact on Global Cereal Production and Potential Approaches for Management

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Soil Borne Pathogens (SBPs) are globally one of the most challenging production constraints facing grain growers. Their insidious and subterranean natures mean that their presence often goes unrecognized by both researchers and growers. A lack of genetic and/or chemical control options for many make their management much more challenging compared with foliar diseases such as rust and *Septoria*. Often the control of SBPs are reliant on long term management of in-field inoculum levels and likewise, the development of management strategies are reliant on long-term research approaches. Soil borne diseases of cereals are caused by both fungi (e.g. take-all caused by *Gaeumanomyces graminis* var. *tritici* (*Ggt*), crown rot (CR) caused by *Fusarium pseudograminearum* and/or *F. culmorum*, common root rot caused by *Bipolaris sorokiniana*, and bare patch caused by *Rhizoctonia solani*) and nematodes (e.g. root lesion nematode caused by *Pratylenchus* spp. and cereal cyst nematode caused *Heterodera* spp.) and all can result in reduced grain quality and quantity. As the symptoms caused by SBPs on plant roots and crowns are visible and distinct, such as lesions, cysts on root system, rots and wilt, which may lead to plant mortality; they are considered major pathogens (7). The damage caused by these diseases is accelerated in areas where water stress and monoculture practices are dominating. Sustainable agriculture production of rainfed crop exposed to drought, especially those growing under arid and semi-arid conditions, is being impacted by climate change inducing hotter and drier soils. It is important to recognize that a plant's ability to secure adequate amounts of water is severely impacted by the destabilizing effects of root rotting fungi and nematodes on root architecture (4). In 2009, soil borne pathogens were responsible for an estimated 10% of losses in vegetable crops. In Australia, current estimates put the value of grain yield lost to soil borne diseases and microorganisms such as root lesion nematodes (RLN) at more than $500 million a year (8, 9, https://grdc.com.au/resources-and-publications/groundcover/groundcover-issue-128-may-june-2017/soilborne-diseases-symposium). Root disease surveys of fields monitored by the National Paddock Survey in 2015 and 2016, showed widespread moderate levels of root disease in cereal crops across Australia. Root disease ratings varied between seasons and districts. In general, each 0.5-unit increase in root disease score above a base of 0.5 units can reduce yield by 10%. This means that in WA the average yield losses caused by SBPs could be as high as 20% in 2015 and 40% in 2016. Final losses however depend on seasonal conditions, especially during grain fill (2). Plant-parasitic nematodes alone are estimated to reduce production of all world crops by 10% (14) causing annual economic losses valued at over $125 billion (3). Unfortunately, no accurate studies was performed on a global scale to assess yield losses caused by the SBPs in cereals. Some reseracher has been published on a regional and or local economic studies on the losses caused by the SBPs (1, 10, 11, 12, 13). At a global scale, yield losses ranging from 20% to 40% were quantified in rice, wheat, barley, maize, potatoes, soybeans, cotton, and coffee in different countries and regions (10, 11). Integrated crop health management approaches, using both modern cultivars with resistance/tolerance to these organisms, as well as technologies that stimulate root health and growth coupled with modern nematode/fungi management strategies such as chemical, biological, cultural are needed for sustainable production in the ever-drier environments that are now a reality in many areas of the world (4). Genetic resistance is environmentally friendly and biologically effective, once identified. Resistance is however, not yet present in the varieties widely grown. Extensive screening of wheat germplasm against SBPs has identified many moderately resistant winter and spring wheat germplasm for nematodes and crown rot. However, CR remains a significant bottleneck for wheat production in many wheat-growing areas around the world where no variety with complete

resistant exist. Hundreds of wheat germplasm are screened annually for SBPs at the International Maize and Wheat Improvement Center (CIMMYT) in Turkey in collaboration with the Australian Grains Research Development Corporation (GRDC) with new moderately resistant to resistant germplasm being identified (5, 6). These sources of resistance are new and previously unreported QTLs were identified through association mapping (5, 6). These new sources of resistance to SBPs may be useful for selecting parents and deploying resistance into elite germplasm adapted to regions where it is a problem. Pathologists, breeders and agronomists need to work together to find solutions to the complex issues facing agricultural production and use multidisciplinary approaches to insure food security for all. Recent research within the SBPs program at CIMMYT has focused on germplasm screening, the potential of this germplasm as source of resistance, and how to incorporate the new sources of resistance into breeding programs. Breeding for resistance is particularly complicated and difficult when different species and pathotypes coexist in nature. To accelerate breeding for resistance to SBPs, expertise and recognition of SBPs as a limiting factor in wheat production potential are needed. Appropriate breeding strategies, faster screening processes, and sufficient research funding are required for more holistic approach to plant health management.

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❖ Crop Protection News from Arab and Near East Countries

INVASIVE AND NEW PESTS

ALGERIA

***Fusarium algeriense*, sp. nov., a Novel Toxigenic Crown rot Pathogen of durum Wheat from Algeria is nested in the *Fusarium burgessii* species complex.** A novel crown rot pathogen of wheat discovered during pathogen surveys in Algeria in 2014 and 2015 is formally described as *Fusarium algeriense*. Multilocus molecular phylogenetic data resolved the eight isolates of this pathogen as a genealogically exclusive species lineage in the *F. burgessii* species complex. The previously described species of this complex, *F. burgessii* and *F. beomiforme*, produce abundant chlamydospores in culture, and their optimal temperature for growth is 30C. In comparison, *F.algeriense* did not produce chlamydospores under the conditions tested and its optimal temperature for growth is 25C. Furthermore, *F. algeriense* differs from *F. burgessii* because it does not produce polyphialides and *F. beomiforme*, because it does not produce globose-to napi form conidia in the aerial mycelium. Isolates of *F. algeriense* induced moderate crown rot on the susceptible spring wheat cultivar Norm in a temperature-controlled incubator. *Fusarium burgessii* and *F. beomiforme*, in contrast, only induced mild symptoms of this disease. BLASTn searches of the whole-genome sequence of *F. algeriense* strains NRRL 66647 and 66648, using homologs of genes that are responsible for synthesis of toxic secondary metabolites, indicated that they have the potential to produce several polyketide and non-ribosomal peptide-derived mycotoxins. However, moniliformin and2-AOD-ol (2-amino-14, 16-dimethyloctadecan3-ol) were the only mycotoxins detected by liquid chromatography–mass spectrometry (LC-MS) analyses of strains cultivated in vitro on a solid medium. A polymerase chain reaction (PCR) assay for MAT idiomorph revealed that MAT1-1 and MAT1-2 strains of *F. algeriense* were present in Algeria, which suggests this pathogen might possess a heterothallic sexual reproductive mode**.[Imane Laraba, Abdelaziz Keddad, Houda Boureghda, Nora Abdallah, Martha M. Vaughan, Robert H. Proctor, Mark Busman & Kerry O'Donnell(Algeria), Mycologia, 2018].** DOI: 10.1080/00275514.2018.1425067

EGYPT

First Report and Molecular Characterization of Citrus Dwarfing Viroid (CDVd) and Citrus Bark Cracking viroid (CBCVd) on *Citrus volkameriana* in Egypt. Following the findings of hop stunt viroid (HSVd) variants associated to citrus gummy bark and cachexia diseases on *Citrus volkameriana*, evidencing stem pitting and bark gummosis in Egypt (Sofy and El-Dougdoug 2014), further studies were performed on 45 *C. volkameriana* plants, in order to investigate the putative presence of other viroids. During the summer season of 2016, sampling was carried out on citrus plants located in new reclaimed land (Nile river side banks). Leaves and budstick samples from different sweet orange varieties, grafted on *C. volkameriana* rootstock, were collected from different regions (Cairo – Alexandria desert road, Beni Suef, Benha). Total nucleic acids were extracted using the silica trap method, according to the protocol described by Foissac et al. (2001). The samples were subjected to reverse transcription and polymerase chain reaction (RT-PCR) for CDVd and CBCVd, using specific primers sets (Wang et al., 2013). The RT-PCR assays revealed a high prevalence (79%) of CBCVd on *C. volkameriana* trees expressing stem pitting and bark gummosis symptoms, whereas CDVd was found in a low number of trees (32%). Since CDVd and CBCVd were not previously reported in *C. volkameriana* in Egypt, special attention was paid to characterize molecularly both viroids detected. The RT-PCR product was clo attention was paid to characterize molecularly both viroids detected. The RT-PCR product was cloned and analysed by sequencing; the retrieved sequences of CDVd and CBCVd were deposited in GenBank under the accession numbers [MF421245.1-MF421247.1] and [MF421250.1- MF421255.1]. The CDVd and CBCVd revealed 99% nucleotide homology to the Cuban E77 isolate (AJ630358.1) and 98% nucleotide identity to the Cypriote CY305 isolate (KX819247.1) respectively. Considering that Al-Harthi et al. (2013) reported the presence of these viroids in another citrus species from the Middle East countries, including Egypt, to our knowledge this is the first report of the natural occurrence and characterization of CDVd and CBCVd on *C. volkameriana* in Egypt was cloned and analyzed by sequencing; the retrieved sequences of CDVd and CBCVd were deposited in GenBank under the accession numbers [MF421245.1-MF421247.1] and [MF421250.1- MF421255.1]. The CDVd and CBCVd revealed 99% nucleotide homology to the Cuban E77 isolate (AJ630358.1) and 98% nucleotide identity to the Cypriote CY305 isolate (KX819247.1) respectively. Considering that Al-Harthi et al. (2013) reported the

presence of these viroids in other citrus species from the Middle East countries, including Egypt, to our knowledge this is the first report of the natural occurrence and characterization of CDVd and CBCVd on *C. volkameriana* in Egypt. [**Arafat Hanani & Mohga Khater & Mounira Inas Drais & Khaled Djelouah, Journal of Plant Pathology,Published online 22August 2018.** https://doi.org/10.1007/s42161-018-0134-7]

IRAQ

First Report of Stem and Root rot of Lucky Bamboo (*Dracaena braunii*) caused by *Fusarium proliferatum* in Iraq. Recently, lucky bamboo (*Dracaena braunii*) has become a popular ornamental plant that is widely grown in Iraq. Stem and root rot symptoms were observed on this plant in several nurseries in Kerbala province, Iraq. Based on morphological and molecular characteristics, the pathogen associated with the disease was identified as *Fusarium proliferatum*. This represents the first record of this pathogen affecting the lucky bamboo plants in Iraq. [**Adnan A. Lahuf (Iraq), Hellenic Plant Protection Journal, 2018] In press.**

First Report of the Crown rot Fungus *Fusarium equiseti* affecting *Triticum aestivum* L. and *Aptenia cordifolia* seedlings in Iraq. Severe crown rot symptoms were observed on seedlings of *Triticum aestivum* L. and *Aptenia cordifolia* in Kerbala province, Iraq. The diseased seedlings displayed brownish to black necrotic lesions with softening on basal petioles and roots lead to collapse of the infected seedlings. The pathogen was identified as *Fusarium equiseti* based on its morphological and molecular characters. To best of our knowledge, this is the first report of *F. equiseti* causing crown rot on *T. aestivum* and *A. cordifolia* plants in Iraq. [**Adnan A. Lahuf, Ola H.Jaafar, Muhassen Al-Mosaoy, Zainab L. Hameed (Iraq), Asian Journal of Agriculture and Biology Journal, 2018]. In press.**

LEBANON

First Report of the main Vector of Dutch elm Disease *Scolytus multistriatus* (Marsham, 1802) on elm and Poplar Trees in Lebanon (Coleoptera, Curculionidae, Scolytinae). In August 2017, the smaller European bark beetle, *Scolytus multistriatus* (Marsham, 1802) was recorded for the first time in Lebanon on elm trees in the Monastery of Deir Taanayel at Bekaa Valley. Infected trees were highly suffered from resin flows and yellowish on crowns with shot holes on barks. In May 2018, a survey conducted in the region indicated a high infestation of barks on elm and poplar trees in two areas: Taanayel and Ammiq. Both elm and poplar trees are commonly used in Lebanon as wind barriers in agricultural zones, as shelters on roads and important habitat for the wildlife and migratory birds in the wet zones of the valley. Isolation from symptomatic wood on culture media indicates the absence of the inset associated fungus, *Ophiostoma ulmi*, the agent causal of Dutch elm disease. Despite the absence of the pathogen disease, the occurrence of *S. multistriatus* could represent a serious threat to the biodiversity in the region**. [Zinette Moussa & Abdo Tannouri (Lebanon), Bulletin de la Société entomologique de France, 123 (4): 429-434, 2018].** https://doi.org/10.32475/bsef_2045

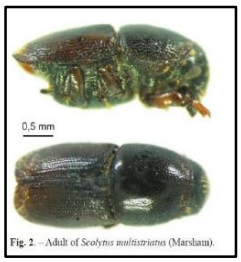


Fig. 2 – Adult of *Scolytus multistriatus* (Marsham).

SYRIA

First Report of *Cotesia glomerata* Larvae (Hymenoptera: Braconidae) Infected by Entomopathogenic nematode *Heterorhabditis* sp. The initial pathogenicity of *Heterorhabditis* sp was tested on the third larval instar of cabbage butterfly *Pieris brassicae* (Lepidoptera: Pieridae). The insect larvae were collected from the cabbage field, where the parasite *Cotesia glomerata* (Hymenoptera: Braconidae) was spread. This experiment was carried out using the petri dishe assay, that were lined with a double layer of Whatman No1 filter paper, then treated with nematodes concentration 100 IJ/ml, and kept 30 minutes. The one insect larva was placed in each of the petri dishes (10 cm), sealed with parafilm, and kept in the dark at 20-25 °. C. *P.brassicae* larvae died after (24-48) hours from treatment. On the fourth day, we observed dead parasite's larvae *Cotesia glomerata* had emerged from

the host's body and they had colored a purple. We also noticed presence many of parasite cocoons on the petri dish wall and its color was mixture of yellow and light purple. We observed the hermaphrodites nematode were moving inside the dead parasite larvae at (20X) magnification. When we put them in the white trap, the infective juveniles (IJs) emerged after 48 hours .The cocoons were monitored for 7 days and no adult parasite was recorded. We think that this registration is the first in Syria.[**Mohammad Ahmad, Nada Allouf, Mai Ali, (Syria), Plant Protection Department, Faculty of Agriculture, Tishreen University , Syria, 2018].** **In press.**

First Record of Fruit Fly *Capparimyia melanapsis* Bezzi, 1920 (Diptera: Tephritidae) on Apricot, *Prunus armeniaca* L. in Syria. The presence of fruit fly *Capparimyia melanapsis* on apricot is reported for the first time in Syria. The larvae were found in apricots fruit in the central market of fruit and vegetables transferred from Damascus countryside. During the routine survey of diseases and insects affecting different crops early June 2018 in Damascus and Damascus countryside's, yellowish to pink larvae were found within the fruit. Their length was about 1 cm long, resembled to the fruit fly larvae recorded in several species in Syria. Extensive infestation was observed on fruit, the fruit infection was 27% due to the random sampling of 1,000 fruits, and number of eggs laying holes in each fruit reached 7 holes in a limited number of fruits. The number of larvae ranged between 8 and 23 larvae in different ages. Larvae were kept and raised on the same host to complete the life cycle in cages at 18-25 °C.The larvae started to exit jumping outside the infected fruit, The length of pupa ranged between 0.4 and 0.5 cm, pupa phase for about 7-9 days, Adults emerged successively within three days, the length of males between and 5.4 mm and 7.6, length of females ranged between 6 and 9 mm, length of wings between 6.3and 7.9 mm, Adults were identified as the species *Capparimyia melanapsis* (Bezzi). The presence of this species is recorded for the first time in Syria. Classifications of males and females compared to taxonomic references. The age ranged between 41 and 65 days for females and between 26 and 35 days for males, An examination of 40 adult insects found that the ratio of female to male reached 1.5:1. **[Houda Kawas, Abdulnabi Basheer (Syria), Faculty of Agriculture, Biological Control Studies and Research Center , Damascus University, 2018]**

First Record of Quince moth *Euzophera bigella* (Zeller, 1848) (Lepidoptera: Pyralidae/ Phycitinae) on Quince, *Cydonia oblonga* (Mill.) (Rosaceae) in Syria. The presence of the Quince muth *Euzophera bigella* (Zeller, 1848) (Insecta: Lepidoptera: Pyralidae/ Phycitinae) on Quince *Cydonia oblonga* (Mill.) (Rosaceae) is reported for the first time in Syria. The larvae and pupa were found in Quince *Cydonia oblonga* (Mill.) (Rosaceae) fruit, during routine survey of diseases and insects affecting different crops in the governorates of Damascus and Damascus countryside's conducted During Summer/Autumn 2018. 200 fruits were randomly collected from different local market for fruit and vegetable products transferred from the quince growing areas in Damascus and Damascus countryside's and examined to detect and determine the nature of damage / symptoms/ insect stages. Results showed 87% percentage of infected fruit by Quince muth *E.bigella* (Zell.) found only and 25% found together with Codling moth *Cydia* (*Carpocapsa*) *pomonella* (L.) (Lepidoptera: Tortricidae) of overall infestations. In August and early September larvae feed on skin, flesh tunnel through and seeds of fruit of quince *Cydonia oblonga* (Mill.) (Rosaceae), pupae also found in fruit nearby empty seed. The entry of larvae into the fruit appears near the peduncle under the calyx or in wounds already present from some other cause. The larva up to 16-18 mm long, greenish grey with pearly reflections with reddish head, it's easy to distinguished *E. bigella* and *C. pomonella* larvae by Colour and size in the later larval instars, The chrysalis 7-9 mm long pale brown The adult wing spain of 17-20 mm is yellowish/gray with forewings crossed by two clear zigzag lines and hindwings uniformly gray, adult life span were 8 to 20 days at 25°C ±2 under laboratory condition. The highly infestation rate and heavy loss lead to consider *E. bigella* as major insect pests of quince, as a monitor of the importance of *E. bigella* in the region and as an indicator of its spread of earlier date from other plant species to Quince and the possibility of transmission to other plant species to be investigated. **[Houda Kawas, Abdulnabi Basheer (Syria), Faculty of Agriculture, Biological Control Studies and Research Center, Damascus University, 2018]**

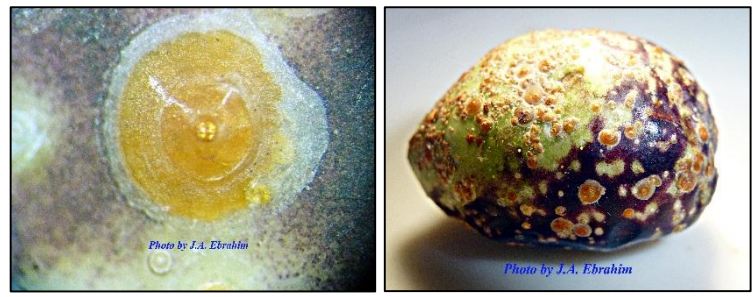
The Preliminary Record of the Death's-head Hawk-moth *Acherontia atropos* (Linnaeus, 1758) (Lepidoptera: Sphingidae) as a pest on *Solanum melongena* in Lattakia, Syria. The Death's-head Hawk-moth *Acherontia atropos* (Linnaeus, 1758) (Lepidoptera: Sphingidae) is a Polyphagous insect, attacks many kinds of plants belong to Solanaceae, Verbenaceae, Cannabaceae and Oleaceae. The moth *Acherontia atropos* is a large hawk moth with a wingspan of 90–130 mm, Caterpillars grow to a maximum of 12-13 cm. *A. atropos* lays single egg on the bottom side of Solanaceous plants, pupates in an underground chamber. *A. atropos* was recorded in eggplant (*Solanum melongena*) in Kemmen village which belongs to Al-Fakhora region in Lattakia, Syria. Where different larval instars was collected from eggplant fields during season 2015. The caterpillars were removed to insect

laboratory in the Department of Biological Control, Lattakia, and reared in glass pots under the laboratory conditions by daily supplying of eggplant leaf, and noticed the large amount of consumed food for one larva, especially in the last instar. This is the first record of Death's-head Hawk-moth as a pest in eggplant fields in Lattakia, Syria. [**Jounar Aziz Ibrahim,Walaa Jaber Bohasan (Syria), Department of Biological control, Directorate Agriculture, Syria, 2018].**

First Record of Entomopathogenic Fungus *Neozygites fresenii* on *Aphis fabae* in Syria. Aphid samples were collected on March 2017 at Damsarkho region- Lattakia. Colonies of *Aphis fabae* were found on *Beta vulgaris* var. *cicla* as mummies covered with a light brown fungus. After studying the mummies microscopically, it was observed that the mummy body was full of fungal spores, which were identified according to the classification keys of the entomopathogenic fungi and showed that the fungus was *Neozygites fresenii* (Nowakowski) Remaudière and Keller (Zygomycota: Entomophthorales: Neozygitacea). It seems that the fungus has spread epidemically within the colonies of *Aphid* in the area where it was found. It is believed to be the first record of this fungus within *Aphis fabae* in Syria **[Mohammad Ahmad, Lobna Rajab (Syria-PhD candidate), Plant Protection Department, Faculty of Agriculture, Tishreen University, 2018].**

First Detection of Black Queen cell Virus, *Varroa destructor* Macula-like virus, *Apis mellifera* Filamentous virus and *Nosema ceranae* in Syrian Honey bees *Apis mellifera syriaca.* The occurrence of honey bee viruses and *Nosema* spp. was investigated by PCR in five honey bee colonies suffering from depopulation, vestigial wings and dark coloring in Rural Damascus city (Syria). Deformed wing virus (DWV), detected in 95.8% of the samples, was the most prevalent virus, followed by *Varroa destructor* macula-like virus (VdMLV), black queen cell virus (BQCV) and *Apis mellifera* filamentous virus (AmFV) (70.8%, 29.2%, 16.7% of infection, respectively). *Nosema ceranae* was detected in two apiaries representing 8.3% of infection in the total tested samples. Simultaneous infections with two, three and four viruses together in the same sample were found. Phylogenetic analyses of the detected pathogens confirmed the high percentages of sequence identity at the nucleotide level with other isolates distributed worldwide. The present study reports the first detection and molecular characterization of VdMLV, BQCV, AmFV and *N. ceranae* in *A. mellifera* colonies with suspected infections in Syria.[**Raied Abou Kubaa, Giulia Molinatto, Bassem Solaiman Khaled, Nouraldin Daher-Hjaij, Khaled Heinoun, Maria Saponari (Syria), Bulletin of Insectology, 71 (2): 217-224, 2018].**

The Preliminary Record of the Chaff scale *Parlatoria pergandii* (Comstock, 1881) (Homoptera: Diaspididae) as a pest in Olive Orchards in Lattakia, Syria. The Chaff scale *Parlatoria pergandii* is a polyphagous insect, attacks more than 170 genus belong to 17 plant families. All citrus species are favored hosts for this insect, which attacks the stone fruits and Apple as minor hosts. *Parlatoria pergandii* is considered the most important insects pests that attack citrus and cause serious damages in different areas in the world and especially in Syria. *P. pergandii* was recorded in olive orchards, on Al-Khderee speices in Kemmen village which belongs to Al-Fakhora region in Lattakia, Syria. The density of infection reached in some cases to an undiluted covering of fruit surface, during season 2017-2018. This is the first record of *P. pergandii* as a pest on olive trees in Lattakia, Syria. [**Walaa Jaber Bohasan, Jounar Aziz Ibrahim (Syria), Department of Biological control, Directorate Agriculture, Syria, 2018].**



First Record of larval parasitoid *Bathyplectes anurus* (Thomson, 1887) (Hymenoptera: Ichneumonidae) on the larva of of Alfalfa Weevil *Hypera postica* (Gyllenhal, 1813) in Syria. A parasitic wasp of on alfalfa weevil was found during the survey. The main characteristics features are small black wasps 3-3.5 mm long with robust stout bodies, females with long ovipositors. Parasitoid wasp lays their eggs in alfalfa weevil's larvae. They prefered to oviposit in the early instars, as the wasp parasite eggs hatch the larva feed internally on the larvae killing its host after the weevil has finished spinning its cocoon. The parasitoid larva then emerges from the weevil and spins *B. anurus* cocoon and only one parasite were develop in each host weevil. These cocoons are 3-

4mm long, oval shaped, brown in color smooth edged with a white band around the middle central band. The cocoon has the habit of jumping when disturbed. The development time from eggs to adults were 20-26 days. **[Houda Kawas, Abdulnabi Basheer (Syria), Faculty of Agriculture, Biological Control Studies and Research Center , Damascus University, 2018]**

First Record of Alfalfa Weevil *Hypera postica* Gyllenhal, 1813(Coleoptera: Curculionidae) on alfalfa *Medicago sativa* Linnaeus, (Fabaceae) in Syria. The presence of Alfalfa Weevil on alfalfa is reported for the first time in Syria. Alfalfa weevil adults were found to overwinter within alfalfa crowns or crop debris and emerges in late March during routine field's survey of legumes including alfalfa in Damascus and Damascus countrysides during February-October 2018. Adult weevils are 5 to7mm in length, brownish-grey snout beetles, with a darker brown mid-back stripe. They start chewing holes in young alfalfa leaves; female weevils begin to chew holes in alfalfa stems with their beaks. They deposit one to 40 eggs in each cavity, eggs found in clusters of 2 to 25eggs/cluster. The eggs are 0.5 mm in size oval and bright to creamy yellow in colour; turn olive-brown near hatching. Egg hatch occurs in 4 to 20 days. The newly-hatched worm-like larvae pass through four growth stages or instars, yellowish-green larvae feed within the stem for a few days before moving to the opening leaf buds at the tips of the stems, leaf sheaths, petioles or in the surface litter producing a characteristic ragged appearance and feed in alfalfa stems. Larvae molt three times. The first instar is about 1 mm long and light yellow in colour. The second instar is yellowish-green with the dark head to black, while the third and fourth instars measure up to 1 cm long, are bright green with a shiny black head capsule, and have a white dorsal stripe has a dark brown head capsule. The larvae curled and drop when disturbed. Larvae found in the field feeds on alfalfa leaves during April to June and September to November, Larval development in 2 to 4 weeks. The fourth instar larvae spin a fragile lacy white cocoons attached to plant crowns or surface debris Mature larvae move down the plant or drop to the ground and may found on the surface of damaged leaf while parasite in it. The pupal period lasts 7 to 12 days. Both adults and larvae feed on alfalfa foliage, but the larvae cause the majority of the Severe damage gives the field a grayish or whitish cast area. Damage inflicted by alfalfa weevil can cause significant loss of biomass, especially leaf tissue, and also slow growth and delay crop maturity. Also *Bathyplectes anurus* Thomson, 1887 (Hymenoptera: Ichneumonidae), a larval parasitoid of the alfalfa weevil, *Hypera postica* (Coleoptera: Curculionidae) A parasitic wasp of the alfalfa weevil were found during the survey, small black wasps 3-3.5 mm long with robust stout bodies, Females with long ovipositors. Adult wasps lay their eggs in alfalfa weevil larvae, preferring to oviposit in the early instars, as the wasp parasite eggs hatch the larva feed internally on the larvae killing its host after the weevil has finished spinning its cocoon. The parasitoid larva then emerges from the weevil and spins *B. anurus* cocoon and only one parasite were develop in each host weevil. These cocoons are 3-4mm long, oval shaped, brown in Colour smooth edged with a white band around the middle central band. the cocoon has the habit of jumping when disturbed. The development time from eggs to adults were 20-26 days. Classifications compared to taxonomic references. The presence of the species is recorded for the first time in Syria. **[Houda Kawas, Abdulnabi Basheer (Syria), Faculty of Agriculture, Biological Control Studies and Research Center, Damascus University, 2018]**

MOROCCO

First Resistant Cactus Ecotypes to the wild Cochineal Identified in Morocco. Since its first detection in Doukkala region in 2014, the wild cochineal *Dactylopius opuntiae* has devastated large cactus plantations in several regions of Morocco, inflicting heavy economic losses for the whole value chain. As part of the control strategy of *D. opuntiae* set by the Ministry of Agriculture, Marine Fisheries, Rural Development and Water and Forest in Morocco, a joint team of scientists from the National Institute of Agricultural Research (INRA) and the International Center for Agricultural Research in the Dry Areas (ICARDA) screened 249 ecotypes of cactus for resistance to this pest. These genotypes are of different cactus species from the collection maintained at INRA, Morocco. The screening was carried out in the field under natural and artificial infestations. Eight ecotypes were found very resistant to the cochineal. These eight resistant ecotypes have been registered in the national cactus catalog under the names of *Marjana*, *Belara*, *Karama*, *Ghalia*, *Angad*, *Cherratia*, *Melk Zhar* and *Aakria.* Also, a timber park with these resistant ecotypes to *D. opuntiae* was established. The use of these resistant cactus ecotypes through Pillar II of the Green Morocco Plan would re-establish cactus plantations in places where the pest has wiped out this crop and contribute greatly to the overall control strategy of the cochineal. **[Mohamed Sbaghi, Rachid Bouharroud, Mustapha EL-Bouhssini , Mohamed Boujghagh, National Institute of Agronomic**

Research (INRA), Morocco, International Center for Agricultural Research in the Dry Areas (ICARDA), Morocco,2018].

TUNISIA

Aphids on Cultivated Cereals in Tunisia with a New Reported Species *Forda formicaria*. A survey of the aphids associated with cultivated cereal in Tunisia was carried out during 2010 to 2012. Fourteen aphid species were recorded from eight regions (Cap Bon, Bizerte, Beja, Bousalem, Manouba, Zaghouan, Kef and Kairouan). For the first time a new species *Forda formicaria* was identified. Ten other winged species were also recorded in the suction trap of the Cap Bon region increasing the aphid richness to 24 species. From these aphid species listed, six are numerous and known for their economic importance: namely *Diuraphis noxia* as phloem feeder and *Metopolophium dirhodum, Rhopalosiphum padi, R. maidis, Schizaphis graminum*, and *Sitobion avenae* as virus vectors. Temporal activity of these species was established for 14 years by suction trap and their seasonal activity was discussed. [Boukhris-**Bouhachem, S., Ben Fekih, I., and Souissi, R. (Tunisia), Tunisian Journal of Plant Protection, 13 (1): 79-91, 2018].**

First Report on the Occurrence of the Braconid Parasitoid *Opius monilicornis* on the Chickpea Leaf Miner *Liriomyza cicerina* in Tunisia. Surveys were conducted during 2016 and 2017 in chickpea crops to document the parasitoid species of the chickpea leaf miner (*Liriomyza cicerina*) in Beja and Kef sites (north-west of Tunisia). One braconid wasp species namely *Opius monilicornis* was recorded for the first time as parasitoid on *L. cicerina* larvae. Larvae parasitism was observed from the end of March onwards and reached its peak during April coinciding with the second annual generation of the pest. Parasitism was noticed only on the second and third instars leaf miner larvae. The parasitoid abundance was higher in Beja site compared to Kef. In winter chickpea crops, parasitism rates during 2016 and 2017 ranged from 11.44 to 17.95% while in spring they fluctuated from 11.96 to 19.77%. [**Soltani, A., Beyareslan, A., Haouel-Hamdi, S., Bousselmi, A., Amri, M., and Mediouni-Ben Jemâa, J.(Tunisia), Tunisian Journal of Plant Protection 13 (1): 93-100,2018].**

RESEARCH HIGHLIGHTS

ALGERIA

Distribution and Genetic Variability of *Fusarium oxysporum* Associated with Tomato Diseases in Algeria and a Biocontrol Strategy with Indigenous *Trichoderma* spp. Fifty fungal isolates were sampled from diseased tomato plants as result of a survey conducted in seven tomato crop areas in Algeria from 2012 to 2015. Morphological criteria and PCR-based identification, using the primers PF02 and PF03, assigned 29 out of 50 isolates to *Fusarium oxysporum* (Fo). The banding patterns amplified for genes SIX1, SIX3 and SIX4 served to identify races 2 and 3 of Fo *f. sp. lycopersici* (FOL), and Fo *f.* sp. *radicis lycopersici* (FORL) among the Algerian isolates. All FOL isolates showed pathogenicity on the susceptible tomato cv. "Super Marmande," while nine of out 10 Algerian FORL isolates were pathogenic on tomato cv. "Rio Grande." Inter simple sequence repeat (ISSR) fingerprints showed high genetic diversity among Algerian Fo isolates. Seventeen Algerian *Trichoderma* isolates were also obtained and assigned to the species *T. asperellum* (12 isolates), *T. harzianum* (four isolates) and *T. ghanense* (one isolate) based on ITS and tef1α gene sequences. Different in vitro tests identified the antagonistic potential of native *Trichoderma* isolates against FORL and FOL. Greenhouse biocontrol assays performed on "SM" tomato plants with *T. ghanense* T8 and *T. asperellum* T9 and T17, and three Fo isolates showed that isolate T8 performed well against FORL and FOL. This finding was based on an incidence reduction of crown and root rot and Fusarium wilt diseases by 53.1 and 48.3%, respectively.**[Debbi A, Boureghda H, Monte E and Hermosa R(Algeria), Front. Microbiol. 9:282, 2018**]. doi: 10.3389/fmicb.2018.00282

EGYPT

Population Density of *Meloidogyne incognita* and Eggplant Growth Vigour Affected by Sucrose-Activated Bread Yeast (*Saccharomyces cerevisiae*). Active dry bread yeast containing fungus, *Saccharomyces cerevisiae* was used as a bio-agent for controlling root-knot nematode, *Meloidogyne incognita* on eggplant under screen house conditions. Three solutions of yeast and sucrose (as a bio-fermenter) at different yeast concentrations (1, 2 & 3% yeast) + a fixed concentration of 2% sucrose and three solutions of sucrose and yeast at different sucrose concentrations (2, 3 & 4% sucrose) + a fixed concentration of 2% yeast were applied. The results indicated that there was a positive correlation (R= 0.097) between average percentage nematode reduction and the applied concentrations of yeast or sucrose. The highest concentrations of bread yeast and sucrose (3%yeast +2% sucrose) and sucrose+bread yeast solution (4% sucrose+2% yeast) achieved the highest average percentages nematode reduction of 86% and 87.4%, respectively. On the other hand, eggplant growth parameters were the best by using 2% yeast + 2% sucrose or 2% sucrose + 2% yeast as growth index was 15.4. However, the highest concentrations of yeast +sucrose solution (3% yeast + 2% sucrose) or sucrose + bread yeast solution (4% sucrose + 2% yeast) caused less growth indices compared to untreated check. **[Mahmoud M. A. Youssef and Wafaa M. A. El-Nagdi, (Egypt), National Research Centre)(Egypt)- Pakistan Journal of Nematology, 36 (2):117-122, 2018].**

Measure of Survivorship Capacity and Fecundity under Different Temperatures of Red Palm Weevil, *Rhynchophorus ferrugineus.* The present investigation was carried out at Research Laboratory of Yousry El-Sebay of Red Palm Weevil at Qassasin, Ismailia Governorate, Plant Protection Research Institute. The objective of this work is to investigate the effect of different temperatures on certain biological aspects of the red palm weevil, *Rhynchophorus ferrugineus* (Olivier) (Coleoptera:Curculionidae). Results indicated that at temperatures of 0, 5, 10 and 40 °C, the insect could not complete its life cycle. The time required for completion of embryogenesis increased as temperature decreased. The mean incubation period ranged between 13±1.08: 3±0.408 days when exposed to 20, 25 and 30°C. The highest percentage of egg hatchability was 89±1.29 % at 30 °C, while the lowest percentage was (35±1.47 %) at 20°C. The larval durations were 149±4.78, 93.5±1.55, 63±1.08 and 57±0.707 days when exposed to 20, 25, 30 and 35°C respectively. The highest percentage of adult emergence (60±1.22 %) was obtained at 30°C. The average of oviposition period lasted for 99±2.04, 46±1.08, 41±2.12 and 33±2.38 days at 20, 25, 30 and 35°C, respectively. The highest number of deposited eggs per female was 166±2.16 eggs at 30°C. According to the previous results, 30°C may be regarded as the optimum temperature for rearing the red palm weevil. [**Abbas, M.k., El-Sheikh, M.F. and Hussein, KH.M.A. (Egypt), Egy. J. Plant Pro. Res. 6 (2): 10-20, 2018].**

Mesostigmata mites (Acari: Parasitiformes) Associated with Birds and Their Nests from Egypt. A survey of gamasid mites (Arachnida: Acari: Mesostigmata) associated with domestic and wild birds in Egypt was conducted. In total, 16 species within 10 families were collected from 22 bird species. The most abundant species belong to the general *Dermanyssus* Dugès (Dermanyssidae), *Ornithonyssus* Sambon, and *Steatonyssus* Kolenati (both Macronyssidae). Among various birds examined, the distribution and occurrence of mites were recorded. Taxonomic remarks about the morphology of the collected mites are presented to facilitate species discrimination for non-acarologists. *Steatonyssus longipes* Radovsky & Yunker, 1963, previously described as a new species from the Egyptian slit-faced bat, *Nycteris thebaica* Geoffroy (Chiroptera), is first recorded from various bird hosts in Egypt. Among the examined birds, chickens, *Gallus gallus domesticus* (Linnaeus) (Galliformes); palm doves, *Streoptopelia senigalensis aegyptiacus* (Linnaeus); domestic pigeons, *Columba livia domestica* Gmelin (both Columbiformes); and house sparrows, *Passer domesticus niloticus*, were the highly mite-infested birds. Commonly, mites were observed under the wings, around the vent region, in the breast area, and around the head and neck. The present study showed that Egyptian birds harbor various species of ectoparasitic mites, with chickens having more diversity, and macronyssid and dermanyssid mites are the most abundant**. [Negm, M.W.; Mohamed, A.A; El-Gepaly, H.M.K.; Abdelaziz, S.A.(Egypt), Turkish Journal of Zoology, vol. 42, 2018.].**

Nano Bio Insecticides Based on Essential Oils against *Phenacoccus solenopsis.* In the present study, insecticidal activity of essential oils (lemon grass *Cymbopogon citratus*, thyme *Thymus vulgaris* and geranium *Pelargonium graveolens*) and silver nanoparticles (AgNPs) synthesized by using tested essential oils were evaluated against female of *P. solenopsis* Tinsley. At high concentration (40µl/l), the percentages of *P. solenopsis* mortality recorded 100, 100 and 86.70%, for thyme, lemon grass and geranium EOs, while it recorded 100, 90 and 83.3 % at

(400ppm) of AgNPs-thyme, AgNPs-lemon grass, and AgNPs-geranium after 72hrs of treatment. All essential oils and AgNPs were proved to be very toxic to female of *P. solenopsis*. However, thyme essential oil and AgNPs-thyme recorded the highest mortality percentage with LC50 = 8.094 µl/l & 86.645 ppm, respectively, followed by lemon grass (bulk & AgNPs- lemon grass oil) and geranium oil (bulk & with AgNPsgeranium oil).[**Sawsan, M. A. ; Afaf,.A. Abasse; Horeia, A. H. ; Naema, A. A. and Enayat, Mohammed, M.(Egypt), Egypt. Acad. J. Biolog. Sci., 11(5): 1– 12, 2018].**

Field Evaluation of Some Microbial and Chemical Insecticides in Controlling *Pachyzancla licarsicalis* (Walk.) (Lepidoptera: Pyralidae) on *Paspalum vagenatom* Turf grass. Insecticides; Lannate, Chlorofos and microbial insecticide *Bacillus thuringiensis* (Dipel 2X) at the recommended rates of application were evaluated for controlling the larvae of *Pachyzancla licarsicalis* (Walk.) infesting *Paspalum Vagenatom* turf grass. Efficacy of different compound on the larvae of *P. licarsicalis* infesting *P. Vagenatom* turf grass. The data present indicated obviously the effectiveness of the used chemical insecticides (Lannate, Chlorofos) and microbial insecticide (Dipel 2X) on the population density reduction of *P. licarsicalis* Larvae on *P. Vagenatom* turf grass. Treatments were applied 5 times at Nasr City – Cairo Governorate during 2017 season and 5 times also in Smart Village at 6 October City – Giza Governorate during the same season 2017 to induce a perfect control of the *P. licarsicalis* and protect the plants for longer periods. Lannate was the most effective insecticide, recording the highest reduction percentages in Nasr City after 21 days and in Smart Village after 21 days post-initial application too (76.56 and 83.81%, respectively). Also in both Nasr City Cairo Governorate and Smart Village Giza Governorate Dipel was the least tested recording reduction percentages (58.33% and 78.75%), respectively after 21 days of the application. All compounds were differed significantly than control and not exhibited any phytotoxicity on *P. Vagenatom* leaves. [**Hassan, M. I., Emam, A. S. And Gamila A.M. Heikal (Egypt), Egypt. Acad. J. Biolog. Sci., 11(2): 63–70, 2018].**

Induction of Defense Mechanisms Involved in Disease Resistance of Onion Blight Disease Caused by *Botrytis allii*. Botrytis umbel blight caused by *Botrytis allii* is a major disease that attacks onion crop. In vitro, *Trichoderma viride, Penicillium chrysogenum*, and *Saccharomyces cerevisiae* and extract of bitter apple fruits (*Citrullus colocynthis*) showed antagonistic effect and inhibited the mycelial growth of *B. allii*. Gas chromatography–mass spectrometry (GC-MS) analysis of bitter apple fruits showed the existence of 37 compounds and their derivatives. Among them, 10 compounds constituted 58.66% of the total analyses. Greenhouse experiment approved that the extract of bitter apple fruits was the most effective in reducing disease incidence and severity, followed by *P. chrysogenum*, when they were applied 2 days pre-inoculation with the pathogen. All treatments significantly increased the total phenolic contents than the untreated control, but the highest increase was obtained when S. cerevisiae and *P. chrysogenum* were applied. A positive correlation was found between the activity of bioagents and improvement of peroxidase and phenylalanine ammonia-lyase enzymes in onion plants to resist infection with the pathogen. *P. chrysogenum* caused the highest increase in polyphenol oxidase activity in infected onion plants, while S. cerevisiae showed the lowest level of this enzyme. The study approved that application of the bioagents not only protected the onions against Botrytis disease but also enhanced the content of antioxidant compounds in onions. This encourages the application of such preparations to manage the production of onion crop, especially in the organic farming that bans the application of any chemicals. [**Mohamed M A Hussein, Kamal A M Abo-Elyousr , Mohamed A H Hassan ,Mohamed Hashem, Elhagag Ahmed Hassan and Saad A M Alamri (Egypt), Egyptian Journal of Biological Pest Control (2018)]**
https://doi.org/10.1186/s41938-018-0085-5

Natural Enemies Associated with some Economic Pests in Egyptian Agro-ecosystems. No doubt, there are changes in insect pest problems facing the farmers in the newly reclaimed land as well as in the old valley in Egypt due to different reasons, e.g., pesticide misuse and pest resistance, secondary pest outbreaks, absence or inefficient presence of natural enemies, and climate changes. Since the 1990s, the Ministry of Agriculture and Land Reclamation emphasizes to spread the philosophy of integrated pest management (IPM) among the farmers to utilize all suitable means, techniques, and approaches for maintaining pest population levels below those causing economic losses. Among these means understands the role of natural enemies in the agro-ecosystem to preserve and encourage their presence and enhance their role in suppressing pest populations as a main factor among the IPM strategies. Thus, it is of essential need to know more about the existing natural enemies associated with the key pests of the economic crops representing different agro-ecosystems in Egypt to develop a successful utilization of biological control agents within the frame of such IPM programs. Thus, it was found necessary to update their recent status as natural resources in various agro-ecosystems. These data are considered a review article eagerly needed for strategies

of IPM of serious insect and mite pests in Egypt. The role of the biological control agents, mainly parasitoids and predators in different economic crops, is highlighted.[**M. M. El-Husseini , A. H. El-Heneidy and K. T. Awadallah(Egypt), Egyptian Journal of Biological Pest Control (2018),]** https://doi.org/10.1186/s41938-018-0081-9

On the Control of the Cotton Aphid, Aphis Gossypii Glov. (Hemiptera: Aphididae), on Cucumber in Greenhouses. The objective of this study was to apply a biological control program on cucumber crop under greenhouse conditions, using biological control agents compared with insecticides to control the cotton aphid, *Aphis gossypii* Glover. The treatments were conducted at Dokki, Giza, Egypt, through two cucumber summer plantations in 2015 and 2016. Inspection was made once a week to determine the population density of *A. gossypii*, one of the major pests on cucumber. Aphid infestation occurred from week 6 to week 12 in 2015 and from week 4 to week 11 in 2016. Adults of the aphid parasitoid *Aphidius colemani* Viereck and larvae of the predatory coccinellid, *Coccinella septempunctata* L., were released in the biological greenhouse in weeks 8, 9, and 10 in season 2015 and 7, 8, and 9 in season 2016. In the insecticide greenhouse, the recommended insecticide program was used. The cost of control in the biological control greenhouses was more than that in the insecticide one, but the yield was much higher, recording 63.88% increase in 2015 and 64.91% in 2016. **[A.E. Eid , A. H. El-Heneidy, A. A. Hafez , F. F. Shalaby and D. Adly (Egypt), Egyptian Journal of Biological Pest Control, 2018].** https://doi.org/10.1186/s41938-018-0065-9

The Roles of two *hfq* Genes in the Virulence and Stress Resistance of *Burkholderia glumae*. The Hfq protein is a global small RNA chaperone that interacts with regulatory bacterial small RNAs (sRNA) and plays a role in the post-transcriptional regulation of gene expression. The roles of Hfq in the virulence and pathogenicity of several infectious bacteria have been reported. This study was conducted to elucidate the functions of two hfq genes in *Burkholderia glumae*, a causal agent of rice grain rot. Therefore, mutant strains of the rice-pathogenic *B. glumae* BGR1, targeting each of the two *hfq* genes, as well as the double defective mutant were constructed and tested for several phenotypic characteristics. Bacterial swarming motility, toxoflavin production, virulence in rice, siderophore production, sensitivity to H_2O_2, and lipase production assays were conducted to compare the mutant strains with the wild-type *B. glumae* BGR1 and complementation strains. The *hfq1* gene showed more influence on bacterial motility and toxoflavin production than the *hfq2* gene. Both genes were involved in the full virulence of *B. glumae* in rice plants. Other biochemical characteristics such as siderophore production and sensitivity to H_2O_2 induced oxidative stress were also found to be regulated by the hfq1 gene. However, lipase activity was shown to be unassociated with both tested genes. To the best of our knowledge, this is the first study to elucidate the functions of two *hfq* genes in *B. glumae*. Identification of virulence-related factors in *B. glumae* will facilitate the development of efficient control measures. **[Kim J., Mannaa M., (Egypt-Koria), Kim N., Lee C., Kim J., Park J., Lee H., Seo Y.S., The Plant Pathology Journal. 34, 412–425,2018]. (Authors contributed equally)**

IRAQ

Population Density and Percentage of Infestation with Mediterranean Fruit Fly *Ceratitis capitata* (Wiedemann) in Two Iraqi Provinces. The population density of *Ceratitis capitata* adults and the percentage of infestation of citrus and stone fruits with *C. capitata* larvae were studied during seasons of 2007, 2009 and 2011 in two Iraqi Provinces (Baghdad and Wasit). McPhail traps were used to estimate the mean numbers of flies captured/ trap/ month in both locations. The results showed that the highest males flies captured/ month was 800 – 1000 males / trap during August –September 2009 in Jadirya orchard and 500 male/ trap during March 2011 in Wasit orchard. Furthermore, the results also illustrated that the highest percentage of fruit infestation was in Mandarin (77%, 65%, and 68% for years 2007, 2009 and 2011 respectively) then in Kaki (62%, 75% and 63%) for the same years respectively for Wasit orchard while, the percentage of infestation was 63%, 32%and 54% for 2007, 2009 and 2011 in Mandarin and 52%, 32% and 54% for the same years respectively in Apricot fruits. [**Samira A. Khlaywi, Ayad A. Al-Taweel, Hussain F. Alrubeai- European Academic Research - Vol. VI, Issue 3 / June 2018].**

Biocontrol of the Cladosporic Spot in the Eggplant Plant caused by the Fungus *Cladosporium cladosporioides.* The aim of this study was to control eggplant Cladosporium disease caused by the fungus

Cladosporium cladosporioides using the biological control fungi *Aspergillus niger*, *Trichoderma harzianum* and *T. koningii*. The effect of these agents was tested in vitro. Three isolates of *C. cladosporioides* were obtained from various regions growing eggplant in Basrah governorate. When testing the pathogenic capacity of the three isolates, isolate 1 from Shatt al-Arab area was found the most severe, with 68.7% severity of infection, accordingly this isolate was used for further testing. Bio-fungicide filtrate was tested for its ability to reduce the growth of pathogenic fungi in PDA medium. All filtrates concentrations tested affected the fungal growth of pathogenic fungi with a rate of inhibition between 29.61 and 40.69%. In addition, the spore's concentrations of the bio-control agents (10, 20- and 30-ml filtrate/L) reduced the sporulation of the pathogenic fungus *C. cladosporioides*. The average number of spores per one ml of pathogenic fungus reached 22.73, 19.96 and 16. 95 × 10^3, respectively, compared with 40.11 × 10^3 for the control treatment. For comparison, carbendazim fungicide was also tested to inhibit the pathogenic fungus in PDA medium, and the rate of inhibition of *C. cladosporioides* obtained was 33.95, 68.26, 82.99 and 100%, respectively, for concentrations 25, 50, 75 and 100 ppm. Filtrates of *A. niger, T. harzianum* and *T. koningii* (20 and 30 ml filtrate/L) were found to reduce the severity of *C. cladosporioides* infection on eggplant plant by 33.65, 30.12 and 28.42%, for the three fungi, respectively, compared to 66.86% for the control treatment. The fresh and dry weight of eggplants treated with bio-fungicides was increased. Eggplants treated with bio-fungicides showed an increase in peroxidase activity compared with the control treatment. [**Matrood, Abdulnabi A. A. (Iraq), Arab Journal of Plant Protection, 36, 3, 2018].**

LEBANON

Effect of Temperature on the Pathogenicity of Mediterranean Native Entomopathogenic Nematodes (Steinernematidae and Heterorhabditidae) From Natural Ecosystems. Seven strains of entomopathogenic nematodes (EPNs) belonging to three species (*Steinernema feltiae, S. ichnusae* and *Heterorhabditis bacteriophora)* naturally isolated from Mediterranean countries (Southern Italy and Lebanon) were evaluated for their potential to infest greater wax moth (*Galleria mellonella*) larvae at different temperatures under laboratory conditions. The laboratory bioassay was conducted at six different temperatures ranging from 10°C to 35°C. Nematode Infective Juvenile (IJs) were put in contact with *G. mellonella* larvae in Petri dishes and mortality rates were recorded after 72 hours. The purpose of the study was to evaluate the temperature range in which the EPNs caused larval mortality; higher mortalities were recorded at 15°C and 20°C. All species failed at lower temperatures except for *S. ichnusae* ItS-SAR4, which caused 7% mortality. At 35°C *S. ichnusae* maintained its infectious activity (24%) along with *H. bacteriophora* ItH-LU1 (38%)*;* both were isolated from Italy and were more efficient at high temperatures than the remaining Lebanese isolates**.[El Khoury Y., Oreste M., Noujeim E., Nemer N., Tarasco E.(Lebanon), REDIA, 101,: 123-127, 2018].**

SYRIA

Influence of Arbuscular Mycorrhizae on Plant Growth, Essential Oilproduction and Phosphorus uptake of *Salvia officinalis* L. active ingredients in aromatic and medicinal plants. This symbiotic association is particularly affected by the availability of phosphorus (P) in the soil. This study was conducted on *Salvia officinalis* L. using two inoc-ula, commercial Symbivit and *Septoglomus viscosum* (syn. *Glomus viscosum*), alone or supplemented withtwo doses of actual P (0.03, 0.06 g kg−1). The effects of these fungi and their combinations with P were determined in relation to the growth of sage plants (Regula variety), to the concentration of P in leaf tissues, and to the quantity and quality of essential oils (EOs). S. viscosum treated plants showed better growth with or without P-supply compared to non-mycorrhizal plants. The plants inoculated with *S.viscosum* presented the highest dry weight regardless of addition of P. Both AM fungi increased the leafP content as more P was applied to the soil, whereas the EO content did not change with any of the treatments. Although the EO yield slightly increased with the Symbivit treatment, the chemical com-position of the oil was drastically altered by S. *viscosum* in which the manool was the main component (28.13%), while _-thujone decreased (13.09%). These results suggest that AM symbiosis is a good candi-date for promoting plant growth and essential oil composition and for improving P uptake in low fertility soils. Thus, mycorrhiza can be considered as a sustainable strategy based on natural resources in order to influence the manool and _-thujone content in sage EO composition. These compositions are very important to develop new classes of biocides and contribute to reducing risks to both human health and the environment. **[Waed Tarraf (Syria), Claudia Ruta, Anna Tagarelli, Francesca De Cillis, and Giuseppe De Mastro. Industrial Crops and Products 102, 144–153, 2017.]**

SAUDIA ARABIA

Insights into the Incidence of *Watermelon chlorotic stunt virus* Causing Yellowing Disease of Watermelon in Western and Southwestern Regions of Saudi Arabia. During the spring season of 2014, a total of 148 melon and watermelon leaf samples were collected from symptomatic and asymptomatic plants in the western and southwestern regions of Saudi Arabia and were tested for the presence of Watermelon chlorotic stunt virus (WmCSV) and other suspected cucurbit viruses by double antibody sandwich enzyme-linked immunosorbent assays. Ninety-eight samples were found to be positive for the presence of WmCSV, nine samples were positive for the presence of Cucurbit yellow stunting disorder virus (CYSDV), and 22 showed a mixed infection with both WmCSV and CYSDV. No other cucurbit viruses were detected in any of the samples. Host range experiments revealed that eight out of fourteen tested plant species were susceptible to WmCSV. PCR products of approximately 1.2 kb were obtained after amplification using primers specifically targeting the coat protein region of WmCSV. Positive PCR results were confirmed by dot blot hybridization. Coat protein gene sequences from eleven WmCSV isolates indicated that the highest identity was between the 104WMA-SA isolate from the Wadi Baish location and a previously reported isolate from the AL-Lith location in Saudi Arabia. The lowest identity was observed between the 42WMA-SA isolate and an isolate from Palestine. [**M. H. Ahmad, M. T. Shakeel, I. M. Al-Shahwan, M. A. Al-Saleh, and M. A. Amer , Plant Protection Department, College of Food and Agriculture Sciences, King Saud University, Riyadh, Saudi Arabia, Plant Pathol. J. 34(5): 426-434, 2018].** https://doi.org/10.5423/PPJ.OA.04.2018.0059

TUNISIA

Performance of Barley Lines Selected Under Drought Stressed Conditions and Ultra-low Density. Rainfall and temperature are unpredictable in Mediterranean environments, which result in irregular environmental conditions for crop growth and a critical source of uncertainty for farmers. In this study, selected barley lines for grain yield stability under drought stressed conditions and ultra-low plant density (Honeycomb design), were evaluated for agronomic performance in semi-arid areas (Kef and Mornag) compared to the source material. Results showed a significant effect of genotype and genotype×environment (G×E) interaction which indicate the existence of differences among genotypes for plasticity. Biological and grain yield ranged from 3.72 to 7.13 t/ha and 1.46 to 2.66 t/ha across environments with higher values in Kef compared to Mornag. Five high yielding selected lines outyield the original populations (IH17 and IH4-H4 from Imen, AH10-H2 and AH10-H3 from Ardhaoui and MH18 from Manel). The first cycle low yielding lines showed a performance that ranked below the source material. Second cycle high yielding lines did not differ from the first cycle high yielding ones. In conclusion, selection under ultra-low density has been proven an efficient tool to select for lines with high agronomic performance and improved adaptation under the Tunisian dry conditions.[**Ben Ghanem, H., El Felah, M., Najar, A., Kehel, Z., Amri, A., Rezgui, S., and Tsivelikas, A.L. (Tunisia),Tunisian Journal of Plant Protection 13 (1): 1-25.,2018].**

Novel Source of Resistance against Root Necrosis and Plant Wilting Disease Caused by *Phytophthora nicotianae* in *Capsicum annuum.* *Phytophthora nicotianae* the causal agent of root necrosis in pepper was isolated and identified for the first time in Tunisia in 1995. It causes plant wilting and might induce considerable damage especially in infested soils grown with pepper varieties lacking genetic resistance. This disease was observed in green houses as well as in open fields. The present study aimed to identify sources of resistance against *P. nicotianae* in a collection of pepper accessions from the WorldVeg (The World Vegetable Center, previously named AVRDC for Asian Vegetable Research and Development Center) gene bank. These WorldVeg accessions include 28 chili and 12 sweet peppers together with 8 chili and one sweet local cultivars. Seedling reaction to the pathogen was determined one month after inoculation by the zoospores of a highly aggressive isolate deposited at the seedling crown. Results showed that 12 accessions (11 chili and 1 sweet peppers) displayed good resistance to this oomycete. However, fruit quality and productivity of these resistant accessions need to be verified. It is of importance to carry out an analysis on genetic control of such resistance by performing crosses between susceptible and resistant ones, besides studying the suitable use of the unveiled resistance according to the pathogenicity and virulence of the pathogen strains. Therefore, appropriate resistance sources can be used as genitors in a breeding program. [**Elbaz, M., Allagui, M.B., and Harbaoui, S. (Tunisia), Tunisian Journal of Plant Protection 13 (1): 27-38, 2018].**

Antifungal Activity of Essential Oils of *Origanum majorana* and *Lavender angustifolia* against Fusarium Wilt and Root Rot Disease of Melon Plants. The objective of this study was to evaluate the antifungal activity of essential oils of marjoram (*Origanum majorana*) and lavender (*Lavender angustifolia*) against eleven isolates of *Fusarium oxysporum* f. sp. *melonis* and ten isolates of *Fusarium solani*, the causal agents of Fusarium wilt and root rot disease of melon. The effect of essential oils on disease development under in vivo conditions was also tested. GC-MS analysis of marjoram essential oils showed that terpinen-4-ol (34.94%) is the major component, followed by γ-terpinene (24.66%), α-terpinene (13.22%), β-terpinene (5.84%), α- terpineol (3.98%), and β-phellandrene (3.16%). Chemical analysis of lavender essential oils showed that α-terpinene (48.76%) is the major component, followed by linalool (16.79%), γ-terpinene (7.00%), β-trans-ocimane (6.47%), β-caryophyllene (5.83%), and lavandulol (3.23%). All essential oils tested in vitro using the disk diffusion method revealed a significant antifungal effect against mycelium growth of all *F. oxysporum* f. sp. *melonis* and *F. solani* isolates. The volatile compounds of essential oils have completely inhibited spore germination of both pathogens. In vivo, the essential oils applied as biofumigant significantly reduced disease severity on melon plants 20 days post-incubation. Lavender essential oils significantly reduced disease severity by almost 60% as compared to control melon plants while Marjoram essential oils reduced disease severity by almost 23% under controlled conditions. These results showed that lavender essential oils may contribute to the development of new antifungal compounds to protect melon crops from Fusarium wilt and root rot disease.[**Dhaouadi, S., Rouissi, W., Mougou-Hamdane, A., Hannachi, I., and Nasraoui, B.(Tunisia), Tunisian Journal of Plant Protection 13 (1): 39-55,2018].**

Barley Net Blotch in Tunisia: Areal distribution, forms and Molecular Identification. Net blotch is one of the most important diseases of barley in Tunisia and it frequently causes heavy yield losses. The causal fungal agent is *Pyrenophora teres* (anamorph: *Drechslera teres*) with two forms, *P. teres* f. *teres* and *P. teres* f. *maculata* showing the net type and the spot type symptoms, respectively. In the current study, we characterized the distribution and the severity of the disease in Northern Tunisian areas. It was easy to differentiate the symptoms caused by the two fungal forms (net and spot), but no morphological difference between conidia of these forms was observed. The confirmation of the identity of the fungus was achieved based on molecular techniques, using two specific primers, PTT for the net form and PTM for the spot form.[**Mougou-Hamdane, A., Touati, R., Faddaoui, S., Garbouj, R., BenAraar, A., Nasraoui, B.(Tunisia), Tunisian Journal of Plant Protection, 13 (1): 57-68, 2018].**

Management of the tomato leaf miner *Tuta absoluta* in Tunisia: A three years' survey. *Tuta absoluta* is considered as one of the most devastating pest causing significant losses to tomato production worldwide. Thus, the knowledge of its biological characteristics makes its management less challenging. Here, the population dynamics of this pest was monitored in protected tomato crop in Takelsa region (Northeastern of Tunisia). Monitoring the flight activity of males by pheromone traps and leaf sampling revealed the presence of four generations. A maximum of 120 males / trap / week and 74.66 larvae / 40 leaves were recorded on May 13, 2016. Furthermore, there was a significant linear relationship between trapped adults and laid eggs ($R^2 = 0.81$; $P < 0.0001$), trapped adults and mines with larvae ($R^2 = 0.76$; $P < 0.0001$), and trapped adults and mines ($R^2 = 0.70$; $P < 0.05$). Likewise, mines with and without larvae were highly correlated ($R^2 = 0.72$; $P < 0.0001$). [**Cherif, A., and Grissa-Lebdi, K.(Tunisia), Tunisian Journal of Plant Protection, 13 (1): 101-112, 2018].**

Effect of Benzothiadiazole and Salicylic Acid Resistance Inducers on *Orobanche foetida* Infestation in *Vicia faba*. The broomrape or orobanche (*Orobanche foetida*) is considered as an important agricultural problem of faba bean (*Vicia faba* var. *minor*) production in Tunisia. The effect of salicylic acid (SA) and benzothiadiazole (BTH) on the induction of faba bean resistance to *O. foetida* was studied. Three application methods (seed soaking, foliar spraying and watering) were used. SA and BTH treatments reduced broomrape infestation under controlled conditions in pot and Petri dish experiments. In pot experiment, SA and BTH treatments reduced broomrape total number. Seed soaking treatments were more effective than foliar spraying and watering. In Petri dish experiment, *O. foetida* seed germination and the number of orobanche tubercles were reduced. The most efficient method was watering for SA and BTH treatments. This reduction was associated to a delay in the tubercle formation. The different application methods of SA and BTH treatment attest that the induced systemic resistance to *O. foetida* can be used in integrated management of broomrapes.[**Triki, E.**, **Trabelsi, I., Amri, M., Nefzi, F.**, **Kharrat, M.**, **and Abbes, Z.(Tunisia), Tunisian Journal of Plant Protection, 13 (1): 113-125, 2018].**

Risk Assessment of Tunisian Consumers and Farm Workers Exposed to Residues after Pesticide Application in Chili Peppers and Tomatoes. In Tunisia, to prevent and control pests and diseases during

cultivation under greenhouses, chili pepper and tomato require the use of a wide range of pesticides potentially toxic and thus presenting a possible risk for farm operators, workers or consumers. A study has been carried out in the Sahel region of Tunisia to assess the risk for farm operators and workers exposed, by contact during harvest tasks, to possible pesticide residues remaining in tomato and chili pepper crops, and for the Tunisian consumers (adults and children) after intake. A questionnaire was addressed to a group of 73 market gardeners to better understand the local professional practices and to determine the main route of exposure to pesticide. Twenty samples of cotton gloves (2 pairs / sample) were distributed to 20 volunteers who worn them for two consecutive half-days during the harvest of chili peppers or tomatoes before analysis of the dislodge able pesticide residues which could be transferred from crops to hands. Using models, predictive exposures values were calculated for consumers and farm workers. The highest exposure of consumers was observed for chlorpyrifos residues on tomatoes (with 82% and 312% of the Acute Reference Dose (ARfD), for adults and children respectively). The systemic exposure (SE) of farm workers was estimated for the median, the 90th percentile and the maximum concentration. At the highest observed concentrations, 15 pesticide residues (active ingredients and metabolites) used in pepper greenhouses, and 9 in tomato crops, exceeded the Acceptable Operator Exposure Level (AOEL). Exposure appeared to be particularly critical for chlorothalonil sprayed in chili pepper greenhouses with SE_{MAX} values 113 times higher than the AOEL (11285%). Long task duration (8 h/day) after re-entry in greenhouse, limited access to personal protective equipment (PPE), lack of hygiene and bad habits (eating, drinking, or smoking at work) have also been observed and discussed as risk factors.[**Toumi, K., Joly, L., Tarchoun, N., Souabni, L., Bouaziz, M., Vleminckx, C., and Schiffers, B. (Tunisia), Tunisian Journal of Plant Protection, 13 (1): 127-143, 2018].**

Aphidicidal Activities of *Melaleuca styphelioides* Sm. Essential Oils on Three Citrus Aphids: *Aphis gossypii* Glover; *Aphis spiraecola* Patch and *Myzus persicae* (Sulzer). Essential oils are a mixture of various compounds that can have acted against insect pests through complex mechanisms. Their constituents were shown to be a potent source of biological pesticides. The aims of the present study are to characterize the chemical composition and evaluate the aphidicidal activities of Tunisian *Melaleuca styphelioides* leaves essential oil. Fumigant and contact toxicities were determined against three major aphid infecting citrus trees: *Aphis gossypi*, *Aphis spiraecola* and *Myzus persicae*. The chemical composition of this oil was characterized by GC–MS. The major common compounds were caryophyllene oxide (23.42%), spathulenol (20.5%), isoaromadendrene epoxide (7.45%), ledol (5.98%), and α-pinene (3.82%).The results showed that *M. styphelioides* essential oil has a good fumigant and contact toxicity against the three citrus aphids tested. The highest activity was registered on *A. spiraecola* nymphs (LC50 = 44.72 µL/L air for the fumigant activity and 115.93 µL/L for the contact toxicity). The adults of *A. gossypii* seem to be more resistant to essential oil in the contact bioassay with an LC50=3660.99 µL/L. Overall, our work proposes the use of the *M. styphelioides* essential oil as contact and fumigant bio-insecticides against resistant citrus aphids. **[F. Albouchi , N. Ghazouani , R. Souissi , M. Abderrabba , S. Boukhris-Bouhachem (Tunisia), South African Journal of Botany 117 , 149–154, 2018].**

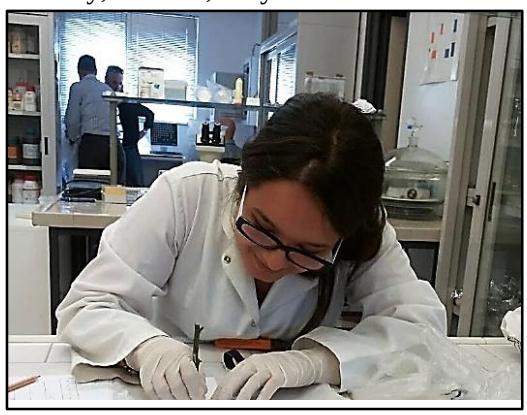
PLANT PROTECTION NEWS IN THE ARAB COUNTRIES AND NEAR EAST

❖ Graduate Students Activities (Master and Doctorate Thesis)

- **Isolation, Identification and Pathogenisity of Fusarium Species from Different Soil Locations in Basrah.** Fourteen species belong to the genus Fusarium were isolated from different regions in Basrah province. *F.sambucinum* and *F.musaru* were reported for the first time in Iraq**. [Dalal Radhi, Supervisor Dr. Mohammed A. Fayyadh. (Iraq), Plant Protection Department, Basrah University. (MSc, 2018)].**
- **Efficacy of different isolates of *Streptomyces spp.* in Controlling the Cucumber Seedling Damping-off Disease Caused by *Rhizoctonia solani* and *Pythium spp*.** 28 isolates of Streptomyces were isolated from different sources in Basrah province .Two isolates were identified by amplification of 16s r RNA gene. Six isolates out of 28 isolates showed high antagonistic ability against *Rhizoctonia solani* and *Pythium sp* .Results revealed that treated soil with such isolate reduced pre and post emergence damping –off caused by *R.solani* and *Pythium sp.* **[Lina Kadhim Mashhot, supervisor Dr.Mohammed A. Fayyadh (Iraq), Plant Protection Department, Basrah University. (MSc, 2018)].**

❖ Arab Graduate Students Activities Abroad

Development of New Tools for on-site Detection of *Spiroplasma citri*, the Causal Agent of Citrus Stubborn Disease. On March 19, 2018, **Mounira Inas DRAIS (Algeria)** has defended her PhD thesis in the Department of Agriculture and Forest Sciences (DAFNE) of Tuscia University, Viterbo, Italy in collaboration with CIHEAM-Bari. The committee members have approved the PhD degree based on the thesis examination and the discussion conducted during the defense. The PhD thesis work concerned the development of new tools for the on-site detection of *Spiroplasma citri* the causal agent of citrus Stubborn Disease (CSD). More diagnosis strategies were proposed, for rapid and accurate detection of *S.citri*. The thesis work indicated that the developed Direct Tissue Blot Immunoassay protocol was a reliable technique for the mass detection of *S. citri* in citrus orchards and an alternative to PCR assays. This technique does not require a sophisticated equipment or highly skilled operators; thus, reducing time processing and costs. This technique allowed the detection of *S. citri* in Algerian citrus groves; the local isolates were then studied molecularly and evidenced that the spiralin nucleotide sequence obtained from the Algerian strain was genetically closer to the Iranian FasaI strain than to the other Mediterranean strains. The Algerian strain also reacted positively with the primer pairs targeting the TraG gene, which is essential for insect transmission; confirming the presence of the pSci6 plasmid in the genome. Following these findings, a preliminary insect vector survey was carried out indicating that *N. hematoceps* was the main vector which is not present in the studied area but additional research is needed to investigate if the dominant leafhoppers species identified are potential *S. citri* vectors. A LAMP (Loop Mediated Isothermal Amplification) assay was also developed, in order to obtain a cost-effective and user- friendly method for *S. citri* detection in plant. Following the development of this detection method, an evaluation of the performance of the assay was compared with real-time PCR, an already established "gold standard"; the comparison of the two approaches enabled us to confirm the results obtained from the developed assay. LAMP can be run directly on portable devices and the reactions were successfully carried out in the BioRanger (Diagenetix, Inc., Hawaii, USA) device testing the crude plant extract procedure. The validation of the developed LAMP assay was performed, which highlighted its suitability and provided information on the reliability of the assay for field diagnostic. The thesis included also an investigation on the genetic diversity of Mediterranean and American strains *of S. citri*. This study enabled to confirm the presence of a conserved sequence in the first 24 amino acids at the N-terminus in the gene that encodes spiralin, in our different isolates. However, it showed that even if Spiralins of different strains of *S. citri* have the same number of amino acids, they are usually polymorphic along the sequence. **[Mounira Inas DRAIS (Algeria), Supervised by: K. Djelouah, L. Varvaro, S. Speranza].**



During the period of conducting her PhD thesis research (November 2014- March 2018), Dr. Drais participated in different scientific meetings and presented several contributions as follows:

- **Drais M.I**, Maheshwari Y., Selvaraj V.,Varvaro L., Yokomi R.,Djelouah K., Development and validation of a Loop-Mediated Isothermal Amplification technique (LAMP) for the detection of *Spiroplasma citri*, the causal agent of citrus stubborn disease (Submitted)
- **Drais M.I**., Varvaro L. and Djelouah K. Setting up of innovative Direct Tissue Blot Immunoassay (DTBIA) as an efficient tool for large scale detection of *Spiroplasma citri* causal agent of Citrus Stubborn disease. Poster presentation in the 21st Congress of the International Organization for Mycoplasmology, 3-7 July 2016, Brisbane, Australia.
- **Drais M.I.,** Larbi D., Ghezli C., Varvaro L. and Djelouah K. Molecular evidence of the presence of quarantine Citrus pathogens in the main Algerian citrus growing areas predicts a risk on the citrus patrimony. Poster presentation in the Ist European Conference of Post Graduate Horticulture Scientists (ECPHS), 12-13 may 2016, Palermo, Italy.
- **Drais M.I.**, Varvaro L.and Djelouah K. Mise au point d'un protocole innovant pour la detection simple et rapide du *Spiroplasma citri* l'agent causal de la maladie du Stubborn. Oral presentation in the international meeting « Santé des plantes au service du development » 12-13-14 April 2016, Chlef, Algeria

- Hanani A., Khater M., **Drais M.I**, Djelouah K. First report and molecular Characterization of citrus dwarfing viroid (CDVd) and citrus bark cracking viroid (CBCVd) on citrus volkameriana in Egypt (Journal of Plant Pathology)

Elements Involved in the Rsv3-Mediated Extreme Resistance against an Avirulent Strain of Soybean Mosaic Virus. Extreme resistance (ER) is a type of *R*-gene-mediated resistance that rapidly induces a symptomless resistance phenotype, which is different from the phenotypical *R*-resistance manifested by the programmed cell death, accumulation of reactive oxygen species, and hypersensitive response. The *Rsv3* gene in soybean cultivar L29 is responsible for ER against the avirulent strain G5H of soybean mosaic virus (SMV), but is ineffective against the virulent strain G7H. Rsv3-mediated ER is achieved through the rapid accumulation of callose, which arrests SMV-G5H at the point of infection. Callose accumulation, however, may not be the lone mechanism of this ER. Analyses of RNA-seq data obtained from infected soybean plants revealed a rapid induction of the abscisic acid pathway at 8 h post infection (hpi) in response to G5H but not to G7H, which resulted in the down-regulation of transcripts encoding β-1,3 glucanases that degrade callose in G5H-infected but not G7H-infected plants. In addition, parts of the autophagy and the small interfering (si) RNA pathways were temporally up-regulated at 24 hpi in response to G5H but not in response to G7H. The jasmonic acid (JA) pathway and many WRKY factors were clearly up-regulated only in G7H-infected plants. These results suggest that ER against SMV-G5H is achieved through the quick and temporary induction of ABA, autophagy, and the siRNA pathways, which rapidly eliminate G5H. The results also suggest that suppression of the JA pathway in the case of G5H is important for the Rsv3-mediated ER. **[Mazen Alazem (Syria-Koria, PhD, 2018), Kuan-Chieh Tseng, Wen-Chi Chang, Jang-Kyun Seo, and Kook-Hyung Kim].** https://www.mdpi.com/1999-4915/10/11/581

Benzophenone as a Primary Mediator in Host Preference behavior of *Bagada hilaris.* The painted bug, *Bagrada hilaris* Burmeister (Pentatomidae; Heteropterea), is a stink bug native of Asia, Africa and invasive in the United States, Mexico, and more recently, South America. This species can cause heavy damage to several vegetable crops in the genus *Brassica*, in particular to young plants at seedling stage with marked preference for some species as *Raphanus sativus* L. and *Eruca sativa* L. Objective of this study was to evaluate the role of Volatile Organic Compounds (VOCs) emitted by seedlings of four *Brassica* species on the host location process of *B. hilaris*. Behavioral experiment were carried out using the vertical Y-shaped olfactometer, and VOCs emitted by seedlings were collected in headspace using solid phase micro-extraction (SPME) and analyzed by GC-MS. Results of behavioural experiment evidenced that *B. hilaris* prefer *R. sativus*, *E. sativa* and *B. rapa* over *B. carinata*. However, *B. hilaris* individual didn't elicit any significant preference among *R. sativus*, *E. sativa* and *B. rapa*. Chemical analyses evidenced the VOCs of *R. sativus*, *E. sativa* and *B. rapa* have in common the same main compound identified as benzophenone, whoich was not detected in *B. carinata*. Moreover *B hilaris* individuals were attracted to the crude extract of *E. sativa* seedlings, and to a liquid chromatography polar fraction. It was speculated that benzophenone, the main constituent of the active polar fraction, might act as primary mediator in this insect-plant interaction. **[Mokhtar Abdulsattar Arif(PhD Candidate, Iraq-Italy), Salvatore Guarino, Ezio Peri, Stefano Colazza Università degli Studi di Palermo - Dipartimento di Scienze Agrarie, Alimentari e Forestali (SAAF) .European PhD Network "Insect Science" - IX Annual Meeting, 14-16 November 2018, Scuola di Agraria – University of Firenze].**

***Chickpea chlorotic stunt* and *Beet western yellows viruses* (genus *Polerovirus*, family *Luteoviridae*) on cool-season food legumes in Tunisia: importance, characterization and management**

Legumes are considered as strategic crops in Tunisia because of their economic and social relevance and directly contribute in the national alimentary equilibrium. However, legumes production levels remain quite low which is often attributed to abiotic and biotic stresses that are prevailing in the major growing areas. Viral diseases represent one of the major constraints that reduce the genetic potential of most cultivated species and varieties. Viruses causing yellowing/stunting symptoms are the most important virus diseases in many regions of the world. During my Diploma project, a field survey was carried out during 2015 season on faba bean and chickpea in Cap bon, Béja, Bizerte, Jendouba and Kef regions, Tunisia. Laboratory serological tests showed that *Chickpea chlorotic stunt virus* (CpCSV) and *Beet western yellows virus* (BWYV) (genus *Polerovirus*, family *Luteoviridae*) were the most important viruses in Tunisia. Data of my Diploma project was presented during 12th Arab Congress of Plant Protection, which held in Hurghada, Egypt, 4-10 November 2017, and wined one of the award of the best research work for a graduate student. In order to control the spread of these viruses, the development of resistant varieties is not only the most effective solution but also more appropriate and safer for the environment, health and economic. To facilitate disease resistance breeding, through better understanding of pathogenic variability, the proposed PhD research has the following objectives: (1) Conduct epidemiological and ecological studies to obtain a better understanding of the distribution and variability of BWYV/CpCSV in Tunisia and the factors involved in BWYV/CpCSV epidemics under field conditions in order to devise improved measures for their control; (2) Investigate serological and biological characteristics of different BWYV/CpCSV isolates collected from different legume hosts; (3) Study the molecular variability among BWYV & CpCSV legume isolates in Tunisia and other virus isolates from different part of the world, using sequence analysis; (4) Production of specific antibodies for one or two isolates of BWYV and/or CpCSV; (5) Evaluate legumes germplasm, which available at ICARDA's GenBank for BWYV/CpCSV isolates. **[Samia Mghandef (PhD Candidate, Tunisian, Faculty of Science, Bizerte, Tunisia); Supervisors: Dr Asma Najar [National Institute of Agricultural Research in Tunisia (INRAT), Tunisia], and Dr Safaa Kumari (International Centre for Agricultural Research in the Dry Areas (ICARDA), Terbol, Lebanon, 2018].**

THESIS ABSTRACTS OF ARAB AND NEAR EAST MASTER STUDENTS GRADUATED FROM MEDITERRANEAN AGRONOMIC INSTITUTE OF BARI (IAMB) 2016/2018

Awarding of Diplomas "Master of Science" 2016-2018, October 17th, 2018

Master of Science diplomas were awarded to 33 graduates coming from Algeria, Bosnia, Egypt, Iraq, Kosovo, Lebanon, Morocco, Palestine, Somalia, Tunisia, Turkey, who have concluded the two-year 2016-2018 programme in: **Land and Water Resources Management: Irrigated Agriculture, Sustainable IPM Technologies for Mediterranean Fruit and Vegetable Crops and Mediterranean Organic Agriculture. Selected IPM theses are below:**

Evaluation of Forecasting Models for *Monilinia fructicola* in Stone Fruits and Monitoring of *Erwinia amylovora* Using rt-LAMP in Sicily. Brown rot and fire blight diseases cause enormous losses for pome and stone fruit crops. Chemical treatments generally fail without predicting the infection risk, and understanding the inoculum dynamic and its relationship with the environmental variables. In this study fire blight and brown rot disease caused by *Monilinia fructicola* were respectively monitored from March until August in pear, and peach orchards located in Maniace and Bronte (Catania province, Sicily, Italy) using rt-LAMP. Two different trapping methods (Gravitational spore trap and Burkard spore trap) were used to capture the airborne conidia of *M. fructicola*. Two risk infection models (The Tate brown rot model and *Monilinia fructicola* infection risk criteria) were applied in the study area. A meteorological station provided the climate data needed for their evaluation. Fire blight disease was detected in July and August. Brown rot was observed on flowers and shoots. The gravitational spore trap was more efficient than the volumetric trapping method. A temporal heterogeneous distribution of conidia was observed during the growing season. Correlation between the inoculum presence, and the weather parameters was obtained (e.g. soil moisture: $R^2 = 0.82$). *M. fructicola* infection risk criteria was close to predict the disease occurrence in the peach orchards. [**Lahsen Oualguirah (Morocco), MSc, Sustainable IPM Technologies for Mediterranean Fruit and Vegetable Crops, Mediterranean Agronomic Institute of Bari, 2018].**

Construction of a Synthetic Infectious cDNA Clone of Artichoke Italian latent Virus for RNA Silencing Studies. Samsun tobacco plants, infected by the grapevine strain of artichoke Italian latent virus (AILV-V), recover from severe disease symptoms by three weeks after inoculation. Recovery is thought to be a feature of the inability of the virus to suppress the plant defence response based on RNA silencing. A recent study showed that AILV-V is able to interfere with the cell-to-cell movement of the RNA silencing but no evidence has been provided for long distance movement of the silencing signal. In order to investigate if AILV-V codes for any viral suppressor of RNA silencing protein, an infectious clone has to be constructed. The dscDNA of RNA1 and RNA2 were synthesised and cloned into pUC19 and pGEMT-Easy vector based on the AILV-V sequence available on the GenBank. Then, a screening was carried out in order to identify the clones of interest. Two clones covered the 5' and the 3' of the RNA 2 of AILV-V, which was placed under T7 and SP6 promoters that are necessary for the in vitro transcription of a biologically active viral RNA. The sequence of the putative full-length clone of AILV-V RNA-2 fragments was deduced from eleven overlapping fragments and found to be 99% similar to the sequence under the accession number LT608396.1. Despite the several attempts done, cloning of RNA-1 was unsuccessful**. [Ayoub Maachi (Morocco), MSc, Sustainable IPM Technologies for Mediterranean Fruit and Vegetable Crops, Mediterranean Agronomic Institute of Bari, 2018].**

Evaluation of the Use of Sap Extraction Method for Detection of *Xylella fastidiosa* & Endophyte Pathogens (Fungi) Associated with Olive Quick Decline Syndrome. The finding of *X. fastidiosa* (*Xf*) in Puglia and in other areas of the European Union encouraged the necessity to investigate the presence of this pathogen in different host plants, through the application of serological and molecular techniques. Due to the fastidious behavior of this bacterium (xylem vessel limited) to be isolated and/or extracted from infected plants, the detection remains one of the critical points for a successful diagnostic. Therefore, it has been necessary to use several approaches different from those used until now conventional method (grinding plant materials) which release many inhibitors

for ELISA, PCR test like phenols. Find a method to obtain plant sap especially xylem sap without grinding plant tissues will reduce releasing the inhibitors and effective in case low titer of the pathogens. One of these approaches is the patented extraction method (CIHAEM/MAIB Patent number WO2017017555A1) for which the bacterium can be isolated and/or detected in the crude sap of infected plants. The patented extraction method of plant sap was evaluated during this thesis to investigate both the presence of *X.fastidiosa* and other entophytic microorganisms associated with this bacterium in olive, i.e. the tracheomycotic fungi (*Phaeoacremonium* spp, *Pleurostomophora richardsiae, Phoma* spp, *Neofusicoccum parvum),* all found to be associated with CoDiRo. One hundred forty-one samples collected from different host species were assayed for the presence of *X.fastidiosa*, while the isolation of entophytic tracheomycotic fungi associated with bacterium was performed only in olive plants. Plant sap extracted by conventional methods (crushing and print) and patented method was used for the diagnosis of the bacterium by DAS-ELISA and RT-LAMP as well as for the isolation of *X.fastidiosa* and entophytic fungi. Furthermore, conventional PCR and DTBIA were used to support positive sample confirmation. The results obtained showed that results were close or equal in the detection of the above-mentioned pathogens. Which is considered to be effective and possible to be used in the future in the field or entry point such as airports and border points as well as easy to use and less expensive and faster and do not need to high-level skill technician compared to conventional methods. [**Alasadi Ghazwan Jalil (Iraq), MSc, Sustainable IPM Technologies for Mediterranean Fruit and Vegetable Crops, Mediterranean Agronomic Institute of Bari, 2018].**

Analysis of Variables of DTBIA-Processed Membranes for Developing an Automatic Reader. Serological tests are a simple and rapid method for the detection of many plant viruses and bacterial diseases. ELISA and DTBIA have been used to perform screening of a large number of samples. In this work, an analysis of the five main components of variability detectable by membranes processed with standard EPPO protocols DTBIA (*CTV* and *X. fastidiosa*) was conducted, useful for the development of an algorithm for the recognition of positive print, through the use of normalized images. Statistical analyses of "brand" variability showed a significant influence of the media used in microscopic reading, also highlighted through optical characteristics. CTV Plant-Print membranes express warmer and more defined colors. Similarly, for the variable "background", the results show a significant difference between laboratory and field operating conditions, highlighting the possibility of coding false positives. Membranes containing var-3 (duration of membrane staining) showed significantly clearer and more evident impressions than the control, while those processed after 1, 2 and 3 months (storage) showed no significant statistical change. Finally, the variability "sampling period" for CTV print confirmed the experimental evidence in which the perception of positivity increases linearly from the coldest month, while for *Xylella* the statistical analysis did not detect any upward trend of positives towards the hottest periods. The optical tests carried out on the normalized images have always confirmed the statistical results highlighted by the variability introduced. [**Mujahed Sami (Palestine), MSc, Sustainable IPM Technologies for Mediterranean Fruit and Vegetable Crops, Mediterranean Agronomic Institute of Bari, 2018].**

Investigations on Further or other Causal Agent/s of Viral Citrus Diseases Expressing leaf Symptoms in the main Mediterranean Countries. Most of the virus and virus-like diseases in the Mediterranean region express a particular type of leaf symptoms, which are often considered as an indicator of specific diseases affecting the citrus trees. However, the mixed infections of plant viruses are common in nature, and a number of important viral diseases of plants are the outcomes of interactions between causative agents. Consequently, the mixture of synergistic and antagonistic interactions usually creates unpredictable biological consequences. Relatively and in consideration of the new findings on the putative agents of citrus diseases in the Mediterranean area, an investigation on the presence of four citrus viruses CVV, CCGaV, CCDaV and SDV was performed in citrus plants from several Mediterranean countries. In this context, molecular detection (RT-PCR) and characterization (nucleotide sequences) were conducted on citrus samples selected from citrus varietal collection and field. This investigation showed a prevalence of CVV among the Mediterranean sources. Among

these citrus samples, SDV was also identified for the first time in Palestine and Syria. Moreover, as expected CCDaV was detected only in Turkish samples. Interestingly, albeit the absence of CCGaV in the citrus samples belonging to different countries, this virus was detected for the first time in Apulia Region (South Italy**).[Toumi Oumayma (Tunisia), MSc, Sustainable IPM Technologies for Mediterranean Fruit and Vegetable Crops, Mediterranean Agronomic Institute of Bari, 2018].**

Isolation and Molecular Characterization of *Xylella fastidiosa* from Different Host Plant Species in Apulia Region (Italy). The identification of one single strain, De Donno ST53, in southern Italy and the continuous spread of the bacterium to new areas prompted the necessity to isolate and further ascertain if we still have the same sequence type ST53 in the region. Additionally, population variability is poorly understood in the epidemic area. Thus, highly discriminative typing methods such as Variable Number of Tandem Repeat analysis (VNTR) are needed. In this thesis, isolation throughout six months from different host species was performed using printing and patented sap extraction methods. Subsequently, Multilocus Sequence Typing System (MLST) was conducted for four olive isolates obtained from samples collected from the latest outbreak area. Besides, PCR amplification for eleven VNTRs loci was performed in 4 olive isolates and amplicons were sequenced by Sanger sequencing. All the sequences sizes of VNTR loci were validated and compared to the expected size of VNTR already predicted in silico. Results indicate that besides Olea europaea, Nerium oleander and Polygala myrtifolia seem to have a great potential for isolation and the successful isolation rate was achieved in the late spring time. Printing method has presented significantly better results with 26 isolates. Whereas, only 12 isolates have occurred using patented sap extraction method. MLST results have confirmed genetic commonality with De Donno (ST53) strain. After the validation of VNTR loci sequences, discrepancies were observed between our experimentally derived amplicon size and the predicted sizes in silico. Only around 50% of the expected results screened in silico proved to be correct after validation by Sanger sequencing. [**Mourou Marwa (Tunisia), MSc, Sustainable IPM Technologies for Mediterranean Fruit and Vegetable Crops, Mediterranean Agronomic Institute of Bari, 2018].**

❖ Some Plant Protection Activities of FAO and Other Organizations

ACTIVITIES OF FAO REGIONAL OFFICE FOR NEAR EAST AND NORTH AFRICA (FAORNE)

International Conference on "Fall Armyworm Research-For-Development: Status and Priorities for Africa

Fall Armyworm R4D International Conference held at the African Union Commission (AUC) campus in Addis Ababa, Ethiopia (October 29-31, 2018).An International Conference on "**Fall Armyworm Research-for-Development – Status and Priorities for Africa"** was successfully co-organized by the International Maize and Wheat Improvement Center (CIMMYT), the International Institute of Tropical Agriculture (IITA), the African Union Commission (AUC), the Food and Agriculture Organization (FAO) of the United Nations, the U.S. Agency for International Development (USAID), the Centre for Agriculture and Biosciences International (CABI), the International Centre of Insect Physiology and Ecology (**icipe**), and the Alliance for Green Revolution in Africa (AGRA) at the AUC campus in Addis Ababa, Ethiopia, during October 29-31, 2018. The Conference brought together over 220 experts from an array of scientific and development organizations worldwide, including lead technical staff from international agricultural research centers, African National Agricultural Research institutions, National Plant Protection Organizations, National Agricultural Universities, private sector institutions, African national, sub-regional and regional organizations, and key development organizations.

The first formal meeting of the newly established **Fall Armyworm (FAW) Research-For-Development (R4D) International Consortium** was held on 31st October. The R4D Consortium, coordinated by CIMMYT and IITA, serves as a science-based platform for sustained collaboration, adaptation and learning for effective FAW management. The Consortium presently includes more than 40 institutions worldwide, and aims to explore ways to synergistically work on short-, medium- and long-term solutions to tackle the challenge of FAW in Africa, and other parts of the world where the pest is prevalent or may invade.The three-day Conference included several high-quality presentations, intensive breakout groups discussions, and panel discussions, on key R4D areas related to integrated pest management (IPM)-based FAW management, including (i) FAW ecology, monitoring, surveillance, early warning and ICT tools; ii) host plant resistance; iii) biological control; iv) cultural control and agro-ecological management; v) environmentally-safer pesticides, and pesticide risk management; vi) socio-economic contexts and impact assessments; and vii) policy support for appropriate accelerated response. The participants recognized the need for implementing concerted, farmer-focused, and IPM-based R4D, especially through the R4D International Consortium. **One** of the key recommendations is to develop and implement harmonization protocols in various R4D areas, including multi-location assessment of relationship between crop damage due to FAW and yield losses, and determination of economic and action thresholds for FAW interventions. Enhanced cooperation and regional policy approaches to access new technologies to control FAW and other destructive pests in Africa was also highlighted as a priority, along with the need for effective pooling of scientific and institutional resources toward robust risk assessments, speeding regulatory decisions, and responding to emergencies on a wider scale. Based on the discussions held at the conference, the organizers will soon formulate an action plan, with prioritized set of IPM-based R4D areas relevant for African agro-ecologies and cropping system landscapes.

High cost of ineffective collaboration

Hans Dreyer, director of FAO's plant protection division, listed many collaborative initiatives, including national task forces and expert working groups, which contributed to document and inform the current state of knowledge.

Thaer Yaseen, FAO's regional plant protection officer in near east and north African countries, confirm the need of knowledge sharing between countries and preparedness to be able to face Fall Armyworm in non-infested NENA countries.

"The cost of not collaborating is pretty severe," said **Regina Eddy**, who leads the Fall Armyworm Task Force at the USAID Bureau for Food Security. The real game changer will be that "all experts in the room agree on a common and concrete research-for-development agenda and how to organize ourselves to implement it effectively," she added.

During the conference, the experts debated intensely on the technical gaps and the best ways to combat the pest through an integrated pest management strategy, including how to scout the caterpillar in the crop field, establish monitoring and surveillance systems, pest control innovations and appropriate policy support to accelerate introduction of relevant innovations.

Safe, sustainable, farmer-centered solutions

Short-term responses to the pest at present include synthetic pesticide use. However, there are public health and environment concerns over some of the toxic pesticides being used in Africa to control the fall armyworm. Pesticide use has many negative trade-offs, said Paul Jepson, a professor of environmental and molecular toxicology in the College of Agricultural Sciences at Oregon State University. Natural enemies like parasitic wasps are also often far more vulnerable to pesticides than fall armyworm larvae, which are hard to reach and hide themselves in the maize whorls for instance.

Continental action plan

A key recommendation made by the Fall Armyworm R4D International Consortium is to develop common methodologies and research protocols to ensure data from various studies across the continent are better used and compared. For example, how best could the true impacts of the fall armyworm on food and seed security, public health and environment be measured? Collaborative research could include multilocation assessment of the relationship between observed crop damages and yield losses, which is key to determine the efficacy of a pest control innovation. Conference participants also agreed to work on defining economic and action thresholds for fall armyworm interventions, to ensure better recommendations to the farming communities.

Because no one solution can fit all farmers and socioeconomic contexts, advice must include use of environmentally safer pesticides, low-cost agronomic practices and landscape management and fall armyworm-resistant varieties, among other integrated pest management tools.

Enhanced cooperation between countries to access new technologies and manage the transboundary pest is seen as a priority. Consortium experts also urge an integrated pest management approach, initiated based on farmers' needs. Controlling the fall armyworm in the long run will require important investments into research-for-development for generating and sharing knowledge and addressing technical gaps with farmers.

FAO Regional Office for Near East and North Africa FAO and CIHEAM Promote Control of Red Palm Weevil.

The international meeting "Innovative and sustainable approaches to control the Red Palm Weevil". **25 October 2018, Bari, Italy –** The Food and Agriculture Organization of the United Nations (FAO), in collaboration with the International Center for Advanced Mediterranean Agronomic Studies (CIHEAM), has called for the adoption of an integrated multidisciplinary approach to identify and transfer innovative technologies and methods for the control of the Red Palm Weevil (RPW). This came during a three-day international meeting titled "Innovative and sustainable approaches to control the Red Palm Weevil", held in Bari, Italy, with the participation of representation from over 29 countries. The meeting was organized in collaboration with the Arab Organization for Agricultural Development (AOAD), The International Centre for Agricultural Research in the Arid Areas (ICARDA) and Khalifa International Award for Date Palm and Agricultural Innovation (KIADPAI). During the meeting, stakeholders addressed topics concerning biological control, socio-economic impact, surveillance and early detection of RPW and environmentally friendly control measures. The RPW Expert Group, with the support of technical officers from FAO, CIHEAM and the Near East Plant Protection Organization (NEPPO), had prepared a multidisciplinary strategy paper on RPW control. The strategy stressed the importance of organizing an international meeting to focus on the identification and transfer of innovative techniques applied to the control of RPW and the need to create an international multidisciplinary network of stakeholders. In light of this, the meeting provided an opportunity to identify the most promising scientific activities, with efficient and sustainable application for pest control in the main areas of palm cultivation. In conclusion of the meeting, representatives from the participating organizations signed an official declaration with which they committed themselves to cooperate for the implementation of the recommendations and outcomes of this meeting.

FAO Regional Office for Near East and North Africa

Closure of FAO Training on the Conservation of Stored Grains for some 50 Participants and Supervisors of Wheat Silos.

Theoretical and practical training on conservation of stocked grains. ©FAO / Issam Azouri.

As part of the project to reduce food loss and waste in Tunisia, the Food and Agriculture Organization (FAO) is implementing a training program in cooperation with the Central Cooperative for Wheat (COCEBLE), funded by the Italian Agency for International Cooperation. About fifty participants and supervisors of wheat silos took part in the theoretical and practical training on the storage of wheat from 26 to 28 November. The National Pedagogical and Continuing Agricultural Training Institute (INPFCA) of Sidi Thabet hosted the theoretical course led by the international expert on conservation of grains, **Dr. Hussein Rezk,** who presented to the participants the various types of insects that can damage the grain stored in wheat silos and the ravages each type can cause. A presentation on prevention methods and effective controls was also provided.The theoretical course was followed by two days of practical training on spraying and disinfection of wheat silos in Mateur, in the Bizerte region, and in Siliana. Participants visited various silos and reviewed "best practices" for keeping silos free of pests and insects. Several lessons covered the importance of cleaning the environment around silos to prevent the spread of rodents and insects.

The trainees were provided with the best accessories and protective gear (uniforms and masks) for steaming and disinfecting wheat silos. They also received the necessary guidance to reduce the risk of pesticide exposure and minimize overuse. Mr. Mohamed Nedri, Director General of the Central Cooperative for Wheat (COCEBLE), welcomed the participants to the opening of the training and the co-operation with the Food and Agriculture Organization of the United Nations (FAO), underlining the importance of this course, which is one of the priorities for maintaining food security and guaranteeing food safety in general. He added that this training is part of the two-year long capacity building program to reduce food losses and the waste of wheat in Tunisia. The organization of specialized courses for each stage of the agricultural production process, from the harvest through storage, were provided, where many tangible successes have been recorded. The generalization of these training courses will have the effect of allowing a qualitative improvement in the treatment of wheat, a strategic food.

In 2016, FAO initiated the implementation of food loss and waste reduction project in Tunisia and Egypt following an in-depth study on the strategic priorities of the two countries. This study aimed to analyze the causes of food waste and how to reduce them for grapes and tomatoes in Egypt. For Tunisia, the study focused on milk and cereals. The project was launched to address the alarming amount of food waste in the Middle East and North Africa, where waste is estimated at around 200 kg per person per year.

This FAO project, implemented in cooperation with the Tunisian Ministry of Agriculture, Water Resources and Fisheries, as well as many local partners, including the Central Cooperative for Wheat (COCEBLE), aims to increase food security both in terms of quantity and quality of food available, and to improve the living conditions of small farmers. The project also hopes to increase the purchasing power of consumers, reducing the negative effects of food loss and food waste on natural resources.

Some Activities of Plant Protection in Food and Agriculture Organization of the United Nation (FAO-UN) and other Organizations

DESERT LOCUST SITUATION

Warning level: CALM

General Situation of the Desert Locust during October 2018 and Forecast until mid-December 2018 provided by the FAO Emergency Centre for Desert Locust (ECLO).

General Situation

The Desert Locust situation continued to remain calm during October 2018. Although seasonal rains ended in the northern Sahel between Mauritania and Sudan and vegetation was drying out, a second generation of breeding took place in Chad and small-scale breeding occurred in northern Niger and southern Algeria. There were unconfirmed reports of adult groups and breeding in northern Mali. In Mauritania, locusts moved from the south and concentrated in western areas to form a few small groups. Some of the adults may have moved further north to northern Mauritania, Morocco and western Algeria during periods of southerly winds. Local breeding continued in central Algeria where 180 ha were treated. Scattered adults persisted in the interior of Sudan and began moving towards winter breeding areas along the Red Sea coast where early rains fell in some places. Cyclone Luban brought heavy rains to eastern Yemen and southern Oman. Ecological conditions remained favourable in southern Oman and northwest Somalia from earlier cyclones Mekunu and Sagar in May, respectively. Local breeding was in progress in both areas and 70 ha of very small hopper and adult groups were treated with biopesticides on the northwest coast of Somalia. The situation remained calm in southwest Asia. During the forecast period, small-scale breeding is expected in northwest Mauritania where groups could form, and along both sides of the Red Sea.

Western Region

Small-scale breeding occurred in Mauritania, Niger and Chad. There were unconfirmed reports of locusts and groups in northern Mali. Limited control operations were carried out in central Algeria. FORECAST. Breeding will continue in northwest Mauritania and northern Mali where locusts will concentrate and maybe form small groups. Locusts will decline in Niger and Chad. Local breeding may continue in central Algeria. Additional adults may appear in northern Mauritania and Western Sahara.

Central Region

Scattered adults were present and breeding in Sudan and Oman. Scattered adults were also present on the Red Sea coast in Eritrea. Limited control operations were carried in northwest Somalia. FORECAST. Scattered adults will appear in winter breeding areas along both sides of the Red Sea in southeast Egypt, Sudan, Eritrea, Yemen and Saudi Arabia, and in northwest Somalia where small-scale breeding will occur in areas that receive rainfall or runoff. No significant developments are likely.

Eastern Region

Isolated adults were present in Pakistan. FORECAST. No significant developments are likely

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

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

September 2018 - Regional Contingency Planning Workshop, Egypt
In order to prepare and update Desert Locust emergency response and control plans, the Commission organized Regional Contingency Planning Workshop- 30 September to 4 October 2018, in Hurghada, Egypt, 12 members countries were participated in this workshop.

October 2018- Regional workshop on the use of *Metarhizium acridum* in Desert Locust control operations, Egypt to expand the uses of biocide in Desert locust control, the Commission organized a Regional workshop on the use of *Metarhizium acridum* in Desert Locust control operations, 7-10 October, in Hurghada, Egypt, the frontline countries was participated in this workshop.

November 2018- National Training Course on Survey and Control Operation, Jordan
To strengthen the control capacity of national staff and build up self-reliant and sustainable national training structures. The Commission in cooperation with the Ministry of Agriculture in Jordan organized and conducted a national training course on Desert Locust Survey and Control Operation, Agaba, 11 -15 November 2018, 21 participants from Ministry of Agriculture and other relevant parties attended the training.

November 2018-National Training Course on Survey and Control Operation, Jordan
In cooperation with the Ministry of Agriculture, Jordan to upgrade the sprayer technicians on the field of operate and maintain ULV sprayers that used for controlling Desert Locust control, the Commission organized the training course for the national cadres in the field of maintenance the spray machines in Aqaba from 11-15 November 2018 with the participation of 10 of Technicians from different governorates

❖ Plant Protection Activities of IPPC - FAO

WORKING TOGETHER TO PROTECT PLANTS FROM HARMFUL PESTS IN THE NEAR EAST AND NORTH AFRICA: 2018 IPPC

Regional Workshop: Forty-five plant health experts from 18 countries in the Near East and North Africa, and the International Plant Protection Convention (IPPC) Secretariat, attended the IPPC regional workshop in Muscat, the Sultanate of Oman from 17 to 20 September 2018. They shared experiences in developing phytosanitary capacity, prepared regional positions on proposed International Standards for Phytosanitary Measures (ISPMs), and shared best practices in plant health.

Participants discussed and shared their common views and substantive comments on six new and revised draft ISPMs put forth by the IPPC for consultation by Contracting Parties. In particular, they identified two draft ISPMs that could significantly improve the performance of national phytosanitary services:

- Authorization of entities to perform phytosanitary actions;
- Requirements for the use of modified atmosphere treatments as phytosanitary measures.

Topics of regional interest

Lively discussions focused on topics of regional interest such as:

- challenges and experiences in implementing ISPM 38 on the international movement of seeds; and
- The IPPC Electronic Phytosanitary Certification (ePhyto) project which provides developing countries with a simple generic system for producing, sending and receiving electronic phytosanitary certificates (ePhyto).

Several countries also expressed their interest in joining the Generic ePhyto National System (GeNS). A special session on stopping the spread of the highly destructive Fall Armyworm (*Spodoptera frugiperda*) was also organized. The workshop was jointly organized by the IPPC Secretariat, the Food and Agriculture Organization of the United Nations (FAO) Regional Office for the Near East and North Africa, the Near East Plant Protection Organization (NEPPO) and the Ministry of Agriculture and Fisheries of Oman.

FALL ARMYWORM - AN EMERGING FOOD SECURITY GLOBAL THREAT

Fall Armyworm - an Emerging Food Security Global Threat: The highly destructive, and fast spreading, Fall Armyworm (***Spodoptera frugiperda***) poses a real threat to global food security. Furthermore, it cannot be eliminated once it has infested a country. Originally, native to the Americas, the Fall Armyworm (FAW) was first detected in Africa in 2016 and has now spread to all sub-Saharan countries. It has also recently been detected in Yemen and India.

"**It has been estimated that *maize yield reduction* per year from FAW across Africa may be of *8 to 16 million tons*, the estimated value of this loss is USD 2400 to 4800 million per year**," remarked Hans Dreyer, Director of FAO's Plant Production and Protection Division at the FAW side event during 2018 Committee on Agriculture (COAG) meeting.

A 2018 report from the Democratic Republic of the Congo illustrates Fall Armyworm's (FAW) huge threat to food security: It estimates that **45% of maize harvest losses** are due to FAW attacks and have resulted in a loss of 0.9 million tonnes of maize during the 2017-2018 harvest season. Indeed, the insects prefer maize – a key food crop in

Africa – as well as rice, sorghum, millet, sugarcane, vegetable crops and cotton.The FAW spreads quickly as the moth can fly up to 100 km in one night. Furthermore, it can spread as a stowaway in aircraft or on other means of transportation, or through trade – for example in infested commodities. Many countries in Africa and the Near East are thus implementing strategies to prevent or manage infestations. The FAO of the United Nations is assisting these countries through twenty ongoing projects in Africa – with at least 10 more in the pipeline. The International Plant Protection Convention (IPPC) community has also organized regional workshops to foster cooperation in preventing and managing the FAW.

"The IPPC has an important role to play in helping prevent the spread of the Fall Armyworm – especially due to travel and trade, " emphasized Jinyuang Xia, Secretary of the IPPC. "South-South Cooperation, as well as more technical and financial support, are necessary to manage ongoing infestations."

Special session on the Fall Armyworm at the IPPC Workshop in Africa

During the special session on FAW at the IPPC regional workshop in Africa, participants shared their experiences in managing the pest:

- Many countries highlighted the importance of increasing awareness about the FAW and providing training and support (including through South-South cooperation) to farmers for dealing with it.
- Namibia reported that it has been successfully using biological pesticides to combat FAW, while Guinea is using systemic pesticides in place of contact pesticides.
- The DRC said it was important to establish an NPPO Information Exchange Platform for Armyworm Management and strengthen collaboration between research institutions.

- **Special session on the Fall Armyworm at the IPPC Workshop in the Near East and North Africa (NENA)**

A special session on the highly destructive FAW helped addressed the growing concern about its rapid spread in the region. The session aimed at:

- strengthening the coordination between FAO and NENA countries to foster the early detection of, and good practices for managing, the Fall Armyworm;
- sharing lessons learned from managing the FAW in sub-Saharan Africa; and
- introducing participants to the Fall Armyworm Monitoring and Early Warning System (FAMEWS) mobile app and global platform developed by FAO.

Participants from the Sudan and Yemen shared their experiences about the programmes they have put in place to fight FAW since initial infestations were reported. Egypt shared its preparedness and contingency plan to face a future infestation.

FAO's response to the Fall Armyworm

In addition to providing direct assistance to countries and farmers, FAO and its partners are working on:

- recommendations on the use of synthetic pesticides and biological control (including bio-pesticides);
- a FAW monitoring and early warning programme – including a mobile app and a global platform for sharing results;
- Farmer Field School curricula and communications; and
- South-South cooperation to integrate lessons learned in managing FAW in the Americas.

The IPPC's The Strategic Planning Group (SPG) at its meeting from 9 to 11 October 2018 in Rome discussed how the IPPC community can address this challenge.

In his presentation at the SPG meeting, Shoki Al-Dobai, IPPC Secretariat Integration and Support Team Leader, highlighted how the IPPC has fostered cooperation and knowledge sharing in preventing and managing the FAW among IPPC contracting parties. The IPPC also plays an important role in helping to prevent the spread of the Fall Armyworm – and minimize the risk of the movement of the pest, through commodities and means of transportation, in international trade.

Mr Al-Dobai highlighted a specific set of IPPC International Standards for Phytosanitary Measures (ISPMs) that can help countries enforce suitable effective measures to prevent and regulate the pest. These include pest risk analysis, pest surveillance, and requirements for the establishment of pest free areas, phytosanitary inspection and different phytosanitary treatments. To find out more, see:

- The FAO Fall Armyworm portal

- The FAO Advisory Note on FAW in Africa
  Fall Armyworm Monitoring and Early Warning System (FAMEWS) mobile app

Special session on the Fall Armyworm at the IPPC Workshop in the Near East and North Africa (Muscat, September 2018)

ICARDA'S SEED HEALTH LABORATORY

Workshop at ICARDA on the Occasion of the "International Phytosanitary Awareness Week" with a theme "Role of Genetic Resources Health Units (GHUs) of International Centers in Invasive Pest and Disease Control'. On the occasion of the "International Phytosanitary Awareness Week" (22-26 October 2018) with a theme of 'Role of Genetic Resources Health Units (GHUs) in invasive pest and disease control', ICARDA's Seed Health Laboratory organized a one day workshop on October 24, 2018 at Terbol Station, Beqa'a Valley, Lebanon. The following five staff from Syrian Quarantine Service, Ministry of Agriculture joined the workshop: Ourouba Alziati Abo Albourgoul (Head of Quarantine Department), Eiad Yakoub Alfalah (Deputy Head of Quarantine Department), Douaa Hassan Haider (Department of Quarantine), Ramez Ali Darwish (Head of Jedidiah Yabbos Quarantine Center), and Mahmoud Abdulkarim Ghazi (Head of Al Aredaah Quarantine Center). In addition, Dr Asma Najar (Plant Virologist, INRAT, Tunis) was invited to attend the workshop. The workshop was opened by welcome note and history of ICARDA presentation by Dr Hassan Machlab (ICARDA Country Manager, Lebanon) followed by a presentation by Dr Majd Jamal (Head of Government Liaison, Syria – ICARDA) on Cooperation between ICARDA and Syria. Dr Safaa Kumari (Head of Seed Health Lab/Virologist, ICARDA) gave a presentation on the "Seed-health testing at ICARDA" followed by a useful discussion with ICARDA and participants on the procedures of seeds exchange and the shipments documents (e.g. Phytosanitary Certificate, Import Permit) for the incoming and outgoing seeds. After a short break, participants visited ICARDA's Gene Bank together with Dr Ali Shehadeh (Curator of Range Forage Species, GRS–ICARDA), Seed Health Lab with Dr Safaa Kumari, and Seed Unit and Increase facilities with Dr Abdoul Aziz Niane (Scientist, Seed Section, ICARDA).

ARAB SOCIETY FOR PLANT PROTECTION NEWS

ASPP Delegation Visits the FAO-RNE Office in Cairo

Dr. Ibrahim Al-Jboory accompanied with Dr. Khaled Makkouk and Dr. Ahmed El-Heneidy paid a visit to the FAO Near East Regional Office in Cairo, Egypt on November 7, 2018. They first visited Dr. Thaer Yaseen, Regional Plant Protection Officer and discussed with him all possible activities that can be implemented through the collaboration between ASPP and FAO-RNE. There was a full understanding that FAO-RNE and ASPP can complement each other and organize activities that can serve the Arab and Near East region. The ASPP delegation together with Dr. Thaer Yaseen paid a visit to Mr. Abdessalam Ould Ahmed, Assistan Director General and Regional Representative for the Near East and North Africa. Dr. Jboory summarized the strong collaboration between ASPP and FAO over the past 35 years and thanked Mr. Ould Ahmed for the FAO-RNE continued support to ASPP and sincerely hoped that such collaboration can grow further. To formalize such collaboration, the FAO-RNE ADG suggested that it is about time that FAO-RNE and ASPP develop and sign a

memorandum of understanding (MoU) that defines the nature of collaboration between the two parties, in addition to a detailed five year joint work plan. ASPP delegation welcomed the idea, and both parties agreed to finalize this step as soon as is possible. It is hoped that the first outcome of this collaboration will be a workshop to be organized in 2019.

Workshop on invasive pests

The Arab Society for Plant Protection (ASPP) organized during the period 4-5 November, 2018 at Helnan Palestine Hotel, Alexandria, Egypt a workshop entitled "Detection, Epidemiology and Management of Invasive Pests that Threatens Strategic Agricultural Crops in the Arab Region". Around 200 scientists from academic institutions and agriculture research centers in Egypt in addition to several Arab countries (Iraq, Lebanon, Syria, Jordan) participated in this event. The workshop was opened by a statement presented by Dr. Ibrahim Al-Jboory, ASPP President, followed by a statement by Dr. Ahmed El-Heneidy on behalf of the Workshop Organizing Committee. The workshop program included six sessions that centered around the following topics: 1. New directions in the management of invasive pests, 2. Impact of climate change on insects fauna and pathogens in the Arab region, 3. New invasive viral and bacterial diseases in the Arab region, 4. Economically important soil-borne diseases in the Arab region, 5. New technologies in pest management, 6. Economically important insect pests and their management in the Arab region. During this workshop, 18 presentations were made followed by discussion of the different topics. The workshop was partially sponsored by BASF.

A Visit to Tunis by an Arab Society for Plant Protection delegation

As part of the ASPP activities in preparation for the for the 13th Arab Congress of Plant Protection which will be held in Tunisia during the period 1-6 November 2020 (ACPP 2020) organized by ASPP in collaboration with the Tunisian Ministry of Agriculture, Water Resources and Fisheries represented by the National Agricultural Research Institute of Tunisia (INRAT), an ASPP delegation composed of Dr. Ibrahim Jboory, ASPP president, Dr. Khaled Makkouk and Dr. Safaa Kumari, members of the ASPP Executive Committee, made a short visit to Tunisia lasted for 4 days. During this visit, the ASPP delegation accompanied with the chair of the ACPP 2020 Local Organizing Committee Dr. Asma Najar, paid a visit to policy makers in the Tunisian institutions involved in agricultural scientific research and has vested interest in making ACPP 2020 a successful event. The first visit was to the Deputy Minister of Agriculture, Water Resources and Fisheries Dr. Bou Bakr Kray who was briefed by the delegation about ASPP activities since its establishment in 1981 and then discussed with him ongoing arrangements to organize ACPP 2020 in Tunisia. Dr. Kray expressed the willingness of the Ministry of Agriculture to support the congress to the maximum of its ability to make sure that it will be a successful event. The delegation then visited Dr. Mahmoud Elias Hamze, President of the Agricultural Research and Higher Education Institute (IRESA) in Tunisia and again briefed him about ASPP activities and discussed with him ways and means to make ACPP 2020 a successful event, especially most of the Tunisian scientists who will participate in the congress are working at institutions under IRESA. Dr. Hamza was extremely positive about having ACPP 2020 in Tunisia and indicated his strong support to this regional congress. The delegation also visited with Dr. Mondher Ben Salem, Acting Director General of INRAT, the institution directly involved in organizing ACPP 2020, as the chair of the congress organizing committee Dr. Asma Najar is an INRAT scientist. There was a broad discussion with Dr. Ben Salem who also joined the organizational joint ASPP-Local Organizing Committee meeting held on December 13, 2018.

The delegation accompanied with the chair of the Local Organizing Committee Dr. Asma Najar visited the few hotels in Hammamat that has the capacity to host a congress of 400-500 participants. The congress needs were discussed with the sales people of the hotels visited who were requested to submit their offers the next morning, to enable the Congress Organizing Committee make a final decision on the congress venue in its meeting on December 13, 2018.

During the last day of the visit, a joint meeting between ASPP Executive Committee and the Local Organizing Committee represented by all its members was held at INRAT and discussed all organizational details related to the congress. The meeting lasted five hours and there was full agreement on all points discussed. During the meeting all the hotel offers received were evaluated and there was agreement that the venue of the congress will be Le Royal Hotel in Hammamat, Tunisia who gave the best offer. The date and venue of the congress will be formally announced during January 2019 in the first announcement for the congress which will be placed on the ACPP 2020 dedicated website.
By all measures the visit of the ASPP delegation to Tunisia was very successful. The warm welcome expressed to the delegation by all those who met with them is an expression of willingness to make ACPP 2020 a big success.




2018 Report of the Arab Impact Factor: The Arab Journal of Plant Protection was Ranked Number 1 among Arabic Agricultural Scientific Journals.

The Arab Impact Factor (AIF) is a measure of scientific journals that publish scientific research in the Arabic language. It is a quantitative and qualitative measure that ranks the academic excellence of Arabic scientific journals. AIF is published annually by a committee at Zoweil Science and Technology University, Egypt, supervised by a group of distinguished scientists from different Arab countries covering many disciplines. The 2018 report was published this week, which included the evaluation of 272 Arabic scientific journals, where the Arab Journal of Plant Protection (AJPP) received an AIF of 3.0 and ranked second after Arab American University Research Journal, which received an AIF of 3.07. If we consider that the Arab American University Research Journal is a multidisciplinary journal, whereas the AJPP is a journal that focuses on agricultural issues, it can be concluded that the AJPP is ranked number 1 among agricultural journals in the Arab region. The Arab Society of Plant Protection is proud of this achievement, and look forward for continued progress in the coming years

ASPP MEMBERS NEWS

The 15th International Congress of Acarology (ICA) was organized in Antalya, Turkey during 2-8 September 2018.

The theme of the congress was "The Acari: very small but impossible to deny!" .Around 270 delegates from 45 countries attended the meeting. The congress program over a five days period included 190 concurrent oral sessions and 89 poster presentations, which were organized into six keynote lectures, four symposia and ten contributed sections. Arab scientists from five Arab countries attended the meeting, namely: Drs Ibrahim Al-Jboory, scientific committee member (Iraq), Fahad Al-Atawi (Saudi Arabia), Dr. Hebatallah Galal Mansour Abouelmaaty (Egypt), Dr. Amani Bellahirech and Dr. Sarra Bouagga (Tunisia). (Group photo of Arab Scientists). It was decided that the next ICA congress will be held in Auckland, New Zealand during, 2022. For more information on the congress check the congress website: http://www.acarology.org/ica/ica2022/

Research Activities of JSPS-Postdoctoral Fellow in Japan

Morphological and Molecular Identification of Mites: Dr. Mohamed W. Negm has awarded a JSPS Postdoctoral Fellow at Ibaraki University since 2017-present. Mr.Negm is an Associate Professor; Assiut University, Egypt is conducting a research under the prestigious JSPS Postdoctoral Fellowship with his host Prof. Tetsuo Gotoh at the Laboratory of Applied Entomology & Zoology .He is currently doing research on mite taxonomy by using combined analyses of morphological and molecular approaches. Mr.Negm has a very good relation with the Japanese authorities backdated to April 2014, where he got a postdoctoral fellow at Kyoto University under the Matsumae International Foundation, in collaboration with Prof. Hiroshi Amano, achieved a research on some predatory mites in Japan. The importance of the proposed work to the international trade is obvious, which will lead to encourage more studies to protect and increase the quality of agricultural crops consumed locally in Japan and internationally. Also, it will pave the way towards applying the globally-important programs such as organic farming, sustainable agriculture, biological control and integrated pest management (IPM). This research should help to resolve international trade barriers related to plant quarantine as well as discover new invasive and cryptic species since the combination of morphological and molecular approaches provides more reliable identification and better understanding of species identities. In the Acari, the internal transcribed spacer (*ITS*) of the ribosomal DNA and the cytochrome oxidase subunit I gene (*COI*) are the most commonly used regions for molecular diagnostics as DNA barcodes. Therefore, the following outcomes are expected to be achieved from their current project: study the biodiversity of mites inhabiting different ecosystems with special emphasis on species of high economic importance, describe and illustrate new species and/or new records, establish taxonomic keys for the separation among various mite species, classify and describe mites using morphological-based identification and by using molecular techniques to differentiate between species with taxonomic problems. Drs. Gotoh and Negm had the chance to publish and present some of their new research findings at the 15th International Congress of Acarology held in Turkey (September 2018) and at the 27th Annual Meeting of the Acarological Society of Japan in Tsukuba (October 2018).

Fungal Entomopathogens as Endophytes: A Promising Approach towards Sustainable Agriculture?

Fungal entomopathogens have been investigated as important natural enemies of arthropods for more than 100 years. Yet to date, their development as effective biological control agents of insect and other arthropod pests has only been met with limited success, especially when applied under field conditions. An increasing number of recent studies demonstrate that entomopathogenic fungi can play important roles as endophytes, plant growth promoters, plant disease antagonists, and rhizosphere colonizers, in addition to their direct biocontrol action against insect herbivores through inundative releases. Of these recently-discovered roles, endophytic colonization by various genera of fungal entomopathogens is of particular interest and might offer an effective alternative to conventional inundative application of such entomopathogens. As endophytes, entomopathogenic fungi have been shown to endow plants with several benefits including enhanced plant growth and increased protection against not only insect pests but also plant pathogens. Therefore, a deeper understanding of the various ecological roles and potential interactions entomopathogenic microbial agents might display post-application would be of crucial importance for the development of more successful control approaches and sustainable production practices. A series of studies examining multiple roles of fungal entomopathogens, especially *Beauveria bassiana* and *Metarhizium brunneum*, and providing significant evidence for their promising multifaceted and cost-effective use in sustainable agriculture, for instance as biofertilizers as well as dual biocontrol agents of plant pathogens and insect pests, are discussed. **[Lara R Jaber (Jordan), Department of Plant Protection, Faculty of Agriculture, University of Jordan, Amman-Jordan, (Keynote presentation at ICOFAAS, October 3-7- 2018 in Antalya Turkey].**

Bioactives metabolites for the antifungal and Plant Promoting Growth activities among Plant-associated Bacteria of *Vicia faba* L.

Vicia faba L. plants are very important culture in Tunisia and over the world; however, emergence of severe factors is compromising the economical fit of this culture. Different products are been used to fight against biotic stress such as fungal diseases and abiotic stress such as drought, salt, etc. Among them, chemicals product shows good

results in short term to reduce diseases, but it has consequences, the accumulation of residues in the environment became dangerous and the development of resistances in the pathogen. One of the biggest challenges in new research is the development of a biological product to replace chemical treatment for an environment friendly approach. The purpose of this study is selecting good candidates used as Biocontrol agents against fungal diseases. A collection of 33 bacterial strains was selected from 500 plant-associated bacterial based on their high antifungal activity against Fusarium oxysporum as first screening, then selected strains tested against 11 different phytopathogenic fungi. The most active strains were identified as Bacillus species. Analysis of the presence of cLPs genes showed that that fenD and srfAA were the most frequently genes detected (50% and 70%, respectively), then bmyB(40%), when the spaS and dfnM were the less frequent genes (10% and 20%, respectively). A 78% of stains presented at least one of the cLPs genes, although 22% of isolates had not any biosynthetic genes. The analysis of the production of the cLPs by HPLC showed that 30% of strains produced Iturin, Fengycin and Surfactin, when 12% only Iturin and Surfactin, 6% Iturin and Fengycin, when others strains were able to produce only one type of Lipopeptide Fengycin and Iturin (18% and 6%, respectively). The 33 strains were tested also for some PGP activities, 90% of strains produced Siderophores, 12% able to solubilize to phosphate, 85% of isolates produced AIA and 18% produced HCN. The biocontrol essay on *Vicia faba* L. plants under greenhouse shows the capacity of selected strains to protect plants from two different phytopathogenic fungi, the PGP activities was noticied by promoting growth of inoculated *Vicia faba* L. plants than no inoculated. [**Imen Haddoudi (Tunisia), Isabel Mora, Jordi Cabrefiga, Emilio Montesinos, and Moncef Mrabet, University of Tunis El Manar, Faculty of Mathematical, Physical and Natural Sciences of Tunis (FST) – Campus Universitaire El-Manar, 2092 El Manar Tunis. The second Mediterranean Forum for PhD Students and Young Researchers, on "Research and Innovation as Tools for Sustainable Agriculture, Food and Nutrition Security" 18 to 20 September 2018 Bari, Italy]**

First Report of Grapevine Pinot Gris Virus in Grapevine in Moldavia

During the past 40 years, the grapevine varietal collection of the Republic of Moldova was diversified as a result of intensive breeding using genetic resources from various viticulture centers of the world. Grapevine Pinot gris virus (GPGV) from the genus Trichovirus, family Betaflexiviridae, has been reported from several grape-growing regions of the world (Giampetruzzi et al. 2012; Saldarelli et al. 2017). In autumn 2016, GPGV was found in five symptomless out of 12 grapevine samples collected from Moldavia. Margaritar, Muscat timpuriu, Leana, Muskat dnjestrovski and Ruskij ranij were the five cultivars found infected with GPGV. RNA was extracted from cortical scrapings of dormant canes and used in RT-PCR to amplify a fragment targeting the end of the movement protein gene and the beginning of the coat protein genes using specific primer pair DeF/R (Morelli et al. 2014). The expected 588 bp amplicon was obtained from two vines. The DNA fragments were cloned into pSC-A-amp/kan (Agilent Technologies, United Kingdom) and sequenced (Macrogen Europe, The Netherlands). BLAST analysis revealed a 98% nucleotide sequence homology with the SK53 isolate from Slovakia (KF134127). Bioinformatics analysis of the Moldavian sequence (LT719093) is consistent with the sequence of GPGV from symptomless vines, as it has the described C/T polymorphism (Giampetruzzi et al. 2012) in the stop codon of the movement protein. The existence of GPGV latent infections and/or presence of asymptomatic strains of GPGVunderline the importance of sensitive diagnostic assays to detect genetic variants of GPGV in natural populations. To our knowledge, this is the first report of GPGV from Moldavia **[Raied Abou Kubaa , Pierfederico Lanotte ,Pasquale Saldarelli, Journal of Plant Pathology, 20 November 2018.]** https://doi.org/10.1007/s42161-018-00209-y

Xylella fastidiosa Vectors Training:

Dr's Naima Mahmoudi and Sonia Bouhachem from INRAT-Tunisia have participated in three month's training on detection and identification measures of Olive Quick Decline Syndrome (OQDS) bacteria *Xylella fastidiosa* vectors. This training was conducted in the context of CURE-XF in cooperation with CIHEAM, Bari University and CNR-Bari. The photo includes the two Drs besides Professor Giovanni Martelli, Dr.Khaled Djelouah and Michele Digiaro.

Visit of an Arab Society for Plant Protection delegation to ControlMed project in Sidi Thabit, Tunisia

On December 13, 2018 a delegation from the Arab Society for Plant Protection (ASPP) represented by Ibrahim Al-Jboory, ASPP president, Khaled Makkouk and Safaa Kumari, ASPP Executive Committee members, in addition to Asma Najar, the 13th Arab Conference of Plant Protection Organizing Committee Chairperson visited ControlMed at Sidi Thabit, a young and innovative startup in Tunisia. The project focus on local beneficial insects' mass-rearing, produced in Tunisia and marketed inside and outside Tunisia. The founder and CEO of ControlMed is Dr. Faten Hamdi, an agricultural engineer specialized in horticulture and plant protection. She studied at the National Institute of Agricultural Sciences in Tunisia (INAT) and the Higher Agricultural Institute of Chott-Mariam (ISA-CM, Sousse, Tunisia). She obtained a Master degree in environmental diversity and microbial and parasitic interactions at the University of Montpellier 2 (UM2, France) and a joint doctoral thesis from the University of Sousse (Tunisia) and the University of Montpellier 2 in Agricultural Sciences, Plant and Environment Protection and Biological Sciences. ControlMed is an industrial company created in 2014 and licensed by the National Agency for the Promotion of Industry and Innovation. The idea of the project came after the successful participation in an entrepreneurial contest (PACEIM) in 2011 organized by the Research Institute for Development (IRD, France, http://www.ird.fr), which encourages high school graduates in Mediterranean countries to launch their own innovative projects. ControlMed was also among the winners of the first session of the national debate for innovation in 2014, http://www.concoursinnovation.tn/edition2014.asp. Within the same year, the company signed a cooperation agreement with "Institut de l'Olivier" in Tunisia (http://www.iosfax.agrinet.tn/) to establish its production unit according to standards and to invest the results of Tunisian scientific research in the field of beneficial insects propagation. ControlMed seeks to value the local natural resources of beneficial natural insects and biological control agents and their intensive propagation based on scientific research results. In this context, the company started its first phase by producing two insect species because of the availability of marketing opportunities in the local and foreign markets. The Trichogramma, as natural local parasitoids on lepidopteran eggs which is very efficient bio-agent on of certain pests, such as carob/dates moth, tomato leaf miner was selected. ControlMed was involved in a national program for the biological control of Carob moth in Tunisian pomegranate orchards. The framework of this program is an agreement for Trichogramma supply was signed for the years 2015, 2016, 2017 and 2018 with an inter-professional fruits group (http://gifruits.com/) under the supervision of the Ministry of Agriculture. ControlMed's participation under this program covered 3000 ha of pomegranate orchards (3 to 4 releases/ season) in seven production sites in the north, south and central regions of the country. The Mediterranean flour moth, Ephestia, reared for its eggs and as an alternative host for the mass-rearing of beneficial parasitoids and as a food supply to multiply predatory beneficial insects such as ladybug, bugs, green lacewing and others. ControlMed is looking for foreign markets for its two products in Europe, Middle East and Africa. The company objectives beside the production of beneficial insects is organizing open house days to introduce its activities to the public (schools, NGO, local communities, and others). Also, it organizes awareness days about biological control and pest's sustainable management tools. The company is also keen to maintain communication with scientific researchers by participating in the formulation of student's theses from schools and higher education institutes and developing agricultural research projects with Tunisian and foreign research centers. In spite of its modest capabilities, the company participates actively in scientific seminars and conferences related to entrepreneurship. Dr. Hamdi is a member of several associations concerned with women entrepreneurship leaders. (http://www.utica.org.tn/Fr/chambre-nationale-des-femmes-chefs-d-entreprise_11_36). In 2019 and 2020 ControlMed will contribute in the development of its R & D activities by participating in an European program "MOBIDOC" (http://www.anpr.tn/mobidoc/) in partnership with the National Agency for The Promotion of Scientific Research (http://www.anpr.tn/) to train and integrate three newly graduated Ph. D. students to work on research in the field of pests biological control of fruit trees and stored products in cooperation with three Tunisian research centers.

http://www.ird.fr/toute-l-actualite/actualites-institutionnelles/lancement-du-paceim
http://www.anpr.tn/mobidoc/

Dr.Hamdi published several scientific articles as follows:

1-Streito J.C, Clouet C., Hamdi F.,Gauthier N. 2017. "Population genetic structure of the biological control agent Macrolophus pygmaeus in Mediterranean agroecosystems. Insect Science, 24, 859-876.

2-Hamdi F. & Bonato O. 2014. Trophic relationships and survival capacity of Macrolophus pygmaeaus. The Canadian Entomologist.

3-Hamdi F. & Bonato O. 2014. Relationship between trophic resources and survival capacity in Macrolophus pygmaeus (Hemiptera: Miridae). 146. 93-102.

4-Hamdi F., Chadoeuf J., Bonato O. 2013. "Functional relationships between plant feeding and prey feeding for a zoophytophagous bug". Physiol Entomol.

5-Hamdi F., Chadoeuf J., Chermiti B., Bonato O. 2013. Evidence of cannibalism in *Macrolophus pygmaeus*, a natural enemy of whiteflies. *J. Insect. Behav*. DOI 10.1007/s10905-013-9379-3. 26 (1).

6-Hamdi F., Clouet C,. Sreito J.C., Bonato O., Gauthier N. 2012. Isolation and characterisation of 9 polymorphic microsatellite loci in the predatory bug *Macrolophus pygmaeus* Rambur (Hemiptera: Miridae) using pyrosequencing technology. *Mol. Ecol. Resour*. 12: 972-974.

7-Bonato O., Deschamps, C., Hamdi F., Ridray G., Chadoeuf J. 2011. Répartition spatio-temporelle de *Macrolophus caliginosus* (Hétéroptera: Miridae) en culture de tomate sous abris. *Entomol. Gen*. 32 (1/2): 91-102.

8-Hamdi, F., Fargues, J., Ridray, G., Jeannequin, B., Bonato O. 2011. Compatibility among entomopathogenic hypocreales and two beneficial insects used to control *Trialeurodes vaporariorum* (Hemiptera: Aleyrodidae) in Mediterranean greenhouses. *J. Invert. Path*. 108: 22-29.

9-Hamdi, F., Bonato, O. Etude de l'influence de la température sur la réponse fonctionnelle de l'agent de lutte biologique *Macrolophus pygmaeus*. Actes de la *9ème Conférence Internationale sur les Ravageurs en Agriculture*, 26-27 octobre 2011, Montpellier, France, p. 65.

XYLELLA NEWS

1st International Summer School on: "*Xylella fastidiosa* – Detection, Epidemiology and Control Measures".

CIHEAM Bari hosted the first International Summer School "CureXFSS2018"on "*Xylella fastidiosa* – detection, epidemiology and control measures" from 10 September to 17 October 2018, in the framework of the Project on "Capacity Building and Raising Awareness in Europe and in Third Countries to Cope with Xylella fastidiosa – CURE-XF" funded by the EU Horizon 2020 Research and Innovation Programme H2020-MSCA-RISE-2016. CURE-XF is the only European Project aiming at strengthening the capacity building in the Near East and North Africa Region on *Xylella fastidiosa* Cure XFSS 2018 was jointly organized by CIHEAM Bari, CNR-IPSP, CRSFA, and UNIBA (Italian partners of the project) in collaboration with XF-ACTORS and POnTE projects. 25 participants from 12 different countries (Algeria, Egypt, Iran, Iraq, Italy, Lebanon, Macedonia, Morocco, Palestine, Spain, Tunisia, the UK) attended theoretical courses and carried out practical activities organized in four different sessions on "Biology, genetics and pathogen-host-interaction", "Diagnosis and strain characterization", "Control, containment and management measures" and "Socio-economic impacts and requirements of the EU phytosanitary legislation". Thanks to the Summer School, trainees could deepen and strengthen their knowledge and know-how on Xf and raise their awareness in relation to Xf impacts and risks upon its establishment. Such training helped them in developing a critical mass ready to be used in their countries of origin where they will start working to consolidate expertise and awareness of plant health agencies, decision-makers and relevant stakeholders, promote

the use of advanced diagnostic tools for the detection and characterization of Xf and associated vectors, consolidate disease prevention, monitoring and control of Xf and associated vectors, and improve pest risk analysis, phytosanitary legislations and contingency measures for a safe plant material trade. To this main purpose, the next step of the CURE-XF project will be to organize training activities at regional level, in all partner countries falling into the NENA Region. The partner Institutions in the NENA Region are: ARC (Egypt), the Islamic Azad University (Iran), LARI (Lebanon), INRA Maroc (Morocco), CORE (Palestine), and INRAT (Tunisia). Further information: www.cure-xf.eu . The Certificate of Attendance was delivered to the 25 participants in the **1st International Summer School on *Xylella fastidiosa*** (jointly organized by CIHEAM Bari, CNR-IPSP, CRSFA and UNIBA, in collaboration with XF-ACTORS and POnTE Projects).

Second Annual Meeting of the POnTE Project and XF-ACTORS Projects in Valencia on the Emerging Plant Diseases.

Second Annual Meeting of the POnTE and XF-ACTORS Projects funded by the European Union's Horizon 2020 research and innovation program, took place in Valencia, Spain from 23 to 26 October 2018, co-organized by the Instituto Valencia no de Investigations Agrarias (IVIA) Generalitat Valencia.The Meeting was dedicated to the presentation of the latest scientific results gathered within the framework of both European H2020 projects targeting emerging plant diseases.The program consisted of three main sessions with the following topics:
Pathogens of Forestry, *Candidatus liberibacter solanacearum* and *Xylella fastidiosa*

Xylella fastidiosa – Vectors
Xylella fastidiosa – Sampling, detection and remote sensing
Xylella fastidiosa – Control of *Xylella fastidiosa*
Xylella fastidiosa – Modeling and risk assessment
Xylella fastidiosa – Insights into the genetics of *Xylella fastidiosa* and host-pathogen interactions.
Xylella fastidiosa – Plant health and risk management.
In addition, an open discussion was dedicated to the topic "Control of *Xylella fastidiosa* vectors", one of the key aspects of the management of *X. fastidiosa*.
From the Arab society of plant protection, **Dr. Raied Abou Kubaa**, a researcher at the Italian National Research Council (CNR) participated in this event, contributing in three different research activities on *Xylella fastidiosa.*
https://www.ponteproject.eu/wp-content/uploads/2018/10/BOOK-OF ABSTRACTS_VALENCIA_ONLINE.pdf

Breaking News: *Xylella fastidiosa* attacks Tuscany, Italy. *Italian National Research Council (CNR) Institute for Sustainable Plant Protection* (ANSA) – ROME.

On DECEMBER 12, an outbreak of *Xylella fastidiosa* was found for the first time in the municipality of Monte Argentario, by the Regional Plant Health Service of Tuscany, a bacterium that attacks several sensitive plant species leading to severe diseases. This is not the first finding in Italy, an epidemic spread of the bacterium has been reported since 2013 in southern Italy confined to the region of Apulia, where olives are severely affected by an exotic strain of Xylella presumably introduced with infected ornamental plants from South America some years ago. The finding of an outbreak in north Italy was announced by the Ministry of Agriculture, in a note, stating that the strain of the bacterium discovered in Tuscany is clearly distinct from the one spreading in Apulia, thus this finding is not linked to the presence of the bacterium in southern Italy. Whereas, strains genetically similar to this one has been described in France (Corsica and Paca regions) and in Spain. The area where the infected plants were

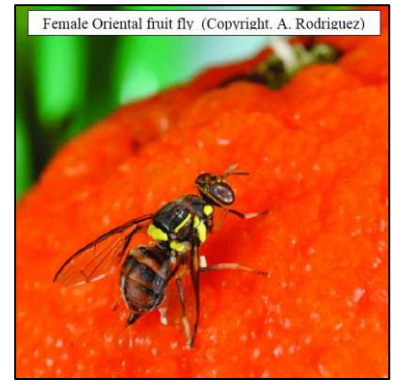
found is located near Porto Santo Stefano, is particularly isolated from the rest of the Tuscan territory due to the presence of the Orbetello Lake on a surface area 26.9 km^2 that separates it from the mainland. The bacterium was detected in 41 plants: 13 brooms, 11 *polygala mirtifolia*, three almond trees, two calicotome, one rosemary, one lavender, a cistus, and an eleagn. The results of more than 1000 diagnostic tests performed on samples collected in the area did not reveal any infection on olive tree. The origin of the infestation is not known, but among the hypotheses credited the introduction into the area of infected plants or the transport of insects' carriers of the disease, coming from locations located outside the Italian territory. [**Raied Abou Kubaa and Maria Saponari, 14/12/2018 (IPSP) Bari, Italy]**

Workshop on Plant Viruses Diagnostic Application.

Technical workshop on Plant virus diagnostic application of RNA high throughput sequencing to phytosanitary certification procedures. 7-9 November 2018, IPSP-CNR, Bari, ITALY. Participants are doctorate candidates from Italy, Turkey, Spain and Greece. Dr. **Raied Abou Kubaa from CNR-Bari and ASPP Member has participated in this workshop.**

GENERAL NEWS

Breaking News First report of *Bactrocera dorsalis* in Italy.



The NPPO of Italy recently informed the EPPO Secretariat of the first captures of *Bactrocera dorsalis* (Diptera: Tephritidae – EPPO A1 List) on its territory. During an official survey conducted in 2018 in Campania region, 10 traps (with methyl-eugenol bait) were placed in 10 locations, in 2 fields with mixed fruit trees in each of the provinces of Salerno and Napoli. These trapping sites had been chosen because of their proximity to various cultivated species (e.g. *Capsicum, Citrus, Diospyros kaki, Malus, Solanum lycopersicum, S. melongena, Prunus, Pyrus, Vitis*) to ensure the presence of ripe fruits during the whole monitoring period. Caught specimens were collected and identified using morphological identification keys and molecular tests. Using several morphological keys, specimens were tentatively identified as *B. dorsalis*, but molecular studies identified 2 clades. Obtained sequences were deposited in GenBank. For the moment, the possible pathway of introduction of *B. dorsalis* in Campania is unknown. Official phytosanitary measures have been taken. The pest status of *Bactrocera dorsalis* in Italy is officially, declared as: **Present, some adult specimens caught in traps, in specific parts of the Member State, where host crop(s) are not grown. Source: NPPO of Italy (2018-11). *Bactrocera dorsalis.***

2018 Research Excellence Award for Egyptian Journal of Biological Control

Regarding the subject of the Biological Control Journal Award, I would like to inform you of the following: On November 8, 2018, the Ministry of Higher Education and Scientific Research organized a ceremony to honor a number of researchers, universities and scientific journals in the celebration of "Excellence in International Publishing" at the Ministry of Education in Cairo. Dr. Tarek Shawki, Minister of Education and Chairman of the Board of Directors of Egyptian Knowledge Bank, honored: 10 professors in different scientific fields representing different universities and research centers in recognition of their distinguished scientific research Awarded certificates of appreciation and shields for 6 specialized scientific journals indexed in the Web of Sciences (WOS) as the best scientific journals in Egypt during 2018. The six distinguished journals included the Egyptian Journal of Biological Pest Control (EJBPC) www.ejbpc.com .The Egyptian Journal of Biological Pest Control has been regularly published since 1991 and has been an international journal since 2004 in cooperation with CABI. Since 2008, the journal has become an international journal

and has an international impact factor that is determined annually by Thomson Reuters, Scopus, Elsevier, since mid-2017, it has become an online journal (Open Access), in collaboration with Springer-Nature. Congratulations to the journal staff and best wishes for success.

Executive Editor. **Prof. Ahmed Hussein Al Heneidy, Department of Biological Control, Plant Protection Research Institute, Giza Research Center, Giza, Egypt**. Email: aelheneidy@gmail.com

The Reference Insect Collection 1913-2018 Plant Protection Research Institute (PPRI), Giza, Egypt

Since the beginning of the 20th century and at the time of establishing the department of entomology, later Plant Protection Research Institute (PPRI), efforts were made to set up an insect collection to cope with the needs of recognizing the insect fauna of Egypt. This collection developed and progressed throughout the long history of the PPRI and has always served as an important source of information and knowledge for taxonomic studies and research. This collection is now considered as the largest and the first reference collection in Egypt and Arab world. It contains more than 150000 insect specimens collected from various geographical and topographical regions of the Egyptian territory. Continuous updating and renewing the collection are made periodically to provide more valuable contribution to the knowledge of Egypt insect fauna. The Egyptian pioneers and many authors, specialist and nonprofessional entomologists in different parts of the worlds, i.e. England, France, Germany, Austria, Italy, Russia, America, ….etc. participating and played a great part in the establishing, developing and supporting this insect collection throughout their efforts in collecting and identifying the numerous material of the Egyptian insects, Those were: Giovanni Ferrante and E. Chakour, 1908; Walter Innes, 1910; Adolf Andres; A. M. Honore; P. de Peyerimhoff; G.C. Price; E. P. Wiltshire; Edward Wagner; Edward Meyrick; Klapulek and Navas, 1912; Frank



Willcocks, 1917; Gilbert Storey and H. Gough, 1919; Bronislaw Debski; W. H. Hall, 1920; S. S. Hower, 1921; Anstase Alfieri and T. W. Kirkpatrick, 1922; E. Ballard, 1927; Ernest W. Andre and Herman Priesner, 1933; B. Uvarov, 1936; G. Styskal and A. B. Gurney, 1967; and Ronald W. Hodges, 1962 – 1969. Mr. Noaman Mohamed; Mohamed Soliman El-Zohairy; Dr. Moustafa Hafez; Dr. Mohamed Mahmoud Ibrahim; Mr. Fathy Shalaby; Mr. Kamal El-din Hamid; Dr. Nabia Hassan Nazmy; Mrs. Lila El-Saaid; Mohamed Mahmoud Hosny; Mr. Saad El-Bialy, Dr. Mohamed Abd El-Khalek Moustafa, Dr. Mohamed M. Al-Gamal and Fathy H. Nigm.

The collection is divided into the following collections:

I- The reference collection: It is the main reference insect collect of Egypt and represents the Egyptian insect fauna. It contain about 150000 specimens, representing 6000 insect species belonging to over 1800 genera and 200 families of 20 insect orders: Coleoptera (2000 spp), Heteroptera and Homoptera (1000 spp), Hymenoptera (900 spp), Lepidoptera (800 spp), Diptera (500 spp), Thysanoptera (156 spp), Orthoptera (150 spp), Neuroptera (100 spp), Dermaptera, Mantodea, Blattodea, Odonata, Collembolla, Embioptera, Anoplura, Ephemeroptera, Isoptera, Siphonaptera and Trichoptera are represented by a few species each. The reference collection also includes 5000 specimens mounted on glass slides representing 156 Thrips species, 2674 microscopic slides of some taxonomic parts of insect of orders Lepidoptera and Hymenoptera and it contains nearly 150 types of insect species.

II- The economic collection: This is a smaller insect collection, which includes specimens of agricultural pests of major economic importance in Egypt, which attack crops, vegetables and fruits in addition to the beneficial insects. The collect is supported by exhibition boxes (76 boxes), showing the life cycles and different stages of the most important insect pests, together with signs of infestation and types of damage to host plants. Illustrations are provided. This collection is rendered accessible to students of agriculture, training and extension.

III- Quarantine collection: This collection contains specimens of the foreign insect pests that come with the imported plants and plants products from all over the world, since 1932 up till now. The collection is arranged

according to the exporting countries. The collection contains specimens' representatives to 77 species of 35 insects' families of economic importance. It also includes 1119 specimens of 514 species under 323 genera belonging to 37 insect families of major economic importance in the United States of America. The specimens were exchanged in the cooperation with the Museums of Natural History of Los Angeles and New York in 1994 and 1995 assists in identification of the American species. This collection assists the agricultural quarantine authorities and preserves agricultural resources in Egypt by preventing new pests from entering the country.

IV- The side collection: This is a relatively large collection that includes voluminous number of specimens of different orders collected during various surveys, faunistic and taxonomical studies. The specimens are mounted and maintained in boxes and / or drawers of cupboards supplied with repellents and kept in store out of the main collection. It also contains the unknown species (nearly 300 species). Specimens of this collection are used in classification, taxonomical researches and studies and in replacing the damaged specimens of the main collection. It also provides more information and valuable data about the insect fauna of Egypt.

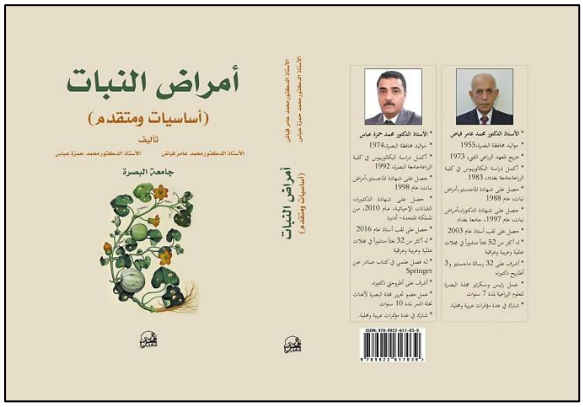
Staff members of the insect collection:
Prof. Dr. Ashraf M. El-Torkey (Coleoptera), Prof. Dr. Moustafa A. Badr (Lepidoptera), Prof. Dr. Magdi M. Salem (Hymenoptera), Prof. Dr. Hussein R. Hussein (Lepidoptera), Prof. Dr. Mohamed K. El-Akkad(Coleoptera), Prof. Dr. Iman M. El-Sybaei (Hemiptera), Prof. Dr. Ayman M. Ibrahim (Diptera), Dr. Neveen E. ElMetwaly (Coleoptera), Dr. Dalia A. El-Shewey (Coleoptera) Dr. Emad M. Bibars (Coleoptera), Dr. Rabab M. Alhady (Hemiptera), Dr. Mahmoud Y. Hassan (Lepidoptera), Dr. Maaly E. Abdallah (Thysanoptera).
Prepared by: Prof. Dr. Ashraf M. El-Torkey, Head of Classification Department, ameltorkey@arc.sc.eg

Basra Journal of Date Palm Researches.

ISSN Number: 1816-0379, BJDPR is a half yearly peer-reviewed scientific journal of date palm focusing on all new researches relevant to date palm physiology, diseases, insects and mites, water and soil management, genome, pollution and other related fields. BJDPR also published reviews, short communication and letters; as well as technical paper. BJDPR is published by Date Palm Research Centre- University of Basra. First issue of BJDPR was published in 2001. Currently the volume 17 was released. BJDPR is awarded Arab impact factor of 2.695 for 2018.
Websites: 1- http://www.bjdar.net/, Full archive on: Iraqi Academic scientific Journals: https://www.iasj.net/iasj?uiLanguage=en

New Published Books 2018

Plant Diseases: Basics and Advanced

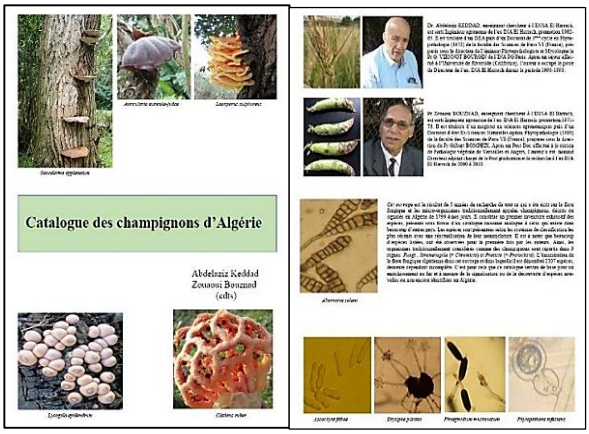


Phytopathology, the study of plant diseases as a descriptive discipline has largely maintained for long centuries since the first early ages of plant disease. Several good textbooks are available dealing with plant diseases and pathogens, as well as their control. The need for a new publication is justified by the data accumulation on various topics such as new disease emerging; pathogens' nomenclature; recent approaches in disease control and new topics on plant-pathogen interactions on hormones and genetic level. The contents of **Plant diseases (basics and advanced)** are divided into twelve chapters; starting with the history of plant disease and the stages of plant disease. The 3ed chapter deal with the classical and modern methods in pathogens identification with an emphasize on new molecular techniques. Chapter four and five focused on pathogens enzymes and toxins and their interaction with plant diseases; and plant mechanisms in pathogens growth restriction. The 6th chapter explained the main control procedures for plant diseases emphasizing on new ones. An account has also been given in chapter seven on the interactions between soil and environmental factors on plant disease progress with full illustrations.

The chapters 8-12 introduced the plant diseases as classified by their pathogens including fungi; bacteria; phytoplasma; spiroplasma; virus; viroids; nematodes and flowering parasitic plants; with special attention on the Iraq and neighboring countries. All of plant pathogens in this book were described briefly as possible and accompanied by illustrations for their identity, disease symptoms and signs. Finally, the authors wish by introducing this book to be considered and useful for all workers in plant diseases field. **Dr.Mohamed Amer Fyadh and Dr.Mohamed Hamza Abbas, Basra University, Iraq**

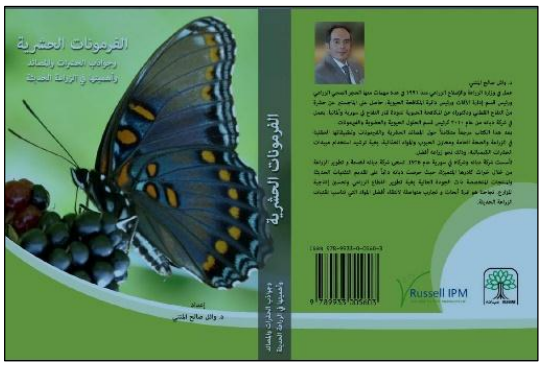
Catalog of the Fungi from Algeria

This book is the result of 5 years of research of all that has been written on the fungal flora and microorganisms traditionally called fungi, described or reported in Algeria from 1799 to the present day. It constitutes a first exhaustive inventory of species, presented in the form of a catalog similar to that which exists in many other countries. The species are presented according to the most recent classification systems with an update of their nomenclature. It should be noted that many species listed, were observed for the first time by the authors. Thus, the organisms traditionally considered as fungus are divided into 3 kingdoms: Fungi, Stramenopila (= Chromista) and Protista (= Protoctista). The enumeration of the Algerian fungal flora in this work, in which 2107 species are counted, remains however incomplete. That is why this catalog will serve as a basis for enrichment as the signaling or the discovery of new species or not yet identified in Algeria. The Authors of this book are two scientists as followed**. Abdelaziz Keddad**, teacher researcher at ENSA El Harrach, graduated as an agronomist from the former INA El Harrach, 1962- 65. He got a DEA and Ph.D. in Phytopathology (1972) from the Faculty of Sciences of Paris VI (France), prepared under the direction of the eminent Phytopathologist and Mycologist Professor G. VIENNOT BOURGIN of INA PG Paris. After a stay at Riverside University California, the author held the position of Director of Ex. INA El Harrach during the period 1990-1993. **Pr. Zouaoui Bouznad**, teacher researcher at ENSA El Harrach, graduated as agricultural engineer from ex. INA El Harrach, 1971-76. He has got Msc in agronomic sciences then a Ph.D. in Es-Sciences Naturelles option Phytopathology (1989) from the Faculty of Sciences of Paris VI (France), prepared under the direction of Professor Gilbert BOMPEIX. After a Post Doctorate carried out at the plant pathology station of Versailles and Angers, the author was appointed Associate Director in charge of post-graduation and research at the former INA El Harrach from 2000 to 2010.



Insect Pheromones and Attractants and its Importance in Modern Agriculture.

Pheromones have become the cornerstone of the Integrated Pest Management Program (IPM) in the world, especially in an efficient, safe and environmentally sound pest management system. In order to fill this gap in the Arab library, the book Insect Pheromones and Attractants and its Importance in Modern Agriculture In cooperation between Debbane & Co. - Syria and Russell IPM, UK. The book consists of 220 pages divided into several sections: communication methods and insects and the history of pheromones, the importance of pheromones in the life of insects, insect monitoring and the role of pheromones in it, and cumulative and bio-thermal accumulation and their importance in the management of insects, mating confusion and catch, The use of pheromone traps and insects in stores, warehouses and public health. The book is colourful and contains hundreds of illustrations.



This book is intended for field agricultural engineers, planners of pest management programs, plant protection workers, farmers and farmers who wish to manage their farms in modern ways, as well as through public health doors, store insects and other interesting topics. **Dr. Wa'el Saleh Almatani, Director of Biotechnology and Organic Materials at Debbane Company, formerly Head of Pest Management and Biological Control Department, Plant Protection Directorate, Ministry of Agriculture, Syria.**

SELECTED RESEARCH PAPERS

- **Nematicidal Cyclic Lipodepsipeptides and a Xanthocillin Derivative from a Phaeosphariaceous Fungus Parasitizing Eggs of the Plant Parasitic Nematode *Heterodera filipjevi*.** S.E. Helaly, S. Ashrafi, R.B. Teponno, S. Bernecker, A.A. Dababat, W. Maier, Journal of natural products 81 (10), 2228-2234,2018.
- **6 Nematode Parasites of Cereals.** A.A. Dababat, H. Fourie, Plant Parasitic Nematodes in Subtropical and Tropical Agriculture, 163, 2018.
- **Occurrence of the Root-Knot Nematode Species in Vegetable Crops in Souss Region of Morocco.** S Janati, A Houari, A Wifaya, A Essarioui, A Mimouni, A Hormatallah. The plant pathology journal 34 (4), 308, 2018.
- **Inhabiting Plant Roots, Nematodes and Truffles — Polyphilus, a New Helotialean Genus with Two Globally Distributed Species.** S Ashrafi, DG Knapp, D Blaudez, M Chalot, JG Maciá-Vicente, I Zagyva. Mycologia, 2018.
- **First Report of *Heterodera hordecalis*, a Cereal Cyst Nematode, on Wheat in Algeria.** D Smaha, F Mokrini, İ Mustafa, M Aissa, AA Dababat. Plant Disease, 1, 2018.
- **First Report of the Cereal Cyst Nematode (*Heterodera filipjevi*) on Wheat in Algeria .**D Smaha, F Mokrini, İ Mustafa, A Mokabli, AA Dababat. Plant Disease,1,2018.
- **Identity and Pathogenicity of Fusarium species Associated with Crown Rot on Wheat (Triticum spp.) in Turkey.** ES Gebremariam, D Sharma-Poudyal, TC Paulitz, G Erginbas-Orakci. European journal of plant pathology 150 (2), 387-399,2 ,2018.
- **Morphometric and Genetic Variability among Mediterranean Cereal cyst Nematode (*Heterodera latipons)* Populations in Turkey.** M İmren, Ş Yildiz, H Toktay, N Duman, AA Dababat. Turkish Journal of Zoology, 42, 2018.
- **IPM to Control Soil-borne Pests on Wheat and Sustainable Food Production.** AA Dababat, G Erginbas-Orakci, F Toumi, HJ Braun, AI Morgounov. Arab Journal of Plant Protection 36 (1), 37-44,2018
- **Investigation of Resistance to *Pratylenchus penetrans* and *P. thornei* in International Wheat lines and its Durability when Inoculated together with the Cereal cyst Nematode *Heterodera avenae*, using qPCR for nematode quantification** . F Mokrini, N Viaene, L Waeyenberge, AA Dababat, M Moens. European Journal of Plant Pathology, 1-15 2, 2018.
- **Cereal cyst Nematodes: Importance, Distribution, Identification, Quantification, and Control.** F Toumi, L Waeyenberge, N Viaene, AA Dababat, JM Nicol, F Ogbonnaya. European journal of plant pathology, 150 (1), 1-20, 2018.
- **Genomics-based Sensitive and Specific Novel Primers for Simultaneous Detection of *Burkholderia glumae* and *Burkholderia gladioli* in rice seeds.** Lee C., Lee H., Mannaa M., (Egypt-Korea), Kim N., Park J. and Seo Y.S. The Plant Pathology Journal. 34, 1-9, 2018].
- **Induction of Resistance against Pine wilt Disease Caused by *Bursaphelenchus xylophilus* using Selected Pine Endophytic Bacteria.** Kim, N., Jeon, H.W., Mannaa, M., (Egypt-Korea), Jeong, S.I., Kim, J., Lee, C., Park, A.R., Kim, J.C. and Seo, Y.S. Plant Pathology. Published online: 02 November 2018.
- **Effect of Temperature and Relative Humidity on Growth of *Aspergillus* and *Penicillium* spp. and Biocontrol Activity of *Pseudomonas protegens* AS15 against Aflatoxigenic *Aspergillus flavus* in Stored Rice Grains.** Mannaa M. (Egypt-Korea), and Kim K.D, Mycobiology Published online: 06 Sep 2018.
- **Effect of Kombucha on Gut-Microbiota in Mouse having Non-Alcoholic Fatty Liver Disease.** Jung Y., Kim I., Mannaa M., (Egypt-Korea), Kim J., Wang S., Park I., Kim J. and Seo, Y.S. Food Science and Biotechnology. Published online: 12 July 2018.

PAPERS PUBLISHED IN THE ARAB JOURNAL OF PLANT PROTECTION (AJPP) VOLUME 36, ISSUE 2, AUGUST 2018

BIOLOGY, ECOLOGY

Study of life table of *Cydia pomonella* L. at different Constant temperatures under laboratory conditions
S.I. Elhaj, A.N. Bashir and L. Aslan (SYRIA)
Pages 86-93 http://dx.doi.org/10.22268/AJPP-036.2.086093

First record of pear lace bug *Stephanitis pyri* (F. 1775) on narrow leaf firethorn shrubs *Pyracantha angustifolia* (Franch.) C.K. Schneid. in Syria
N. Diab, E. Al-Jouri, N. Daher-Hjai and A. Almanoufi (SYRIA)
Pages 94-97 http://dx.doi.org/10.22268/AJPP-036.2.094097

SURVEY

Monitoring of *Fusarium* wheat head blight distribution, its causal agents, and pathogenicity variation in Al-Ghab plain, Syria
S. Al-Chaabi, S. Al-Masri, A. Nehlawi, L. Al-Matroud and T. Abu-Fadel (SYRIA)
Pages 98-113 http://dx.doi.org/10.22268/AJPP-036.2.098113

Occurrence of potato viruses in the major potato growing areas in Saudi Arabia
K.A. Alhudaib (SAUDI ARABIA)
Pages 114-122 http://dx.doi.org/10.22268/AJPP-036.2.114122

First record of the Eucalyptus gall wasp *Ophelimus maskelli* (Ashmead) in Kerbala province, Iraq
A.A. Lahouf, T.M.M. El-Seweydi anf I.J. El-Jboory (IRAQ)
Pages 123-125 http://dx.doi.org/10.22268/AJPP-036.2.123125

BIOLOGICAL CONTROL

Evaluation of inoculation with local isolates of *Beauveria bassiana* on the potato tuber moth, *Phthorimaea operculella* (Zeller) in the field
N. Al-Saoud, D. Nammour and A.Y. Ali (SYRIA)
Pages 126-134 http://dx.doi.org/10.22268/AJPP-036.2.126134

Biological characteristics and the predation efficacy of *Acletoxenus formosus* (Loew, 1864) as a predator of the whitefly of cabbage, *Aleyrodes proletella* (L.) under laboratory conditions
W.J. Bou Hasan and A. Ibrahim (SYRIA)
Pages 135-140 http://dx.doi.org/10.22268/AJPP-036.2.135140

NATURAL ENEMIES

Laboratory evaluating of the efficiency of some substrates for storing entomopathogenic nematodes *Heterorhabditis bacteriophora*
K. El-Asas, A. Jawish, A. Haydar and A. Hasan (SYRIA)
Pages 141-146 http://dx.doi.org/10.22268/AJPP-036.2.141146

HOST REACTION

Comparison of volatile emissions from un-infested and infested almond leaves with *Aporia crataegi* (L.)
A.J. Shllalo and M. Daghestani (SYRIA)
Pages 147-153 http://dx.doi.org/10.22268/AJPP-036.2.147153

HOST RESISTANCE

Effect of some bioinducers in controlling the pathogen *M. phaseolina* that causes root and stem charcoal rot of strawberry
H.H. Al-Juboory, A.K. Hassan and Y.N. El-Humeiri (IRAQ)
Pages 154-163 http://dx.doi.org/10.22268/AJPP-036.2.154163

Slow rusting of bread wheat landraces to *Puccinia striiformis* f.sp. *tritici* under artificial field inoculation
F. Alo, W. Al-Saaid, M. Baum, H. Alatwani and A. Amri (SYRIA, Egypt & MOROCCO)
Pages 164-175. http://dx.doi.org/10.22268/AJPP-036.2.164175

PAPERS, WHICH WILL BE PUBLISHED IN THE ARAB JOURNAL OF PLANT PROTECTION (AJPP), VOLUME 36, ISSUE 3, DECEMBER 2018

- **Primary evaluation of Acibenzolar-S-Methyl (ASM) efficiency on vegetative parameters and resistance responses of tomato and eggplant to root-knot nematode *Meloidogyne incognita*.** Ahmad Mouhamad Mouhanna (SYRIA).
- **Toxicity of some inert dusts kaolin, silica and zeolite against cowpea seed beetle *Callosobruchus maculatus* (F.) under laboratory conditions.** Rehab Esber, Ziad Chikh-Khamis and Ebraheem Al-Jouri (SYRIA).
- **Plant extracts and their role in stimulating the production of antimicrobial peptides in honey bee workers, *Apis mellifera* L.** H.Sh. Barhoum, H. Adib Al-Roz and A.M. Mouhanna (SYRIA).
- **Progress of Infection by Septoria Leaf Spot and Study of its Relation with some Agronomic Traits of Durum Wheat Using some Mathematical Models.** Alaa Abdulghani, Mohammed Abu Shaar, Ahmed Shams ElDien Shaaban and Kusay Rehiyeh (SYRIA).
- **The effect of roots' mycorrhization of two rockrose plant species: *Helianthemum almeriense* (L.) Mill. and *Helianthemum violaceum* (L.) Mill., with the mycorrhiza fungus *Terfezia claveryi*, in their protection from some fungal pathogens**. Hijazi Mohammed Husein Mando, Bassam Bayaa and Fahed Albiski (SYRIA).
- **Role of entomopathogenic fungi in controlling agricultural pests.** A.N. Trissi, B. Bayaa and M. El Bouhssini (SYRIA & MOROCCO)
- **The pathogenicity of the fungus *Beauveria bassiana* (Bals.) Vuil. on adults and eggs of the two spotted spider mite *Tetranychus urticae* Koch in the laboratory**. M. Ahmad, S. Kerhili, L. Rajab and I. Ghazal (SYRIA).
- **Efficiency of Salicylic Acid In the resistance of peacock eye disease inoculation conditions.** Samer Ghanem, Mohamed Tawil and Sabah Al-Maghribi (SYRIA).
- **Biocontrol of the cladosporic spot in the eggplant plant caused by the fungus *Cladosporium cladosporioides*.** Abdulnabi A.A. Matrood (IRAQ)

EVENTS OF INTEREST 2018-2020

17-19 MARCH,2019	The 3rd Minia International Conference on Agriculture and Irrigation in the Nile Basin Countries. www.minia.edu.eg/Minia/
26–30 MAY 2019	15th Symposium on Bacterial Genetics and Ecology (BAGECO), in Lisbon/Portugal. www.bageco.org
7-12, JUNE, 2020	4th International Conference on Plant Pathogenic Bacteria (ICPPB), Assisi, Umbria,Italy.WWW.SIPAV.ORG/EN/46/14TH_INTERNATIONAL_CONFERENCE_ON_PLANT_PATHOGENIC_BACTERIA_(ICPPB)/279/
19 -24 JULY,2020	XXXVI International Congress of Entomology, Helsinki, Finland. www.ice2020helsinki.fi
1-6 NOVEMBER, 2020	The 13th Congresses of Plant Protection in Tunis (2020), Hammamat, - Le Royal Hotel- Tunisia.

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.

NEW FINDINGS

Isolation and Identification of Entomopathogenic Nematode from the Female's Reproduction System of Date Palm Stem Borer *Oryctes* sp in Iraq.

Mohamed Zaidan Khalaf, Ministry of Science and Tecnology**, Ibrahim Al-Jboory**, Collage of Agriculture, Ministry of Baghdad, Baghdad-Iraq.

Entomopathogenic nematode *Metarhabditis adenobia* was isolated and identified for the first from the from the female reproductive system of the date palm trunk borer *Oryctes* sp collected from date palm trees in central Iraq. Dr. Walter Sudhaus from the German institute'' Institut für Biologie /Zoologie der FU'' has identified and confirm the nematode species. The pathogenicity of this species was tested in the laboratory achieved 95% mortality and 45% on Oryctes in the field. Three species of bacteria were identified associate with this nematode *Alcaligenes faecalis*, *Flavobacterium*, and *Providencia vermicola* responsible for *Oryctes* septicemia.Rearing of *M.adenobia* on cheap artificial materials was succeeded and implemented.Movement of this nematode was confirmed in the the palm trunk vascular bundles which have a diameter of 1080-1180 µm (Braim variety, Mada'en). Nematode body measurements were calculated as in the table below in µm:

Body length	Width	Enterior end to exterior pore	Oesophagus length	Tail length
528-512	19-20	90-97	104-115	98-101

The Editorial board of the Arab and Near East Plant Protection Newsletter highly appreciates the contribution of several Arab scientists in this issue, namely:

Mahmoud M. A. Youssef (Egypt), Luaay Kahtan (Iraq-USA), Mohamed Ibrahim Ahmed Manna(Egypt-Koria) ,Mai Ali (Syria), Abdulnabi Basheer (Syria), Houda Kawas(Syria), Samira A. Khlaywi(Iraq), Aziz Ajlan (Saudi Arabia), Jounar Aziz Ibrahim(Syria), Lobna Rajab (Syria), Mustapha EL-Bouhssini(Morocco), Lahsen Oualguirah (Morocco-Bari), Ayoub Maachi (Morocco-Bari), Alasadi Ghazwan Jalil (Iraq-Bari), Mujahed Sami (Palestine-Bari), Toumi Oumayma (Tunisia-Bari), Mourou Marwa (Tunisia-Bari) Mohammed Amer (Iraq), Mohamed Hamza Abbas(Iraq), Raied Abou Kubaa (Bari- Italy), Maria Saponari (Bari- Italy), Khaled Djelouah(Bari-Italy), Silvia Centonze (Italy), Anne-Sophie Roy (Eppo-France), Mahmoud M. A. Youssef (Egypt), Mohamed W. Negm(Egypt), Heba Tokali(Egypt-FAO), Lara R Jaber (Jordan), Sarra Bouagga (Tunisia), Mounira Inas Drais (Algerian), Sonia Boukhris(Tunis), Amani Bellahirech(Tunis), Mariam Yehya(FAO-Egypt), Dalia Adly(Egypt), Walaa Jamel(Egypt), Mazen Alazem (Syria-Koria), Jounar Aziz Ibrahim (Syria), Matrood, Abdulnabi A. A. (Iraq), Mohammed Abass (Iraq-Basrah). Mokhtar Abdulsattar Arif (Iraq-Italy), Abdelfattah A. Dababat(CIMMYT-Turkey), Adnan A. Lahuf (Iraq), Mamoon Alalawi(FAO–Egypt), Yara El Khoury (Lebanon), Waad Taraf (Syria), Houda Boureghda (Algeria), Zinette Moussa(Lebanon), Arafat Hanani (Palestine), Mohga Khater (Egypt,) Imen Haddoudi (Tunisia). Samia Mghandef (Tunisia), Faten HAMDI (Tunisia), Mohamed Zedan Khalaf (Iraq), (Egypt), Hussein Rezk (Egypt). Asma Najar (Tunisia).