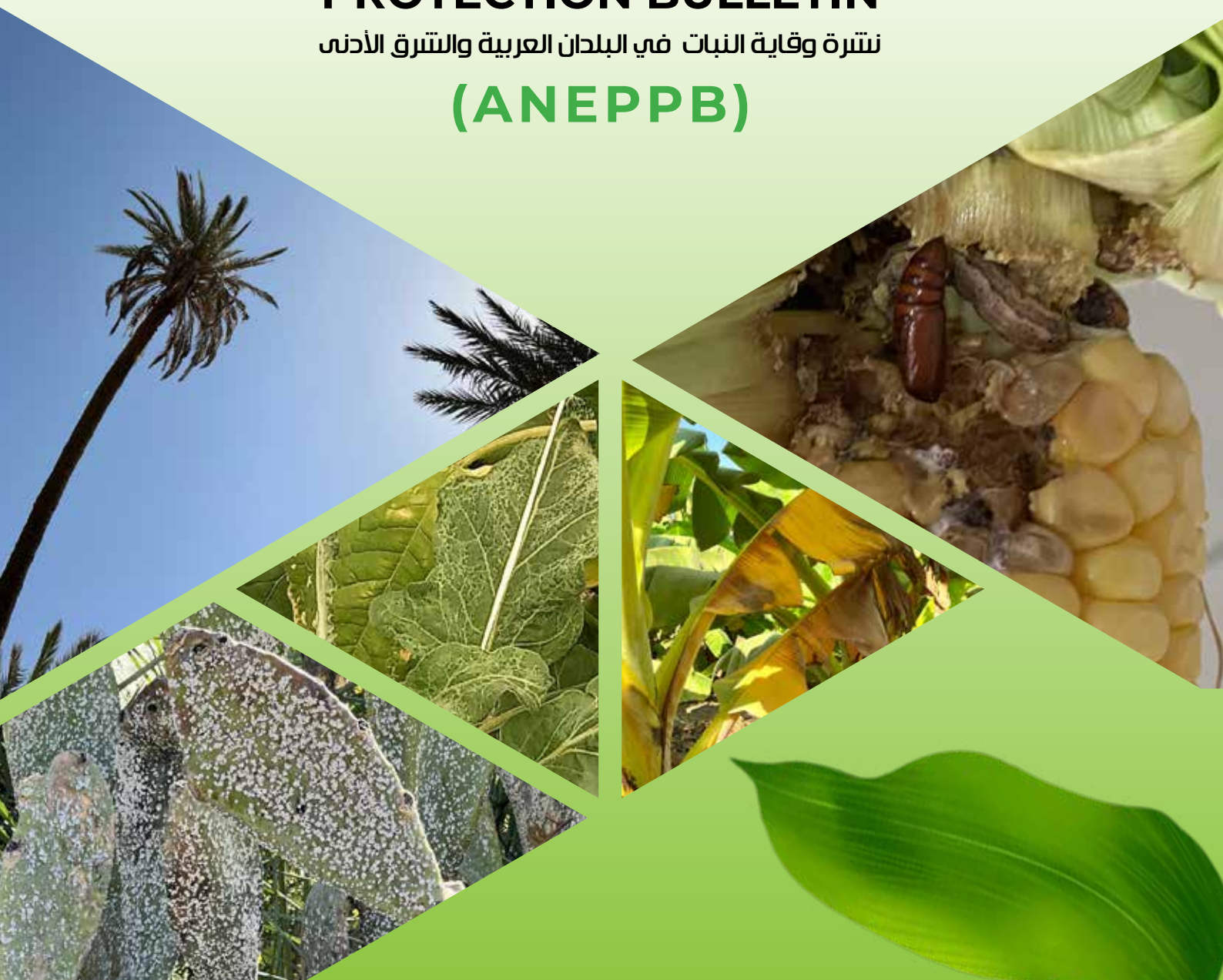
Food and Agriculture Organization of the United Nations

الجمعية العربية لوقاية النبات
ARAB SOCIETY FOR PLANT PROTECTION

ARAB AND NEAR EAST PLANT PROTECTION BULLETIN

نشرة وقاية النبات في البلدان العربية والشرق الأدنى

(ANEPPB)



ARAB AND NEAR EAST PLANT PROTECTION BULLETIN (ANEPPB)

P.O. Box 17399, Amman11195, Jordan

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

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ISSUE 89 , AUGUST 2023

EDITORIAL

Semiochemicals: Manipulating Insect Behaviour for Sustainable IPM

Chemical communication plays an essential role in the survival of insect pests.

Semiochemicals are behaviour - modifying organic compounds used by insects to convey specific chemical messages. These are species-specific, harmless to the environment, and are of immense significance in the sustainable management of agricultural pests, particularly under organic cropping systems. Semiochemicals are divided into two broad groups viz. pheromones, which mediate interactions among individuals of the same species (intraspecific reactions), and allelochemicals which mediate interactions among individuals of different species (interspecific interactions). Allelochemicals are divided into kairomones mediating interactions favouring the recipient and allomones favouring the emitter. Semiochemicals are well-known management tools, especially for cryptic species and are vital components of integrated pest management programmes the world over.

The sex pheromone of the silkworm moth, Bombyx mori, was the first to be chemically identified in 1959 and is considered the most important semiochemical used in pest management. Isolation and identification of semiochemicals is a sophisticated process generally involving analytical procedures such as SPME, GC-EAG, GCMS and NMR.

Control of pest populations can be achieved via several methods, including the use of attractants for mating disruption, mass trapping, attract-and-kill, push-pull, a combination of an attractant and a repellent or attract-and-infect when the attractant is combined with a pathogen to enhance biological control. Among insect pests, most identified pheromones are of Lepidoptera and Coleoptera species. Furthermore, sex

pheromones that have been most successfully used are lepidopteran pests while aggregation pheromones are significant in combating coleopterans. In the Middle East and North Africa, pheromone technology is widely used to monitor, and mass trap the Red Palm Weevil (RPW), Rhynchophorus ferrugineus (Coleoptera : Curculionidae) in date palm. Recently the trap and bait free 'attract and kill' technique against RPW has emerged as a promising tactic to control this lethal pest in hot spots, while the repellent tumerone holds promise as an oviposition deterrent against RPW.

Insecticide based chemical agriculture poses a significant threat to human health and the environment. In this context the role of semiochemicals for sustainable IPM is of overwhelming significance.

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Crop Protection News from Arab and Near East Countries

invasive, new pests and beneficials

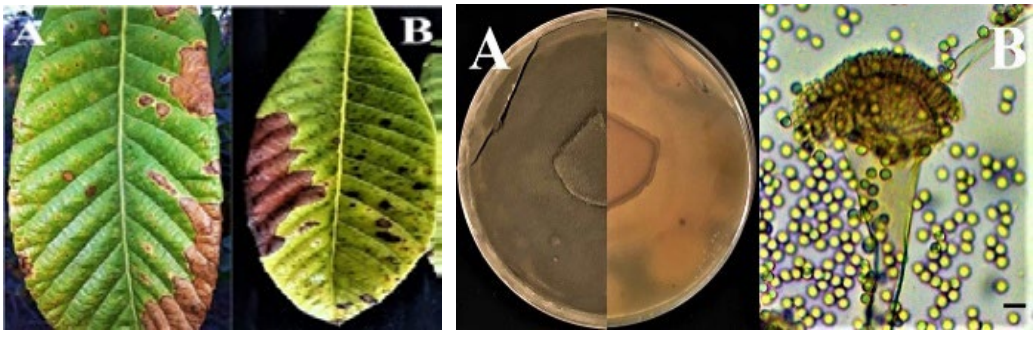
Iraq

First report of *Cucumber vein yellowing virus* in Iraq

Viruses significantly threaten cucurbit production in Iraq, particularly whitefly-transmitted viruses. In the 2022 growing season, courgette plants with extensive leaf vein-yellowing symptoms associated with whitefly infestation were observed in fields around Al-Yusufiyah, Baghdad Province, Iraq. The disease incidence was 40–50%. Thirty leaf samples with vein-yellowing symptoms were collected randomly. The sample was sent in RNAprotect Tissue Reagent (Qiagen, Germany) for high throughput RNA sequencing (RNA-seq) at Macrogen Inc. (Seoul, South Korea). Overall, 39,549,599 paired-end reads (151 bp length) were obtained. The Bioinformatic analysis showed ≥99% pairwise nucleotide identity with the entire genomes of five Cucumber vein yellowing virus (CVYV) isolates. Other viruses were also detected, including Squash leaf curl virus (SqLCV) and Tomato leaf curl Palampur virus (ToLCPMV). A total of 86,245 reads mapped to NC_006941.1 with 100% coverage and a depth coverage of 1.335× and BLAST analysis showed that the assembled genome of CVYV Iraq-1 shares 99.86% pairwise nucleotide identity with this isolate. The genome sequence of the CVYV isolate Iraq-1 was deposited in GenBank (Accession No. OQ685957.1). Phylogenetic analysis showed a close relationship between CVYV isolate Iraq-1 and isolates from diverse origins, particularly those from Spain (AY578085.1 and MK777994.1) and Portugal (MZ130935.1 and OK181771.1). This is the first report of CVYV in Iraq. **[M. S. Mohammed and A. A. Lahuf (Iraq), Plant Protection Department, Agriculture College, University of Kerbala, Karbala, Iraq, Published in 2023 at New Disease Report Journal, 2023].** DOI: 10.1002/ndr2.12183.

First report of Aspergillus Leaf Spot on Loquat,*Eriobotrya japonica* caused by *Aspergillus fumigatus* in Iraq.

Leaf spots were commonly noticed on loquat trees in Alhussiania, Karbala Province, Iraq. The associated fungus was isolated and identified as *Aspergillus fumigatus* based on the morphology (cultural and microscopic features) and molecular analysis (sequence of internal transcribed spacer rDNA). The pathogenicity of isolated fungus was confirmed through Koch's postulates that were implemented by comparing the disease symptoms with those of naturally appeared and re-isolated from the inoculated leaves and re-identified. To the best of our knowledge, this is the first record of *A. fumigatus* as a causative agent of leaf spot on loquat (*E. japonica*) trees in Iraq and worldwide **[Noor A. AL-Ghazali, Zainab L. Hameed and Ahmed B. Abu-Duka.(Iraq), University of Kerbala, Karbala, Iraq, 2023].**



First record of the complete mitochondrial genome of *Culex pipiens* (Diptera: Culicidae) in Iraq

The common house mosquito, *Culex pipiens*, is a worldwide insect that is known as a vector of several human and animals' pathogens that cause critical diseases, such as malaria, yellow fever and encephalitis. The mitochondrial genome knowledge can supply a foresight for evolutionary biology and phylogenetic analysis. Thus, in the current study, the complete mitochondrial genomes of the Iraqi *C. pipiens* were first sequenced, assembled, annotated, and analyzed using high throughput sequencing techniques. The results revealed that the length of the complete mitochondrial genome is 14,856 bp, comprising 13 protein-coding genes (PCGs), 22 transfer RNA genes, and two ribosomal RNA genes. The A + T content was 77.09%, while the G+C content was only 22.1%. All PCGs open with the start codon ATN, except the cox1 gene and end with the stop codon TAA. A phylogenetic relatedness with other different species of Culex spp. was achieved by operating the molecular evolutionary genetic analysis based on the whole mitochondrial genome sequences. The results showed that *C. pipiens* from Iraq shares a close ancestry with *C. pipiens* from Tunisia and France. To our knowledge, this is the first report of the complete mitochondrial genome sequence of the Iraqi *C. pipiens*. As a consequence, this conclusion may provide a new profound insight into the evolution of *C. pipiens* in Iraq. **[Zhuang-Xin Ye[1], Adnan A. Lahuf[2], Mohammed D. Salman[2], Jun-Min Li[1] [1]Institute of Plant Virology, Ningbo University, Ningbo, China. [2]Plant Protection Department, Agriculture College, University of Kerbala, Karbala, Iraq. Published in 2023 at Journal of Kerbala for Agricultural Sciences:** https://doi.org/10.59658/jkas.v10i3.1126

Jordan

First record of the African powder post beetle, *Lyctus africanus* Lesne 1907 (Insecta: Coleoptera: Bostrichidae: Lyctinae), from Jordan

The African powder post beetle, *Lyctus africanus* Lesne 1907 is recorded from Jordan for the first time. Specimens were collected from infested wood in Jordan Valley near the Dead Sea. The distribution and available data about this beetle are given. **[Ahmad Katbeh Bader[1] and Ibrahim J. Al-Jboory[2],(Jordan), [1]Department of Plant Protection, School of Agriculture, The University of Jordan, Amman, Jordan. [2]Department of Plant Protection, College of Agriculture, University of Baghdad, Baghdad, Iraq. Jordan Journal of Natural History, 10 (1), 2023].** ahmadk@ju.edu.jo

Lebanon

First report of *Xylella fastidiosa* on almond (*Prunus dulcis*) in Lebanon.

Xylella fastidiosa (*Xf*) has recently emerged as a phytosanitary threat in the Mediterranean Basin. Following its first appearance in southern Italy (Puglia region), the bacterium was reported in several southern European countries, including France, Spain, Portugal. Among the numerous host species found infected in these countries, olive (*Olea europaea*) and almond (*Prunus dulcis*) are the main crops affected. Inspections in Lebanon in late summer 2020 identified almond trees with symptoms such as leaf scorch, resembling those caused by *Xf*, in some orchards in Bint Jbeil district (Nabatiyeh governorate). A total of 40 samples, consisting of mature leaves, were collected from 15 symptomatic and 25 asymptomatic trees, 10-15 years old. Leaf petioles and midribs were used to investigate the presence of *Xf*, using ELISA (commercial kit from Agritest, Italy), conventional PCR,

quantitative (q)PCR and real-time LAMP assays following the EPPO diagnostic protocol (European and Mediterranean Plant Protection Organization 2019; Appendix 4,5,10). Consistent results were obtained with all diagnostic techniques used, with 3 symptomatic trees testing positive for *Xf*. BLAST search of the nucleotide sequence of the *rpoD* gene fragment, amplified from the DNA extracted from one of the *Xf*-infected trees (GenBank accession number OP437558), showed >99% sequence identity with *Xf* isolates of the subspecies *fastidiosa* (Temecula, M23, etc.), further confirming the occurrence of this bacterium in the tested samples. Infected almond trees were located in the southern border of the country, just a few kilometres from the Hula Valley, where similar *Xf* infections belonging to the subspecies *fastidiosa* have been reported from almond in 2017 (Zecharia et al. 2022). This is the first report of *Xf* in Lebanon. Further investigations are ongoing to delimit the infected area, characterize the strain, and identify insect vectors and their host range in the country. **[Elia Choueiri[1], Raied Abou Kubaa[2], Franco Valentini[3], Thaer Yaseen[4], Houssein El Sakka[5], Sylvana Gerges[6], Pierfederico La Notte[2], Maria Saponari[2], Toufic Elbeaino[3], Maroun El Moujabber[3], [1]Department of Plant Protection, Lebanese Agricultural Research Institute, P.O. Box 287, Zahlé, Tal Amara, Lebanon.[2] CNR Istituto per la Protezione Sostenibile delle Piante, Via Amendola 122/D, 70126 Bari, Italy [3] CIHEAM Bari, Istituto Agronomico Mediterraneo di Bari, Via Ceglie 9, 70010 Bari, Italy. [4]Food and Agriculture Organization of the United Nations, Regional Office for the Near East and North Africa, Cairo, Egypt. [5]Nabatieh Regional Department, Ministry of Agriculture, Bir Hasan, Lebanon. [6]Department of Plant Protection, Ministry of Agriculture, Bir Hasan, Beirut, Lebanon. Journal of Plant Pathology,2023].** https://doi.org/10.1007/s42161-023-01361-w

Syria

First Record of stiletto flies *Thereva nobilitata* (Fabricius, 1775) (Diptera: Therevidae) in Syria

The male The female

The fly has a long hairy body with slender legs. The adults are conspicuous with their golden hairs and banded abdomen. The female abdomen is quite pointed. Knob of halteres yellowish brown. Anteroventral bristles of hind femora multiserial (with some bristles outside the anteroventral row). Frontal callus separated from anterior ocellus. Tergite 3 without contrasting line between anterior narrow brownish part and posterior, greyish part of the tergite. Hedgerows and well-wooded areas where it can be found resting on vegetation and is often netted from the foliage of bushes and trees. Anteroventral bristles of mal on hind femora multiserial (some bristles outside the straight row). Hairs on scutellum are not exceptionally dense' and mixed yellowish and black. Usually, one pair of bristles is on the dorsum. Front femora with 1–4 anteroventral bristles. **[Mohamad Kanouh, Abdulnabi Basheer, Zakaria Al-naser (Syria), Department of Plant Protection, Faculty of Agriculture Damascus University, Syria, 2023].**

First record of the beetle *Psylliodes dulcamarae* (Koch, 1803) (Coleoptera : Chrysomelidae)

Psylliodes dulcamarae

The Adult is a beetle, 3-4 mm long., elongate-oval and very convex, body dark metallic blue, antennae black with two or three basal segments yellow, legs dark brown, the hind femora usually darker and the tarsi paler brown. Head only narrowly visible from above; smoothly convex and finely punctured between large convex eyes, frontal impressions usually faint or indistinct, often obscured by punctures, antennae 10-segmented with all segments elongated. Pronotum transverse, broadest across almost perpendicular posterior angles and narrowed to distinct anterior calli, from above with a slight projection about the middle, surface with a mixture of larger and smaller punctures throughout. Elytra broadest behind sloping shoulders and narrowed in almost straight lines to a continuous apical margin, striae punctured and distinct to the apex, interstices finely punctured throughout. Front and middle femora normal, hind femora extensively developed and excavated behind to receive the tibiae. Hind tibiae smoothly curved and without prominent teeth or spines along the internal margin, apical margin excavate towards a bidentate apex, the tarsi inserted at the base of this excavation. Tarsi basal segment of the front tarsi is much broader in the male. **[Mohamad Kanouh, Abdulnabi Basheer, Zakaria Al-naser (Syria), Department of Plant Protection, Faculty of Agriculture Damascus University, Syria, 2023].**

First record of the Australian Carpet Beetle *Anthrenocerus australis* (Hope, 1843) (Coleoptera: Dermastidae) in Syria

Anthrenocerus australis is a species of beetle belonging to the Dermestidae family; it is commonly known as the Australian carpet beetle and is one of the most researched of the thirty-one species in the *Anthrenocerus* genus. This is generally attributed to its prevalence throughout Australia and New Zealand and its negative economic and agricultural impact as a pest. It is the larvae that cause damage to products, not the adult beetle. The adult *A. australis* is a dark brown and black oval beetle, which grows to be around 2.2-2.5mm long. The back of the beetle's body has a hardened shell to protect the delicate wings that retract beneath when the beetle is not in flight. When disturbed or threatened, the beetle will freeze up and fold their legs into their body. The A. australis larvae are hairy and stretched to form an eruciform (caterpillar-like) shape. They are "grub-like" and can grow up to 7mm long, have a head and mouth with six legs at the front of the body and an extended abdomen. The larvae are covered with long hairs that protect the adolescent against predators. Upon perceiving a threat, the hairs are erected to sharp needles and lodge themselves into the predator. **[Mohamad Kanouh, Abdulnabi Basheer, (Syria), Department of Plant Protection, Faculty of Agriculture Damascus University, Syria, 2023].**

Mite fauna on *Dittrichia* species (Asteraceae) in Syrian coastal region: New records and primary observations on the behaviour of *Typhloseiella isotricha* (Athias-Henriot) (Meostigmata: Phytoseiidae)

Surveys of mite fauna on *Dittrichia viscosa* and *D. graveolens* (Asteraceae) were conducted at multiple locations in Tartous and Latakia governorates, Syria, in 2021 and 2022. A total of 13 mite species belonging to seven families (Acaridae, Camerobiidae, Erythraeidae, Phytoseiidae, Raphignathidae, Tenuipalpidae, and Tetranychidae) were collected. Among them, *Erythraeus* (*Zaracarus*) *passidonicus* (Erythraeidae), *Raphignathus collegiatus* (Raphignathidae), and *Brevipalpus rotai* (Tenuipalpidae) are recorded for the first time in Syria.

The most abundant family observed on *Dittrichia* species was Phytoseiidae, with four species representing about 86% of the collected mite specimens. Among them, *Typhloseiella isotricha* was the dominant species. It was mainly observed on big leaves of *D. viscosa*, highly infected by the rust spots of *Coleosporium inulae*. Results suggest that rust spores could be a potential food for this predator. **[Ebrahim W. and Barbar Z. (Syria), Department of Plant Protection, Faculty of Agriculture, Al-Baath University, Syria. Acarologia, 63(2): 529-538, 2023].** https://doi.org/10.24349/ma1r-1i1n

First record of the mite *Brachytydeus mali* Oudemans (Acari: Tydeidae) on apple trees in southern Syria.

The species *Brachytydeus mali* Oudemans was found on the leaves of apple trees of different varieties in As-Suwayda Governorate, southern Syria. Its numbers were small. All stages of eggs, nymphs and adults were present during the growing season. It was recorded for the first time in Syria. This mite belongs to the Tydeidae family and under the Tydeinae family, whose members are characterized by their small size and rapid movement. They feed on small arthropods and their eggs and can feed on plants, but their importance is secondary.

It plays an important role as an alternative food for predators of the order Mesostigmata. The colour of live individuals varies according to nutrition. Individuals that feed on leaves are yellowish-green. It has also been recorded on leaves and woody parts of citrus trees, pine and carob branches, and the bark of acacia and eucalyptus in other parts of the world. **[J. Alabdulla and Mohamad Kanouh (Syria), General Commission for Scientific Agricultural Research, As-Suwayda Center. Damascus University, Department of Plant Protection, 2023].** jihan_na@hotmail.com

First record of the insect warehouse beetle *Trogoderma variabile* Ballion 1878 (Coleoptera: Dermestidae) in Syria.

The adult beetle is variable in morphology but is typically brownish-black and about 3.2 mm long. This insect is closely related to the khapra beetle *Trogoderma granarium*, under quarantine restriction. Warehouse beetles, unlike the Khapra beetle, can fly.

Antennal club 6- or 7-segmented in males, 4-segmented in females. Larvae are approximately 7-8 mm long and vary in colour from yellow-white to dark brown, depending on age. The upper side of the last 3-4 abdominal segments is covered with dense tufts of

spear-tipped hairs. These hairs may be a source of irritation to sensitive individuals who come into contact with or ingest the larvae. Warehouse beetles are voracious feeders.

They have been reported from seeds of all kinds, dead insects and animals, cereal products, candy cocoa, corn, corn meal, dog food (dried and 'burgers'), fishmeal, flour, oatmeal, milk powder, spaghetti, spices, peas, wheat, barley, and pollen. In grain, they cannot feed on whole grain but can feed on broken kernels that are usually present. **[Mohamad Kanouh, Abdulnabi basheer, (Syria), Department of Plant Protection, Faculty of Agriculture Damascus University, Syria, 2023].**

First Record of Some Insects of Lepidoptera and Hemiptera Orders in Syria

Some insects of the two orders Lepidoptera and Hemiptera have been recorded through the study of the biodiversity of insects in Syria, and they were not recorded before in Syria.

Elachista argentella *Heliothis peltigera*

Coptosoma variegatum *Deraeocoris serenus*

Record two insects of the order Lepidoptera; the first is *Elachista argentella* (Clerck, 1759) (Lepidoptera:Elachistidae). This insect is widespread in grassy habitats, flower meadows, etc. The head is white. Forewings are white, sometimes ochreous-tinged. The hind wings in male grey in female grey-whitish. The adults are on the wing mainly in June and July and fly from evening onwards, being attracted to light after darkness. The second insect is *Heliothis peltigera* (Denis & Schiffermüller, 1775) **(Lepidoptera: Noctuidae).** The adult insect is 14-18 mm long and has a 29–40 mm wingspan. *Heliothis peltigera* has a wingspan of 40–29 mm, and forewings reaching a length of 19–16 mm. These moths are somewhat variable in pattern and colour. Forewings are usually greyish ochreous, flushed with pale brown. On the middle of the costa is a reniform grey dot with a dark brown edge and centre, joined to a brown mark. Record of the order Hemiptera, two insects, the first is *Coptosoma variegatum* Herrich-Schaeffer, 1838 (Hemiptera: Plataspidae).

Body beetle-like and shield-like. The adult bugs are 2.5 mm to 3.5 mm in length (tip of clypeus to the tip of abdomen), body roundly ovate to suborbicular, flattened ventrally and convex above. The shield is dome-like and covers the entire body and the shield-like scutellum is shining black with creamy-white coloured of narrow stripes around the sides and its posterior part and the scutellum covers the whole abdomen. This stripe is slightly narrow on both sides of the scutellum. The second, *Deraeocoris serenus* (Douglas & Scott, 1868), of the Miridae family, is characterized by the absence of simple eyes characterized by a flat-oval shape, and pale yellow-brown colour, the head is triangular in a dark brown colour, and the forehead is slightly concave in a dark brown colour, with fine holes on it. The antennae consist of 4 segments, pale brown, the first segment is small and tubular, the second segment is tubular, its length is 3 times the length of the first segment, the third segment is dark brown, and the fourth segment is oval and rectangular, equal in length to the third segment. The average elongate proboscis, length length is 1.6 mm.

The thorax is light brown, glossy, and trapezoidal, with moderate-density holes and a high density of circular spots joined together in the shape of the letter H. The posterior part is concave. prosternal proses acute at the middle. Scutellum pale brown. Segments of the abdomen are 7. **[Mohamad Kanouh, Abdulnabi Basheer, Zakaria Al-naser (Syria), Department of Plant Protection, Damascus University, Syria, 2023].**

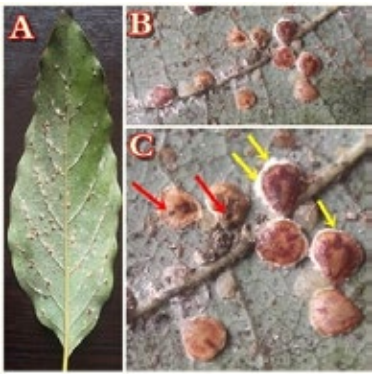
First record of genus Polynema Haliday, 1833 (Hymenoptera: Mymaridae) in Syria

The family Mymaridae and genus Polynema are recorded for the first time in Syria and identified based on identification keys (Gibson,1997) (Zeya and Hayat,1995). Specimens were collected from tomato plants in Latakkia/Syria in May 2022. Genus Polynema is an egg parasitoid on many families of orders: Hymenoptera (Braconidae), Hemiptera (Nabidae-Miridae), and Diptera. The morphological characteristics of the female body mostly dark brown except petiole yellowish. Antenna dark brown except for scape, pedicel, F_1-F_3 pale yellow. Legs yellowish or light brown except for tarsal distal segments, dark brown. The head is usually a little wider than mesosoma, smooth. Mesosoma with pronotum short, Propodeum with conspicuous lateral carinae and complete median carinae. Scutellum smooth and about as long as broad. Mesoscutum is more expansive than long. Fore wing disc hyaline densely setose beyond venation, hind wing very narrow. Legs, coxae smooth, meta coxa a little shorter than petiole. **[Rawa Muhsen Youssef, Agricultural research centre in Latakia, General Commission of Scientific Agricultural Research in Damascus Syria.** rawa.m.youssef@tishreen.edu.sy **, Nabil Abokaf, Faculty of agricultural engineering, Tishreen University, Syria.**

The preliminary record of citrus mussel scale *Lepidosaphes beckii* (Newman, 1869) (Homoptera: Coccoidea) as a pest in olive orchards in Lattakia, Syria.

The Citrus Mussel Scale *Lepidosaphes beckii* (Newman, 1869) (Homoptera: Coccoidea) is an ologophagus insect. The citrus species are the main hosts of this insect, in addition to many secondary hosts: Indian mango *Mangifera indica*, Banana *Musa elaeagnus*, Guava *Agave sisalava*, some wild herbs and ornamental plants. *L. beckii* is the most important pest that attacks Citrus and causes serious damages in different areas, especially the Syrian coastal region. *L. beckii* was recorded in olive orchards, on Al-Dermlanii species 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, in November during season 2022. The insect was existed in the second nymphs and adult stage (female and male). Some females were laying eggs under the scale. This is the first record of *L. beckii* as a pest in olive orchards in Lattakia, Syria**. [Jounar Aziz Ibrahim[1], Walaa Jaber Bohasan[2] [1]Biological Control Center, Lattakia, Syria. [2]Lattakia Directorate Agriculture, Syria, 2023].** Jounar800@yahoo.com

Avocado is a new host plant for the pyriform scale insect, *Protopulvinaria pyriformis* from Syria



During the regular detection and investigation trips for scale insects and mealybugs associated with trees and vegetable crops in some areas of Latakia Governorate, note that the leaves of avocado trees were fell severely, reaching the extent of partial erosion of some trees. When these leaves were examined and compared with suitable literature, it was found that it was infested with the pyriform scale insect, *Protopulvinaria pyriformis*. This insect was previously recorded from Syria in 2019 for the first time on Laurel, Myrtle and Pomelo, noting that this pest is considered dangerous to avocado trees in several countries, like Australia. The damage of this insect, as in other scale insects, is direct, through the sucking of the plant sap, thus weakening and falling of the infested leaves, and indirect, through the secretion of honeydew, which is accompanied by the growth of black mold and thus impeding the process of photosynthesis. **[Mahran Zeity, Atie Arab and Ola Salman (Syria) Latakia Research Center, General Commission for Scientific Agricultural Research, Damascus, Syria, 2023].** mzma2009@gmail.com

Saudi arabia

Two new species of the genus *Agistemus* Summers (Acari: Stigmaeidae) from Saudi Arabia

Two new predatory mites of the genus *Agistemus* Summers (Acari: Prostigmata: Stigmaeidae), namely *A. neocollyerae* **n. sp.** and *A. arabensis* **n. sp.** are described and illustrated based on adult females. Additionally, the *A. simplex* González-Rodriguez and *A. floridanus* González-Rodriguez are reported as new records for the stigmaeid mite fauna of Saudi Arabia. A regional key to reported species of the genus *Agistemus* is also provided. **[Kamran, Muhammad, Mirza, Jawwad Hassan[2], Elgoni, Nasreldeen Ahmed[3] and Alatawi, Fahad Jaber (Saudi Arabia), Volume: 63 Issue: 2 pages: 580-590, 2023].** https://doi.org/10.24349/srli-y7e

Tunisia

The first detection of *Exorista segregate* (Rondani, 1859) (Diptera: Tachinidae) as a larval parasitoid of *Orgyia trigotephras* Boisduval, 1829 (Lepidoptera: Erebidae) from Tunisia

The tachinid parasitoid, *Exorista segregata* (Rondani, 1859) (Diptera: Tachinidae), is a polyphagous fly recorded on larvae of lepidopterans. Larvae of the Erebidae, *Orgyia trigotephras* Boisduval were collected from Northern Tunisia and reared in the laboratory at INRGREF. Larvae were kept individually until the emergence of parasitoid's adults. Morphological data, including dissected genitalia was used to identify *E. segregate* as a parasitoid of *O. trigotephras* larvae. The larval parasitoid, *E. segregata* is recorded from a new host *O. trigotephras* for the first time in Tunisia. This species could be considered in the biological control programs of different lepidopterans pests in Tunisia and neighbouring countries. **[Sonia Hammami, Olfa Ezzine, Cezary Bystrowski and Mohamed Lahbib Ben Jamaa (Tunisia), Egyptian Journal of Biological Pest Control, 33:9, 2023].** https://doi.org/10.1186/s41938-023-00656-5

RESEARCH HIGHLIGHTS

Algeria

Relationships between wild flora, crops, aphids (Hemiptera, Aphididae) and their natural enemies in citrus orchards. The survey was carried out in some citrus orchards in the area of Bernalda, in the region of Basilicata, south Italy. Aphids and their natural enemies were monthly sampled from citrus tree canopies and spontaneous plants in four citrus orchards differently managed (organic and conventional with and without herb layer). Four weed species (*Rumex crispus*, *Sonchus oleraceus*, *Euphorbia peplus* and *Vicia sp.*) were reported as hosts of four non-pest aphids of citrus, which were *Myzus persciae*, *Acyrthosiphon pisum*, *Hyperomyzus lactucae* and *Aphis rumicis*, serving as preys for natural enemies including coccinellids (Coleoptera, Coccinellidae), lacewings (Neuroptera, Chrysopidae), hoverflies (Diptera, Syrphidae) and various parasitoid species (Hymenoptera, Braconidae) that were recorded on citrus canopies. Statistical analysis using parametric tests of collected data showed a positive correlation between weed management systems and wild plants hosting aphidophagous communities ($P < 0.05$).

Moreover, organic weeding approaches had a positive effect on aphid antagonist richness and abundance, whereas the conventional weeding method may cause scarcity of aphidiphagous, but interactions among strata (entomofaunal diversity on citrus tree canopies & wild plant cover) are still unclear. Overall, this study is a further step towards the investigation of the interaction between plants, crops and arthropods in citrus orchards in the Mediterranean basin to make weed management strategy a key for aphid management in crops. **[Samir Ali-Arous[1]*, Malika Meziane[1] and Khaled Djelouah[2], [1] Laboratory of production and protection of crops of Chlef region , Faculty of Nature and Life Sciences, University of Hassiba Ben Bouali, Chlef, Algeria.[2]International Centre for Advanced Mediterranean Agronomic Studies (CIHEAM), Mediterranean Agronomic Institute of Bari, Valenzano (Bari), Italy. Journal of Insect Biodiversity and Systematics, 9 (1), 17–32, 2023].**
https://doi.org/10.52547/jibs.9.1.17

Algeria

Common reed (*Phragmites communis* Trin.) and agricultural irrigation channels in hot hyper-arid zones. Common reed (*Phragmites communis* Trin.) is an invasive perennial plant belonging to the poaceae family that causes functional disturbances in humid and aquatic environments. It spreads in multiple ways, by sexual reproduction by seeds that ensure its spread in a wide geographical range or by asexual reproduction by rhizomes and aerial stems which ensure its spread in a limited range. With this strategy, the common reed plant negatively affects the water runoff in the irrigation channels, causing them to crack and overflow of water in the surrounding areas. Preliminary studies conducted next to irrigation canals in the wilaya of Adrar (Algeria) during July 2023 showed that this plant forms a special ecosystem called meadows. Based on the method of floristic surveys, it was found that the formations of the common reed meadows studied contain 7 species belonging to 6 plant families with the dominance of the poaceae family.

This study also showed that the common reed plant is the dominant and the densest plant, as it recorded a coefficient of dominance and abundance (Braun-Blanquet) ranging between 1 and 5, while other species recorded a coefficient ranging between + and 1 only. This plant also recorded the highest density, ranging from 5 to 23 plants in 4 m^2, while for other species, the density of each species does not exceed 5 plants in 4 m^2. Through this strategy, the common reed causes damage to agricultural irrigation channels and can also pose a danger to agricultural irrigation basins in hot hyper-arid zones. This study provides basic data for monitoring and managing ecosystems containing this invasive plant. **[Souddi Mohammed[1], Bouallala M'hammed[1,2]*(Algeria), [1]Saharan Natural Ressources Laboratory, Faculty of Sciences and Technology, University of Ahmed Draia, 01000 Adrar, Algeria,[2]Higher School of Saharan Agriculture-Adrar, Algeria, 2023].**
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Algeria

Defeated stacked resistance genes induce a delay in disease manifestation in the Pathosystem *Solanum tuberosum—Phytophthora infestans.* Cultivated potato (*Solanum tuberosum* L.) is one of the most important crops worldwide. *Phytophthora infestans* (Mont.) de Bary is the oomycete pathogen responsible for the famous Irish famine (1840s).

It is still the most important pathogen affecting potato crops, causing the late blight disease on potato and tomato. It is mainly controlled by fungicides. Breeding for disease resistance is the best alternative to chemical control of the disease. One of the strategies used is to stack many resistance genes in the same genotype. Here, we wanted to test the effect of the stacked resistance gene (R) from *S. demissum* on the infection process by the virulent race EU_13_A2. Four potato genotypes were tested, each one harboring, respectively, one, two, three or four R genes. All the tested genotypes were sensitive.

However, the sensitivity degree was negatively correlated with the number of genes harbored by each genotype. There was a delay of two days of symptoms manifestation for the genotype with 4Rs, and the pathogen produced less spores on the detached leaf test. In addition, the amount of phenolic compounds produced is higher in the genotypes with multiple R genes. **[Abdelmoumen Taoutaou, Ioana Virginia Berindean , Miloud Khalil Chemmam, Lyes Beninal, Soumeya Rida, Lakhdar Khelifi, Zouaoui Bouznad, Ionut Racz, Andreea Ona and Leon Muntean (Algeria), Agronomy, 13, 1255, 2023].** https://doi.org/10.3390

Egypt

The long-legged flies (Diptera: Dolichopodidae) in Egypt

The Dolichopodidae, commonly known as long-legged flies, are a cosmopolitan dipteran family in the superfamily Empidoidea. The adults and majority of larvae in this family are predaceous, feeding on small and soft bodied invertebrates, and can be used as biological control agents. Nevertheless, only few old taxonomic studies on the Egyptian dolichopodids have been carried out.All dolichopodid taxa known to be represented in Egypt are cataloged in the present study. The classification of all species is updated, with synonyms, type localities, distributions and data of collection from Egypt being provided. Colored photographs of some species are also provided. Syntypes of eight species are preserved in the collection of Efflatoun Bey, Cairo University, Egypt (EFC), namely *Asyndetus albifacies* Parent, 1929; *A. albifrons* Parent,1929 ; *Argyrochlamys cavicola* (Parent, 1929); *Aphrosylus parcearmatus* Parent, 1925; *Thinophilus atritarsis* Parent, 1929;*T. maculatus* Parent, 1929; *T. spinulosus* Parent, 1929 and *T. tinctus* Parent, 1929. Lectotypes are designated from these syntypes in the present work. Sixty-six species in 21 genera and 8 subfamilies are known to be represented from Egypt and catalogued in the present study. One of these species, *Tachytrechus notatus* (Stannius, 1831), is recorded herein for the first time. Lectotypes are designated for eight species in the collection of Efflatoun Bey, Cairo University. **[Magdi S. A. El-Hawagry (Iraq), Egyptian Journal of Biological Pest Control, 33:16, 2023].**

Egypt

Pathogenicity of entomopathogenic nematodes against the new invasive fall armyworm, *Spodoptera frugiperda* (J. E. Smith) (Lepidoptera: Noctuidae)

Fall armyworm (FAW), *Spodoptera frugiperda* (J. E. Smith) (Lepidoptera: Noctuidae) is the new invasive pest of different economic crops, threatening the agricultural economy worldwide. Chemical insecticides are the main control management strategy applied by almost farmers. As the adverse effect of these chemicals on the environment and human health, improving alternative environmentally friendly control against this pest is urgently needed. In this response, the pathogenicity bioassays of 2 entomopathogenic nematode species (EPNs), *Steinernema carpocapsae* (All) and *Heterorhabditis indica* (EGAZ2), on different FAW larval instars (2nd to 6th instars) were assessed under laboratory conditions.The results showed that FAW larval mortality rate was significantly related to nematode species, post-exposure times and developmental instar stages. *S. carpocapsae* application was more virulent and effective against all tested instars larvae, registering 100% mortality after 48–72 h post-exposure at different nematode concentrations (150–2400 IJs). However, *H. indica* caused 100% mortality in early instars only after 96 h, but late instars required a longer time extending to 120–188 h at tested concentrations. In this context, 2nd and 3rd instars were highly susceptible to *Heterorhabditis* species infection. Lower nematode concentrations (150–300 IJs) caused moderate mortality 33.33–50%, respectively, in 5th and 6th full-developed larvae only. All recovery larvae died in the pupal stage post-infection, or adult emerged with wing malformation. The 2 EPN species were virulent against different FAW larval instars at different concentrations and exposure times. Thereby, they are recommended as biocontrol agents against this invasive pest, particularly *S.*

carpocapsae, after low-exposure time. This study provides essential information on EPNs, which will further help in the practical application of biological control against fall armyworm. **[Hend Mohamed and Souad Shairra (Egypt), Egyptian Journal of Biological Pest Control, 33:24, 2023].**

Egypt

Biological control of onion white rot disease using potential *Bacillus subtilis* isolates.

Onion (*Allium cepa* L.) is an essential vegetable crop worldwide, particularly in Egypt, for local consumption and exportation. White rot disease is the most serious disease of *Allium* spp. caused by the soil-borne fungus *Sclerotium cepivorum* Berk. In this investigation, five tested isolates of *Bacillus subtilis* showed an antagonistic effect and significantly reduced the linear growth of the pathogen *in vitro*. *B. subtilis* isolates no. 2 and 4 caused the highest reduction of *S. cepivorum* growth, 75.78 and 74.33%, respectively, while isolate no. 3 was the least effective one, causing 66.67% growth reduction. Under field conditions at two successive seasons (2019/20 and 2020/21), all tested bioagent treatments reduced the percentage of infection than Folicure as an officially recommended fungicide. *B. subtilis* isolate no. 2 showed the highest efficacy (78.57 and 77.78%) followed by isolates no. 4 (74.29 and 72.22%), while *B. subtilis* isolate no. 3 showed the lowest efficacy (42.86 and 50.00%) for both successive seasons. All treatments increased dry onion bulb yield and improved its quality than the untreated control plants. The chemical changes of total carbohydrates, total nitrogen contents, total soluble solids (TSS %) and enzymes activity related to defence mechanisms in treated plants by biological treatments were considered. This study aimed to find effective biological agents of *B. subtilis* isolates against the white rot of onion and evaluate their effect on yield parameters, components and quality. **[M. M. Amin and M. F. A. Ahmed (Egypt), Egyptian Journal of Biological Pest Control, 27:33, 2023].**

Egypt

Seasonal Activity of *Bactrocera zonata* (Saunders) and *Ceratitis capitata* in a Navel Orange Orchard in Dakahlia, Egypt. The peach fruit fly (PFF), *Bactrocera zonata* (Saunders) and the Mediterranean fruit fly (MFF), *Ceratitis capitata* (Wiedemann) (Diptera: Tephritidae), are the major pests infesting citrus orchards in Egypt as well as several countries of the world. The present study was carried out to study the seasonal activity of PFF and MFF in navel orange orchards in Dakahlia governorate, Egypt during two successive fruiting seasons of 2019/2020 and 2020/2021 using sex attractants and fruit samples. The results showed that, using sex attractants, PFF males had two peaks each season, whereas MFF showed one to two peaks. By monitoring fruit samples, PFF exhibited one to two peak activity seasonally in the non-fallen and fallen fruits, whereas MFF exhibited two to three peaks on the non-fallen and fallen fruits. Both PFF and MFF were more abundant in the fallen fruits than in the non-fallen fruits. The relationships between flies trapped per day (FTD) of PFF and MFF males in Jackson traps and the infestation rate of these pests showed that these traps can be used to predict infestation rates of PFF and MFF in their host fruits. **[El-Afify, A.H., R.M. Shreef, M.A. Hendawy and N.M. Ghanim (Egypt), Arab Journal of Plant Protection, 41(2): 98-104, 2023].** https://doi.org/10.22268/AJPP-041.2.0981045 **.**

Egypt

Biochemical evaluation of *Acremonium* sp. as Biological Control Agent against the spiny bollworm, *Earias insulana,* by Scanning Electron Microscopy. Ultrastructure and physiological effects of the biological control agent *Acremonium* sp. on larvae of the spiny bollworm (SBW) *Earias insulana* (Boisduval) (Lepidoptera: Noctuidae) were investigated. The isolate of *Acremonium* sp., EZ1 (MN25101) was applied on the 4th instar larvae and pupae of the spiny bollworm *E. insulana,* with two ml spore suspension of different concentrations of 6x10^{6}, 6x10^{7} and 6x10^{8} spores/ml mixed with four gm of artificial diet. Scanning electron microscopy (SEM) was used to investigate sporulation potential and the extent of damage to the growth rate of *Acremonium* sp. on the exoskeleton of *E. insulana* larvae and pupae five days after inoculation, as compared to the untreated control.

Treated larvae showed varied level of cuticle damage. Surface of infected pupae showed varied stages of mycelial growth. The biochemical parameters investigated were: carbohydrate hydrolyzing enzymes activity (trehalas, invertase, and amylase), the total soluble protein, acetylcholine esterase, aspartate aminotransferase (AST) and Alanine aminotransferase (ALT) activities. High significant reduction in amylase, trehalase and ALT activities in treated larvae was observed. On the other hand, high significant gradual increase in the amount of total soluble protein and the acetylcholine esterase activity were observed.

At the same time AST activity was slightly increased, whereas invertase activity was not significantly different from the control. Scanning electron microscopy clearly showed the ability of *Acremonium* sp. fungus to damage the cuticle of both larvae and pupae of *E. insulana* by spore's germination. In addition, it disturbs the activity of many important enzymes, thus, it can play a vital role in the control of the target pest safely without polluting the environment. **[Sabry, H., W.A.Z. El-Medany, H.S. El-Tahawe and E.M. Abd El-Azeem(Egypt), Arab Journal of Plant Protection, 41(2): 140-145, 2023].** https://doi.org/10.22268/AJPP-41.2.140145

Egypt

Efficacy of some predators and *Lecanicillium lecanii* fungus in Controlling *Aphis gossypii* (Glover) and *Myzus persicae* (Sulzer) in Potato Crop. This study was conducted to evaluate the efficiency of predators and *Lecanicillium lecanii* suspension as biocontrol agents against *Myzus persicae* and *Aphis gossypii* in potato crop, whereas *Aphis gossypii* had two peaks in the third week of March and April in 2020 and 2021 seasons. In addition, *M. persicae* had two peaks for both seasons in the fourth week of March and third week of April in 2020 and in the third week of March 2021. The common predators observed in potato fields were: *Coccinella undecimpunctata* L., *Chrysoperla carnea* Steph., *Coccinella septumpunctata, Metasyrphus corollae* F. and *Cydonia vicina isis* (Muls.). Regarding potato predators, one peak was found in the second week of March (60 predators/25 leaves) during the 2020 season, and two peaks were found in the third week of March and second week of April (53 and 38 predators/25 leaves, respectively), in 2021 season. On the 8th day after treatment, the entomopathogenic fungus *L. Lecanii* produced maximum aphid mortality at the highest concentration of 10^{8} conidia/ml and 50% concentration of fungal metabolites for both *M. persicae* and *A. gossypii*. Meanwhile, *L. lecanii* 50% metabolites solution

had a more latent effect by decreasing the longevity and the number of nymphs than when using the spore suspension of 10^8 conidial/ml. **[Lokma, N., A.A.A. Saleh, S.A.M. Amer and M F.M. Zawrah (Egypt), Arab Journal of Plant Protection, 41(2): 152-160,2023].** https://doi.org/10.22268/AJPP-041.2.152160

Egypt

Evaluate the efficiency of releasing two predatory species at their optimal temperature for controlling *Tetranychus urticae* (Acari: Tetranychidae) in a Croton greenhouse. Croton, *Codiaeum variegatum* L., is a beautiful tropical plant. The two-spotted spider mite, *Tetranychus urticae* Koch, causes economic damage to Croton. The present study aimed to control *T. urticae* by releasing two predatory species, *Phytoseiulus persimilis* Athias-Henriot and *Stethorus punctillum* Weise, at each predator's optimal temperature and humidity.

The experiments were carried out in commercial plastic greenhouses for two seasons. Once the *T. urticae* infestation was detected, the predators were released. *Phytoseiulus persimilis* was released three times, with a rate of 9/m2. Its population increased when the temperature and humidity ranged from 25.5–29 °C and 72.8–86.4% RH, respectively, while it disappeared when the temperature increased above 30 °C. There was a negative correlation between *P. persimilis* and temperature and a positive correlation with relative humidity. *Stethorus punctillum* was released twice at a rate of 0.5/m2. Its population increased when the temperature and humidity ranged from 31.8–35 °C and 65–77% RH, respectively.

There was a positive correlation between *S. punctillum* and temperature and a negative correlation with relative humidity. In the two seasons, the population of *T. urticae* decreased gradually to nil/croton leaf in the biological greenhouse while increasing to 59.47 ± 6.34 and 85.63 ± 10.45 mites/croton leaf in the control greenhouse in 2019 and 2020, respectively, at the end of the season. The combination of the two predators was able to achieve effective control of *T. urticae* when used according to the optimal temperature for each predator in croton greenhouses. **[Dalia Adly (Egypt), Persian J. Acarol., Vol. 12, No. 2, pp. 315–326, 2023].** https://doi.org/10.22073/pja.v12i2.78030

Egypt

Field evaluation of predacious fungus, *Dactylaria brochopaga* in liquid and granular formulations for management of root-knot nematodes infecting soybean. A field experiment was carried out during the 2020 growing season in a soybean field naturally infested with the root-knot nematode *Meloidogyne incognita* for evaluating the predacious fungus, *Dacylaria brochopaga* against nematode infection, compared with the chemical nematicide Furadan *(*Carbofuran*).* The fungus was formulated in liquid (DB L) and granules (DBG) biocide. DBG and Furadan treatments were applied once at the planting date, while DBL was applied once after seed germination. Data indicated that DBG and Furadan treatments significantly reduced nematode final population (P_f) in soil by 32.4% and 36.5%, respectively, in the case of soybean cv. Giza-22 and by 47.1% and 48.2% in the case of cv. Giza-111, compared to control treatment. DBL had no significant effect on Pf at both soybean cultivars. At mid-season, the root-

gall index (RGI) was not significantly influenced by DBG and DBL treatments, while Furadan treatment reduced RGI with 30.6%, for cv. Giza-22 and with 22.5%, for cv. Giza-111. At harvest RGI, was significantly reduced by DBG and Furadan treatments, with 31.6% and 33.3%, respectively in case of cv. Giza-22 and with 39.3% and 42.9%, in case of cv. Giza-111, compared to control treatment, while no significant effect on RGI was obtained by DBL at both soybean cultivars either at mid-season or at harvest compared to control. Soybean seed yield was significantly increased by DBG treatment with 10.9% in the case of cv. Giza-22 and with 12.3% in case of cv. Giza -111 over control. DBL and Furadan treatments had no significant effect on the seed yield of both cultivars. **[A.M. Korayem, E.M.A. Noweer, M.M.M. Mohamed (Egypt), Plant Pathology Department, National Research Centre. Dokki, Giza, Egypt.**

Iraq

Integrated management for palm borers. Integrated management programme was conducted to control the Palm borers, Oryctes sp., in date palm orchards of central Iraq from 2015 – 2020. The following control factors were used: cultural practices, such as sanitation and pruning frond bases, hand collection of larvae during regular annual service work, solar light traps with lamp of 320–420 nm wavelength and biocontrol agents (entomopathogenic fungi). Results indicated that the population density of *Oryctes* spp. reduced in percentage to 91.6%, 53.0 % for larvae and adults, respectively. The yield increased by 28% and 32% after one and two years of following the programme. The results depicted the effectiveness of some integrated ecological sound control methods for monitoring and population suppression of *Oryects* spp. on date palm orchard environment.**[[1]Mohammed Zaidan Khalaf ,[2]Samia Khalel Mahmood and [3]Mysoon Hassan Al-Seria, [1]Agricultural Research Directorate, Ministry of Science and Technology, Iraq.[2]College of Biotechnology, Al-Nahrain University, Baghdad, Iraq. [3]College of Science for Women, Baghdad University, Baghdad, Iraq , 2023].** https://doi.org/10.17660/ActaHortic.2023.1371.36

Iraq

Seasonal distribution and food preference of the peach fruit fly, *Bactrocera zonata* (Saunders) on different types of citrus fruit trees in Baghdad Governorate. The study was conducted in an orchard in Baghdad city to monitor the infestation rate and movement of *Bactrocera zonata* in infested fruits during different periods. Results obtained showed that the seasonal distribution of the peach fruit fly *B. zonata* was proportional to the presence of the fruits and their maturity stage in the orchard. Apricots infestation occurred in May and June, peach in June and July, yellow figs in July and August, mango in August and September, mandarin in October and November, oranges in November and December, and sour oranges in December. The results of the study demonstrated that the peach fruit fly varied in its preference and infestation of the different citrus species fruits, based on fruits infestation rates and the average larvae number per fruit. Mandarin fruits were the most preferred types of citrus by *B. zonata*, followed by orange fruits, grapefruit, sindhi, sweet lemon, and sour orange. In contrast, the sour lemon fruits were not infested. The seasonal distribution of fruit types is important and can be used in the design of preventive control strategies to protect the various fruits from insect's infestation. **[Al-Jassani, R.F. and A.H. Abou Rgheef (Iraq), Arab Journal of Plant Protection, 41(2): 93-97, 2023].**

Iraq

The role of spray pattern and operating pressure and their interactions on the control of *Tetranychus urticae* Koch in eggplant plants under greenhouse conditions. The mite *Tetranychus urticae* Koch is one of the most dangerous pests that attack the eggplant (Solanum melongena L.). Several attempts were carried out for controlling this pest to avoid crop losses through the extensive use of chemical products. The present study aimed to shed light on the effect of the spraying pattern and selecting the appropriate operating pressure to obtain a suitable droplet size and density deposited on the leaves to get optimal effect for the control of mites which attack eggplant under greenhouse conditions. Six types of spray patterns (from top, side, bottom, top and side together, bottom and side together, and combination spray mode) toward plant canopy and two different operating pressures (2 and 5 bar) were tested. The factorial experiment was applied in split-plot arrangement in a completely random design.

The significant differences between the parameters studied were tested by calculating the least significant difference (L.S.D.) at P=0.05. The findings showed a clear significant influence in the control efficiency by both spraying patterns and operating pressures. Significant mortality efficiency was observed using the bottom spray pattern from the plant canopy, especially at 5 bar constant pressure compared with the other spray patterns at the same operating pressure.

It was also observed that spraying with two-nozzle spray pattern from the bottom led to an increase in the efficiency of killing mites not only on the bottom part of the plant but also those present in the upper part of the plant, with a mortality rate of 22.67% compared to the control treatment. The results also illustrated that the bottom spray pattern reduced the amount of pesticide applied by more than 46% compared to the other treatments. **[Ibraheem, S.N. and M.H. Alheidary (Iraq), Arab Journal of Plant Protection, 41(2): 105-113, 2023].** https://doi.org/10.22268/AJPP-41.2.105113

Iraq

Effect of some surfactants on the expired bioformulation Belthirul® and evaluation of its efficacy against fig moth larvae, *Ephestia cautella* (Walker). A laboratory study was conducted to evaluate the effect of two surfactants Neutrafol-pH and Inex-A, compared to the expired Belthirul® formulation (*Bacillus. thuringiensis* var *kurstaki*) on the larvae of the fig moth *Ephestia cautella* (Walker).

Tests were conducted to determine the time required for wetting, stability of the suspension under normal conditions and the compatibility between the entomopathogen and surfactants. Expired formulation, fresh formulation and treated expired formulation were bio-assayed on third instar larvae of the fig moth *E. cautella* to evaluate its efficacy. The results obtained showed that the two surfactants Neutrafol-PH and Inex-A were highly efficient in reforming the expired bioformulation Beltirul®, improved its physical specifications and increased its biological activity on fig moth larvae, and Neutrafol-PH was more effective in increasing the activity and vitality of *B. thuringiensis* var. *kurstaki* in the expired bioformulation.

The number of bacterial colonies was 17.3×10^{10} CFU/g, whereas it was 8.0×10^{10} colonies/g in the expired bioformulation treated with Inex-A surfactant, compared with non-treated expired bioformulation which reached 3.9×10^{10} CFU/g. The treated ex-

pired bioformulation with Neutrafol-PH and Inex-A increased its efficacy by increasing mortality rate 82.08 and 74.38%, respectively, on the third instar larvae of the fig moth at the concentration of 1 g/L. **[Safaa Zakaria Baker, Salih Mohammed Ismail and Khaldoon Fares Saeed (Iraq), Arab Journal of Plant Protection, 41(2): 119-126, 2023].** https://doi.org/10.22268/AJPP-041.2.119126

Iraq

The efficiency of some plant extracts, pesticides and the entomopathogenic fungus *Metarhizium anisopliae* in controlling the field's tomato moth, Tuta absoluta (Meyrick). A field study was conducted to evaluate the efficacy of *Conocarpus erectus* leaf and *Illicium verum* extracts, Belt 480 SC and Movento 100 SC and the *Metarhizium anisopliae* (WP) biological preparation in controlling the tomato moth *T. absoluta* on the tomato cultivar Ahlam. The results showed that all treatments could reduce fruit infestation rate, leaf mining level and severity of infestation by the insect.

The combined treatment of *M. anisopliae* + Movento was superior by preventing fruit infestation, with the lowest leaf mining level and infestation severity, which amounted to 0.00, 6.00 and 0.5%, respectively, four weeks after treatment.

The general average of the same treatment was 3.41, 9.08 and 0.77%, respectively, and the combined treatment (Belt + *M. anisopliae*) came second in the average fruit infestation rate (7.74%) and third in leaf-mining level, and infestation severity, which amounted to 12.41 and 1.10%, respectively. However, the Movento 100 SC treatment ranked third in fruits infestation rate and second in leaf-mining level, reaching 8.08 and 10.49%, respectively.

It did not differ significantly from the combined treatment M. anisopliae + Movento in infestation severity with an average of 7.30%. In contrast, the treatment star anise + *M. anisopliae* ranked third, with an average infestation severity of 30.9%. **[Raad, M.F., S.Z. Baker and A.A. Kareem (Iraq), Arab Journal of Plant Protection, 41(2): 127-133, 2023].** https://doi.org/10.22268/AJPP-41.2.127133

Iraq

Evaluation of the efficacy of Oxymatrine, Emamectin Benzoate , Silica and Zinc Nanoparticles for controlling the adults of *Trogoderma granarium* (Evert) under laboratory conditions. This study evaluated the efficiency of Oxymatrine, Emamectin benzoate, and silica and zinc nanoparticles against the adults of Khapra beetle, *Trogoderma granarium* (Evert) under laboratory conditions. Results revealed that Oxymatrine gave the highest mortality rate, reaching 100% at a concentration of 2.5 ml/L water seven days after treatment, compared with 63.33% for Emamectin benzoate, at a concentration of 1.25 ml/L following the same period after treatment. The results indicated that silica nanoparticles' use achieved a mortality rate of 37.11% at the concentration of 300 mg/kg seeds compared with 23.11% for zinc nanoparticles 7 days after treatment. The combination of Oxymatrine and silica nanoparticles at a concentration of 1 ml/L and 300 mg/kg seeds, respectively, gave the highest mortality rate of 100%, 5 days after treatment. **[Yahya, E.E. and M.T. Mohammadali (Iraq), Arab Journal of Plant Protection, 41(2): 168-172, 2023].** https://doi.org/10.22268/AJPP-41.2.168172

Iraq

Isolation of the Pectinase Enzyme produced by the fungus *Penicillium* spp. that causes citrus fruit Rot disease and evaluation of the inhibitor's efficacy for its control. This study was conducted during the period 2021-2022 to evaluate the effect of some chemicals in inhibiting the pectinase enzyme produced by the fungus *Penecillium* spp. When enzyme preparation concentration of 2.5% was used, the enzymatic activity was 0.01 units/ml compared to 0.2 units/ml in the crude enzyme preparation. When chemical inhibitors were used singly, the calcium chloride treatment was superior at the 5% concentration, which gave an enzymatic activity of 0.03 units/ml. Results showed that the lowest residual enzymatic activity was in the treatment that included using all enzyme-inhibiting substances at 2.5% concentration, where the residual effect was 5% compared to 100% in the crude enzyme treatment. This indicates a loss of 95% of the enzyme's activity. The treatment with calcium chloride was superior when used at a concentration of 5% and gave a residual activity of 15%, indicating that the enzyme lost 85% of its enzymatic activity. This treatment was superior to all other treatments by achieving the lowest diagonal growth of the pathogenic fungus, which was 0 cm compared to 9 cm in the control treatment. In addition, the calcium chloride treatment achieved an infection rate and disease index of 30 and 59%, respectively, in the scratched fruits treatment, whereas these two parameters were reduced to 10 and 22% in the case of non-scratched fruits treatment. The severity of infection when using all inhibitors combined at 2.5% concentration infection rate and disease index were reduced to 20 and 26.6% in the scratched fruits treatment and to 0 and 0 in the non-scratched fruits treatment. **[Al-Jbory, A.A.A., K.A. Mohammed and S.M. Ismaeel (Iraq), Arab Journal of Plant Protection, 41(2): 190-196, 2023].** https://doi.org/10.22268/AJPP-41.2.190196

Iraq

Predatory efficiency of predator Cybocephalus rufifrons on parlatoria. The predator Cybocephalus rufifrons is also considered one of the vital enemies of the Iraqi environment as a predator of various scale insects, including the scale insect on the palm. the predatory efficiency of the larval instars increases with their advancing age and in a manner consistent with their nutritional needs. The reason is due to their large size, which leads to greater gluttony, as well as an increase in the speed of movement with the advancing age of the larval stages, and the rates of what the first, second, and third larval stages consume have reached The fourth was 96.12, 172.4, 329.06 and 702.0 nymphs, respectively, with a daily consumption rate of 24.78, 35.28, 66.61 and 141.2 nymphs, respectively. The average consumption of the entire larval stage was 1296.58 nymphs, with a daily average of 264.87 nymphs. The results of the statistical analysis indicated significant differences between the consumption rates of predator instars and between their daily consumption rates. As for the adults, the average daily consumption of the female was 128.5 nymphs, while the daily consumption rate of the male was 107 nymphs. The results of the analysis also showed that there were significant differences between the consumption rates of the larval role and the role of the adult in both genders. **[Mustafa A. Al-Jbouri[1] and Feryal B. Hermize[2] (Iraq), [1,2] Department of Plant Protection, College of Agriculture Engineering Science, University of Baghdad, Baghdad, Iraq. Fifth International Conference for Agricultural and Environment Sciences IOP Conf. Series: Earth and Environmental Science IOP Publishing 1158 (2023) 072009. doi:10.1088/1755-1315/1158/7/072009].** mustafaaljboori@gmail.com

Iran

Review on resistance of lentil varieties to the blight disease caused by *Ascochyta lentis*, with emphasis on genetic aspects. Lentil, *Lens culinaris* (syn: *Lens esculenta*), is one of the most important annual legumes from the Fabaceae family, which is widely cultivated throughout Asia, Europe, Northern America, Australia, and North Africa. Lentil seeds are mostly used in food industries to produce soups and its fodder is used as livestock feed. Ascochyta blight of lentil (ABL), which is caused by the pathogenic fungus *Ascochyta lentis* (teleomorph *Didymella lentis*), is one of the important diseases of this crop worldwide which causes serious damage to it. Resistance of different lentil varieties to this disease is variable.

For this purpose, different studies have been performed on resistance in cultivated and wild varieties against this disease; some of them have focused on ecological aspects, others on genetics, and few on pathogen virulence. In this review, we have outlined the advantages of each background along with latest research.

The present review, due to its unique characteristics which has been done to our knowledge for the first time, can be considered as valuable regarding the management of this dangerous disease in lentil. **[Badri, H., and Simorgh, S. (Iran), Tunisian Journal of Plant Protection 18 (1): 1-14, 2023].** https://doi.org/10.52543/tjpp.18.1.1

Effects of five plant essential oils on the protein content and digestive enzymes of *Ephestia kuehniella*

The Mediterranean flour moth or mill moth *Ephestia kuehniella* is a common pest of cereal grains, especially flour.

In this research, the sublethal effects of essential oils isolated from five medicinal plants including *Allium sativum*, *Glycyrrhiza glabra*, *Rosmarinus officinalis*, *Salvia officinalis*, and *Piper nigrum* were investigated on the protein content and digestive enzymes activity of the fifth instar larvae, under laboratory conditions. The GC-MS analysis of the essential oils showed that tetracosamethyl cyclododeca siloxan, aristolene, α-pinene, β-thujone, and caryophyllene were the dominant constituents for each essential oil, respectively. The enzymatic activity was investigated by the treatment using the LC_{30} concentration against the larvae that were 2.86, 12.03, 2.19, 7.84, and 9.39 µl/l air, respectively.

Results revealed that there were significant differences among the treatments on total protein content and enzymatic activities ($F_{5,12}$ = 2.95, 3.56, and 7.07). Regarding the total protein content, the control and treatment with *R. officinalis* essential oil showed the highest and lowest concentrations (1.0288 ± 0.0212 mg/ml versus 0.7333 ± 0.0329 mg/ml).

The highest amylolytic activity was also seen in the control (0.0551 ± 0.0025 mU/mg) and the lowest in *R. officinalis* oil treatment (0.0373 ± 0.0009 mU/mg). Moreover, the highest and lowest proteolytic activities were observed in the control (5.5063 ± 0.1086 U/mg) and *R. officinalis* essential oil (3.3028 ± 0.1077 U/mg). Accordingly, *R. officinalis* essential oil could be applied to control *E. kuehniella*. **[Mohammad Asadi (Iran), Tunisian Journal of Plant Protection 18 (1): 29-40, 2023].**

oman

***Talaromyces omanensis* and *Aspergillus fumigatus* endophytic fungi suppress *Pythium aphanidermatum* and its induced damping-off diseases of cucumber and radish.**

Damping-off diseases caused considerable losses in crop production in numerous countries. *Pythium aphanidermatum* represents a major cause of these diseases. In the present investigation, two endophytic fungi *Talaromyces omanensis* and *Aspergillus fumigatus* isolated from a desert plant, *Rhazya stricta*, were investigated for their efficiency in suppressing *P. aphanider- matum* and its stimulated damping-off diseases in cucumber and radish.

The results proved the ability of both endophytes to inhibit *P. aphanidermatum* growth in both solid and liquid forms, inhibit its oospore production, induce abnormal patterns in its hyphae and suppress its induced damping-off diseases. Moreover, *T. omanensis* produced an inhibition zone area against *P. aphanidermatum* and enhanced the fresh weight of cucumber and length, fresh weight and dry weight of radish. Further, *A. fumigatus* caused cellular leakage in *P.aphanidermatum* mycelium. The previous results were

interpreted through the secretion of □-1,3-glucanase, cellulose and siderophore by both endophytic fungi. **[Boshra A. Halo[a], Rashid A. Al-Yahyai[b] and Abdullah M. Al-Sadi[b] (Oman), [a]National Coalition of Independent Scholars, Brattleboro, VT, USA; [b]Department of Plant Sciences, College of Agricultural and Marine Sciences, Sultan Qaboos University, Muscat, Oman Archives of Phytopathology and Plant Protection,** DOI:10.1080/03235408.2023.2216350

Lebanon

Investigation on phytoplasma diseases of sweet pepper in the Bekaa valley of Lebanon. In July 2018, several sweet pepper plants showing symptoms of leaf chlorosis, yellowing and stunted leaves, typically associated with phytoplasma infection, were observed in different locations in the Bekaa Valley, Lebanon.

Polymerase chain reaction (PCR) was used to amplify the 16S ribosomal gene of phytoplasmas with the universal primers P1/P7 and R16F2n/R16R2 primers in nested PCR assay. The amplifications from all the symptomatic plants yielded a product of 1.2 kb in nested PCR. BLAST and phylogenetic analysis of the amplified 16S rRNA gene sequences confirmed the presence of '*Candidatus* Phytoplasma solani' and '*Ca.* P. trifolii' phytoplasmas. This is the first report of the occurrence of '*Ca.* P. solani' in pepper in Lebanon.

[Raied Abou Kubaa, Contaldo Nicoletta, Amoia Serafina Serena, Jreijiri Fouad, Choueiri Elia (Lebanon), Institute for Sustainable Plant Protection, National Research Council of Italy, Bari, Italy Department of Plant Protection, Lebanese Agricultural Research Institute, Tal Amara, Zahle, Lebanon, Phytopathogenic Mollicutes, Volume: 13, Issue: pp111-112. 2023].

DOI; 10.5958/2249-4677.2023.00056.

Lebanon

Chapter17- Diversity, distribution, and status of phytoplasma diseases in Lebanon. The emergence of phytoplasma diseases in Lebanon dates two decades back when almond witches' broom (AlmWB) was reported as the first phytoplasma disease in almond trees. Accordingly, phytoplasma diseases are considered to be invasive diseases of economic importance that affect fruit trees and some field crops in several regions of Lebanon.

To date, phytoplasmas associated with emerging diseases in Lebanon are AlmWB phytoplasma identified on almond and peach trees threatening stone fruit production and food security at family and country levels, grapevine yellows "bois noir" and '*Candidatus* Phytoplasma omanense' on wine grapes producing serious disturbances in plant growth and productivity, pear decline, '*Ca.* P. trifolii' in tomatoes and peppers, in addition to other phytoplasmas reported in cactus and in several wild plant species belonging to groups/subgroups 16SrII, 16SrIX-B, 16SrIX-C, and 16SrXII-A.

This chapter deals with the current status of the phytoplasma diseases in Lebanon, and their diversity and geographical distribution. **[Elia Choueiri (Lebanon), Department of Plant Protection, Lebanese Agricultural Research Institute, Tal Amara, Zahlé, Lebanon, Diversity, Volume 1 in Phytoplasma Diseases in Asian Countries, Pages 341-353, 2023].** https://doi.org/10.1016/B978-0-323-91896-1.00006-4

Chapter 2 - Graft and vegetative transmission of phytoplasma-associated diseases in Asia and their management. The propagation materials infected with phytoplasmas, such as rootstocks and other types of grafting materials used as scions play an important role in the dissemination of phytoplasma-associated diseases in new areas. Since the phytoplasma infection is systemic in the plants, the vegetative propagation of many horticultural crops allows their spread through cuttings, bud wood, tubers, runners, and bulbs.

Grafting is therefore an efficient method of phytoplasma spreading and establishing infection in vegetatively propagated plants.

The phytoplasma spreads through vegetative plant propagation and occurs in nature over short and long distances by natural scattering and transportation of infected propagation materials. The transmission of phytoplasmas in Asian countries is also mainly attributed to grafting of infected propagation materials in woody and herbaceous plant species. In Asia, the phytoplasma associated with stone fruits, pome fruits, citrus, jujube, ornamentals, other trees species, and grapevine are majorly transmitted by grafting. However, possibility of phytoplasma vegetative propagation through basal shoots, stems, rhizomes, tubers, stolons, corms, buds, and bulbs is reported in sugarcane, cassava, potato, sweet potato, and many ornamentals such as rose, carnations, marigold, chrysanthemum.

Dodder species are also efficiently utilized for vegetative phytoplasma transmission. The importance of phytoplasma infection spread by grafting, vegetatively propagated plants, and possible management practices are discussed in this chapter. **[Kadriye Caglayan, Elia Choueiri (Lebanon), Govind Pratap Rao, Phytoplasma Diseases in Asian Countries. Characterization, Epidemiology, and Management, Volume 3, Pages 21-36, 2023].** https://doi.org/10.1016/B978-0-323-91671-4.00014-9

Libya

The mortality effect of some plant powders on the cowpea beetle *Callosobruchus maculatus* Fab. (Coleoptera: Chrysomelidae). This study aimed to test the biological effect of four plant powders (black pepper *Piper nigrum*, ginger *Zingiber offiicinale*, retem *Retama raetam* and rosemary *Rosmarinus officinalis*) against cowpea weevil *Callosobruchus maculates* Fab.

in chickpeas for the following concentrations 0.0, 1, 2, 3 and 4% w/w. Mortality was observed. Results showed that all the test plant powders recorded significantly higher mortality than the control reaching (80.63%) in 96 h. Mortality rates increased proportionally with the duration of exposure.

The black pepper *P. nigrum* caused the highest beetle mortality at all exposure times, which differed significantly from mortalities caused by the other plant powders in this experiment.**[Nagat Ali Abuelnnor (Libya), Plant Protection Department, Faculty of Agriculture, Tripoli University, Tripoli, Libya, Arab Journal of Plant Protection, The article will be published in Volume 41, Issue 3, September 2023].**

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Syria

Effect of temperature on efficacy of the Entomopathogenic Fungi *Beauveria bassiana* and *Metarhizum anisopliae* against the Sunn Pest, *Eurygaster integriceps* Puton.

An experiment was conducted in the plant protection laboratory of the Directorate of Agriculture and Agrarian Reform in Raqqa Province in 2013 to assess the effect of temperature and four spores suspension concentrations (1.5×10^2, 10^3, 10^4 and 10^5 spores/insect) on the efficacy of *Beauveria bassiana* and *Metarhizum anisopliae* against the Sunn pest (*Eurygaster inegriceps* Puton).

Insect adults dorsal side were inoculated with 1.5×10^3 spores/insect of *B. bassiana* and caused insects mortality at a temperature range of 22-31°C, with optimum effect at 25°C, with a LT_{50} of 5.3 days after inoculation.

In contrast, *M. anisopliae* had a wider temperature range up to 37°C, with optimal effect at 28-31°C with LT50 of 5 days. No significant differences were observed between the fungal concentrations of 1.5×10^3 and 1.5×10^5. Results obtained for using the four fungal spore suspension concentrations (1.5×10^2, 1.5×10^3, 1.5×10^4, 1.5×10^5 spores/insect) under optimum conditions for each fungus indicated that the LT_{50} was close among concentrations.

In contrast, there was a significant difference between the two fungal concentrations 1.5×10^2 and 1.5×10^4, and *B. bassiana* was most effective at 1.5×10^4 spores/insect, in contrast to *M. anisopliae* which was most effective at 1.5×10^2 spores/insect. **[El-Mukhlef, A.A., Sh.A. Kharouf and A. Al-Khalaf (Syria), Arab Journal of Plant Protection, 41(2): 134-139,2023].** https://doi.org/10.22268/AJPP-41.2.134139

Syria

The Secondary Parasitoid *Perilampus tristis* Mayr, 1905 and its effect on the primary parasitoids on the Codling Moth, *Cydia pomonella* L.

The study was carried out in some apple orchards infested with the codling moth, *Cydia pomonella* (L.) (Lepidoptera: Tortricidae) in Khan Arnabah (Quneitra governorate) and Al-Hariseh (Sweida governorate).

The study aimed to study the secondary parasitoid *Perilampus tristis* Mayr, 1905 (Hymenoptera: Perilampidae) and to identify its hosts of the primary parasitoids that parasitize the codling moth in the two study areas. Two methods were used to identify the insect parasitoids on the codling moth, (i) collecting infested fruits, and (ii) cardboard traps. The study revealed the presence of many insect parasitoids that parasitize the apple fruit worm, but the secondary parasitoid *P. tristis* parasitizes as a secondary parasitoid on the pupae of two types of primary parasitoids, the egg-larval parasitoid *Ascogaster quadridentata* Wesmael (Hymenoptera: Braconidae) and the young larval parasitoid *Pristomerus vulnerator*, Pzeran1799) (Hymenoptera: Ichneuomonidae) in the two study areas.

The number of secondary parasitoids *P. tristis* increased in the cardboard traps, whereas the number of primary parasitoids *A. quadridentata* and *P. vulnerator* decreased in the two study areas. The secondary parasitoid *P. tristis* reduced the effectiveness of the primary parasitoids *A. quadridentata* and *Pristomerus vulnerator* in the two study areas.

[Basheer, A., G. Ibrahim, N. Diab, K. Al-Assas, R. Alsaied Omar, F. Al-Ghammaz, H. Nasrallah and Y. Idris (Syria), Arab Journal of Plant Protection,146-151,2023 :(2)41]. https://doi.org/10.22268/AJPP-41.2.146151

Efficacy of some plant extracts, *Sorghum bicolor*, *Medicago sativa,* and *Cynodon dactylon,* in Controlling Weeds and Identification of Active Substances.

This investigation was carried out in 2020 in the farm and laboratories of the Faculty of Agriculture and the Central Laboratory of the Faculty of Sciences, Damascus University, to investigate the effect of hexane extract of *Sorghum bicolor* L., *Medicago sativa* L., *Cynodon dactylon* L. on growth of three weed species: *Setaria viridis* (L.) Beauv, *Urtica urens* L and *Diplotaxis erucoides* (L.) DC. The chemical analysis of hexane plant extracts, used in integrated weed control programs, was carried out to identify the most important active substances present in these extracts using a gas chromatography device attached to a mass spectrometer (GC-MS).

The results showed that the *S. bicolor* extract was superior in controlling the studied weed species, with an efficacy of 77.4% for the weed *U. urens*. Whereas the most sensitive weed was *S. viridis* (L.) whose plant height was reduced to 12.7 cm with dry matter content of 5.79% compared to the control, whose length reached 39 cm with the same dry matter content.

Nine substances were identified in the *S. bicolor* extract with the highest percentage of Neophytadiene (32.045%), and nine substances in *M. sativa* extract with the highest percentage of Phytol (28.23%), whereas 14 compounds were identified in the *C. dactylon extract,* with 17.55% propanoic acid.

[Alyousef, A., G. Ibrahim and A. Al Mouemar (Syria), Arab Journal of Plant Protection, 41(2): 161-167, 2023]. https://doi.org/10.22268/AJPP-41.2.161167

Syria

Identification of Resistance Traits against Whiteflies, *Bemisia tabaci* in Certified Varieties and Promising Strains in Field and Semi-Field Experiments. Plants have developed defence systems to cope with pests' challenges, especially insects, to reduce their damage. In this study, some resistance traits in 30 cotton (*Gossypium hirsutum*) genotypes against cotton's whitefly, *Bemisia tabaci* (Genn.) were evaluated through semi-field experiments, where antixenosis of certified varieties and promising strains to the insect where studied by designing adhesive cage placed on leaves of the plant third upper, insect development from egg to adult were regularly observed and rates of development and survival, lifespan, sex ratio, and total emergence of adults were monitored. A preference test was conducted through recording numbers of different insect stages in 1cm^2 area. Field experiments were carried out by planting cotton genotype for two successive seasons (2018, 2019). Insect density was evaluated by measuring whiteflies density every 15 days until the end of the growing season. During the 2020 season, trichome density in 1cm^2 area was determined and their length and diameter were also determined at the 8th node of cotton genotypes. The results showed no significant differences among cotton genotype in relation to insect survival rate, lifespan, sex ratio, and emergence rate of adults. This study revealed that there were significant differences in trichome density in 1 cm^2 of leaf area ranged between 86.33 to 160.7/cm^2. The correlation was significantly negative between egg and trichome density (R= -0.984). However, no significant correlation between the length and diameter of trichome with nymph and egg density. The egg density varied from 32 to 54 egg/cm^2, whereas nymph's density varied between 3.8 to 6.1 nymphs/cm^2, and the variety Raqqa 5 had the highest density of whitefly nymphs and eggs during the two seasons. Whiteflies density peak was around mid-September and started to decline until mid-October. The results obtained suggested that there is a role for trichome density in resistance to whiteflies and there aren't antixenosis between studied cotton's genotypes. There is a need to investigate cotton genotypes from different cotton species, such as *G. arboreum, G. barbadens, G. thuberi* for the presence of insect resistance traits. Incorporation of such resistance in cotton cultivars is a key to sustainable pest management. **[Al-Issa, Z., M.N. Salti, M. Nabahan and A. Khalifa (Syria), Arab Journal of Plant Protection, 41(2): 173-182, 2023].** https://doi.org/10.22268/AJPP-41.2.173182

Resistance of Third and Fifth Instars of Codling Moth, *Cydia pomonella* (L.) to the Insecticide Deltamethrin in As-Suwayda Governorate, Syria. Codling moth, *Cydia pomonella* (L.) is a key pest of global importance that affects apple fruit production and its populations have developed resistance to insecticides in many apple production areas. Third-instar larvae of *Cydia pomonella* has developed a vigor tolerance to deltamethrin in the fields of As-Suwayda Governorate, Syria. The resistance rate (RR) was (5, 5.6, 6.79) after (24, 48, 72) hours after treatment with deltamethrin, respectively, while ultra-vigor tolerance was observed in the non-diapausing fifth-instar larvae of codling moth (males and females), the resistance rate (RR) was (6.42, 7.75, 9.67) for males and (8.49, 9.84, 10.26) for females after (24, 48, 72) hours, respectively, It was noted that females of the non-diapausing fifth-instar larvae was more resistant than males. Based on the results, it is recommended to exclude deltamethrin for a while, using it with other insecticides, not re-using it many times or mixing it with one of the synergists. **[Bou Hamdan, R., W. Kassis and M. Bufaur (Syria), Arab Journal of Plant Protection, 41(2): 183-189, 2023].** https://doi.org/10.22268/AJPP-41.2.183189

Syria

The efficacy of some pesticides supplied with summer oil on females of *Dactylopius opuntiae* in Al-Sweida Governorate, Syria. A field experiment was executed to compare the effectiveness of some insecticides Supplied with summer oil on females of *Dactylopius opuntiae* (Dactylopiidae; Hemiptera) which was recently recorded in Syria. Acetamiprid 20%, Chlorine-perphos ethyl 48%, Dimethoate 40%, Delta-permethrin100q/l and summer oil were used as a foliar spray and control, the results were showed that the efficacy of Acetamiprid, Chlorine-perphos ethyland Dimethoate treatments were the best after one and two weeks of spraying with significant different Deltamethrin and summer oil treatments.The efficacy of Chlorpyrifos was reduced with Significant different with Acetamiprid and Dimethoate treatments in the third week after treatment. Using summer oil only has made a recorded efficacy on females during of three weeks after treatment. **[Mazen Bufaur, Rami Bohamdan, Waed Ghanem and Mohammad Al-allan (Syria), Journal of Agricultural Research, February, 10(1):390-395, 2023].**

Spread of the African fig fly *Zaprionus indianus* Gupta, 1970 (Drosophilidae: Diptera) in Syria. After recording the African fig fly *Zaprionus indianus* Gupta, 1970 (Drosophilidae: Diptera) in the fall of 2020 in the governorates of Sweida and Quneitra in southern Syria on the fruits of the common fig *Ficus carica* (Arab Plant Protection Newsletter, 2020-81), the spread of this insect was observed in 2023 in several areas of northwestern Syria (Masyaf - Hama on fig fruits, Harison and al-Kharab - Tartous on tomato fruits in greenhouses, Safsafa - Tartous on strawberry, Bahlouliya - Lattakia on peach fruits) in addition to the registration of new hosts of it in several areas from Sweida governorate (figs, peaches, plum, and grapes). Samples of these insects were classified according to the approved classification keys (Yassin and David, 2010; KREMMER et al., 2017), and through morphological description.

Most of the insects present on the infected fruits, especially the decaying or overripe, were the African fig fly, *Zaprionus indianus*. The insect is mainly distinguished by its large size compared to the common vinegar fly, by the longitudinal white lines on the thorax of the whole insect, and by the base-toothed hairs on its front thigh, five large on one side and two on the other. The hosts of this insect are more than 80 plant species, and it infects fully ripe and decayed fruits, but it can also infect unripe fruits such as figs and strawberries, and fruits that have any damage or cracks, as they enter through these cracks to infect the pulp and make them unmarketable. The symptoms of infection in fruits are similar to that of the vinegar fly, *Drosophila melanogaster*, as well as the Mediterranean fruit fly, *Ceratitis capitata* (Diptera, Tephritidae), but the method of monitoring and attracting traps is different. Therefore, integrated management programs for fruit flies in Syria should also be updated to include prediction, attraction and control methods for this invasive insect. This species is considered an invasive pest in the region and is on EPPO Alert List 1. It has recently been recorded in many countries of the region, such as Jordan, Iraq, Cyprus, Egypt, Malta, France, Spain, Tunisia and Algeria. **[Wa'el Almatni, Entomologist, Damascus, Syria, 2023].**

Tunisia

First attempt to develop a rearing method for the native green lacewing *Chrysoperla lucasina* in Tunisia. Green lacewing (*Chrysoperla lucasina*) is well known for its polyphagous predator larvae, which are commonly used in pest's biological control worldwide. In Tunisia, this auxiliary occurs in nature in association with several pests but it has never been mass reared and released in biological control programs. Hence, the chrysopid species *C. lucasina* was chosen for an attempt at rearing to strengthen its natural populations. The study was carried out in the insectarium of the company ControlMed specialized in *Trichogramma* parasitoid production. All equipment used for green lacewing larvae and adult rearing was newly designed for this study. Two diets were given to larvae and adults to assess their biological performances. The first diet was based on pollen for adults and eggs of *Ephestia kuehniella* for larvae. The second diet consisting of a pasty mixture of honey, yeast and eggs of *E. kuehniella,* was supplied to adults and larvae. The laboratory rearing conditions were kept constant with 26 ± 2°C, 65 ± 5% RH and a photoperiod of 16L: 8D. The diets based on pollen and *E. kuehniella* eggs gave the best biological parameters for both adults and larvae. This study which allowed to design a simple technique to rear green lacewing based on affordable material, is a first step for developing a mass rearing of chrysopids in Tunisia. However, further improvements are required for adult and larvae diets to increase reproductive and developmental performance, as well as an economic feasibility study. **[Karouia, W., Hamdi, F., and Boulahia-Kheder, S. (Tunisia), Tunisian Journal of Plant Protection 18 (1): 15-28.**

Plant Protection News in the Arab and Near East Countries

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

Resistance Study of Codling Moth, *Cydia pomonella* L .to Insecticides in Al-Suwayda Governorate

The codling moth, *Cydia pomonella* L. (Lepidoptera: Tortricidae) is the most serious pest of apple orchards worldwide and a significant pest of other pome fruits. The pest is very adaptable to different climatic conditions.

The results in Al-Suwayda Research Center indicated that the insect had two complete generations in 2019. Longevity of the first and second generations was (70, 54) day, respectively, with accumulative temperatures of (725.7, 755.8) degree-day (dd), from the first and second biofix, respectively and has three generations in (2020-2021). Longevity of the first, second and third generations was (75, 39, 39) and (60, 54, 48) day, respectively with their accumulative temperature of (656.2, 546.4, 412.8) and (553.2, 695.2, 578.2) degree-day, from first, second and third biofix, respectively in (2020-2021). The resistance of the codling moth was studied for a group of pesticides between (2018-2021) where it was observed that the third-instar larvae of *C.pomonella* has developed a vigor tolerance to deltamethrin in the fields of Al-Suwayda Governorate.

The resistance rate (RR) was (5, 5.6, 6.79) after (24, 48, 72) hours after treatment with deltamethrin, respectively, while ultra vigor tolerance was observed in the non-diapausing fifth-instar larvae of codling moth (males and females), the resistance rate (RR) was (6.42, 7.75, 9.67) for males and (8.49, 9.84, 10.26) for females after (24, 48, 72) hours, respectively. Diapausing larvae of the codling moth (males and females) developed a clear resistance

to deltamethrin, the resistance rate (RR) was (10.61, 11.23, 11.18) for male larvae and (11.10, 12.14, 13.48) for females after (24, 48, 72) hours, respectively. While it was observed that a vigor tolerance of the adult of codling moth (males and females), the resistance rate (RR) was (2.93, 2.99, 1.78) for males and (3.27, 3, 2.32) for females after (24, 48, 72) hours, respectively.

Third-instar larvae of *Cydia pomonella* has developed a vigor tolerance to chlorpyrifos, the resistance rate (RR) was (3.53, 3.55, 3.55) after (24, 48, 72) hours, respectively.Ultra vigor tolerance was observed in the non-diapausing fifth-instar larvae, the resistance rate was (6.64, 7.7, 7.8) for males and (6.9, 8.16, 7.92) for females after (24, 48, 72) hours, respectively. While Diapaused.larvae of the codling moth (males and females) developed ultra vigor tolerance to chlorpyrifos, the resistance rate was (8.75, 9.52, 9.16) for male larvae and (8.86, 9.35, 8.95) for females after (24, 48, 72) hours, respectively. Third-instar larvae of *C.pomonella* has developed a tolerance to Dimethoate, the resistance rate (RR) was (1.94, 1.82, 2.17) after (24, 48, 72) hours, respectively.

Non diapaused larvae of the codling moth (males and females) developed vigor tolerance to Dimethoate, the resistance rate was (3.49, 3.31, 3.31) for male larvae and (3.25, 3.54, 3.23) for females after (24, 48, 72) hours, respectively. Third-instar larvae of *Cydia pomonella* has developed a vigor tolerance to Acetamiprid, the resistance rate (RR) was (2.63, 3.34, 3.44) after (24, 48, 72) hours, respectively. Non diapaused larvae of the codling moth (males and females) developed vigor tolerance to Acetamiprid, the resistance rate was (5.07, 5.18, 5.23) for male and (6.26, 5.95, 6.90) for females after (24, 48, 72) hours, respectively. The different larval instars showed different degrees of tolerance to some pesticides but did not reach the degree of resistance.

This requires not using tested pesticides intensively on pome trees so that the tolerance does not develop into long-term resistance, and excluding the pesticides that have been proven to be resistant by the pest from Control programs and dependence on newly formulated pesticides because the tested pesticides are traditional pesticides and have been used in pest control programs for long periods.

[Rami Bou Hamdan[1], Head of pesticide division, plant protection department, Al-Suwayda Research Center, Damascus, Syria. Wajeh Kassis[2] Prof. Dep. Plant Protection, Agricultural College, Damascus University, Syria. Mazen Bufaur[1], Al-Suwayda Research Center, General Commission for Scientific Agricultural Research (GCSAR), Damascus, Syria.(Doctorate, 2023)].

The mode of action and effectiveness of *Trichoderma asperellum* as a bio-fungicide on certain fungal diseases

This study aimed to explore the mode of action and evaluation of the effectiveness of (T34 Biocontrol ®), one of the latest promising biofungicides prepared from the fungus *Trichoderma asperellum* strain, T34) against a group of the most important fungal plant pathogens, through laboratory and field experiments under local conditions in Egypt. Laboratory experiments showed that the tested biofungicide had antifungal activity against (26

isolates) of the studied fungi, and it also led to a significant inhibition of their growth, giving an effect similar to the comparative chemical pesticide Pink-S (Hymexazol, 30% SL). Evaluation using the Dual-culture PDA plates technique on agar plates confirmed the antagonistic activity of the biocide based on *Trichoderma asperellum* against 33 fungal isolates, inhibiting their growth and parasitic on most of them.

The isolate of *Rhizoctonia solani* (isolate from strawberry fruits) was the most affected, as the fungus growth was inhibited by 93.75%, while the isolate of *Sclerotinia sclerotiorum* (from the roots of a bean plant) was the least affected. The double culture test on slides showed more than antagonistic behavior of the tested biocide. Contact (adhesion), wrapping, penetration, deformation/decomposition and disappearance of hyphae of phytopathogenic fungi were observed.

The two fungi *Macrophomina phaseolina* and *Rhizoctonia solani* were the most susceptible to parasitism by *Trichoderma asperellum*. On the other hand, the results of separation and identification of secreted chemical compounds from *T. asperellum* in the liquid culture filtrate using gas chromatography with mass spectrometry (GC-MS) indicated that the fungus secreted a number of chemical compounds with multiple desirable properties/activities (all of which were identified).

Field spraying with the biofungicide reduced the incidence of the disease (strawberry fruit rot) before harvest (in the field) and after harvest (during refrigeration), in each of the two study seasons during two consecutive seasons. Similar results were obtained for bananas, where post-harvest treatment reduced the severity of their infection with rot. As for leaf spot of faba bean, the chemical comparison fungicide achieved better efficacy than the tested biofungicide.**[Mohamed Mostafa Khaled Senussi (Egypt), Plant Protection Department, Faculty of Agriculture, Ain Shams University, Egypt, Supervising Committee: Prof. Walaa Mohamed Abdel-Ghany El-Sayed, Prof. Dr. Fawzi Al-Mursi Abu Al-Abbas (Doctorate in Agricultural Sciences, 2023)]**.

The effect of some biological and chemical treatments to control damping-off disease on okra (*Abelmoschus esculentus*)

The study aimed to isolate and diagnose the pathogens causing of rot and seedling disease from seeds and seedlings of okra infected with seed rot and seedling disease, and test their pathogenicity and evaluate the efficiency of some biological and chemical factors in combating them and improving the growth of seedlings in laboratory, pot and field conditions, as well as the mechanism of their effect in inducing plant resistance by estimating enzyme (PAL).

The study was conducted at the University of Baghdad / College of Agricultural Engineering / Jadiriyah for the agricultural season 2021-2022. The isolation results and the morphological and molecular diagnosis based on ITS1 and ITS4 primers confirmed the presence of different genera of pathogens *Alternaria* sp, *Fusarium solani, Alternaria chlamydospora, Alternaria alternata, Chaetomium globosum, Macrophomina phaseolina and Ulocladium* sp.

The results of their pathogenicity on the seeds of two okra cultivars (Hussainawiya and Battra) showed that *F.solani* and *M.phaseolina* had a significant effect in reducing the percentage of germination of okra seeds in laboratory conditions, as it recorded 23.50 and 17.50% respectively, while in pots it was 33.33 and 29.17% respectively compared to the control treatment which was 89.00 and 87.50% respectively. The field experement indicated that soaking okra seeds with Humic acid and amino acids(0.5ml/L) for 12 hours

before planting significantly reduced the percentage of infection of seedlings when planted in soils contaminated with *F.solani* and *M.phaseolina* (5 g / hole). The average percentage of infection in seeds soaked in amino acids and humic acid and planted in soil contaminated with the fungus *F.solani* was 41.6 and 33.33%, respectively, compared to seeds soaked with water only and planted in soil contaminated with the pathogen *F.solani*, which amounted to 70.83 % , while the soaked seeds with Amino acids and Humic acid for 12 hours and planted in soil contaminated with the pathogen *M.phaseolina*, the average percentage of infection with seed rot and damping off was 33.33 and 37.5%, respectively , compared to the average percentage of infection in soil contaminated with the pathogen only 87.5% after 30 days of cultivation.

The activity of PAL enzyme was measured after 37 days of sowing and for three readings separated by seven days and the result showed an increase in the enzyme activity in the treatment of soaking seeds with amino acid with the presence of *F.solani* and *M.phaseolina* which reached 90.14 and 90.26 (µg cinnamic acid /hour/g.fresh weight). Respectively compared to the treatment of the pathogen *F.solani* which recorded 71.49 and for the pathogen *M.phaseolina* 67.31 (µg cinnamic acid /hour/g. fresh weight). Soaking the seeds with amino acids and humic with a pinch after 37 days achieved a reduction in the incidence and severity of root rot and charcoal rot after 90 days of planting, plant height and dry weight. **[Ali Mohammed Hussein (Iraq), Sciences in Agriculture, Plant Protection, Plant Pathology, Supervised by Dr. Neran Salem AlJarah (Mastr, 2023)].**

Induced resistance against damping off and root rot disease causes by using some bilogical and chemical factors

This study was conducted to evaluate the efficacy of some antioxidants agents individually or in combination in reducing *Rhizoctonia* root rot disease in pepper seedlings The results of the laboratory evaluation study showed the efficiency of (Glutathione, *Azospirillum brasilense*, *Trichoderma viride*) In inhibiting the radial growth of pathogenic fungi, Glutathione achieved an inhibition rate of 100% at a concentration of 3000 mg/L, while *A.brasilense* gave an inhibition rate of 78.62% at a concentration of 7 x10 ^{6} (CUF/ml). As for the biological fungus *T. viride*, it gave an antagonism which reached 1.33 according to the approved scale, which is the highest value on the scale after five days of inoculation in PDA medium. Under greenhouse conditions, formation between (Tr + Az + G + Rh15) (Tr + G + Rh15) and (Az + G + Rh15) in lowest incidence and disease severity to 0.00 and 0.00 % at all of them respectively, followed by the rest of the treatments, in compared to the incidence and severity of pathogen only, which reached to 73.33 and 68.33 % respectively, as well as causing a significant increase in the fresh and dry weight of the plant over the rest of the other treatments, as the factors proved Its efficiency in inducing systemic resistance by increasing the activity of the enzyme (PPO) polyphenol oxidase after 6 and 12 days of adding the pathogen compared to the control treatment (without pathogen). Treatment (G +Tr +Rh15) had the highest percentage of the enzyme content, it reached 82.12, 67.07, 78.12 and 65.33, the rate of change in light absorption/min/gm fresh weight of the leaves of the plant, respectively, followed by the rest of the other treatments. As for the protein content, the treatment (Az + Rh15) achieved the highest protein content of 11.553%, while the average protein content of the control treatment (without pathogen) reached to 9.433% followed by the rest of the other treatments. **[Aalaa Khudair Hassan[1] and Alaa Raad Musa Al-Rubaie[2] (Iraq), College of Agricultural Engineering Sciences[1], University of Baghdad-Iraq. Agricultural Research, Iraqi Ministry of Agriculture[2]. (Master, 2023)].**

Evaluation of the efficiency of some chemicals and seaweed extract to protect the Lemon and Mandarin Fruits from infection with green mold Caused by *Penicillum digitatum* at postharvest

The study was conducted in the College of the Agricultural Engineering Sciences/University of Baghdad for the season2021-2022. The study aimed to evaluate the efficiency of sodium bicarbonate(sb), Phylex(PH), Seaweed extract(sw), Jasmonic acid and Calcium chloride to control green mold disease in lemon(*Citrus limon*) and mandarin(*Citrus reticulata*) fruits under refrigerated storage conditions(4 ˚C), as well as studying their effects to induce resistance in lemon and mandarin fruits peels by estimating the activity of peroxidase(POX) and phenylalanine ammonialyase(PAL). Two isolates from lemon and mandarin fruits (L1, L2 and K1, K2) of *P.digitatum*, were obtained in the PDA. The results confirmed the high pathogenicity of the four isolates, on lemon and mandarin fruits. Molecular diagnosis by using PCR and ITS1 and ITS4 primers confirmed that L2 and K1, are *P. digitatum* and were registered in the Gen Bank with accession numbers OP060141 and OP060142 respectively.

100% of *P.digitatum* growth rate inhibition in PDA was recorded when sb, PH and sw were used at the concentration 64g/L, 4ml/L, and 128g/L, respectively, in 25±2◦C. The results of the Refrigerate storage condition for lemon fruits showed that the treatment of wounding fruits + immersing them for an hour in PH + inoculating with one drop of L2 (10^3spores/ml) and the treatment of wounding the fruits + immersing them for an hour in sb + inoculating with a drop of L2 spores suspension was effective in keeping lemon fruits from infection with *P.digitatum* for 30 and 15 days respectively compared with the control (wounding the fruits+L2), in which the infection rate was 16.65%.

The same two treatments achieved the highest POX and PAL activity rate, indicating their effectiveness to induce resistance against *P.digitatum* during storage (4◦C). In mandarin fruits, the treatment of wounding mandarin peels+ immersing them into PH for an hour+ inoculation with a drop of K1 (10^3spores /ml) achieved the best treatments in preserving the fruits, as no infection was recorded after 60 days of refrigerated storage compared to the control {wounding mandarin peels+ *P.digitatum (*K1*)*} , in which the infection rate was 32.26%. The same treatment achieved the highest rate of POX and PAL activity, which indicates the effectiveness of PH to induce resistance in mandarin fruit peels towards the *P. digitatum* during refrigerated storage (4◦C). **[Roqia Riad Abdul Karim (Iraq), Supervised by Dr. Neran Salem Aljarah (Master, 2023)].**

Isolation, identification and pathogenicity of the Entomopathogenic Nematodes *Oscheius* spp. in Duhok Province, Kurdistan Region-Iraq

A survey for naturally occurring of entomopathogenic nematodes was conducted in various agricultural fields in four districts included: Amedi, Duhok, Semel, Zakho in Duhok province, Kurdistan region- Iraq, in 2021-2022. From the four districts, a total of 102 soil samples were collected around the roots of different vegetation plants including fruit orchards, field crops, forest trees, grasses and vegetables.

The soils of the four districts were found to be positive of EPNs regardless of their vegetation cover, soil pH and soil texture. Twenty-eight (28) pathogenic isolates of EPNs were recovered from the soil samples. The maximum number of EPNs isolates was recovered from Amedi district soil samples as 87.5%, followed by 85.7, 72.22 and 60% positive soil for Duhok, Semel and Zakho, respectively. Based on microscopic observation, isolates display the morphological characteristics found in the genus *Oscheius*. The amplification

of ITS-rDNA region produced a uniform fragment size of 537-752 bp. using blast search, the sequences exhibited high sequence homology to the entomopathogenic nematode *Oscheius sp.*, *Oscheius onirici* and *Oscheius tipulae*.

The present study reports two of EPNs that recorded for the first time in Iraq, namely *Oscheius onirici* and *Oscheius tipulae***.** The observations revealed that both local species were able to invade and propagate within the host *G. mellonella* and produce infective juveniles.

The highest number of IJ3s was recorded at the concentration 100 IJ3s which reached to 4042.5 with no significant difference compared to the IJ3s number harvested at concentrations 50 and 400 IJ3s as 3911.1 and 3934.7, respectively. The highest number of *O. tipulae* was recorded at the concentration 200 IJ3s as 4800.9 IJ3s which significantly differed from those recorded at 50, 100 and 400 IJ3s/ larvae. In the present study, the larvae of *G. mellonella* were found to be susceptible to all tested local isolates of *O. onirici* and *O. tipulae* but their degree of susceptible varied.

The results of nematode pathogenicity showed significant differences among the concentrations (50, 100, 200 and 400 IJ/larva) used and also exposure period (1, 2, 3 and 4 days after treatment). **[Kayfi Sidqi Taher (Iraq- Kurdistan), Plant protection Department, College of Agricultural Engineering Sciences, University of Duhok, Supervised by Prof. Dr. Feyroz Ramadan Hassan (Master, 2023)].** feyroz.hassan@uod.ac

Effect of *Ganoderma lucidium*, Algae Extract and Susceptible Varieties in Resistance to *Watermelon Mosaic Virus* (WMV)

The study aimed to diagnose *Watermelon mosaic virus (WMV)* by two methods, serological and biological, from the local isolate on the crop *Citrullus lanatus*, and biologically resist it with a number of organic nutritional supplements derived from the stages of metabolism of the medicinal food mushroom *Ganodurma lucidum* (mycelium and fruiting body) and seaweed preparations.

The field study was conducted in the fields of the College of Agriculture. Tikrit University. Salah al-Din Governorate. The virus was diagnosed based on the symptoms it causes on asparagus plants in the field, and those it causes on scaffolding plants, which included *Citrullus lanatus*, *Cucumis melo, Cucumis sativus, Cucumis melo flexuosus*, and *Cucumis pepo*, all of which responded to artificial inoculation with the viral extract and showed symptoms.

Typical symptoms appeared on plants infected with WMV virus and included mosaic symptoms, bunching of veins, deformation of leaves, and plant stunting. The results of the diagnostic test with immunostaining strips for the WMV virus showed a positive interaction with the flash kit that contains the anti-WMV virus serum, as the sedimentation line appeared clearly, which indicates the presence of the WMV virus in the foliar plants that were grown for the purpose of maintaining the isolation of the virus and in the plants that detect it as well. As well as field experiment plants. In the study of vi-

rus control, the results of the study showed that the treatment of the mixture with the preparation of the mycelium stage and the fruiting body of the lucidium G. mushroom in reducing the infection with the virus and for all characteristics compared to the two stages of the fungus separately.

The biological treatments stimulated resistance against the virus through a decrease in the infection rate and severity and an increase in the production Polyphenol oxidase enzyme and reduced the loss in some growth characteristics, including the amount of chlorophyll, increase in leaf area, plant length, vegetative and root dry weight, and yield weight. Compared to plants infected with WMV virus, the sensitivity of some cultivars used in the experiment are Charleston Gray, Casper, and Top yield. **[Maadh Abdul Wahab Al-Fahad and Yasamine Bassem Sultan (Iraq), Plant Protection, Faculty of Agriculture, Tikrit University- Iraq (Master, 2023)].** maadh.alfahd@tu.edu.iq

Incidence and identification of Fusarium Chickpea Wilt and its management under Rain-Fed Conditions

Survey results of 55 major chickpea cultivation cities in Sulaymaniyah and Halabja governorates revealed the prevalence of chickpea wilt disease in 91% of the fields, with an average incidence and severity o of 16.04 and 11.13%, respectively, during April and May, 2021.

The highest disease incidence and severity (100%) was recorded in Gameshtapa, Khurmal district at the end of April, followed by Tabrezina with 78.47% incidence and 55.29% severity. Thirty seven *F. oxysporum f. sp. ciceris* (Foc) isolates were isolated from the infected fields of which 14 proved to be pathogenic.

The isolates showed variation in cultural traits, growth aspects, pigmentation, sporulation, dimensions of microconidia, macroconidia, chlamydospores, and other factors related to the taxonomic features of the pathogen. The isolates grow a variety of pigmentation, and different mycelium margins types, including entire, wavy entire, wavy and irregular. Five different mycelium morphologies were found in the isolates, and three chlamydospores formation, Intercalary (61%), Terminal (38%), and Chain formation only in Foc-20.

The microconidia shapes varied from oval (57%) to elongated (43%), while the macroconidia shape ranged from straight (43%) to round. Significant differences were detected

between the isolates in the dimensions of microcondia, macrocondia and chlamydial spores. Foc-4 showed the highest microcondia dimensions (20.09*4.02µm) and Foc-30 showed the highest macroconidia dimensions (8.69* 4.94µm), While the rate of chlamydiospores ranged from 49.1µm in Foc-14 to 160.37µm in Foc-1. Foc isolates respond variously to temperature, light and culture media types.

Temperatures below 25°C decreased the colony growth, while 25-30°C significantly increased the growth. The mean growth of Foc under light conditions were higher than dark conditions. Phenotyping of fourteen Foc isolates on chickpea differential classified them into two groups and ten physiological races. Race 1 characterized by its high aggressiveness and virulence against all the differentials and represented by the isolates Foc-20, Foc-23, Foc-24, and Foc-32. Races 2, 3, 4, and 5 were virulent on one genotype, and represented by Foc-4, Foc-5 and Foc-14, Foc-17, and Foc-100, respectively. Races 6, 7, 8, and 9 were a virulent on two genotypes represented by Foc-16, Foc-18, Foc-28, and Foc-30.

The tenth race was a virulent on three genotypes and represented by Foc-29. *T. harzianum* showed high antagonistic activity against pathogenic Foc isolates which was reflected on their impact on chickpea plants growth in both lab and plastic house. The highest antagonistic effect of *T. harzianum* appeared after 96 hr. on Foc-32 compared to the untreated control. While *Pseudomonus sp.* and *B. subtilis* significantly inhibited Foc growth by 60.7% and 57.3%, respectively. Application of *T. harzianum* significantly reduced wilt severity by 74% compared to control, followed by *P. fluorescens* by 58%. Basten 500sc highly reduced disease severity by 87.2% compared to the control, however, *T. harzianum* significantly decreased disease severity by 74%, and *P. fluorescens* by 58%. The combination of *T. harzianum* and *P. fluorescens* proved to be the most effective in reducing disease severity of the highly susceptible genotype Flip09-424c by 81.38% compared to the control. The internal transcribed spacer (ITS) primers amplified the genomic DNA of each Foc isolate to a size of about 400 bp, yielding a single band per accession. BLAST analysis of the ITS rDNA sequence data supported the morphological identification, whereby the closest match 99–100% similarity with *F. oxysporum* in the NCBI Gene bank database.

The accession numbers have been registered in the NCBI Gene registry under the codes OP824784, OP824785, OP824786, OP824787, OP824788, OP824789, OP824790, and OP824791. The phylogenetic tree proposed two major clades with strains distributed across the dendrogram irrespective of their geographic status.

These sequences showed poor resolution and low bootstrap values. Clade I was heterogenous and include Foc-27, Foc-20, KU671029.1 and KP992931.1, clade II contained other Foc isolates with the Indian Foc isolate KM253762.**[Kazhal Hassan Gharib (IRAQ), supervised by Prof. Dr. Emad Mahmood Al-Maaroof, College of Agricultural Engineering Science, University of Sulaimani. (MSc, 2023)**

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

Plant Protection Division meets UAE Ministry of Climate Change and Environment

9-13 July 2023, Abu Dhabi

The Food and Agriculture Organization of the United Nations' Regional Plant Protection Officer met with His Excellency Eng. Mohammed Alameeri, Assistant Undersecretary for the Food Diversity Sector, United Arab Emirates Ministry of Climate Change and Environment. The discussion focused on the regional project's strategic plan and roadmap for future cooperation with the FAO regional office. They agreed to hold a training in August and establish model fields in all Emirates in collaboration with the UAE Ministry of Climate Change and Environment and the Abu Dhabi Agriculture and Food Safety Authority under the supervision of the FAO.

FAO meets with ICBA over RPW Research

9-13 July 2023, Abu Dhabi

The Food and Agriculture Organization of the United Nations' Regional Plant Protection Officer met with the International Center for Biosaline Agriculture (ICBA)to follow up on the project activities entrusted to ICBA for sensing early RPW infestations remotely using drones and satellites.

The First International Symposium on Plant Propagation in Italy

05 July 2023, Bari

The Food and Agriculture Organization of the United Nations (FAO) Regional Plant Protection Officer in the office for Near East and North Africa region (NENA) participated in the First International Symposium on Plant Propagation, Nursery Organization and Management for the Production of Certified Fruit Trees. During the two-day symposium, Thaer Yaseen, Regional Plant Protection Officer at FAO office in NENA, presented and discussed the status of certified plant propagative materials in NENA, adequate policies to mitigate the Transboundary Plant Pests and Diseases (TPPDs) risks, and the challenges to sustainably set up and

manage certification systems due to a lack of funds, inadequate infrastructure, and insufficiently trained personnel. Yaseen stressed that NENA countries must upgrade their technical capacities and harmonize certification protocols

Global Forum on Biological Control in Kenya

02 July 2023, Nairobi

The Food and Agriculture Organization of the United Nations (FAO) and the International Centre of Insect Physiology and Ecology (ICIPE) held a global forum on Biological Control and a training workshop on Biological Control in Nairobi, Kenya. The forum shared research results on biological control as a primary tool in FAW management and discussed the progress, challenges, and ways to scale-up biocontrol in each target region, particularly in NENA and Asia.

High-Level Meeting on the Management of Transboundary Plant Pests and Diseases in the Near East and North Africa

22 June 2023, Italy

The Food and Agriculture Organization of the United Nations (FAO) and the Mediterranean Agronomic Institute of Bari (CIHEAM Bari), co-organized a three-day high-level meeting in Bari, Italy, to address the management strategy of transboundary plant pests and diseases (TPPDs) in the Near East and North Africa region (NENA).

High-level officials and specialists discussed the limitations and weaknesses of plant protection systems in NENA countries, as well as the main pillars of the regional strategy for the sustainable management of transboundary plant pests and diseases in the NENA region. “The Near East and North Africa region faces many threats from transboundary plant pests and diseases, which causes severe losses to agricultural production that may reach 25 to 40 per cent of the total global production, thus increasing the economic risks in the Near East and North Africa region,” said Abdulhakim Elwaer, Assistant Director-General and Regional Representative of the Food and Agriculture Organization of the United Nations for the Near East and North Africa. Elwaer called on the countries of the region and plant protection experts to support the establishment of a regional programme to manage transboundary plant pests and diseases in NENA, calling for the adaptation of correct policies, legislation and sustainable investments as an initial step to prevent the entry of invasive pests and diseases into the agricultural sector.

The conference aims to address critical regional issues related to plant health in the NENA region while discussing the way forward and guiding further cooperation and partnerships, as well as resource mobilization and outlining the modalities for establishing a regional trust fund to manage TPPDs. The Italian region of Puglia participated in the meetings and shared its experience in managing and controlling transient pests, particularly Xylella bacteria, which will be reviewed during a field visit to the laboratory for the propagation and maintenance of raw materials.

Thaer Yaseen, the Regional Plant Protection Officer at FAO Office in NENA, highlighted the numerous challenges that countries in the region face when managing transboundary pests and diseases, such as weak Plant Protection systems and national phytosanitary regulations, inadequate policies and legislation, and lack of surveillance and monitoring systems."The proposed Transboundary Pests and Diseases strategy would allocate 52 per cent of the budget to capacity building, 28 per cent to environmental, economic, and social impacts, and 20 per cent to cooperation and knowledge; estimated at USD 24.8 Million, USD 13.5 Million, and USD 9.4 Million respectively," added Yaseen.

Representatives of NENA Agriculture Ministers endorse "Bari Declaration" for plant protection in Italy

FAO, CIHEAM Bari High-Level Meeting calls for a five-year action plan to manage Transboundary Plant Pests and Diseases in the region

23 June 2023, Italy

Representative of Agriculture Ministers and officials in the Near East and North Africa region (NENA) endorsed the "Bari Declaration" for plant protection during a high-level meeting on Transboundary Plant Pests and Diseases (TPPDs) in the Near East and North Africa region (NENA), co-organized in Bari, Italy, by the Food and Agriculture Organization of the United Nations (FAO) and the International Center for Advanced Agricultural Studies for the Mediterranean in Bari (CIHEAM Bari).

The "Bari Declaration" called for necessary measures to activate the strategy by defining and adopting a five-year action plan by the members, with the need to designate focal points to coordinate and facilitate cooperation between member states and the council and to communicate with donors to allocate the necessary resources to implement the regional strategy. Over the course of three days, the participants addressed the limitations and weaknesses of plant protection systems in NENA countries, in addition to the main pillars of the regional strategy for the sustainable management of transboundary plant pests and diseases in NENA.

The "Bari Declaration" comes in recognition of the strategic importance of managing transboundary pests considering the threat to food security in the region if they were to enter and spread, as these pests have caused extensive damage to the region over decades. The Declaration signatories expressed their concerns about the escalating rate of hunger and severe food insecurity in the region, as well as the major challenges re-

sulting from the spread of transboundary pests, and the financial and economic crises, which represent challenges for some countries in the region due to the large outbreak of these pests, in addition to various factors, including climate change, water scarcity, land degradation, and biodiversity loss. “The Near East and North Africa region face many threats from transboundary plant pests and diseases, which causes severe losses to agricultural production that may reach 25 to 40 per cent of the total global production, thus increasing the economic risks in the Near East and North Africa region,” said Abdulhakim Elwaer, Assistant Director-General and Regional Representative of the Food and Agriculture Organization of the United Nations for the Near East and North Africa. “The proposed TPPDs strategy would allocate 52 per cent of the budget to capacity building, 28 per cent to environmental, economic, and social impacts, and 20 per cent to cooperation and knowledge; estimated at USD 24.8 Million, USD 13.5 Million, and USD 9.4 Million respectively,” explained Thaer Yaseen, the Regional Plant Protection Officer at FAO Office in NENA. The Ministerial Declaration commended FAO and CIHEAM Bari efforts and thanked the participation of international organizations, such as the Near East Plant Protection Organization (NEPPO), the International Plant Protection Convention (IPPC), and ICARDA.

This declaration emphasizes the urgent need to fundamentally alter the agriculture and food systems in the region to become more efficient, inclusive, and resilient by developing strategies for the sustainable management of transboundary pests, taking action to address climate change, and leveraging science and innovation to boost agricultural productivity and ensure sustainability.

The signatory countries agreed to initiate and facilitate deposit procedures and approve the allocated resources from member states to the designated depository in FAO following the official launch of the strategy.

FFS experience at FAO Global Farmer Field Schools Forum on sustainable agri-food systems in Malawi

14 June 2023, Malawi

The Food and Agriculture Organization of the United Nations (FAO) organized a Global Forum on the future of Farmer Field Schools (FFS) for sustainable agri-food systems on June 14, 15 and 16 in Malawi.

The forum gathered 120 participants worldwide representing farmers, governments, international organizations, the private sector, producer organizations and civil society, all working towards more sustainable agri-food systems through FFS. The event aims to brainstorm on the future of FFS, more than 30 years after the conception of the approach. The discussions focused on innovations, strategies for the future, priority areas and implementation mechanisms.

In recent years, Malawi has been the birthplace of several key innovations, including a

country-wide digital real-time monitoring, evaluation and learning system for FFS. Owing to exciting experiences with FFS in Malawi, it was selected as the meeting point for the Global FFS Forum.

“FFS enables farmers to collaborate in their work, planting, and marketing their produce, as one company, despite land fragmentation. We need to devise a model post-FFS in the Near East and North Africa region that can be adapted to the best modality suitable for each country, such as forming an association for farmers to promote the continuity of their partnership,” explained Thaer Yaseen, Regional Plant Protection Officer at FAO Regional Office in NENA, during his participation in the forum.

Yaseen emphasized the necessity to develop a certification scheme for FFS in the NENA region and suggested establishing an FFS academy, similar to the ones established by some African universities. FFS have been implemented in the NENA region for the past 12 years and in recent years, FFS has been growingly used and developed as an effective tool based on farmers sharing their experiences with each other rather than the traditional extension tool. At the core of FFS is hands-on group learning. Building on farmers’ skills and knowledge, FFS participants tested new ideas and enhanced their capacity to analyze and solve local agricultural challenges critically.

Today, many development partners, major international and local NGOs, national farmer organizations, and community-based organisations rely on FFS as an entry point for community and rural development. In 2018, FAO established the Global FFS Platform https://www.fao.org/farmer-field-schools/home/en/

The Platform is based in the Plant Production and Protection Division (NSP) of FAO, bringing together over 20 partner organizations and 1 900 practitioners from 138 countries to support exchange of experiences across countries and partners, and to develop tools collaboratively to support innovation in the use of FFS in the field. Significant challenges affecting agricultural and food systems today, and the growth in the use of FFS by hundreds of diverse organizations call for a review of the scale and quality of FFS globally. Sweeping global trends, including climate change and biodiversity loss, changing demographics, ICTs, and opportunities with sustainable value chains and technologies, create a rapidly changing context for smallholder farmers.

This comes with increasing recognition that farmers, their practices and their capacity to transform rural areas are central to creating sustainable agri-food systems.

To expand the potential of FFS to support transitions to sustainable agri-food systems, the forum focused on defining critical actions to scale FFS capacities while maintaining quality, strengthening networks and coordination, harnessing innovative tools and approaches, and building multi-stakeholder engagement for resource mobilization and finance to meet increased demand for FFS. The main conclusions and findings of the forum will be shared through the Global FFS Platform discussion group.

Join now the Global FFS Community of Practice at https://dgroups.org/fao/fieldschools to stay tuned!

Highlights

FFS is a non-formal education approach that has been facilitating the empowerment of farmers in over 100 countries for more than 30 years. Recent estimates indicate that between 400 000 and 1 million farmers are trained through FFS worldwide every year.

Training for Farmer Field School facilitators to manage Fall Armyworm in Egypt

14 June 2023, Asyut

The Food and Agriculture Organization of the United Nations (FAO) held a four-day training programme for the Farmers Field Schools (FFS) facilitators in cooperation with the Agricultural Extension Sector at the Ministry of Agriculture and Land Reclamation (MoLAR) in Asyut Governorate, Egypt. A total of 20 facilitators representing nine governorates from Upper Egypt benefited from the training programme that aimed to contribute to the implementation of ten FFSs, especially on maize crops to control FAW.

FFS Future forum confirms its importance to bring about comprehensive and sustainable rural and developmental transformation

04 June 2023, Minya

Experts from the Regional Office for the Near East and North Africa of the Food and Agriculture Organization of the United Nations (FAO) and government officials from 12 Arab countries concluded the activities of the first regional forum on the future of Farmer Field Schools for sustainable agricultural and food systems, which was held for two days in Minya, Egypt.

The first day of the forum witnessed a field visit to two FFS schools in one of the villages of west Samalut, Minya, where meetings were held with local FFS farmers, listening to their experiences, and learning about the many success stories achieved by the FAO Field Schools project in Egypt. In the speech of Mr. Abdelhakim El-Waer, Assistant Director-General of the Food and Agriculture Organization and Regional Representative for the Near East and North Africa, which was delivered on his behalf by Mr. Nasr El-Din Haj El-Amin, FAO Representative in Egypt, he said that farmers are at the center of any transformation process and therefore they must be provided with the knowledge and capabilities that allow them to play an effective role and improve their participation in decision-making to accelerate the transformation of agricultural and food systems in the region.

Therefore, FFS is a great tool in rural development to empower farmers as stakeholders rather than beneficiaries in a sustainable, participatory and experiential way. These schools have improved the skills of more than 4 million farmers, pastoralists and fishers in the world.

He added that between 2015 and 2022, there were about 52 projects out of a total of 192 projects implemented in 13 countries in the region, which included the implementation of Farmer Field Schools to focus on key priorities such as enhancing crop production and protection, integrated management of transboundary pests, poultry, and livestock.

water and irrigation management, and the empowerment of rural women, so the forum provided an opportunity to understand the role of Farmer Field Schools and their contributions to the adoption of sustainable agricultural and food systems. Challenges and priorities in implementing and scaling them strategically and moving forward. For his part, Jingyuan Xia, Director of Plant Production and Protection Division at FAO Headquarters, said: "We are facing great challenges with regard to food and agriculture, as by 2050 the population will double, and this increase must be kept up by increasing agricultural production by 50%, and 80% of this increase is from plant sources, which makes Farmer Field Schools a necessary tool for transforming agricultural food systems to be more comprehensive, flexible and sustainable". "The world needs to apply technology and innovation in the agricultural field to increase production in a shorter time and with fewer resources.

For the ability of technology to provide better and safer nutrition while maximizing benefit and reducing losses and waste of food and agricultural crops, as well as reducing chemical inputs.

Pointing out that the recommendations and discussions that came out of this regional forum will be put forward and used in the Global Forum for the Future of Farmer Field Schools, which will be held in Malawi on June 14-16" he added. In a session titled "Overview of FFS", Anne-Sophie Poisot, Director of the Global Farmer Field School Platform, Division of Agricultural Production and Plant Protection, FAO, Mai Hani, Senior Program Officer, Regional Office for the Near East and North Africa, FAO, and Mohamed Yacoub , Assistant Representative of the Food and Agriculture Organization of Egypt, gave presentations on the status of Farmer Field Schools at the global, regional and local levels, the challenges they face and future prospects for these schools.

Experts in Farmer Field Schools in Egypt, Jordan, Syria, Lebanon, Iraq, Morocco, Saudi Arabia, Yemen, and Algeria presented field school experiences in each country, including the approach used, challenges, needs, factors of distinction, opportunities, future expectations, and the achievement of sustainability and development factors, in addition to the perceived impact of its performance in the rural community. "The success of organizing the first regional forum on the future of farmer field schools is a quantum leap in terms of advancing these schools and their members intellectually, cognitively, skillfully and technologically, which is a major step for using this tool. In a more effective way to bring about a sustainable transformation in agricultural practices and applications at the level of the Near East and North Africa region, which directly contributes to improving the food and agricultural systems in the region and thus overcoming current and future challenges in terms of achieving food security and eliminating hunger and poverty".

Thaer Yassin, coordinator of the forum and the regional officer for plant protection in the regional office of the organization, explained.

In a session entitled "Selected Thematic Areas on FFS", Thaer Yassin, Forum Coordinator and Regional Officer for Plant Protection, FAO, Domitille Vallee, Chief Technical Expert in FAO Regional Office, and Danny Lisha El Khoury, Project Manager for FAO in Lebanon, By highlighting the role of Farmer Field Schools in the issues of plant production and plant protection, water scarcity, and agricultural business management, besides presenting successful models of what these schools can achieve in these issues.

Faten Adada, Agriculture and Rural Development Expert, Regional Office, Mahmoud Abdel Nabi, Farmer Field Schools Expert and International Advisor to the Food and Agriculture Organization, Emad Nahhal, Farmer Field Schools Expert, and Valentina Franchi, Gender Specialist, FAO Regional Office, also managed group discussions on moving forward on issues of capacity development, exchange of knowledge and communication, technologies and innovation, coordination, as well as, enabling environment, gender and integration.

The discussions concluded with the need to work on applying technology and innovation, whether at the level of communication, agricultural mechanization, or precision farming technology on a larger scale, while conducting the necessary training and educating farmers on the importance of technology in achieving better production with fewer resources, cost, and time.

It also concluded the necessity of increasing efforts aimed at raising the capacities of facilitators, master trainers, male and female farmers, and providing the necessary mechanisms for the effective exchange of knowledge and experiences, with a proposal to organize a forum periodically to exchange experiences, knowledge, experiences, and success stories. It was called for the necessity of coordination and cooperation with international organizations, funds and platforms regarding promoting the work of Farmer Field Schools.

In addition to encouraging the participation and empowerment of women in agricultural and food business and providing the capabilities and resources necessary for their effective involvement through Farmer Field Schools.

Noteworthy that FFS is being implemented in more than 90 countries with approximately 0.4-1 million farmers graduating annually as a good tool to engage farmers in validating and adapting agrifood systems to better meet their needs.

Several reports have documented how FFS improves farmers' skills and knowledge to create more sustainable production systems and contribute to achieving all the Sustainable Development Goals.

It is also indicated that the forum provided an opportunity to better understand the role of Farmer Field Schools and their future contributions to sustainable agricultural and food systems through exchanging experiences and innovations between NENA countries, providing technical guidance to enhance the capabilities of Farmer Field Schools, and identifying challenges and priorities in their implementation with the aim of adopting transformation and comprehensive and sustainable agrifood systems. Furthermore, strengthening communication among members of the global FFS community, and strategically expanding its reach in the region.

Workshop on the management of the destructive banana Fusarium wilt in Lebanon

Sidon, 24 May 2023

The Food and Agriculture Organization of the United Nations (FAO) held a training of trainers' workshop in Lebanon on surveillance, containment and management of the Tropical Race 4 of Fusarium wilt (Foc TR4), which is one of the most destructive diseases for banana crops. The city of Sidon hosted the workshop, which included a field visit and practical training on sampling. The training comes within the framework of the project "Enhancing Capacity to Contain and Manage Fusarium Wilt (Foc TR4) on Bananas in Lebanon". FAO and scientists from the University of Stellenbosch in South Africa prepared a training manual for the field and laboratory diagnosis of this devastating disease, which threatens the banana crop and can cause huge economic losses in the affected countries. Stellenbosch University in South Africa is regarded as one of the best research universities in Africa. The Agriscience Faculty is rated as one of the top 100 agriculture faculties in the world. Foc TR4, a soilborne disease, is considered dangerous since it can affect a wide range of banana races, including "Cavendish" banana, the most important traded variety globally. After infection with Foc TR4, banana plants may not show any signs of infection and can remain intact for up to a year. Symptoms of leaf yellowing and wilting of the leaves then appear. By the time signs appear, the disease has already spread in the soil and moved from one place to another through shoes, plants, agricultural machinery, and animals. Considered the world's most traded fruit, bananas are a major strategic crop in Lebanon, and the absence of appropriate phytosanitary measures and good management can lead to huge losses in banana production and trade, affecting farmers' livelihoods and food security in Lebanon and the region.

What is banana Fusarium wilt TR4?

Part of *Fusarium oxysporum* f.sp. *cubense* , the disease, which poses a great threat to banana cultivation in the Near East and North Africa region, is caused by a new variant of the fungus that had decimated banana plantations in the early 20th century, ultimately causing more than USD 2 billion worldwide in damages and leading to the replacement of the "Gros Michel" banana type with the "Cavendish" variety, which proved resistant to the earlier strain of the fungus but has now succumbed to the new race Foc TR4. The fungus can easily spread and remains viable in the soil for decades, which is why phytosanitary standards established by the International Plant Protection Convention (IPPC) are essential as the best approach in preventing the fungus from reaching a new country or region.

Training workshop on managing date palm bunch fruit in Iraq

Basra, 21 May 2023

The Food and Agriculture Organization of the United Nations held a four-day training workshop on Good Practices in Managing Fruit Bunch of Date Palm and Introduction to Integrated Pest Management (IPM) and Farmers Field Schools (FFS) within the framework of the project: "*Restoration and Strengthening the Resilience of Agri-Food Systems in Southern Iraq- GCP/IRQ/004/EC"* in the city of Basra, Iraq. Twenty-Five Trainees, including seven women from the regional directorates of Agriculture from the Governorates of Basra, Missan and Thi-qar are attending the workshop.

Workshop on citrus diseases and methods of diagnosis and prevention in Oman

Muscat, May 17, 2023

The Office of the Food and Agriculture Organization of the United Nations (FAO) in the Sultanate of Oman, with the General Directorate of Agricultural and Animal Research represented by the Agricultural Research Department in North Al Batinah Governorate, organized a workshop on "The main Citrus Diseases and Diagnosis and Prevention Methods" in cooperation with CIHEAM Bari Institute, Italy within the framework of the" *Development, Production and Multiplication of Certified Citrus Propagation Materials*" project with the participation of researchers and specialists in plant protection and agricultural quarantine.

Italy, FAO, WHO sign agreement to control water hyacinth pest in Hama Governorate

Damascus, 15 May 2023

The Food and Agriculture Organization of the United Nations (FAO), Italy and the World Food Programme (WFP) signed a EUR one million agreement, funded by Italy, to implement a project that aims at restoring access to water for farmers through strengthening the capacity of the targeted local communities in water hyacinth control and management in Al- Ghab, Hama Governorate.

Plant production division in Yemen holds several activities, distributes seeds and neem oil

Yemen, May 2023

The Plant Production division (NSP) in Yemen held a Framers Field Schools master training for 170 participants from different parts of Yemen. NSP in Yemen also organized a Training of Trainers (Tot) in home gardening for 50 participants from the extension department in the south and north governorates. In addition to these trainings, the following were distributed:

- 10,500 cans of tomato seeds for 10,500 BNFs were distributed. The estimated covered area is about 23,389 Ha, and the estimated production is 47,778 MT.
- 2.25 MT of vegetable seeds (hot Pepper, Okra, Onion, and Cowpea) and farming tools for 1,000 BNFs. The estimated covered area is about 434.2 Ha, and the estimated production is 2508 MT.
- 4.75 MT Mallow seeds for 9,500 BNFs. The estimated covered area is about 396 Ha, and the estimated production is 2,772 TM for 23,100 HHs/year.
- 2,500 litres of neem oil for 5,000 BNFs.

Training the Farmer Field School facilitators on the management of date palm pests in Kuwait

Kuwait, 08 May 2023

Within the framework of the regional programme for Red Palm Weevil (RPW) management in the Near East and North Africa region, the Food and Agriculture Organization of the United Nations (FAO), in cooperation with the Public Authority of Agriculture Affairs and Fish Resources in Kuwait, held a training programme for Farmer Field Schools (FFS) facilitators on managing date palm pests, focusing on the Red Palm Weevil (RPW) in Kuwait, from 8 to 11 of May. The training was attended by FAO regional experts and trainers, as well as more than 30 participants working in the date palm sector in Kuwait.

The programme was held for the first time in Kuwait and aimed to enhance the capacities of agricultural extensionists to establish and implement farmer field schools and improve farmers' skills and capabilities in controlling RPW and other date palm pests.

"The training programme in Kuwait is of great importance as it focuses on training FFS facilitators and the specifications for establishing and preparing successful FFS topics as well as how to prepare the agricultural crop calendar and the agro-ecosystem analysis. The training also discusses the wrong practices in the integrated management of RPW

and other palm pests stressed Thaer Yaseen, Plant Protection Officer at the Regional Office of the Food and Agriculture Organization of the United Nations for the Near East and North Africa region (NENA). “Recent studies on assessing RPW’s social and economic impact in the NENA region showed that the annual cost of RPW treatment programs is about $5.7 million in Egypt and about $34.4 million in Saudi Arabia. Moreover, the annual value of lost palm trees and their lost revenues costs around USD 213 million in Egypt and around USD 401 million in Saudi Arabia,” added Yaseen.

“The issue of the RPW pest occupies an advanced position among the priorities of the State of Kuwait due to the importance of preserving and protecting palm trees as a national wealth and improving its productivity,” stated Amal AbdulKareem on behalf of Nasser Taqi, Deputy Director General for Plant Wealth Affairs at the Public Authority for Agriculture Affairs and Fish Resources in Kuwait.

She pointed out that the current situation of RPW infection and the measures taken to limit its spread indicates a positive dimension of dealing with it. RPW is a serious pest that attacks around 40 species of palms in more than 50 countries, causing widespread damage to palm trees and other crops and affecting production, farmers’ livelihoods, and the environment.

The Regional Programme for RPW management in the NENA region aims to address the gaps in managing RPW in three main areas: scientific research, technology transfer, and capacity building. The programme also developed five working groups in the areas of RPW monitoring and early detection, activating the participation of farmers, developing RPW control protocols and techniques, studying RPW social and economic impact, and developing phytosanitary systems and border protocols, as well as producing certified palm propagation materials for RPW sustainable management.

https://www.fao.org/neareast/news/view/en/c/1638976/

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

Desert Locust Situation

Warning level: Calm

General situation during June 2023 Forecast until mid-August 2023 Provided by the FAO Desert Locust Information Service (DLIS).
General Situation

Calm situation

The Desert Locust situation was mainly calm during June. Control operations continued in Saudi Arabia, where late instar hoppers, groups, and bands became groups of immature adults in the interior and parts of the Red Sea coastal area. In Yemen, scattered adults were seen in the interior as well as in parts of the highland and northern Red Sea coastal areas. Hoppers and solitarious adults were on the Red Sea coast of Eritrea, while control operations occurred in a few places on the southeast Red Sea coast and Nile Valley in Egypt. In Northwest and Western Africa, a few control operations occurred in Morocco and Algeria, where groups of immature adults were present. In Mauritania, small groups of immature adults arrived in the northwest from further north, and some control was done. There was a cyclone on the coast of southeast Pakistan and nearby India. During the forecast, locusts will decline in Saudi Arabia, Morocco, and Algeria due to increasing temperatures and little or no rainfall. However, locust numbers should increase slightly in the summer breeding area in the northern Sahel from Mauritania to western Eritrea. Small-scale breeding could occur in parts of Yemen and the Indo-Pakistan border if more rains fall.

Western Region: Calm

SITUATION. Groups of adults south of the Atlas Mountains in Morocco and Western Sahara present (523 ha). Adult groups and a few hoppers in the central Sahara of Algeria (798 ha). Scattered adults and a few small groups crossed into the northern border of Mauritania (62 ha).

FORECAST. Any adult groups that are not controlled in the northwest will move south to the northern Sahel in Mauritania and perhaps southern Algeria, northern Mali, and Niger where they are likely to disperse. More summer rains and small-scale breeding can occur from mid-July onwards in south Mauritania, north of Mali, Niger, Chad, and perhaps southern Algeria.

Central Region: Calm

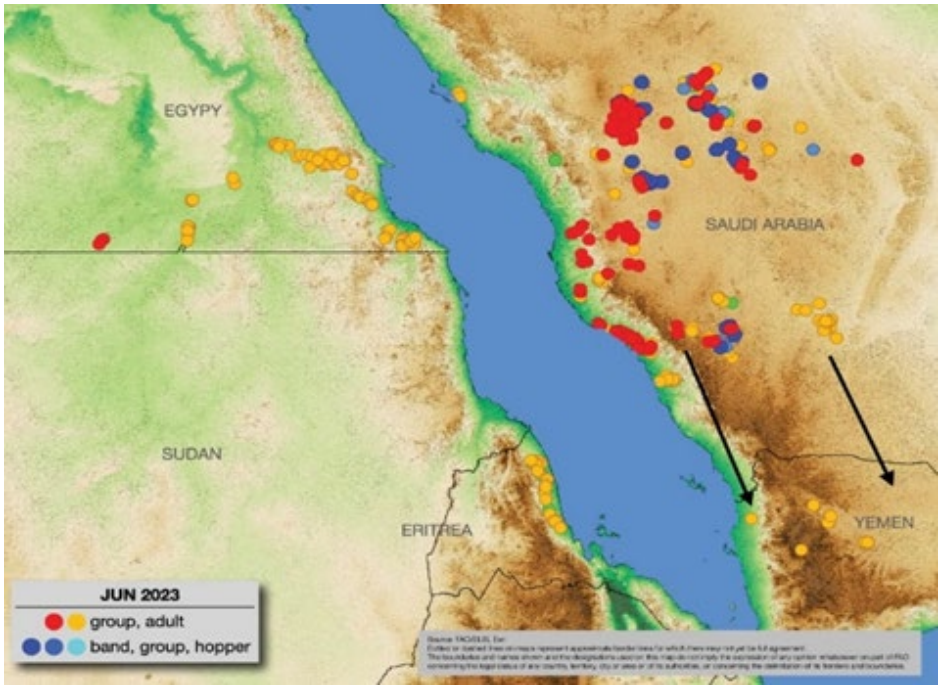
SITUATION. Groups of hoppers and adults as well as bands on the Red Sea coast and interior in Saudi Arabia (19 735 ha treated). Scattered hoppers and adults on the Red Sea coast of Eritrea; scattered adults in the southeast Red Sea coast and southern Nile Valley in Egypt (396 ha) with a few groups; isolated adults in the interior, highland and the Red Sea coast of Yemen and northeast Oman.

FORECAST. Adult groups should decrease in the Red Sea coast and interior of Saudi Arabia due to high temperatures and no rainfall. Small-scale breeding may occur in the interior and Red Sea coast of Yemen. Locust will decline in the Red Sea coast of Eritrea but may appear in the western lowlands and breed as well as in the interior of Sudan. Isolated adults may remain near the southern Nile Valley in Egypt.

Easter Region: Calm

SITUATION. Isolated mature adults seen at one place in Rajasthan, India.

FORECAST. Although drier than normal is expected along both sides of the Indo-Pakistan border, some breeding may occur in July near southeast Pakistan and southern Rajasthan, India due to the Cyclone Biparjoy in mid-June



Map 1 locust situation June 2023

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

4th Field Trials Testing Drones Used for Desert Locust Surveys"

4th Trail on Testing Drones Used for Desert Locust Surveys

A regional workshop on "4th Trail for Testing Drones Used for Desert Locust Surveys" was organized by the Commission for Controlling Desert Locust in the Central Region (CRC) in cooperation with the Commission for Controlling Desert Locust in the Western Region (CLCPRO) and the Locust Control Center, Directorate General of Agriculture Development, Ministry of Agriculture and Fisheries (Oman). Two companies (SenseFly SA, an AgEagle company - Switzerland and Hojung Solution - South Korea) were selected to assess their proposed drones for locust survey requirements and define with companies the improvements to be made to the proposed prototype.

FAO and IAV Hassan II Join Forces to Strengthen Desert Locust Control through Cutting-Edge Acridology master's Program

In a ceremony held at the *Institut Agronomique et Vétérinaire Hassan II (IAV) in Agadir (Morocco),* the Food and Agriculture Organization of the United Nations (FAO) and IAV Hassan II have sealed a partnership by signing an agreement to establish a master's program in Acridology. This collaboration marks a significant milestone in the ongoing Desert Locust sustainable preventive control strategy in the Western and Central regions.

The newly launched master's program in Acridology is dedicated to equipping locust control specialists from member countries of the Commissions for Controlling the Desert Locust in the Central Region (CRC) and Western Region (CLCPRO) with state-of-the-art knowledge and skills. The carefully crafted curriculum focuses on crucial aspects, including advanced bio-ecology, cutting-edge surveillance techniques utilizing drones, eco-friendly spraying methods featuring biopesticides, comprehensive health and environmental monitoring, as well as innovative control strategies. Scheduled to start in the coming months, this pioneering initiative will provide extensive training to 48 seasoned professionals hailing from 26 countries over a span of four years. By empowering these experts, the program will play a pivotal role in consolidating the accomplishments of both commissions by implementing sustainable preventive measures against the menacing Desert Locusts.

Signing the agreement to establish a Master's Program in Acridology

Part of the inauguration for establishing the Master's Program in Acridology

Inter-regional Workshop for Desert Locust Information management and use of Google Earth Engine, Sharm El-Sheikh, Egypt, 21-27 May 2023

An Inter-Regional Workshop on Desert Locust Information Management and Google Earth Engine was organized by the Commission for Controlling the Desert Locust in the Central Region (CRC) and the Commission for Controlling the Desert Locust in the Western Region (CLCPRO) from 21-27, May 2023 in Sharm El Sheikh, Egypt.

The workshop started with a one-day brainstorming to allow to collect from the participants all feedback, ideas and inquiries on the different themes of the Desert Locust information management (RAMSES, data transmission, eLocust3, eLocust3m (Pro), eLocust3w, eLocust3g, maps, layers, drones, and Locust Hub). This was followed by a presentation and discussions on data transmission tools from the field and the different faced problems. Presentation on RAMSES v4 and the management of the collected data followed by a brief on the GIS systems (Geographic Information System) to facilitate the

introduction to QGIS and RAMSES v5 which is under development. After the four training days intended for DL management purposes, three days were dedicated to the initiation of the use of Google Earth Engine (GEE) where a trainer from the African Regional Institute for Geospatial Information Science and Technology (AFRIGIST) presented remotely via Zoom the introduction to GEE platform followed by exercises applied by the participants to allow them to be more familiar with GEE.

The main outcomes can be summarized as follows:

New ideas and proposals for the improvement of the Desert Locust information tools/systems have been formulated as a result of the brainstorming session, for Rv4.1, data transmission, eLocust3, eLocust3m, eLocust3g, Locust Hub.

- The DLIOs from the locust invasion countries are well informed and trained on the use of the DL information management tools.
- Participants were trained on the platforms of the management of the different data tools presented by trainers.
- Participants were familiarized with the GIS and QGIS.
- The proposal of RAMSESv5 was presented and the DLIOs and participants endorsed it development and use.

Group photo of the participants to the Inter-regional Workshop

International Center for Agricultural Research in the Dry Areas (ICARDA)

CGIAR's Plant Health Initiative has selected the ICARDA Terbol Research Station as the site for the Plant Health Innovation Platform for CWANA

May 13, 2023

The launch of the platform at Qob Elias Village in southern Lebanon was attended by farmers and key partners, including Mr. Jihad El-Maalem (the Mayor of Qob Elias), Dr. Khaled Makkouk (Vice-President of the International Society of Plant Pathology, and Editor-in-Chief of Arab Journal of Plant Protection), Drs Rola Al-Amil and Elia Choueiri from

Lebanese Agricultural Research Institute (LARI), and Dr. Khalil Akel (Head of Agriculture, Beqaa Division, Lebanese Ministry of Agriculture). Guests visited an on-farm integrated pest and disease management (IPDM) validation site in Qob Elias village and were given a full tour of the ICARDA Research Station in Terbol. The Plant Health Innovation Platform (IP) plays key role in participatory pest constraint analysis, on-farm validation of pest management options, and scaling of subsequent innovations to improve crop yield and quality, thereby increasing incomes and food security for wider rural farming communities. The key to the initiative's success is the collaboration of multiple partners, including CGIAR, IARCs, NARES, and the private sector, each bringing unique expertise and knowledge to the table. As well as new pest management technologies developed at the Innovation Platform to support national farmers, pest management training are also provided. Farmers, development agents, policymakers, and young researchers are all included demonstrating the relevance of the integrated pest and disease management packages to diverse stakeholders. During the launch, Safaa Kumari (ICARDA's focal person of the Plant Health Initiative & President of Arab Society for Plant Protection) explained how the faba bean virus and vector management approach protects faba bean from an increasing prevalence of diseases due to climate change.

Mohamed Abou Nasif (farmer) and Dr. Elia Choueiri, Plant Virologist from LARI, then outlined how the new IP can support the urgent need to reduce pests of major crops in Lebanon and improve food security in the country. Most importantly farmers at the event were given the opportunity to discuss the challenges they face under the increased threat of climate change and how CGIAR and partners can address their needs through evidence-based research. Including farmers in our research right from the start is an ICARDA priority to make sure our research is relevant, affordable and scalable. The CGIAR Plant Health Initiative has launched eight other Innovation Platforms in Africa, Asia, and Latin America, for developing and testing pest management solutions for key crops in real-life settings. The Lebanon IP launch represents another tool in the ICARDA integrated innovation packages towards sustainable agriculture in the CWANA region, providing resilient livelihoods for farmers struggling with increasing climate impacts.




Regional Workshop in Basra, Iraq

The Arab Society for Plant Protection (ASPP) in collaboration with the Faculty of Agriculture, Basra University organized a workshop entitled "Advances in plant health technologies for healthy plant propagation materials production and distribution and its role in food security". The workshop was held during the period 15-16 May 2023 at the Oil Cultural Center, in Basra city and attended by 135 participants from Iraq and neighboring countries. In the opening session, Dr. Mohamed Hamza Abbas on behalf of the University of Basra President Dr. Saad Shahin Hammadi, welcomed the participants to Basra and wished them success, followed with opening notes by Dr. Safaa Kumari, ASPP president and Dr. Sajid Saad Hasan, the chairman of the workshop organizing committee and dean of the Faculty of Agriculture, Basra University.

The workshop program included six sessions over a two days period. The first session was chaired by Dr. Ibrahim Al-Jboory entitled "Importance of plant health strategies and application of phytosanitary regulations to protect agricultural production and enhance food security" included three presentations from Syria, Lebanon and Tunisia.

The second session entitled "Importance of monitoring invasive/transboundary pests and the use of modern technology in detecting them" was chaired by Dr. Aqeel Adnan El-Yousef and included six presentations from Iraq, Syria and Lebanon. The third session entitled "Recent strategies for agricultural pests' management and reducing yield losses caused by them" was chaired by Dr. Mohamed Amer Fayadh and included six presentations from Egypt, Iraq and Algeria. The fourth session was a continuation of the previous session, was chaired by Dr. Elia Choueiri and included four presentations from Iraq and Algeria. The fifth session, entitled "Importance of reducing mycotoxins contamination in food materials, especially seeds" was chaired by Dr. Safaa Kumari and included four presentations from Iraq.The sixth session, entitled "Examples of important seed-borne or soil-borne agricultural pests in the Arab region" was chaired by Dr. Khaled Makkouk and included five presentations from Iraq and Syria. Abstracts of all presentations were published in the June 2023 issue of the Arab Journal of Plant Protection.

WORKSHOP ABSTRACTS: Abstracts of the papers presented in a regional workshop entitled "Advance in Plant Health Technologies in Healthy Plant Propagation Materials Production and Distribution and its role in Food Security", Basra – Iraq, 15-16 May 2023 https://doi.org/10.22268/AJPP-41.2.197225

An intensive course on scientific writing

The Arab Society for Plant Protection, in collaboration with the Plant Protection Department, Faculty of Agriculture, University of Mosel, organized a two-day intensive course on scientific writing during the period 17-18 May 2023. Twenty participants, mainly graduate students and staff, joined this course. The course was given by Dr Khaled Makkouk, Editor-in-Chief Arab Journal of Plant Protection, Dr. Safaa Kumari, Associate editor and Mr. Abdulrahman Mukahal, technical editor. This course aimed to train research scientists in plant protection on scientific writing principles that help them publish the results

of their work in credible journals. The course included two parts; the first part focused on details of scientific writing principles and how to prepare articles with precise and straightforward language and follow the appropriate style that increases the chance of acceptance by publishers. The second part of the course included practical exercises to help participants professionally apply what was presented in the lectures around preparing manuscripts with all its components (Tables, figures, references list...). The course also discussed other communication skills, such as preparing abstracts, power point presentations and posters for meetings, which are essential ways of exchanging knowledge in specialized scientific meetings.

The 14th Arab Conference on Plant Protection Sciences (Algeria, 2025)

The Executive committee of the Arab Society for Plant Protection and the Presidency of the Organizing Committee of the 14th Arab Conference on Plant Protection Sciences (Algeria, 2025) held a virtual meeting on Tuesday, August 1, 2023, to discuss the arrangements for holding the conference in Algeria, the host country. During the virtual meeting, the following points have been discussed:
The conference venue, invitation format, conference sponsorship, conference committee formation, conference website, the official announcement of the conference (first announcement), scientific sessions, registration fees, abstract book, entry visa, hotels, travel, and other detailed points.

NEWS OF aspp Members abroad

Recruitment of the rhizo-microbiome army: assembly determinants and engineering of the rhizosphere microbiome as a key to unlocking plant potential

The viable community of microorganisms in the rhizosphere significantly impacts the physiological development and vitality of plants. The assembly and functional capacity of the rhizosphere microbiome are greatly influenced by various factors within the rhizosphere. The primary factors are the host plant genotype, developmental stage and status, soil properties, and resident microbiota. These factors drive the composition, dynamics, and activity of the rhizosphere microbiome.

This review addresses the intricate interplay between these factors and how it facilitates the recruitment of specific microbes by the host plant to support plant growth and resilience under stress. This review also explores current methods for engineering and manipulating the rhizosphere microbiome, including host plant-mediated manipulation, soil-related methods, and microbe-mediated methods. Advanced techniques to harness the plant's ability to recruit useful microbes and the promising use of rhizo-microbiome transplantation are highlighted.

The goal of this review is to provide valuable insights into the current knowledge, which will facilitate the development of cutting-edge strategies for manipulating the rhizosphere microbiome for enhanced plant growth and stress tolerance. The article also indicates promising avenues for future research in this field. **[Inmyoung Park, Young-Su Seo and Mohamed Mannaa (Koria), Frontiers in Microbiology, May 2023].**

Insect-based agri-food waste valorization: Agricultural applications and roles of insect gut microbiota

Meeting the demands of the growing population requires increased food and feed production, leading to higher levels of agri-food waste. As this type of waste seriously threatens public health and the environment, novel approaches to waste management should be developed. Insects have been proposed as efficient agents for biorefining waste, producing biomass that can be used for commercial products. However, challenges in achieving optimal outcomes and maximizing beneficial results remain. Microbial symbionts associated with insects are known to have a critical role in the development, fitness, and versatility of insects, and as such, they can be utilized as targets for the optimization of agri-food waste insect-based biorefinery systems. This review discusses insect-based biorefineries, focusing on the agricultural applications of edible insects, mainly as animal feed and organic fertilizers. We also describe the interplay between agri-food waste-utilizing insects and associated microbiota and the microbial contribution in enhancing insect growth, development, and involvement in organic waste bioconversion processes.

The potential contribution of insect gut microbiota in eliminating pathogens, toxins, and pollutants and microbe-mediated approaches for enhancing insect growth and the bioconversion of organic waste are also discussed. The present review outlines the benefits of using insects in agri-food and organic waste biorefinery systems, describes the roles of insect-associated microbial symbionts in waste bioconversion processes, and highlights the potential of such biorefinery systems in addressing the current agri-food waste-related challenges**. [Mohamed Mannaa(Koria), Abdelaziz Mansour, Inmyoung Park, Dae-Weon Lee, Young-Su Seo, Environmental Science and Ecotechnology, May, 2023].**

Feeding preference of the red palm weevil (Rhynchophorus ferrugineus Oliver) toward Phoenix canariensis Hortum ex Chabaud

Rhynchophorus ferrugineus Olivier (Coleoptera: Curculionidae), commonly called the red palm weevil (RPW), is one of the most severe palm pests of the tropics and Mediterranean countries. This pest attacked mainly Phoenix canariensis, the most used ornamental palm for gardens and urban green spots in these latter countries. However, it is still not understood if this preference for this host palm is determined by the attractiveness of its volatile organic compounds (VOCs) or resistance/avoidance mechanisms present in the other palm species. In this study, we investigate, in electro-physiological and behavioural experiments, the role of the *P. canariensis* VOCs in this host preference behaviour versus other three palm species: *Chamaerops humilis*, *Trachycarpus fortunei* and *Washingtonia filifera*. In EAG recordings, *P. canariensis* VOC extracts elicited a stronger response on RPW antennae than solvent or *C. humilis* extract. In contrast, similar responses were recorded using *W. filifera* and *T. fortunei* extracts. In dual choice arena bioassays, females of RPW showed feeding preference for the *P. canariensis* compared to *T. fortunei* and *C. humilis*. Overall, the present findings suggest that this preference behaviour is mediated by VOCs emitted. **[Mokhtar Abdulsattar Arif[1], Paolo Lo Bue[2], Ezio Peri[2], Stefano Colazza[2], Salvatore Guarino[3]. [1]Plant Protection Directorate, Ministry of Agriculture, Baghdad, Iraq. [2]Department of Agricultural, Food and Forest Sciences (SAAF), University of Palermo, Palermo, Italy. [3]Institute of Biosciences and Bioresources (IBBR), National Research Council of Italy (CNR), Palermo, Italy. 2023].** https://www.actahort.org/members/showpdf?booknrarnr=1371_18

The 4th European conference on Xylella fastidiosa

Background and topic

The 4th European conference on *Xylella fastidiosa* will be held on 20 August 2023 in Lyon (France), as a Satellite event of the International Congress on Plant Pathology (ICPP2023). It will bring together researchers, risk assessors, risk managers and stakeholders to discuss the results from research that has taken place since *X. fastidiosa* was first detected in Europe in 2013.

Organised by EFSA with the active contribution of the major EU and transnational research initiatives on *X. fastidiosa* (BeXyl, BIOVEXO, ERC MultiX and EUPHRESCO), the conference will be chaired by Blanca B. Landa, who coordinates the EU funded project BeXyl (Beyond Xylella), and Giuseppe Stancanelli, who leads the Plant Health Risk Assessment team at EFSA. The Scientific Committee of this conference includes scientists from all the partner organisations and external reviewers.

The presentations and discussions will take stock of the results from research that has taken place over the last decade. Two major research projects[1] funded by the European Union have filled knowledge gaps on the distinctive elements of the outbreaks, consolidated a robust network for monitoring and testing, and produced results that have supported and influenced the activities of researchers, stakeholders and policy makers.

Raied Abou Kubaa with Donato Boscia, CNR IPSP

research group, visiting some orchards and collecting diverse olive cultivars to be tested for resistance to Xylella. The trial Is located in the Lecce epidemica area in which plants are exposed to Natural infections and Is carried out in the activities of CNR-IPSP of Bari.

The 7th National Congress of the Italian Society of Virology (SIV-ISV)

Brescia hosted the 7th National Congress of the Italian Society for Virology (SIV-ISV). The SIV-ISV National Congress represents the annual forum for Italian scientists working in the different areas of virology (molecular virology, veterinary virology, environmental and plant virology), taking advantage of the most advanced technological platforms. Special attention has been given to Young Investigators whose participation has been encouraged by Scholarships. From the Arab Society of Plant Protection, Dr. Raied Abou Kubaa and Dr. Sabri Zaidat have participated in the conference, presenting two different types of research on honey bee and plant viruses as follows:

1- Droplet Digital PCR (ddPCR) for the absolute quantification of different viruses infecting honey bees (Apis mellifera L.). Raied Abou Kubaa, Sabri Ala Eddine Zaidat, Simona Sanzani, Khaled Djelouah and Maria Saponari.
2- Preliminary survey of common honey bee (Apis mellifera L.) viruses in apiaries located in Apulia region (southern Italy). Sabri Ala Eddine Zaidat, Raied Abou Kubaa, Simona Sanzani, Maria Saponari and Khaled Djelouah.
3- Nanopore-based detection of plant virus: challenges and opportunities. Serena Serafina Amoia, Raied

Plant-pest interactions: anticipated discoveries and surprises

Dr. Isgouhi Kaloshian is a Professor in the Department of Nematology at the University of California (UC) Riverside. Isgouhi received a B.S. and M.S. in Plant Protection from America University of Beirut, Lebanon and a Ph.D. in Plant Pathology from UC Riverside. She was a postdoctoral Research Fellow at UC Riverside and UC Davis in the Departments of Nematology. In 1997 she joined the Department of Nematology at UC Riverside as a professor, where she developed a program in molecular genetics of resistance to root-knot nematodes (RKN) and aphids. Her work seeks to understand how plants protect themselves from invading nematodes and pests, and she focuses on dissecting tomato resistance to RKN and potato aphids mediated by the resistance gene Mi-1. In addition, her group has identified aphid effectors using functional genomics approaches. In recognition to her scientific contributions, Isgouhi has been elected Fellow of the American Association for the Advancement of the Sciences and has received the Society of Nematologists Syngenta Crop Protection Award for excellence in research in the field of Nematology. She is Divisional Dean in the College of Natural and Agricultural Sciences University of California Riverside.

Dr. Isgouhi Kaloshian

Within the framework of cooperation and communication with prestigious international universities, and to develop the process of higher education and research, the School of Agriculture hosted **Dr Isgouhi Kaloshian**, Professor of Nematodes and Division Dean for Agricultural and Natural Resources Affairs at the College of Natural and Agricultural Sciences at the University of California / Riverside / USA for the College of Agriculture /

University of Jordan on the day Sunday, May 7, 2023. The visit included many activities, signing of a memorandum of understanding between the University of California / Riverside and the University of Jordan, which was signed by the Dean of the Faculty, Prof. Dr. Safwan Al-Shiyab, as a representative of the President of the University of Jordan, and Dr. Isgouhi Kaloshian, as a representative of the President of the University of California / Riverside.

A tour of the school facilities and the experimental fields of some faculty members and a meeting with department heads to discuss aspects of cooperation. She delivered a seminar entitled **Plant-pest interactions: anticipated discoveries and surprises** in attendance of many faculty members and private sectors

1st International conference ESIPM 2024 building roads and bridges to adopt integrated pest management (IPM) Cairo, Egypt, 21-26 April 2024

Dear colleagues of national and international scientific and related communities in the field of plant health are welcome to join and attend the 1st Conference of ESIPM 2024.

The Egyptian Society of Integrated Pest Management (ESIPM) is honoured to announce the 1st International Conference for Integrated Pest Management (IPM) with the general theme **"Building Roads and Bridges to Adopt Integrated Pest Management (IPM).**

The conference will emphasize the main themes for IPM in the era of globalization, mainly Information Communication Technology (ICT) and a changing climate. These themes will address the increased need to produce clean food free of pesticide residues, whether for local consumption or for export, adopting and implementing IPM for the management of the major pests being insects, animal pests, plant pathogens, weeds....etc.) under different agricultural systems as well as utilization of ICT tools in this respect. Furthermore, the effects imposed by climatic changes on the appearance and spread of pests, and what are the appropriate IPM programs to meet such challenges.

The congress program includes various concurrent sessions. Each session will include a number of contributed papers and posters. Also, a symposium on some important IPM topics will be organised at the beginning of each conference day. The detailed full program will be posted on the conference website promptly. The Conference e- mail: esipmc@gmail.com

The 16th Asian Apicultural Association International Conference (AAA Conference)

The 16th Asian Apicultural Association International Conference (AAA Conference) was held under the patronage of HRH Prince Dr. Hussam bin Saud bin Abdulaziz Al Saud Between 7 th -9 th August 2023 in conjunction with the 5th Arab Beekeeping Association International Conference (Apiarab) and with Al-Baha 15th international honey festival which will be held from the 3 rd -16th August 2023 in Albaha, Saudi Arabia. The theme of the conference is "Breeding the indigenous bees for sustainable beekeeping to cope up with climate changes" and discussed several topics, including the effect of climate change on the honey bee, honey bee resource development, bee management, genetic improvement of honeybees, and mechanisms to enhance the value addition to honeybee products and by-products in arid areas. The event also organized several workshops to discuss topics related to beekeeping and honey production development. Training programs on Apitherapy, Apimedicine, and honey sensory analysis are also among the events. The Conference was attended by a group of worldwide beekeeping scientists, allowing the exchange of information and expertise, constructive and fruitful ideas on the challenges beekeepers face in arid environments; and ways to overcome problems to sustainably promote beekeeping and honey production industries of the arid regions. From the Arab society of Plant protection**, [Dr. Raied Abou Kubaa from the Italian National Research Council (CNR), Institute for Sustainable Plant Protection (IPSP) and Dr. Nehaya Al-Karablieh, from the University of Jordan, Faculty of Agriculture participated in the event and presented two different research as follows:**

1- A Rapid, Simple and Cost-Effective Method for Total Nucleic Acid Extraction and Direct Detection of Viral Community in the Honey Bees. Raied Abou Kubaa, Sabri Sabri Ala Eddine Zaidat, Khaled Djelouah and Maria Saponari.
2- A small-scale survey revealed the presence of four newly reported honey bee viruses in Jordan. Nehaya Al-Karablieh and Raied Abou Kubaa.

The First International Plant Protection Symposium 1st SIPV.ensa2023

The National High School of Agronomy (ENSA) - El Harrach-Algiers- Algeria, 21-23 November2023

The National High School of Agronomy (ENSA)- El Harrach-Algiers- Algeria, organizes its first International Plant Protection Symposium **1st SIPV. ENSA.2023** from 21 to 23rd November 2023. The symposium's main objectives are the presentation of the current crop health status in Algeria; the Exchange of Knowledge on the latest advances in the

identification and control of bioaggressors; the Interaction of the Algerian scientific community with foreign researchers, and the establishment of national and international collaborations.

The main axes of the Symposium:

1. Crop Protection in Algeria: the main issues affecting strategic crops and their management;
2. Invasive and emerging pathogens and pests;
3. Biocontrol of bioaggressors, and preservation of biodiversity

Important dates:

- Deadline for abstract submission, September 30th 2023
- Notification of acceptance, October 30th 2023

For more information and to upload the Symposium Announcement, please visit the following link https://www.ensa.dz/en/2023/07/25/the-1st-international-plant-protection-symposium/

For more information, please contact: sipv-ensa@edu.ensa.dz

The 16th European Fusarium Seminar EFS16 report. Rome, Italy 12- 15th June 2023

The European Fusarium Seminar is a significant meeting where several aspects of Fusarium biology, epidemiology and new application are discussed. This meeting is organized each two or three years in a European country. Rome University (Sapienza Univerisita di Roma) organized the 16th European Fusarium Seminar, which was an excellent opportunity to present and discuss the progress made in all fields related to Fusarium research, ranging from plant pathology (Pathogenesis and Plant – Host Interaction, Disease Control and Forecasting Model, Epidemiology and Population Genetics, Secondary Metabolites – Biochemistry, Biosynthesis, Metabolomics) to medical research and from mycotoxin research to mitigation strategies (Fusarium Mycotoxin Reduction – Detoxification In Food And Feed). Participants from different countries around the world attended the seminar. The seminar from 12-15 June 2023 consists of 52 orals conferences and 32 posters related to the topics mentioned above. In this important event, the Arab countries were presented by two researchers concerned with Fusarium research fields, **Dr Houda Boureghda from The National High School of Agronomy (ENSA) - Algeria and Dr. Samia Gargouri from the National Agronomic Research Institute of Tunisia (INRAT) - Tunisia.**

The Egyptian Journal of Biological Pest Control (EJBPC)

Aims and scope The Egyptian Journal of Biological Pest Control (EJBPC- www.ejbpc.com) is a periodic scientific journal published by the Egyptian Society for Biological Control of Pests (ESBCP) in collaboration with Springer-Nature. The journal aims to publish internationally peer-reviewed, high-quality research articles in biological and integrated pest control (non-chemical control). The journal publishes review articles, original papers, conference

reports, book reviews, editorials, laboratory reports, technical notes and short communications.

Citation Impact
2.4 - 2- year Impact Factor (2022)
2.3 - 5- year Impact Factor (2022)
The journal has also moved up in rank in the "**ENTOMOLOGYJCR"** category, from **41/100 (Q2)** to **20/100 (Q1).**

Selected Research Papers

- **A Novel Insect Overwintering Strategy: The Case of Mealybugs.** Rosa Vercher, Sandra González, Adrián Sánchez-Domingo and Juan Sorribas. Insects, 14(5), 481, 2023. https://doi.org/10.3390/insects14050481
- **Life Histories and Functional Responses of Two Predatory Mites Feeding on the Stored-Grain Pest *Liposcelis bostrychophila* Badonnel (Psocoptera: Liposcelididae).** Weiwei Sun, Liyuan Xia and Yi Wu, Insects,14 (5), 478, 2023**.** https://doi.org/10.3390/insects14050478
- **Mechanisms of Neuroendocrine Stress Response in *Drosophila* and Its Effect on Carbohydrate and Lipid Metabolism.** Margarita A. Bobrovskikh andNataly E. Gruntenko, Insects, 14(5), 474; 2023. https://doi.org/10.3390/insects14050474 - 17 May 2023
- **Life Table Study of Fall Armyworm (*Spodoptera frugiperda*) (Lepidoptera: Noctuidae) on Three Host Plants under Laboratory Conditions.** Wen-Hua Chen, Brandon Itza, Lekhnath Kafle and Tsui-Ying Chang, Insects, 14(4), 329, 2023. https://doi.org/10.3390/insects14040329
- **Invasion, Distribution, Monitoring and Farmers Perception of Fall Armyworm (*Spodoptera frugiperda*) and Farm-Level Management Practices in Bangladesh.** Mohammad Shaef Ullah, Dilruba Sharmin,Toufica Ahmed Tumpa, Md Tafsir Nur Nabi Rashed, Powlomee Mondal, Md Wasim Akram, Setu Chowdhury, Masum Ahmad, Tetsuo Gotoh and Malvika Chaudhary, Insects, 14(4), 343, 2023**.** https://doi.org/10.3390/insects14040343
- **Endophytic fungi of hazelnut (*Corylus avellana*).** Rosario Nicoletti, Beata Zimowska, Plant Protection Science, 59, (2): 107–123, 2023. DOI: 10.17221/133/2022-PPS
- **Effects of fungicides and antagonistic marine-derived fungi on rice seedling promotion and rice sheath blight control.** Tida Dethoup, Rotchana Klaram, Arom Jantasorn, Plant Protect. Sci., 59(2):159-173, 2023. DOI: 10.17221/95/2022-PPS
- **The influence of temperature on the biological activity of selected nematode species (Steinernematidae and Heterorhabditidae) under the conditions of their coexistence.** Magdalena Dzięgielewska, Krystian Kaczmarek, Katarzyna Kruk, Plant Protect. Sci.,59(2):193-201,2023. DOI: 10.17221/104/2022-PPS
- **Attraction of *Frankliniella occidentalis* Females towards the Aggregation Pheromone Neryl (*S*)-2-Methylbutanoate and Kairomones in a Y-Olfactometer.** Charles J. F. Chappuis, Marilyn Cléroux, Corentin Descombes, Yannick Barth and François Lefort, Insects, 14(6), 562, 2023. https://doi.org/10.3390/insects14060562
- **A Review on Digestive System of *Rhynchophorus ferrugineus* as Potential Target to Develop Control Strategies.** Ahmad-Faris Seman-Kamarulzaman, Faizatul Atikah Pariamiskal, Amiratul Nabihah Azidi and Maizom Hassan, Insects , 14(6), 506, 2023. https://doi.org/10.3390/insects14060506

PAPERS pubLished in THE Arab Journal of Plant Protection (AJPP), Volume 41, Issue 2, June 2023

ECOLOGY

Seasonal Distribution and Food Preference of the Peach Fly, *Bactrocera zonata* (Saunders) on Different Types of Citrus Fruit Trees in Baghdad Governorate
R.F. Al-Jassani and A.H. Abou Rgheef (IRAQ).
Pages 93-97. https://doi.org/10.22268/AJPP-41.2.093097

Seasonal Activity of *Bactrocera zonata* (Saunders) and *Ceratitis capitata* in a Navel Orange Orchard in Dakahlia, Egypt
A.H. El-Afify, R.M. Shreef, M.A. Hendawy and N.M. Ghanim (EGYPT)
Pages 98-104. https://doi.org/10.22268/AJPP-041.2.098104

CONTROL

The Role of Spray Pattern and Operating Pressure and their Interactions on the Control of *Tetranychus urticae* Koch. in Eggplant Plants Under Greenhouse Conditions
S.N. Ibraheem and M.H. Alheidary (IRAQ)
Pages 105-113. https://doi.org/10.22268/AJPP-41.2.105113

Some Significant Threats to Lychee Production and their Management Options in Bangladesh
M.A. Taher, M.M. Rahman, K.S. Islam and M.M. Uddin (BANGLADESH)
Pages 114-118. https://doi.org/10.22268/AJPP-041.2.114118

Effect of Some Surfactants on the Expired Bioformulation Belthirul® and Evaluation of its Efficacy Against Fig Moth Larvae, *Ephestia cautella* (Walker)
S.Z. Baker, S.M. Ismail and K.F. Saeed (IRAQ)
Pages 119-126. https://doi.org/10.22268/AJPP-041.2.119126

INTEGRATED PEST MANAGEMENT

Efficiency of Some Plant Extracts, Pesticides and the Entomopathogenic Fungus *Metarhizium anisopliae* in Controlling the Tomato Moth, *Tuta absoluta* (Meyrick) in the Field
M.F. Raad, S.Z. Baker and A.A. Kareem (IRAQ)
Pages 127-133. https://doi.org/10.22268/AJPP-41.2.127133

BIOLOGICAL CONTROL

Effect of Temperature on Efficacy of The Entomopathogenic Fungi *Beauveria bassiana* and *Metarhizum anisopliae* Against the Sunn Pest, *Eurygaster integriceps* Puton
A.A. El-Mukhlef, Sh.A. Kharouf and A. Al-Khalaf (SYRIA)
Pages 134-139. https://doi.org/10.22268/AJPP-41.2.134139

Biochemical Evaluation of *Acremonium* sp. as Biological Control Agent Against the Spiny Bollworm, *Earias insulana* by Scanning Electron Microscopy
H. Sabry, W.A.Z. El-Medany, H.S. El-Tahawe and E.M. Abd El-Azeem (EGYPT)
Pages 140-145. https://doi.org/10.22268/AJPP-41.2.140145

NATURAL ENEMIES

The Secondary Parasitoid *Perilampus tristis* Mayr, 1905 and its Effect on the Primary

First report of the tobamovirus *Kyuri green mottle mosaic virus* (KGMMV) in Turkey

A recent survey of Cucurbitaceae seeds in Turkey found that some lots of locally sourced seeds, as well as lots from Peru, Chile, Latvia, Morocco, and India, were contaminated with the tobamovirus *Kyuri green mottle mosaic virus* (KGMMV). This is the first report of KGMMV in Turkey. KGMMV causes yield losses in Cucurbitaceae. KGMMV has also been reported in China, Indonesia, South Korea, and Japan and is not known to occur in the United States. KGMMV is transmitted by seed, through plant tissue, and in contaminated soil.

References: Balsak, S. C. 2023. *Kyuri green mottle mosaic virus* was detected for the first time in Turkey. Australasian Plant Disease Notes 18(1):22. https://link.springer.com/article/10.1007/s13314-023-00504-3

First report of root-knot nematode Meloidogyne enterolobii (Meloidogynidae) in Egypt

Recently, females and eggs of root-knot nematode *Meloidogyne enterolobii* (Meloidogynidae) were found in root galls of cultivated *Psidium guajava* (guava) trees in Egypt. Affected trees exhibited root damage and stunting. This is the first report of *M. enterolobii* in Egypt. *Meloidogyne enterolobii* is associated with many plants, including *Brassica oleracea* (cabbage), *Callistemon citrinus* (crimson bottlebrush), *Ocimum* spp. (basil), *Ipomoea batatas* (sweet potato), *Cannabis sativa* (industrial hemp), and *Tibouchina* spp. (glorytree). *Meloidogyne enterolobii* has been reported from other parts of Africa, Europe, Asia, Australia, Central and South America, the Caribbean, and Mexico. In the United States, it has been reported from North Carolina, Florida, and Puerto Rico.

References: Ibrahim, D. S. S., H. S. Zawam, M. M. El-Deriny, S. N. Riad, P. Castillo, and J. E. Palomares-Rius. 2023. First report of *Meloidogyne enterolobii* (guava root-knot nematode) infecting guava (*Psidium guajava*) in Egypt. Plant Disease 107(5):1637. https://apsjournals.apsnet.org/doi/10.1094/PDIS-09-22-2171-PDN.

Climate change and the emergence of some invasive pests in NENA region

Fig wax scale Ceroplastes rusci (L.)

Cotton mealybugs Phenacoccus solenopsis

Date palm white scale Parlatoria blanchardi

Red spider mite Tetranychus urticae on cucumber in greenhouses

Events of interest

20-25 /8/2023	12th International Congress on Plant Pathology (ICPP2023) in Lyon, France. https://www.icpp2023.org/
20 2023 /8/	4th European conference on *Xylella fastidiosa*. Lyon, France. https://bit.ly/3TBjtHz
12 - 13/9/ 2023	18th Jordanian Chemistry Conference & Exhibition (JCC18), at the Movenpick Hotel in Amman. JCC18.hu.edu.jo
18-20/9/2023	V.International Agricultural, Biological and Life Science Conference, Edirne-Turkey. www.agbiol.org
20-23/9/2023	Balkan Agricultural Congress, Edirne-Turkey. www.agribalkan.net
5-8 2023 /10/	XIV International Agriculture Symposium "AGROSYM 2023" Jahorina, Bosnia and Herzegovina. http://agrosym.ues.rs.ba/
16-19 /10/ 2023	The 6th International Rice Congress (IRC 2023) MANILA, PHILIPPINES. https://www.irri.org/IRC2023-teaser.html
18-19 /10/2023	1st International Webinar, Biodiversity Roles in Plants Protection in Arid Regions (BRPP-AR) BISKRA-Algeria. https://www.crstra.dz/seminaires/2023/brpp-ar/
2-4 /11/2023	International Congress on Oil and Protein Crops, Megasaray Westbeach Hotel, Antalya,Turkey.www.protoil.org
21- 23 /11/2023	The 1St International Plant Protection Symposium 1St SIPV.ENSA.2023 / ENSA. El Harrach-Algiers- Algeria.
1-5 /7/2024	20th International Plant Protection Congress in Greece. https://www.ippcathens2024.gr/concurrent-sessions/concurrent-session-proposals

The Editorial Board of The Arab and Near East Plant Protection Bulletin Highly Appreciates the Contribution of Several Arab Scientists in This Issue, namely:

Abdulnabi Bashir (Syria), Mohamad Kanouh (Syria), Neran Salem AlJarah(Iraq), Ali Mohammed Hussein (Iraq), Walaa Ebrahim(Syria), Ziad Barbar (Syria), Rawa Muhsen Youssef(Syria), Adnan A. Lahuf (Iraq), Choueiri Elia (Lebanon), Luma Albana(Jordan), Mohamed Mannaa (Koria), Mokhtar Abdulsattar Arif(Iraq), Rami Bou Hamdan (Syria), Nagat Ali Abuelnnor (Libya), Dalia Adly (Egypt), Moawad Mohammed M.M. Bondok, Mustafa A. Al-Jbouri (Iraq), Souddi Mohammed (Algeria), Ahmed B. Abu-Duka(Iraq), Mohamed El-Said El-Zemaity (Egypt), Roqia Riad Abdul Karim (Iraq), Feyroz Ramadan Hassan(Kurdistan-Iraq) Jounar Aziz Ibrahim (Syria), Mahran Zeity(Syria), Maadh Abdul Wahab Al-Fahad(Iraq), Yasamine Bassem Sultan (Iraq), Zinette Mousa (Lebanon), AlSarai Alalawi Mamoon (FAORNE), Heba Tokali (FAO-Egypt), Yosra Ahmed (FAORNE), Samar Negida(FAORNE).

The bulletin's editorial board invites the society members to send their scientific findings and news related to plant protection in Arab countries and elsewhere. We also invite scientists studying abroad to share their information and achievements with colleagues in this bulletin.

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