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PROTECTION NEWSLETTER



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**ARAB AND NEAR EAST PLANT
PROTECTION NEWSLETTER
(ANEPPNEL)**

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Number 84, December 2021

CONTENTS

EDITORIAL - OAK TREES AND INSECT PESTS: ARE WE EDUCATED TO BE NARROW-MINDED?	4
CROP PROTECTION NEWS FROM ARAB AND NEAR EAST COUNTRIES	5
• INVASIVE ,NEW PESTS AND BENEFICIALS	5
• RESEARCH HIGHLIGHTS	11
GRADUATE STUDENTS ACTIVITIES (MASTER AND DOCTORATE THESIS)	20
SPECIAL TOPIC:ANTS IN SAUDI ARABIA	24
FAO PLANT PROTECTION ACTIVITIES	25
GLOBAL ACTION FOR FALL ARMYWORM CONTROL	25
ACTIVITIES OF THE REGIONAL OFFICE OF FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS – NEAR EAST AND NORTH AFRICA	26
Emergency Preparedness and Response to Strengthen Capacities of NENA Countries to Mitigate the Risk of Fall Armyworm (FAW) in the Region TCP/RAB/380	26
FAO Red Palm Weevil Eradication Programme in the NENA Region	29
THE DESERT LOCUST IN THE CENTRAL REGION (CRC) FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATION	30
ARAB SOCIETY FOR PLANT PROTECTION NEWS	33
Second National Meeting on Biological Control and Integrated Pest Management, Damascus	33
The 3rd International Festival of Jordanian Dates	33
CHAIRPERSON OF THE PUBLICATION COMMITTEE ACTIVITIES	34
The 13th Arab Congress of Plant Protection 2022	35
ASPP MEMBERS NEWS ABROAD	35
XYLELLA NEWS	38
GENERAL NEWS	38
Releasing the First 10 Scientific Publications out of the “50 Booklets Series in the 50th Year”	38
SCIENTIFIC BOOKS	41
SCIENTIFIC BOOKS,FAW AS A PEST,THE ROLE OF ASPP IN SPREADING AWARENESS OF DATE PALM PEST MANAGEMENT;INSECT BEHAVIOUR	41
SELECTED RESEARCH PAPERS	42
PAPERS PUBLISHED IN THE ARAB JOURNAL OF PLANT PROTECTION(AJPP) VOLIUM 39(4): DECEMBER,2021	42
EVENTS OF INTEREST 2021-2022	43

EDITORIAL

Oak trees and insect pests: are we educated to be narrow-minded?

Those who took a forest entomology course may have a mindset focused on the many insect pests that attack oaks and how we can control them. However, a more holistic way of thinking might be to consider how oak trees support the wellbeing of other living organisms, including insects. Botanists think of oak trees as being among the essential members of the plant kingdom because of the great diversity of life they support. Oaks support more living creatures than any other tree genus, including acorn-gathering woodpeckers and many insects whose larval forms feed on their leaves. At least 100 vertebrate species of animals are known to feed on acorns in the US alone. These include mammals like white-tailed deer, squirrels, bears, mice, rabbits, raccoons, opossums, foxes and wild hogs. Bird species that consume acorns include quail, turkey, wood ducks, woodpeckers, crows, and blue jays. Probably the most conspicuous evidence of insect activity, and maybe the most interesting, is the many forms of galls Cynipid gall wasps produce on oak leaves and twigs. There are about 800 species of gall wasps in North America alone, some of them are beneficial insects, and most of them have specialized relationships only with oak trees. When we adopt a strategy to control oak pests, do we consider all the ecological facts mentioned above??

The genus *Quercus*, oaks, is native to the Northern Hemisphere and includes both deciduous and evergreen species ranging from cool temperate to tropical areas in North and South America, Europe, Asia, and North Africa. North America has the most significant number of oak species, with 90 occurring in the US and 160 in Mexico. China is the second centre of the most remarkable oak diversity, with about 100 species. While most people think of oaks as large trees that may reach a height of 30 meters, the shrub live oak, *Q. turbinella*, attains a height of only 2-4 meters. The importance of oak trees is illustrated by the fact that the United States, Bulgaria, Croatia, Cyprus, Estonia, France, Germany, Moldova, Jordan, Latvia, Lithuania, Poland, Romania, Serbia, and Wales have designated the oak as their national tree.

If you are interested in this topic and would like to learn more about it, you are advised to read the recently (2021) published book, *THE NATURE OF OAKS*, written by Douglas W. Tallamy, professor in the Department of Entomology and Wildlife Ecology at the University of Delaware, USA. If you share his vision, the author encourages you to plant an oak tree in your garden.

Khaled Makkouk, Beirut, Lebanon

and

Gordon Holcomb, Baton Rouge, Louisiana, USA

ALGERIA

First Report of Three Species of *Trichoderma* Isolated from the Rhizosphere in Algeria and the High Antagonistic Effect of *Trichoderma brevicompactum* to Control Grey Mould Disease of Tomato.

Grey mould caused by *Botrytis cinerea* Pers. (teleomorph *Botryotinia fuckeliana* (de Bary) Whetzel) is one of the most destructive fungal diseases of Mediterranean crops. In Algeria, few studies have been made on the economic impact of this disease. Nevertheless, it is practically present in all tomato and strawberry greenhouses, as well as in prospected vineyards in the north and south of the country. The complexity of chemical control of this disease has led to search for *Trichoderma* strains that are effective in biological control. Fifteen isolates of *Trichoderma* spp. were obtained from vigorous and healthy plants (tomatoes, strawberries, and vines) rhizosphere, and from a commercial bio-compost (Bio-composte®), then identified as *T. afroharzianum* (four isolates), *T. gamsii* (four isolates), *T. longibrachiatum* (three isolates), *T. atroviride* (one isolate), *T. brevicompactum* (one isolate), *T. breve* (one isolate), and *T. lixii* (one isolate) on the basis of DNA sequence analysis of four genes (ITS, *tefl*, *rpb2*, and *acl1*). *In vitro* biocontrol tests revealed that four Algerian isolates of *Trichoderma* spp. (TAtC11, TGS7, TGS10, and TBS1) had a high antagonistic activity against *B. cinerea*, the mycelial growth has been reduced by 62 to 65% in dual-culture technique, by 62.31 to 64.49% in volatile compounds test, and a high inhibition of germling growth was recorded by TBS1 isolate with 90.68% in Culture filtrates test. Biocontrol tests carried out on tomato plants with *T. brevicompactum* (TBS1), *T. atroviride* (TAtC11), and *T. lixii* (TLiC8) against *B. cinerea* (BCT04) showed that TBS1 inoculation significantly reduced the incidence of disease by 64.43 and 51.35% in preventive and curative treatment, respectively. Conclusion: The present study revealed the first report of *T. brevicompactum*, *T. breve*, and *T. lixii* in Algeria, and it also contributes to the promotion of the use of native strains of *Trichoderma* in biological control leading to a better preservation of soil microbial diversity. [Massinissa Hammad¹, Thomas Guillemette², Meriem Alem¹ (Algeria) Franck¹ Laboratoire de Phytopathologie et Biologie Moléculaire, Ecole Nationale Supérieure Agronomique (ENSA, ex. INA), Rue Hassan Badi, Belfort, El Harrach, 16004 Algiers, Algeria² Université Angers, France. Bastide² and Meriem Louanchi. Egyptian Journal of Biological Pest Control, 2021]. <https://doi.org/10.1186/s41938-021-00423-4>

IRAN

First Report of Tomato Brown Rugose Fruit Virus in Greenhouse Tomato in Iran.

In August 2021, symptoms of a viral-like infection were observed on the leaves and fruits of tomato plants, cvs. Emperador RZF1 (Rijk Zwaan, The Netherlands) Maxifort, Eshkol and 4129 (Seminis Vegetable Seeds, USA) in a 3.2 ha greenhouse complex in Isfahan province, Iran. Plants had been raised in Iran from imported seed. The symptoms consisted of severe mosaic and deformation of leaves (especially the upper and young leaves) and chlorotic and brown necrotic spots on the fruits. These symptoms resembled those of *Tomato brown rugose fruit virus* (ToBRFV) reported elsewhere (Salem et al., 2016). About 30% of plants were affected by symptoms across the greenhouse complex. The cultivars Eshkol and 4129 were more severely affected than others. Extracts from leaf and fruit samples induced the formation of necrotic local lesions on mechanically inoculated *Nicotiana glutinosa* indicating the possible presence of a tobamovirus. The samples were also subjected to RT-PCR using ToBRFV-specific primers: ToBRFV-F (5'-GAAGTCCCGATGTCTGTAAGG-3') and ToBRFV-R (5'-GTGCTACGGATGTGTATGA-3') (Ling et al., 2019). The fragment obtained from the PCR reaction (842 bp) was isolated, purified after size confirmation (by comparison with molecular weight markers), and Sanger sequenced (Sinuhe Biotech Company, Iran). Sequence comparison using BLAST verified the presence of ToBRFV in the samples. The sequence was 99.75% identical with that of ToBRFV isolate Tom1-Jo (KT383474) from Jordan. The sequence was submitted to GenBank (Accession No. OK075081). To the best of our knowledge, this is the first report of ToBRFV in Iran. Following this study, all plants were removed and destroyed from the affected greenhouse. Additional studies have been started to investigate the possible source of the outbreak. [A. Ghorbani, M. Roostami, S. Seifi, K. Izadpanah (Iran), New Disease Report, 19 October 2021]. <https://doi.org/10.1002/ndr2.12040>

JORDAN

First Record of the bay sucker, *Lauritrioza alacris* (Flor) (Hemiptera: Triozidae), in Jordan

The bay sucker, *Lauritrioza alacris* (Flor), is recorded for the first time in Jordan. It was found on bay trees (*Laurus nobilis*) in home gardens in several localities in the capital Amman. Slide mounts were prepared and voucher specimens were preserved at the University of Jordan Insects Museum. Original images for an adult male and female, their genitalia, head, wings and infestation symptoms on the host are provided. Further investigations are needed to evaluate the number of generations per year, the distribution of the pest, the degree of infestation, the damage caused and to study natural enemies of the pest. [Ahmad Katbeh Bader, Ibrahim Al-Jboory, Aseel Al Qaisy (Jordan), *EPPO Bulletin*. 2021;00:1–5]. <https://doi.org/10.1111/epp.12770>

First Record of the Giant Date Palm mealybug, *Pseudaspidopectus hyphaeniacus* (Hall 1925) (Hemiptera: Monophlebidae), from Jordan.

The giant date palm mealybug, *Pseudaspidopectus hyphaeniacus* (Hall 1925) (Hemiptera: Monophlebidae), is recorded from Jordan for the first time based on material collected from a farm located in Ghawr Kabid in the central Jordan Valley. Infestations were found on date palm, *Phoenix dactylifera* L., Canary Island date palm, *Phoenix canariensis* Hort. ex Chabaud and fan palms, *Washingtonia* sp. Photographs of the infestation in the field, different stages of the insect and slide preparations are provided. Specimens were deposited at the University of Jordan Insects Museum. A survey for the pest and its natural enemies in Jordan is needed to determine its distribution in the country and plan an integrated management program for the pest. [Ahmad Katbeh Bader and Ibrahim Al-Jboory (Jordan), *EPPO Bulletin*. 2021; 00:1–5]. DOI: [10.1111/epp.12800](https://doi.org/10.1111/epp.12800)

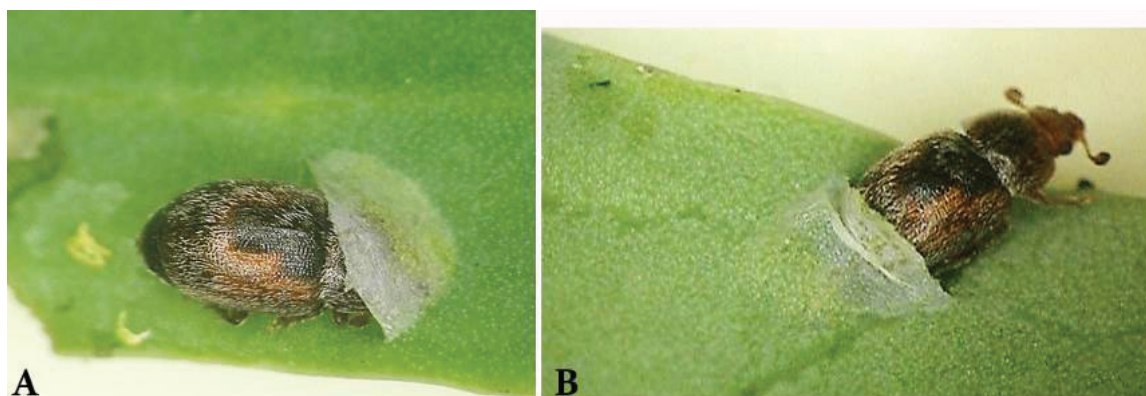
LEBANON

First Report of Tomato Brown Rugose Fruit Virus Infecting Sweet Pepper in Syria and Lebanon.

After the first outbreak of tomato brown rugose fruit virus (ToBRFV) in tomato in Jordan (Salem et al. 2016), this virus has been reported from other neighboring countries and worldwide. In early 2020, virus-like symptoms consisting in chlorosis, mosaic and leaves discolorations accompanied with brown stems and fruit deformation were observed on greenhouse-cultivated sweet pepper plants in the coastal regions of Syria (Tartous) and Lebanon (Byblos). A total of 40 symptomatic and 20 asymptomatic plants were sampled in different sites in both countries and tested for ToBRFV by real-time RT-PCR using CaTa28/CSP1325 primers and probes (diagnostic protocol PM 7/146, *EPPO Bulletin* 2021). ToBRFV was found in 44 samples including all symptomatic ones. Furthermore, RT-PCR using specific primers ToBRFV-F5722/ToBRFV-R6179 amplifying a 458-bp fragment of the coat protein gene (Panno et al. 2019) confirmed the identification of ToBRFV. All the samples tested negative for tomato spotted wilt virus, pepino mosaic virus and cucumber mosaic virus in RT-PCR. To confirm the specificity of the amplified DNA, one representative RT-PCR amplicon from each country was sequenced in both directions. Sequences were deposited in GenBank under the accession numbers OU600529 and OU600530 for the Syrian and Lebanese isolates, respectively. Bioinformatics and BLAST analysis of the sequenced amplicons showed 99.78% similarity between the Syrian and the Lebanese isolates and 99.56% nucleotide identity with TBRFV isolate Ant-Pep (MT002973.1) from Turkey. This is the first report of ToBRFV infecting sweet pepper plants in Syria and Lebanon. [Raied Abou Kubaa, Elia Choueiri (Lebanon), Khaled Heinoun, Fabrizio Cillo and Maria Saponari, *Journal of Plant Pathology*, 25 October 2021. CNR Istituto Per La Protezione Sostenibile Delle Piante (IPSP), UOS Bari, Italy; Department of Plant Protection, Lebanese Agricultural Research Institute, Tal Amara, P.O. Box 287, Zahlé, Lebanon; Ministry of Agriculture and Agrarian Reform, Department of Plant Protection, Damascus, Syria, 2021]. <https://doi.org/10.1007/s42161-021-00987-y>

First Record of the Beetle *Xenostrogylus deyrollei* (Jacquelin Du Val 1860) (Coleoptera: Nitidulidae) in Syria 2021

A number of beetles were observed on cabbage leaves in the farms of the Faculty of Agriculture, Damascus, Syria, in January 2021. Where beetles feed after lifting the cuticle of the leaf (Fig, A). It is at the bottom of these detached areas that the eggs are deposited (one egg per site) (Fig, B). Adult damage (for feeding and laying) is more concentrated on the edge of the cabbage leaves. The different parts of body and female and male genitalia were dissected using small needles. Morphological and anatomical identification showed to be *Xenostrogylus deyrollei* (Jacquelin Du Val, 1860). (Coleoptera: Nitidulidae) (2.7-3.9 mm). This is the first record of this species in Syria. [Alaa Turkey Saleh, Abdulnabi Mohamed Basheer and Ghassan Saman Ibrahim(Syria), Biological Control Studies and Research Center, Faculty of Agriculture, Damascus University, 2021].



First Report of the Celery fly *Euleia heraclei* (Linnaeus,1758) (Diptera: Tephritidae) on Fababean *Vicia faba* in Syria

The celery fly (the hogweed picture-wing fly) *Euleia heraclei* (Linnaeus, 1758) (Diptera: Tephritidae) was recorded on Fababean *Vicia faba* L. (Fabaceae) in Damascus and Damascus countryside. The adults body length of *E. heraclei* can reach 7 millimeters. Bivoltine and dimorphic species, two generations per year, as the color of the body is variable depending on the season. The thorax and the abdomen may be shiny orange-brown or blackish. The sides of the mesonotum have whitish longitudinal stripes. The postscutellum is black. The head has blue-green eyes. The face shows a raised longitudinal rib. These flies have wide wings marked with brown bands. The legs are yellow-brown. The females fly lay the eggs into the leave of the host plants, a few eggs in one leaf. the eggs hatch after 6–8 days, Eggs are oval, white. the white larvae mine the leaves in a short corridor and later a yellow or brown blotch, spindly shaped, up to 8 mm long. After four weeks, adult larvae enter into the soil at a depth of 5 cm. [Houda Kawas, Aida Jalloul Abdulnabi Basheer (Syria), Department of Plant Protection, Faculty of Agriculture, University of Damascus, Syria].

Additional Mite Records (Acari: Mesostigmata, Sarcoptiformes, Trombidiformes) from Syria

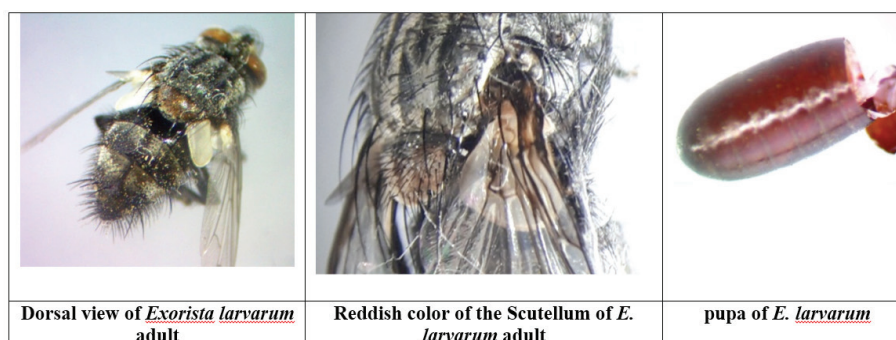
The present study is a part of collection of mites fauna aimed to identify species occurred on some cultivated plants and wild vegetation in Tartus governorate, Syria in November and December, 2020. The results showed the presence of thirteen mite species belonging to six families, of which four species are new records for Syrian mite fauna: the predatory mite *Blattisocius dentriticus* (order Mesostigmata, family Blattisociidae) collected on *Solanum melongena*; the predatory mite *Euseius finlandicus* (order Mesostigmata, family Phytoseiidae) collected on *Castanea* sp.; the predatory mite *Glycyphagus domesticus* (order Sarcoptiformes, family Glycyphagidae) collected on *Quercus* sp.; and the phytophagous mite *Cenopalpus tamarixi* (order Trombidiformes, family Tenuipalpidae) collected on *Pinus pinea*. Morphological measurements and complementary description is given for this later species. [Rania Ebraheem, Aghnar Khador, Yousef Hanna, Lujain Dwya, Ghaith Nakoul, Ziad Barbar (Syria), Accepted in the Syrian Journal of Agriculture Research, Vol. 9, Issue 3, June 2022].

First Record and Identification of Some Parasitoids Accompanying Olive Leaf Midge *Dasineura Oleae* F. Löew (Diptera, Cecidomyiidae) in Some locations Along the Syrian Coast.

For the first time, the species *Zeytinus hatayensis* Doğanlar sp. new (Eulophidae) was recorded depending on the diagnostic characteristics of the male, which has black and yellow spots distributed on the body and antenna with scape 3 times as long as broad. Also, there is an endo-parasitoid of Hym.: Platygasteridae which parasites on the second larval stage of *D. oleae*. In addition, the species of the endo-parasitoid, *Platygaster demades* Walker.1835 was firstly identified and recorded according to the diagnostic characteristics of the female. female antennal segments 7-9 about 1.3-1.4 times as long as wide, female metasoma somewhat longer than rest of body, tergite 2 striated to about half of length, T5 about as long as wide and with rugosity (T3-T4 each wider than long and smooth but with 1-2 transverse rows of deep punctures. [Dr. Ali M. Ramadhane *, Dr. Randa Abu Tara **, Dr. Zahraa M. Baidaq ***, (Syria), *Professor, Department of Plant Protection, Faculty of Agriculture, Tishreen University, Lattakia, Syria. **Researcher, General Commission for Scientific Agricultural Research (GCSAR), Damascus, Syria. ***Researcher, Plant Protection, GCSAR, Lattakia, Syria, 2021]. Zahraaok2@hotmail.com

First Record of the Parasitoid *Exorista larvarum* (Linnaeus, 1758) (Diptera: Tachinidae) on the Larvae of *Thaumetopoea Processionea* (Linnaeus, 1758) (Lepidoptera: Thaumetopoeidae) in Syria.

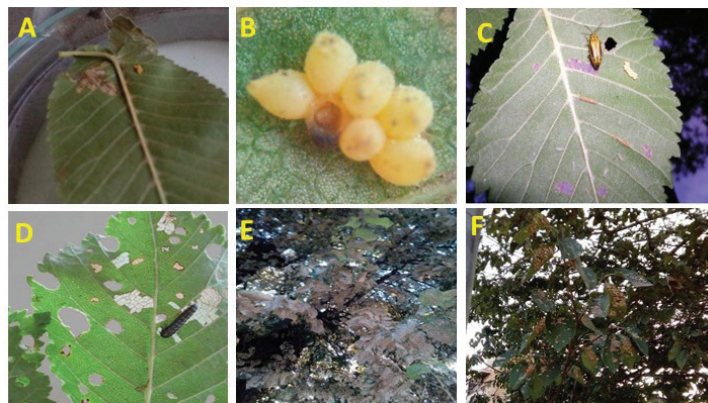
The parasitoid *Exorista larvarum* (Linnaeus, 1758) was recorded on the larvae of *Thaumetopoea Processionea* (Linnaeus, 1758) (Lepidoptera: Thaumetopoeidae) in the forests of Tartous Governorate during the months (May and Jun 2021). It is an Endo parasitoid on the larvae of the host, the female lays eggs in an Oviparous manner, and this parasitoid was recorded as the most important parasitoid on the larvae of *Lymantria dispar* (Linnaeus, 1758) in the forests of the Philippines and Italy in 1999, as it was first recorded in Portugal in 2013. Adults of the parasitoid were obtained after collecting nests of *Thaumetopoea Processionea* from their locations, larvae were reared at the laboratory under conditions of temperature 25 ± 1 c°, $50\pm 5\%$ RH, and (16:8) L:D, in wooden cages measuring 30 x 30 x 40 cm, surrounded on both sides by ventilation nets. The parasitoid was defined using specialized classification keys, depending on the morphological characteristics of the adult stage. Adult is grayish black in color, length about 8.5 mm, Abdomen with black central longitudinal stripe. Scutellum is reddish in color, wing cell r4+5 without petiole and closed the wing edge, M vein with extension. Pupa is cylindrical shape, shiny reddish, its length about 7mm. [Esraa Mahmoud Ahmad¹, Ali Mouhamad Ramadan¹, Louai Hafez Aslan² and Nadia Ibrahim AL- khateeb³. (1) Department of Plant Protection, Faculty of Agriculture, Tishreen University, Lattakia, Syria; (2) Department of Plant Protection, Faculty of Agriculture, Damascus University, Damascus, Syria; (3) Lattakia Center for Rearing Natural Enemies, Department of Biological Control, Directorate of Agriculture, Lattakia, Syria, 2021].



Widespread of Elm Leaf Beetle *Xanthogaleruca luteola* (Müller) in Syria

Elm is considered as deciduous tree which is planted in gardens and on banks of roads in many governorates in Syria. There are many pests which attack this tree, the most important is elm leaf beetle *Xanthogaleruca luteola* (Müller) (Coleoptera: Chrysomelidae). The damage caused by adults and larvae of this insect causes severe defoliation of leaves, which makes the tree unuseful as a shade tree, in addition to losing its beauty. In case of yearly repeated attacks, the weakened plants become more sensitive to secondary pests which may lead to the death of the tree. This pest is widespread threow Europe particularly in France, south Germany, Austria,

and with limited spread in Italy, Corsica and Sardinia, United States of America, Iran, Uzbekistan, Turkey and Iraq. Symptoms of infestation were observed in Aleppo city gardens, particularly the varieties which have smooth and thin leaves, because coarser elm leaves are distasteful to the beetles as in the case of Siberian elm (*Ulmus pumila*) and Scottish elm (*Ulmus minor*). [Ziad Aleisa (Syria), Assistant Researcher in General Commission for Scientific Agricultural Research/Cotton Administration Research, Biocontrol lab, Aleppo, Syria, 2021].



(A) Image of insect's eggs on elm leaf, (B) image of insect's eggs X40, (C) adult damage, (D) larval damage, (E & F) General view of infestation on elm tree.

First Report of Maiden's Blush *Cyclophora punctaria* (Linnaeus, 1758) (Lepidoptera: Geometridae) on both *Solenostemon Coleus scutellarioides* L. and Basil *Ocimum basilicum* L. (Lamiaceae) in Syria.

The Maiden's Blush *Cyclophora punctaria* (Linnaeus, 1758) (*Codonia punctaria* = *Cosymbiapunctaria*) (Lepidoptera: Geometridae) was recorded on *Coleus scutellarioides* L. and basil, *Ocimum basilicum* L. (Lamiaceae) in Damascus and Damascus countryside's. The symptoms were clear disappearance of the surface of the epidermis of the leaves of the plant and elimination of all soft tissues and flowers, led to the development of flowers and seeds with the erosion of the entire plants. Moths fly from mid-April to November in two generations. Adults nectar feeding and have slender abdomens and broad wings shape, which are usually held flat with the hindwings possess a frenulum to link the wings. Wingspan 18-28 mm, first generation, the second generation is typically smaller, Forewings are tip pointed and outer edge with central bulge, the central cross-line is light red-brown coloured as curved row of dots on the forewings, a further line dots on the margin, and have a sand ground colour with dark wavy patterns grey scales and flushed with pink., or may have reddish or yellowish tints. The pattern elements continue on the hindwings. All wings with small whitish discal spot. The larva is smooth and slim, about 25 mm long, very variable in colour, green, grey, or brownish. and easily hide when disturbed by fading into the background or resembling twigs, stand erect and motionless on their prolegs, increasing the resemblance. Over wintering as pupa, which is quite greenish to yellowish-brown with four rows of large dark back spots. The moth *Cyclophora punctaria* is recorded for the first time in Syria. [Houda Kawas, Abdulnabi Basheer (Syria), Department of Plant Protection, Faculty of Agriculture, University of Damascus, Syria, 2021].

Three New Records of psyllid species (Psylloidea, Insect) from Syria.

During regular investigation of plant sanitation in the area of Latakia center for Scientific Agricultural Research activities, some abnormal waxy secretion on terminal buds of three tree species, Indian cherry, *Cordia myxa* L. (Boraginaceae); Indian laurel tree, *Ficus microcarpa* L. f. (Moraceae) and green olive tree, *Phillyrea latifolia* L. (Oleaceae) were noticed. Those insect species responsible were identified as *Diaphorina aegyptiaca*, *Macrohormotoma gladiata* and *Euphyllura phillyreae*, respectively. This is the first record of those species, as well as, a new record of *Diaphorina* and *Macrohormotoma* genera from Syria. [Mahran Zeity (Syria), Agriculture Research Center in Lattakia, General Commission for Scientific Agricultural Research, (GCSAR), Damascus, Syria, accepted to publish in the Syrian Journal of Agricultural Research, August, 2022]. mzma2009@gmail.com

SAUDI ARABIA

First Report of Tomato Brown Rugose Fruit Virus Infecting Tomato Crop in Saudi Arabia.

Tomato (*Solanum lycopersicum* L.) is the most economically important member of family Solanaceae and cultivated worldwide and one of the most important crops in Saudi Arabia. The aim of this study is screening of the most common viruses in Riyadh region and identified the presence of tomato brown rugose fruit virus (ToBRFV) in Saudi Arabia. In January 2021, unusual fruit and leaf symptoms were observed in several greenhouses cultivating tomatoes commercially in Riyadh Region, Saudi Arabia. Fruit symptoms showed irregular brown spots, deformation, and yellowing spots which render the fruits non-marketable, while the leaf symptoms included mottling, mosaic with dark green wrinkled and narrowing. These plants presented the symptoms similar to those described in other studies (Salem et al., 2015, Luria et al., 2017). A total 45 Symptomatic leaf samples were collected and tested serologically against suspected important tomato viruses including: tomato chlorosis virus, tomato spotted wilt virus, tomato yellow leaf curl virus, tomato chlorotic spot virus, tomato aspermy virus, tomato bushy stunt virus, tomato black ring virus, tomato ringspot virus, tomato mosaic virus, pepino mosaic virus and ToBRFV using Enzyme linked immunosorbent assay (ELISA) test (LOEWE®, Biochemica, Germany), according to the manufacturers' instructions. The obtained results showed that 84.4% (38/45) of symptomatic tomato samples were infected with at least one of the detected viruses. The obtained results showed that 55.5% (25/45) of symptomatic tomato samples were found positive to ToBRFV, three out of 25 samples (12%) were singly infected, however 22 out of 45 (48.8%) had mixed infection between ToBRFV and with at least one of tested viruses. A sample with a single infection of ToBRFV was mechanically inoculated into different host range including: *Chenopodium amaranticolor*, *C. quinoa*, *C. album*, *C. glaucum*, *Nicotiana glutinosa*, *N. benthamiana*, *N. tabacum*, *N. occidentalis*, *Gomphrena globosa*, *Datura stramonium*, *Solanum lycopersicum*, *S. nigrum*, *petunia hybrida* and symptoms were observed weekly and the systemic presence of the ToBRFV was confirmed by RT-PCR and partial nucleotide sequence. A Total RNA was extracted from DAS-ELISA positive samples using Thermo Scientific GeneJET Plant RNA Purification Mini Kit. Reverse transcription-Polymerase chain reaction (RT-PCR) was carried out using specific primers F-3666 (5'-ATGGTACGAACGGCGGCAG-3') and R-4718 (5'-CAATCCTTGATGTG TTTAGCAC-3') which amplified a fragment of 1052 bp of Open Reading Frame (ORF) encoding the RNA-dependent RNA polymerase (RdRp). (Luria et al. 2017). RT-PCR products were analyzed using 1.5 % agarose gel electrophoresis. RT-PCR products were sequenced in both directions by Macrogen Inc. Seoul, South Korea. Partial nucleotide sequences obtained from selected samples were submitted to GenBank and assigned the following accession numbers: MZ130501, MZ130502, and MZ130503. BLAST analysis of Saudi isolates of ToBRFV showed that the sequence shared nucleotide identities ranged between 98.99 % to 99.50 % among them and 98.87-99.87 % identity with ToBRFV isolates from Palestine (MK881101 and MN013187), Turkey (MK888980, MT118666, MN065184, and MT107885), United Kingdom (MN182533), Egypt (MN882030 and MN882031), Jordan (KT383474), USA (MT002973), Mexico (MK273183 and MK273190), Canada (MN549395) and Netherlands (MN882017, MN882018, MN882042, MN882023, MN882024, and MN882045). To our knowledge, this is the first report of occurrence of ToBRFV infecting tomato in Saudi Arabia which suggests its likely introduction by commercial seeds from countries reported this virus and spread in greenhouses through mechanical means. The author(s) declare no conflict of interest. Keywords: Tomato brown rugose fruit virus, tomato, ELISA, RT-PCR, Saudi Arabia References: Luria N, et al., 2017. PLoS ONE 12(1): 1-19. Salem N, et al., 2015. Archives of Virology 161(2): 503-506. Fig. 1. Symptoms caused by ToBRFV showing irregular brown spots, deformation, yellowing spots on fruits (A, B, C) and bubbling and mottling, mosaic with dark green wrinkled and narrowing on leaf (D). [Ahmed Sabra, Mohammed Ali Al Saleh, I. M. Alshahwan, and Mahmoud A. Ame (Saudi Arabia), *Plant Dis.* 19, Oct, 2021]. doi: [10.1094/PDIS-05-21-1065-PDN](https://doi.org/10.1094/PDIS-05-21-1065-PDN).

TURKEY

First Report of 'Candidatus Phytoplasma trifolii' associated with leaf reddening and upright growth in pears (*Pyrus communis* L.).

The natural occurrence of 'Candidatus *Phytoplasma trifolii*' in pear trees (*Pyrus communis* Linnaeus) is reported here for the first time. In 2017, a total of thirty-five pear trees, two of them exhibiting leaf rolling along the midvein, reddening, bushy appearance, and upright growth symptoms, were sampled in different locations in Van province, Turkey. The total deoxyribonucleic acid was extracted from symptomatic and

asymptomatic plants. The purified DNA served as a template in nested polymerase chain reaction (nested-PCR) assays, performed to amplify 16S rRNA sequences using universal primer pairs (R16mF2/R16mR1 and R16F2n/R16R2). The resulting PCR products were then cloned into a pGEM T-Easy vector and sequenced bidirectionally. The phytoplasma strain, group, and subgroup identity were determined using the *in silico* restriction fragment length polymorphism (RFLP) analysis of the 16S ribosomal RNA-encoding gene sequences profiling with seventeen distinct restriction enzymes. Of the thirty-five pear samples, only two yielded 1 256 bp and 1 258 bp DNA fragments and were designated as Van-Pr3 (Acc. No. MH709141) and Van-Pr4 (Acc. No. MH730561), respectively. Based on the *in silico* virtual RFLP pattern analysis of the 16S rRNA sequences, we confirmed the presence of ‘*Ca. P. trifolii*’ belonging to the clover proliferation group and both identified phytoplasmas were identical with the similarity coefficient of 1.00 to the reference pattern of 16Sr group VI, subgroup A (Acc. No. AY390261). Here we report that the pear tree is an alternate host of the ‘*Ca. P. trifolii*’. [Mustafa Usta, Abdullah Güller, Hikmet Murat Sipahioğlu (Turkey), *Plant Protection Science*, 57, (3): 188–195, 2021]. <https://doi.org/10.17221/163/2020-PPS>

RESEARCH HIGHLIGHTS

EGYPT

Suitability of Five Plant Species Extracts for their Compatibility with Indigenous *Beauveria bassiana* against *Aphis gossypii* Glov. (Hemiptera: Aphididae).

Background: The cotton aphid, *Aphis gossypii* Glov. (Hemiptera: Aphididae), is a major insect pest on a wide range of plants that causes high damage and transmits plant viruses. This study was carried out to evaluate an indigenous isolate, *Beauveria bassiana* (Bb), and extracts of 5 plant species: *Psiadia penninervia*, *Pulicaria crispa*, *Euryops arabicus*, *Salvia officinalis*, and *Ochradenus baccatus* against *A. gossypii*, as individual and combined treatments to estimate their compatibility under laboratory conditions. Also, the antifungal activity of these plant extracts against *B. bassiana* was evaluated.

Results: LC₅₀ value was 8.64×10^4 spores/ml of Bb against *A. gossypii*, while LC₅₀ values of the tested 5 plant extracts on *A. gossypii* were 103.64, 879.92, 747.90, 783.28, and 262.42 µg/ml for *P. penninervia*, *P. crispa*, *E. arabicus*, *S. officinalis*, and *O. baccatus*, respectively. Both *P. penninervia* and *O. baccatus* extracts had the highest antifungal activities against Bb and were significantly different from the other 3 plant extracts. After 24 h of treatment with the combination of Bb and each extract, no effect for these combinations on *A. gossypii* mortality was recorded. Meanwhile, 5 days after treatment, the combined treatments between Bb and each plant extract achieved a significant increase in mortality than that of the single treatment with Bb or plant extract, except for *P. penninervia* extract, which did not achieve a significant mortality increase when combined with *B. bassiana* than that of its single treatment.

Conclusion: *P. penninervia* extract was not compatible with *B. bassiana*, but the other tested four plant extracts were compatible with *B. bassiana*. These four plant extracts could be used to control aphids in combinations with *B. bassiana*. Further laboratory and field investigations are needed to examine the effects of these plant extracts on other insect pests or associated beneficial insects. [Samy Sayed, Sayed-Ashraf Elarnaouty and Esmat Ali (Egypt), *Egyptian Journal of Biological Pest Control*, 31:11, 2021].

The Competitive Potential of Different *Trichoderma* spp. to Control Rhizoctonia Root Rot Disease of Pepper (*Capsicum annuum* L.). Five isolates of *Trichoderma* spp. were investigated, in a preliminary study, for their efficiency in controlling Rhizoctonia root rot of pepper. GC-MS analysis of most active *Trichoderma* spp. extracted secondary metabolites were studied. The major compounds identified by GC-MS analysis include hexadecanol, nonadecene, 1,2-benzenedicarboxylic acid, octadecenoic acid (z) and hexadecanol, 2-methyl. These compounds have been found to play an essential role in controlling plant diseases. The results of antagonistic activity of three isolates proved higher efficiency in managing *R. solani*. Browning of the *R. solani* mycelium was observed where mycoparasitism had occurred. The parasitism of *R. solani* hyphal cells by *Trichoderma harzianum* was studied by light and scanning electron microscopy. Sequence data of *R. solani* isolates (R.1, R. 2 and R. 4) have been submitted to the GenBank under accession numbers (MZ267232, MZ267234 and MZ267689), respectively. The most effective isolates, *i.e.* *T. asperellum*, *T. hamatum* and *T. harzianum* and their mixture, were formulated in different forms *i. e.* suspension and powder, then tested

at different concentrations under the greenhouse protected cultivation conditions. The results of greenhouse studies indicated that all isolates and their mixture effectively controlled pepper root rot disease and increased the percentage of survived plants.

Moreover, results showed that suspension was effective than powder in reducing the disease. Higher bio-control efficiency at protected cultivation was obtained when the mixture of isolates was used at a high concentration. Most of the *Trichoderma* isolates studied in the present work have reduced the severity of *R. solani*. [Ayat M. Ali (Egypt), Central Lab of Organic Agriculture, Agriculture Research Center, Giza, Egyptian Journal of Phytopathology, Vol. 49, No. 1, pp 136-150 ,2021].

***Aphytis lepidosaphes* (Hymenoptera: Aphelinidae) as an effective parasitoid for controlling the *Lepidosaphes tapleyi* (Williams).**

The guava long scale insect *Lepidosaphes tapleyi* (Williams) (Hemiptera: Diaspididae) is considered one of the main destructive pests of guava worldwide. Biological control represents a sustainable alternative for saving control of *L. tapleyi*. The main objective of the present work is to study the seasonal activity, and evaluate the impacts of climatic factors on populations of the parasitoid, *Aphytis lepidosaphes*, during two successive years (2017/2018 and 2018/2019) in Esna district, Luxor Governorate, Egypt. Estimation of the relationship between the population density of *L. tapleyi* and *A. lepidosaphes* activity was made by using different models of correlation and regression analyses. The estimate of the effects of climatic factors (daily mean max. temp., min. temp., mean of % relative humidity, and mean of dew point) on seasonal activity of the parasitoid, *A. lepidosaphes*, during two successive years (2017/2018 and 2018/2019) were made. The results obtained showed that the relationship between the population density of *L. tapleyi* and *A. lepidosaphes* activity was positive during both years. Furthermore, simple regression analysis indicated that the abundance of *A. lepidosaphes* was more highly correlated with the *L. tapleyi* population density in each whole year during the two successive years. The percentages of explained variance (E.V.%) indicated that all tested variables, *i.e.* daily mean maximum temperature, minimum temperature, relative humidity, and dew point, were responsible for 76.26% and 65.40% of the changes in parasitoid, respectively. Furthermore, the dew point was the most influential variable for the change in the parasitoid populations by 33.61% and 18.62%. The results obtained also showed that *A. lepidosaphes* had three peaks of seasonal abundance over the entire year. The activity of *A. lepidosaphes* was also more highly correlated with the *L. tapleyi* population size over the two successive years. [Moustafa M.S. Bakry¹, Laila Ali M. Al- Shuraym², Rania Ali El Hadi Mohamed^{2,3} and Islam R.M. El-Zoghby⁴, ¹Scale insects and Mealybugs Research Dept., Plant Protection Research Institute, A.R.C, Dokki, Giza, Egypt; ²Department of Biology, College of Sciences, Princess Nourah Bint Abdulrahman University, Riyadh –Saudi Arabia; ³Federal Ministry of Health (Sudan), Early preparedness and epidemics control; ⁴Plant Protection Dept., Faculty of Agric. and Natural Resources, Aswan Univ.,

Aswan, Egypt, **Pak. J. of Biol. Sci., 24(12): 1246-1255,2021. DOI: 10.3923/pjbs.2021.1246.1255**

Impact of some weather factors and plant ages on population density of *Aphis craccivora* (Koch) on faba bean plants in Luxor Governorate, Egypt.

Field studies were done on faba bean plants at the El-Mattana Agricultural Research Station in Luxor Governorate, Egypt, during two successive growing seasons (2019/20 and 2020/21) to investigate the seasonal activity of the cowpea aphid, *Aphis craccivora* (Koch) (Hemiptera: Aphididae) (Giza 843 cultivar), and to estimate the effects of some climatic conditions and plant ages on the seasonal abundance of *A. craccivora*. In this study, two insect population factors were assessed, insect numbers and incidence of insect infestation. Results obtained indicated that *A. craccivora* infested faba bean plants from 21st November 2019 to 12th March 2020 during the first growing season and from 22nd November 2020 to 13th March 2021 through the second season. The cumulative counts of *A. craccivora* were 321.48 and 340.66 individuals for each season, respectively. Furthermore, the overall mean of

A. craccivora population was 18.91 ± 0.92 and 20.04 ± 1.52 individuals per 10 plants during the first and second growing seasons, respectively. The general abundance average (%) was 66.73 ± 1.60 and 58.43 ± 2.28 for the two seasons, respectively. Climatic conditions were more favourable for *A. craccivora* to increase its population in November, January and February for the two seasons. Additionally, in two consecutive growing seasons, the number of *A. craccivora* disappeared during the faba bean maturation stage at the end of March. According to the findings, the combined impacts of environmental conditions and plant ages can explain changes in *A. craccivora* population density. The results revealed that the effects of weather conditions and plant ages on population density and infestation incidence percentages by *A. craccivora* were highly significant during the two seasons studied. These parameters varied from season to season. Also, the dew point and mean daily minimum temperature were the most influential variables for the insect population changes and the percentages of infestation incidences under the studied seasons. This information can aid in developing an aphid IPM program for faba bean plants. [Ghada S. Mohamed¹, R.O.H. Allam¹, Heba A. Mohamed¹ and Moustafa M.S. Bakry^{2,1}, Plant Protection Department, Faculty of Agriculture, South Valley University, ²Plant Protection Research Institute, A.R.C, Dokki, Giza, Egypt, SVU-International Journal of Agricultural Sciences, 3 (4): 84-104, 2021] [Doi: 10.21608/svuijas.2021.85028.1125](https://doi.org/10.21608/svuijas.2021.85028.1125)

IRAQ

Tomato Leafminer *Tuta absoluta* (Meyrick), Parasitoids in Open Field Tomato in Iraq.

The tomato leaf miner, *Tuta absoluta* (Lepidoptera: Gelechiidae), is an invasive pest in Iraq that represents a global threat to commercial tomato production in both open fields and greenhouses. A field survey was conducted to identify parasitoids of *T. absoluta* in an open tomato field in three sites: Suweera, Azeezia and Kut in Wasit province, central of Iraq, during the 2019 cropping season. Five hymenopterans parasitoid species were collected and identified on *T. absoluta* v.s. two egg parasitoids *Trichogramma pintoi* Voegele (Trichogrammatidae) and *Telenomus* sp. (Platygastridae); two larval parasitoids *Habrobracon concolorans* Marshall (Braconidae) and *Closterocerus* sp. (Eulophidae), and one parasitoid on pupa, *Proconura* sp. (Chalcididae). The present study was considered the first record of these parasitoids of *T. absoluta* on the open tomato field in Iraq. [Amer J. A. Al-Gerrawy (Iraq), Plant Protection Department, College of Agriculture, Wasit University, Kut, Iraq, Revista Brasileira de Ciências Agrárias, 2021].

Effects of Different doses of Gamma Rays on the Dispersal and Flight Ability Index of Mediterranean Fruit Fly *Ceratitis capitata* (Wiedmann) (Diptera: Tephritidae).

This investigation focused on studying the effect of gamma rays on the flight ability index and the dispersal of irradiated males because these two parameters were very important for applying the sterile male release technique. The results of this study showed that the flight ability index of irradiated males as pupae of 3, 4 and 5 days with doses ranging from 60 to 120 Gy are highly significant $p \leq 0.05$ compared with control treatment during an experiment carried out under field conditions. The results showed a reverse relationship between flight ability index and gamma rays doses. Furthermore, the results of this investigation also showed that there was a reverse relationship between the mean average of males captured by the pheromone traps and gamma rays doses after 1,2,3, and 4 days from the release. [Amer J. A. Al-Gerrawy¹, Ahmed J. M. AL-Shammary², Hayder S. H, Al -Azzawy³ (Iraq), ¹College of Agriculture, Wasit University, Wasit, Iraq, ²Directorate of Agricultural Research, Ministry of Science & Technology, Baghdad-Iraq, ³College of Sciences, Baghdad University, Baghdad-Iraq, IOP Conference Series: Earth and Environmental Science, 2021].

Occurrence of Fig Cryptic Virus in Fig Trees in Iraq.

Fig (*Ficus carica*) belongs to the family Moraceae and is one of the oldest and most important cultivated fruit crops in many countries in temperate regions of the world. The vigour and yield of fig trees are affected by many diseases; the most detrimental of them is fig mosaic disease, which is caused by a complex of viruses. A previous study has shown the presence of fig mosaic virus (FMV) in the northern part of Iraq (Mohammed et al. 2019), but no information is available about the presence of other viruses associated with the disease. The aim of this study is to conduct a survey of major fig viruses, in particular of fig cryptic virus (FCV), in commercial fig orchards in different fig-growing regions in Iraq. A wide range of foliar symptoms, including

deformations, mosaic, chlorotic mottling, vein banding and clearing, and chlorotic ring spots, were observed on fig trees. One hundred samples were collected from the most important fig cultivars Aswed Dyala (50 samples), Waziri (35 samples) and Sultani (15 samples), and total nucleic acids were extracted from leaf tissue with the silica capture protocol (Foissac et al. 2001). All samples were tested by RT-PCR for the presence of FCV using a specific primer pair designed in the RNA-dependent RNA polymerase region (Elbeaino et al. 2011) to amplify a genomic fragment of 350 bp in size. Results showed that 45% (45 of 100) of the tested samples were infected by FCV. RT-PCR amplicons of six samples were sequenced and nucleotide sequences were deposited in GenBank under accessions numbers OU452323-OU452328. Iraqi isolates shared 96% to 100% nucleotide sequence identity among them, and 96% to 99% with FCV isolate BN13 (FR687854) from Italy. Among the other fig viruses selected for this survey, including FMV, fig fleck-associated virus (FFkaV), and fig leaf mottle-associated virus 2 (FLMaV2), only FMV was detected in 37% (37 of 100) of the samples tested. To our knowledge, this is the first report of FCV in fig trees in Iraq. [Nabeel Al-Kaeath, Manel Elair, Lehad Arezki and Naima Mahfoudhi (Iraq), *Journal of Plant Pathology*, Published: 03 November 2021]. <https://doi.org/10.1007/s42161-021-01003-z>

Evaluation of some Biological and Chemical Elements in Controlling some soil-borne Fungi and Stimulating Plant Growth.

This research was conducted to evaluate the efficacy of the biocontrol fungi *Chaetomium cupreum*, *Trichoderma viride*, and *Saccharomyces cerevisiae* and some chemical nutrients that stimulate plant growth, such as calcium nitrate, ammonium phosphate, aqueous magnesium sulfate, copper and boron in controlling some common soil-borne pathogenic fungi and evaluating their role in stimulating plant growth. All the bioagents showed significant antagonism efficiency *In vitro* against the pathogenic fungi *Drechslera Halodes*, *Fusarium oxysporum*, *Fusarium solani*, *Macrophomina phaseolina*, *Pythium aphanidermatum* and *Rhizoctonia solani*. Under greenhouse conditions, BC treatment composed of biological and chemical elements achieved the highest germination rate for tomato, cucumber and cowpea seeds inoculated with the pathogenic fungi and reached 95.83-100.00% compared to 36.67- 47.50% for the control treatment. BC treatment also excelled in reducing disease incidence and severity. The disease rate reached 0% compared to 95.83-99.17% for the inoculated control treatment, without significant difference with the non-inoculated (healthy) control. In addition, the BC treatment produced a 0 % disease severity rate compared to 82.58-85.83% for the inoculated control and without significant difference with non-inoculated control. Furthermore, the BC treatment was superior to the rest in increasing the dry weight of all the plant species tested. [Safaa Neamat Hussein¹, Abdul Zahra Jabar Ali² and Huria Hussein Al-Juboory³ (Iraq),⁽¹⁾Department of Environmental Engineering, College of Engineering, Mustansiriyah University, Iraq, ⁽²⁾Research and Development Division, Ministry of Higher Education and Scientific Research, Iraq, ⁽³⁾Department of Plant Protection, College of Agriculture, Baghdad University, Iraq. *Arab Journal of Plant Protection*, released in March, Vol. 40, Issue 1, 2022].

Bioactive metabolites from tomato endophytic fungi with antibacterial activity against tomato bacterial spot disease. Endophytic fungi are potential antimicrobial agents that play an essential role in improving plant growth. Endophytic fungi from healthy tomato plants have been evaluated for their potential antibacterial activity against *Xanthomonas vesicatoria* causing bacterial spot disease of tomato. Thirty-eight different endophytic fungal isolates were isolated, and their extracts were screened for antibacterial activity using the well diffusion method. Three isolates showed a potent antibacterial activity, which was molecularly identified as *Diaporthe phaseolorum* (USt1), *Aspergillus fumigatus* (USt2) and *Aspergillus versicolor* (USt3), respectively. Comparison of the components of the extracts between three isolates was made using a gas chromatography-mass spectrometry. Thirty-eight compounds were found in *A. fumigatus*, thirty-six compounds in *D. phaseolorum*, and forty-two compounds were found in *A. versicolor*. The most prevalent compounds were acetol, hexanoic acid and acetic acid in all three fungi. Hexanoic acid (39.52%), acetic acid (8.95%) and acetol (8.10%), were found in *A. fumigatus*. However, the *D. phaseolorum* extract contained mainly hexanoic acid (42.35%) and acetic acid (11.89%) and acetol (9.52%), while *A. versicolor* contained hexanoic acid (34.44%), acetic acid (13.44%) and acetol (10.61%). Our results suggest that the three active endophytic fungi isolates provide a basis for identifying new bioactive compounds, and for the effective biocontrol of bacterial spots of tomatoes. [Tavga Sulaiman Rashid. Department of Plant Protection, College of Agricultural Engineering Sciences, Salahaddin University, Erbil, Iraq. *Rhizosphere* Volume 17, March 2021, 100292 <https://doi.org/10.1016/j.rhisph.2020.100292>

Induction of defence-related enzymes and biocontrol efficacy of *Trichoderma harzianum* in tomato plants infected with *Fusarium oxysporum* and *Fusarium solani*.

Fusarium wilt of tomato plants caused by *Fusarium oxysporum* Schlecht. Emend. Snyder & Hansen and *Fusarium solani* (Mart.) Sacc. are a serious problem limiting tomato production worldwide. Biological control has emerged as one of the most promising alternatives to chemical fungicides. The biological control capability of a *T. harzianum* isolate against *F. solani* and *F. oxysporum* were investigated. In dual culture tests, it inhibited colony growth of two *Fusarium* species by more than 80 %. Greenhouse experiments results revealed that disease severity in the tomato plants co-inoculated with *T. harzianum* was significantly lower than plants only infected with the *Fusarium* pathogens. Tomato plants inoculated with the antagonistic *T. harzianum* isolate, showed enhanced peroxidase and polyphenol oxidase activities in greenhouse experiments and increased resistance to *F. solani* and *F. oxysporum*. The *T. harzianum* isolate indirectly affected the *Fusarium* pathogens by enhancing plant defence. [Tavga Sulaiman RASHID, Sirwa Anwar QADIR, Hayman Kakakhan AWLA. Salahaddin University, College of Agricultural Engineering Sciences, Department of Plant Protection, Erbil, Iraq Erbil Polytechnic University, Khabat Technical Institute, Department of Plant Protection, Iraq, *Acta agriculturae Slovenica*, 117/1, 1–6, Ljubljana 2021] doi:10.14720/aas.2021.117.1.1622

MOROCCO

Biofumigation for the Control of Vegetables Soilborne Pathogens in Some non-Temperate Climate Countries. Soil-borne pathogens (SBPs) significantly reduce the yield and quality of crops worldwide. In the past, their control was principally accomplished by using soil fumigants such as methyl bromide (MB). However, this fumigant which is a powerful ozone-depleting substance has completely been phased out under the Montreal Protocol (MP). New chemicals and non-chemical alternatives to MB, including biofumigation, have been actively researched, developed, and commercially adopted worldwide. This review seeks to provide the status of biofumigation for the control of SBPs in some non-temperate climate zones referred to in this paper as Article 5 countries or developing countries according to the Montreal Protocol (MP) classification. The review will first define “the non-temperate climate zone,” list the countries belonging to this zone, focus on the role and importance of the MP in phasing-out MB, and in searching and commercially adopting alternatives including biofumigation to this fumigant. It also describes the biofumigation techniques reported and used, reports its efficacy/inefficacy to manage SBPs in some non-climate temperate countries, insists on the place it must have in an IPM program to increase its efficacy, and finally, lists the collaboration and the research needed to further develop and commercially adopt this technology in non-temperate climate countries. [Mohamed Besri (Morocco), Hassan II Institute of Agronomy and Veterinary Medicine, Rabat, Morocco, *Global Journal of Agricultural Innovations, Research & Development*, 87-99, 2021]. DOI: <https://doi.org/10.15377/2409-9813.2021.08.6>

SYRIA

Morphological and molecular Identification of *Fusarium* spp. associated with crown and root rot of Cham-5 durum wheat in the Syrian coastal area.

Crown and root rot of wheat is considered one of the most damaging diseases, resulting in significant yield losses in different regions worldwide. The aim of this study was to isolate and identify *Fusarium* species associated with crown rot of wheat in Syrian coastal areas. Ten *Fusarium* isolates were recovered from crowns and roots of durum wheat plants (var. Cham5), showing typical symptoms, collected from five different sites in coastal Tartous province. Based on morphological characteristics, seven isolates were identified as *F. incarnatum* (syn. *F. semitectum*), and three isolates were *F. solani*. Sequencing a partial TEF1- α gene of two representative isolates of these two species confirmed the morphological identification. Phylogenetic tree of the partial TEF1- α gene showed a clear separation between the two species and the high genetic similarity of Syrian and reference isolates. Up to our knowledge, this is the first report of *F. incarnatum* and *F. solani* infecting the roots and crowns of wheat in Syria. [Zidan, L., Naffaa, W., Saleh, A. and Jawdat (Syria), *Archives of Phytopathology and Plant Protection*, 2021].

[DOI. 10.1080/03235408.2021.1995250](https://doi.org/10.1080/03235408.2021.1995250)

Taxonomic Study of some Ciliatic Species of the Order Hymenostomatida) Family: Parameciidae) in Qoiq River at the North of Syria.

The order Hymenostomatida is considered as one of the most important orders of the Ciliophora, where its members are contributed to the ecological balance as they form an important circle in the food chain in aquatic environments. Water samples were collected from one site: Qoiq River, during the period between 25/7/2017 and 27/11/2019, whereas this work continued over a period of 16 months. The water samples were taken near the bottom at a depth of 30 cm below the surface of the water. The classification of the ciliated species are considered as an initial step to contribute to the biodiversity map in Syria. The results of this taxonomic study showed the presence of one family: Parameciidae. And we found through it one genus with five species; these species were recorded for the first time in the north of Syria. The founded five species are *Paramecium caudatum*, *P. Multimicronucleatum*, *P. aureli*, *P. polycaryum*, *p.bursaria*. [Zainab Badenjki (Syria), Faculty of Science, Aleppo University, Aleppo, Syria, Syrian Journal of Agricultural Research – SJAR 8(4): 110-021 August 2021]. zainabbadenjkey@gmail.com

Inducing Systemic Resistance in Tomato Plants against Tomato Yellow leaf Curl Virus TYLCV under Protected Cultivation.

This study was conducted to evaluate the efficiency of two strains of Plant Growth Promoting Rhizobacteria, *Pseudomonas chlororaphis* MA342, and *Bacillus subtilis* FZB27, on reducing infection by Tomato yellow leaf curl virus (TYLCV), in tomato plants grown under protected agriculture, in Agricultural Research Centre during autumn and Winter of 2018-2019 growing seasons. Tomato seeds were immersed in a suspension of two strains (concentration 9×10^9 Bacterial cell/ml) before seeding; also, Tomato seedlings before transplanting were treated with bacterial suspension (5ml/seedling). Additional 10ml/plant of bacterial suspension was added after ten days according to the experimental treatments. The following were estimated: peroxides enzyme activity, viral concentration, percentage of viral inhibition. Results showed increasing in peroxides enzyme activity after ten days in plants inoculated with TYLCV and treated with bacterial suspension B27 (0.032 $\mu\text{m}/\text{mg}$), and this was better than other used treatments MA and virus (0.031 $\mu\text{m}/\text{mg}$) and control treatment (0.023 $\mu\text{m}/\text{mg}$). After 30 days of viral infection, the peroxides enzyme activity was higher in plants treated with MA (1.362 $\mu\text{m}/\text{mg}$) than in Plants treated with B27 (0.940 $\mu\text{m}/\text{mg}$) and control treatment (0.449 $\mu\text{m}/\text{mg}$). Results of estimation of viral concentration by TAS-ELISA has shown decreasing in TYLCV concentration after 50 days of inoculation. The absorbance values at 450 nm of extracts from MA treated plants (0.373) and B27 treatment plants (0.378) compared with absorbance values (0.702) of extracts from the control treatment. The percentage of viral inhibition in treated plants with MA (46.86%) was higher from plants treated with B27 (46%) may be because the activity of peroxides enzyme was higher in plants treated with MA than others. [Ensaf Hassan Akel^{(1)*}, Hanan Kawas⁽¹⁾, Qusay Al-Rhayeh⁽¹⁾, Rehab Hamdan⁽¹⁾ and Imad D. Ismail⁽¹⁾. General Commission Agriculture Research, Lattakia, Syria⁽²⁾. Tishreen University, Faculty of Agriculture, Department of plant protection Lattakia, Syria, Syrian Journal of Agricultural Research – SJAR 8(4): 121-133 August 2021]. ensafakel5n4a@gmail.com

Additional mite records (Acari: Mesostigmata, Sarcoptiformes, Trombidiformes) from Syria.

The present study is a part of a collection of mites fauna aimed to identify species that occurred on some cultivated plants and wild vegetation in Tartus governorate, Syria, in November and December 2020. The results showed the presence of thirteen mite species belonging to six families, of which four species are new records for Syrian mite fauna: the predatory mite *Blattisocius dentriticus* (order Mesostigmata, family Blattisociidae) collected on *Solanum melongena*; the predatory mite *Euseius finlandicus* (order Mesostigmata, family Phytoseiidae) collected on *Castanea* sp.; the predatory mite *Glycyphagus domesticus* (order Sarcoptiformes, family Glycyphagidae) collected on *Quercus* sp.; and the phytophagous mite *Cenopalpus tamarixi* (order Trombidiformes, family Tenuipalpidae) collected on *Pinus pinea*. Morphological measurements and complementary description is given for this later species. [Rania Ebraheem, Aghnar Khador, Yousef Hanna, Lujain Dwy, Ghaith Nakoul, Ziad Barbar, Syrian Journal of Agriculture Research, Vol. 9, Issue 3, June 2022]

SAUDIA ARABIA

Taxonomy and distribution of termite fauna (Isoptera) in Riyadh Province, the Kingdom of Saudi

Arabia, with an updated list of termite species on the Arabian Peninsula.

The present study shows an updated synoptic list of the 30 known Isoptera of the Arabian Peninsula classified under four families and nine genera. Twenty-seven species are hitherto known from the Kingdom of Saudi Arabia (KSA). The current inventory of the termites of Riyadh Province (KSA) indicated three species, *Anacanthotermes ochraceus* (Burmeister 1839), *Psammotermes hypoostoma* Desneux, 1902 and a rare species, *Coptotermes heimi* (Wasmann 1902). We present an illustrated key to species based on the soldier caste. *Anacanthotermes ochraceus*, and *P. hypoostoma* are widely distributed Palearctic species, whereas *C. heimi* seems rare and is a new record for KSA. Distribution maps for the three species are provided based on recently collected material and literature records and remarks on species habitat preference are given. [M.R. Sharaf, M. Husain, Khawaja Ghulam Rasool et al., (Saudi Arabia), *Saudi Journal of Biological Sciences*, Volume 28, Issue 12, Pages 6795-6802, 2021]. <https://doi.org/10.1016/j.sjbs.2021.07.055>

RNAi-mediated Silencing of Vitellogenin Gene Curtails Oogenesis in the Almond moth *Cadra cautella*.

Vitellogenins, major yolk protein precursors, play an essential role in the reproduction and spread of all oviparous species, including insects. To investigate reproductive strategies of the warehouse moth *Cadra cautella* at the molecular level, a partial transcript of the *C. cautella* vitellogenin (CcVg) gene was extended through the rapid amplification of cDNA ends PCR and sequenced. The complete CcVg mRNA transcript was 5,334 bp long, which encoded a protein of 1,778 amino acids, including the first 14 amino acids of the signal peptide. The deduced CcVg protein contained a putative cleavage site (RTRR) at the amino-terminal side, similar to several other insect species. DGQR and GI/LCG motifs were present at the CcVg gene C-terminus, followed by nine cysteine residues. CcVg harboured 131 putative phosphorylation sites, numbering 84, 19, and 28 sites for serine, threonine, and tyrosine, respectively. The transcript showed a great resemblance with other lepidopteran Vgs. CcVg protein analysis revealed three conserved regions: 1) vitellogenin-N domain, 2) DUF1943 (domain of unknown function), and 3) a von Willebrand factor type D domain. Additionally, sex, stage-specific, and developmental expression profiles of the CcVg gene were determined through RT-PCR. The Vg was first expressed in 22-day-old female larvae, and its expression increased with growth. The phylogenetic analysis based on different insect Vgs revealed that the CcVg exhibited close ancestry with lepidopterans. The CcVg-based RNAi experiments were performed, and the effects were critically evaluated. The qRT-PCR results showed that CcVg-based dsRNA suppressed the Vg gene expression up to 90% at 48 h post-injection. Moreover, CcVg-based RNAi effects resulted in low fecundity and egg hatchability in the CcVg-based dsRNA-treated females. The females laid eggs, but because of insufficient yolk protein availability the eggs could not succeed to hatch. The significant difference in the fecundity and hatchability unveiled the importance of CcVg gene silencing. It confirmed that the Vg gene plays a key role in *C. cautella* reproduction, and it has the potential to be used as a target for RNAi-mediated control of this warehouse pest. [Husain, Mureed, Khawaja Ghulam Rasool, Muhammad Tufail, Waleed Saleh Alwaneen, and Abdulrahman Saad Aldawood. (Saudi Arabia), *PloS one* 16, no. 2: e0245928, 2021]. <https://doi.org/10.1371/journal.pone.0245928>

Silencing of Vitellogenin Gene Contributes to the Promise of Controlling Red Palm weevil, *Rhynchophorus ferrugineus* (Olivier).

Red palm weevil [*Rhynchophorus ferrugineus* (Olivier)], is native to South Asia and expanding its distribution range globally. Recent invasions of red palm weevil around the world, including Saudi Arabia, has become a global constraint for the production of palm species. Although several control measures have been tested, none of them seemed successful against this invasive species. Therefore, we focused on silencing the reproduction control gene vitellogenin (Vg) based on RNA interference (RNAi) strategy for its possible application in the management of *R. ferrugineus*. The Vg is a major yolk protein precursor critical for oogenesis. To do this, fat body transcriptome of *R. ferrugineus* female adults was sequenced, which provided partial Vg gene transcript (FPKM 5731.60). A complete RfVg gene transcript of 5504 bp encoding 1787 amino acids was then sequenced using RCAE-PCR strategy and characterized. Phylogenetic analysis suggested that RfVg has closer ancestry to the coleopteran insects. The RfVg-based RNAi significantly suppressed the expressions of Vg gene. The 15, 20 and 25 days post-injection periods suppressed Vg expressions by 95, 96.6 and 99%, respectively. The suppressed Vg expressions resulted in the dramatic failure of Vg protein expression, which caused atrophied ovaries or no oogenesis, and ultimately eggs were not hatched. These results suggest that the knockdown of Vg gene involved in *R. ferrugineus* reproduction is a promising target for RNAi-based management of *R. ferrugineus*. [Rasool, K. G., Mehmood, K., Tufail, M., Husain, M., Alwaneen, W. S., & Aldawood, A. S. (Saudi Arabia), *Scientific Reports*, 11(1), 1-12, 2021]. <https://doi.org/10.1038/s41598-021-01159-9>

Pathogenicity of Local and Exotic Entomopathogenic Fungi Isolates against Different Life Stages of Red Palm Weevil (*Rhynchophorus ferrugineus*).

Entomopathogenic fungi are regarded as effective biocontrol agents in pest management. Different fungi isolates exhibit varying degree of pathogenicity against red palm weevil [*Rhynchophorus ferrugineus* (Olivier)]. The pathogenicity of four native isolate from Saudi Arabia (three *Beauveria bassiana* named as BbSA-1, BbSA-2, BbSA-3 and one *Metarhizium anisopliae* regarded as MaSA-1) and three exotic isolates from Indonesia (*B. bassiana* coded as BbIDN-1 and *M. anisopliae* named as MaIDN-1 and MaIDN-2) was evaluated against red palm weevil under laboratory conditions. The isolates were applied to eggs (1 day old), larvae (3 and 35 days old), pupae (5 days old) and adults (10 days old). The average mortality rate of eggs and hatched larvae was 100% in all isolates except BbSA-2 and BbIDN-1, where mortality was 93.3 and 90%, respectively. The lowest mortality rate (73.3%) was recorded for BbSA-3 against 3-days-old larvae; however, all other isolates caused >80% larval mortality. Meanwhile, 93.3% mortality of 35-day-old larvae was noted for MaSA-1 isolate. The highest pupa mortality (80%) was observed for MaSA-1, while remaining isolates caused >60% mortality. The isolates BbSA-1 and MaSA-1 caused 61 and 74.3% mortality in adults, respectively. The tested fungi isolates exhibited high virulence against all life stages of red palm weevil. Local isolates had higher pathogenicity than exotic isolates. The findings of the current study suggest that entomopathogenic fungi could be used as biological control agents for the management of red palm weevil. However, field studies are needed to reach the sound conclusions and practical applications. [Sutanto, Koko Dwi, Mureed Husain, Khawaja Ghulam Rasool, Wahidah Hazza Al-Qahtani, and Abdulrahman Saad Aldawood(Saudi Arabia), Plos one 16, no. 7: e0255029, 2021]. <https://doi.org/10.1371/journal.pone.0255029>

Toxicity and Field Efficacy of Emamectin Benzoate (ARETOR) against Red Palm Weevil, by using Syngenta Tree Microinjection Technique.

Invasions of the red palm weevil (RPW) *Rhynchophorus ferrugineus* (Olivier) has become a well-known problem for several palm species in date palm-growing states, including Saudi Arabia. Although several control measures have been implemented in efforts against RPW, yet, no approach has proven consistently effective against this invasive pest. Therefore, further steps are still needed to develop an effective and efficient control method for RPW management and mitigation. The objectives of the present study were to determine emamectin benzoate (ARETOR) efficacy against RPW larval stages in the laboratory using a diet incorporation bioassay, along with field tests of the Syngenta Tree Micro-Injection Technique. Our laboratory bioassay showed that the median lethal concentration of emamectin benzoate (ARETOR) was 0.30 µg/mL⁻¹ against wild populations of RPW larvae. In the field studies, emamectin benzoate (ARETOR) showed promising effects on RPW mortality for all stages. We found 100% mortality for both larval and pupal stages for all exposure times, except after 2 months, where 86% mortality was observed for larvae. Thus, we conclude that emamectin benzoate (ARETOR) is an effective biopesticide against RPW. Our results show that it killed RPW all stages, also prevented further damage to the healthy tissues of date palms, in addition, provided protection against RPW spread to other neighbouring healthy date palms. [Rasool Khawaja Ghulam, Mureed Husain, Shahzad Salman, Naeem Abbas, Khalid Mehmood, Koko Dwi Sutanto, Abdulrahman Saad Aldawood (Saudi Arabia), International Journal Agriculture and Biology, 25:1120–1125,2021].DOI: [10.17957/IJAB/15.1771](https://doi.org/10.17957/IJAB/15.1771)

De Novo Transcriptome analysis and Identification of Reproduction Control Genes from the Red Palm Weevil *Rhynchophorus ferrugineus*.

Recent attacks by the red palm weevil, *Rhynchophorus ferrugineus* (Olivier), have become a severe problem for palm species. In the present work, the fat body transcriptome of adult female red palm weevil was analyzed, focusing on the identification of reproduction control genes. Transcriptome study was completed by means of next-generation sequencing (NGS) using Illumina Hiseq 2000 sequencing system. A total of 105,938,182 raw reads, 102,645,544 clean reads, and 9,238,098,960 clean nucleotides with a guanine–cytosine content of 40.31%, were produced. The processed transcriptome data resulted in 43,789 unique transcripts (with mean lengths of 1,172 bp). It was found that 20% of total unique transcripts shared up to 80%–100% sequence identity with homologous species, mainly the mountain pine beetle *Dendroctonus ponderosae* (59.9%) and red flour beetle *Tribolium castaneum* (26.9%). Nearly 25 annotated genes were predicted to be involved in red palm weevil reproduction, including five vitellogenin (Vg) transcripts. Among the five Vg gene transcripts, one was highly expressed compared with the other four (FPKM values of 1.963, 1.471, 1.028, and 1.017, respectively), and the five Vg gene transcripts were designated as RfVg, RfVgequivalent1, RfVg-equivalent2,

RfVg-equivalent³, and RfVg-equivalent⁴, respectively. The high expression level of RfVg verified by RT-polymerase chain reaction analysis suggested that RfVg is the primary functional Vg gene in red palm weevil. A high similarity of RfVg with other Coleopterans was also reflected in a phylogenetic tree, where RfVg was placed within the clade of the order Coleoptera. Awareness of the major genes that play critical roles in the reproduction and proliferation of red palm weevil is valuable to understand their reproduction mechanism at a molecular level. In addition, for future molecular studies, the NGS dataset obtained will be useful and promote the exploration of biotech-based control strategies against red palm weevil, a primary pest of palm trees. [Rasool, Khawaja Ghulam, Khalid Mehmood, Mureed Husain, Muhammad Tufail, Waleed Saleh Alwaneen, and Abdulrahman Saad Aldawood (Saudi Arabia), *Plos one* 16, no. 5: e0251278, 2021]. <https://doi.org/10.1371/journal.pone.0251278>

SUDAN

Distribution and identification of luteovirids affecting chickpea in Sudan.

In Sudan, yellowing viruses are key production constraints in pulse crops. Field surveys were carried out to identify luteovirids affecting chickpea crops in the major production regions (Gezira Scheme and River Nile State). A total of 415 chickpea plant samples with yellowing and stunting symptoms were collected during the 2013, 2015 and 2018 growing seasons. Serological results (Tissue-blot immunoassays) showed that *Luteoviridae* and Chickpea chlorotic dwarf virus (CpCDV, genus *Mastrevirus*, family *Geminiviridae*) were the most common viruses, with rare infections with Faba bean necrotic yellows virus (FBNYV, genus *Nanovirus*, family *Nanoviridae*). Some samples reacted only with a broad-spectrum luteovirid monoclonal antibody (5G4-MAb), and others showed cross-reactions between the specific monoclonal antibodies, suggesting the occurrence of new luteovirid variants. Serological results were confirmed by amplification with reverse transcription-polymerase chain reaction (RT-PCR) and sequencing of the partial coat protein gene. Molecular analyses provided an essential, sufficient and reliable characterization for four viruses affecting chickpea that belong to *Polerovirus* (family *Luteoviridae*). These were Cucurbit aphid-borne yellows virus (CABYV), Pepper vein yellows virus (PeVYV), Pepo aphid-borne yellows virus (PABYV) and Cotton leafroll dwarf virus (CLRDV), that shared high similarity with the type sequences. Phylogenetic analyses also revealed high similarity to luteovirid species. This study has established reliable, rapid and sensitive molecular tools for detecting luteovirid species. [A. Moukahel, S.G. Kumari, A.A. Hamed, M. Sharman, S. Ahmed(Sudan), *Phytopathologia Mediterranea* 60(2): 199-214,2021]. [doi: 10.36253/phyto-12135](https://doi.org/10.36253/phyto-12135)

TURKEY

The Effect of a Seed Coating with *Origanum vulgare* Essential Oil on *Clavibacter michiganensis* subsp. *Michiganensis*.

The study aimed to evaluate the efficacy of a seed film coating with *Origanum vulgare* Linnaeus essential oil (EO) against *Clavibacter michiganensis* subsp. *michiganensis* (Cmm) on tomatoes. Tomato seeds (cv. Rio Grande) coated with different doses of EO derived from *O. vulgare* were inoculated with Cmm (1.8×10^8 CFU/mL). *O. vulgare*'s EO showed a remarkable inhibition effect on the Cmm growth. The EO effect against Cmm was determined based on the parameters, such as the inhibition zone and bacterial population in a seed. The GC-MS analysis of EO showed that carvacrol is the major component (at 74.05%), which may inhibit the bacterial growth. Later, we have expanded our studies to determine the inhibitory effect of the EO's mode of action on the pathogenic bacteria with a molecular docking analysis based on the molecular protein-ligand interaction. The results showed that carvacrol has a strong interaction with the bacterial expansin protein (PDB 4JJO) of Cmm and the qPCR analyses confirmed the effect of the *O. vulgare* treatment against Cmm. This original approach has the prominent potential to prevent seed transmission of Cmm for seed quality in the world, suggesting a method for paving the way for Cmm disease management. [Meral Yılmaz, Ömür Baysal, Ragıp Soner Silme (Turkey), *Plant Protect. Science*, 57: 217–225, 2021]. <https://doi.org/10.17221/177/2020-PPS>

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

Environmental, Biological and Laboratory Study of the Parasitoid *Pristomerus vulnerator*.

The field study was carried out during the 2018-2020 seasons in some apple orchards in the governorates: Sweida (Harisa village, southeast of Sweida), Quneitra governorate (Khan Arnabeh region), and Damascus countryside governorate (Arnah area), and laboratory studies were carried out at the Biological Control Studies and Research Center, in the Faculty of Agriculture, Damascus University. The results showed that the parasitoid *Pristomerus vulnerator* is a solitary endoparasitoid on the larva of Wood leopard Moth *Zeuzera pyrina* (Linn) on apples and walnut, the larva of Grape berry moth, *Lobesia botrana*, and larva of Codling Moth *Cydia pomonella* Governorate on apple trees. The study showed that there was an effect of the secondary parasitoid *Perilampus tristis* (Mayr) on the intensity and effectiveness of parasitoid on the larva of Codling Moth, as the generation of the Grape berry moth and Codling Moth. The dynamics of the apple codling moth, *C. pomonella* community and its parasitoids were studied in two areas known for apple cultivation in southern Syria, Khan Arnabeh (Quneitra Governorate) and Al-Harisa (Sweida governorate), The dynamics of the apple codling moth, *C. pomonella* community and its parasitoids were studied in two areas known for apple cultivation in southern Syria, Khan Arnabeh (Quneitra Governorate) and Al-Harisa (Sweida governorate), the number of generations of the insect differed according to the study site, as the insect had three generations in Khan Arnabeh region, and two generations in Al-Harisa area. In this study, eight species of insect parasitoids were recorded in the two study sites, of which eight species were recorded in Khan Arnabah with a percentage of 100%, and seven species were recorded in Al-Hariseh area with a rate of 87.5%. The relationship between the collection method (from fruits or cartoon zigzag traps) and the insect generation was significant in the two study areas; results showed a difference in the parasitism rate on the larvae collected from fruits and on the larvae collected by the cartoon traps. The results of laboratory rearing of the parasitoid *P. vulnerator* on the larvae of three insect families, namely: flour moth *Ephesia kuehniella* Zeller, 1879 (Lepidoptera: Pyralidae), apple fruit worm and grape worm, the preferred host for breeding this parasite is the larvae of the second age of apple fruit worm. The results of the laboratory rearing of the parasitoid *P. vulnerator* on apple fruit worm larvae raised in the laboratory on an artificial food medium at four temperatures (15, 20, 25, 30 °C) showed the different duration of the life stages of the insect according to the temperature. It was found that there was a gradual increase in the rate of development with The temperature rising between 15-25 °C (a direct proportion), then returning to decrease at a temperature of 30 °C than it is at a temperature of 25 °C. The study of the effect of the breeding pattern (relative or mixed) on some of the life characteristics of the parasitoid showed that inbreeding has an effect on the life characteristics of the *P. vulnerator*, and on the average percentage of parasitism. [Rima Khaled Al-Halbouni (Syria) Plant Protection Department, Faculty of Agriculture, Damascus University, Principal Supervisor Abdunabi Bashir, Co-Supervisor Ghassan Ibrahim (Doctorate, 2021)].

A Laboratory Study on the Effect of Insect Host on Morphological Characteristics and Life Parameters of the Parasitoid *Psytalia concolor* (Hymenoptera: Braconidae)

The study included field and laboratory work. Field work was conducted during 2019 in four olive-growing areas in Syria: Jubata al-Khashab and Khan Arnabah in Quneitra Governorate, Qatana District (Damascus Countryside) and Houla District (Homs). Laboratory work was conducted during years 2019 and 2020 at The Biological Control Studies and Researches Center (BCRC), in the Faculty of Agriculture at University of Damascus. The field work included the study of the insect parasitoids of olive fruit fly *Bactrocera oleae* (Diptera: Tephretidae) and some environmental indicators of the numerical diversity of these parasites and a field evaluation of the effectiveness of the parasitoid *Psytalia concolor* on the olive fruit fly in the studied olive groves. 6 parasitoids on the olive fruit fly were recorded in this study. The parasitoids are belonged to the order Hymenoptera, five of which are subfamily Chalcidoidea, *Eupelmus urozonus* Dalm (Eupelmidae), *Eurytoma martellii* Dom (Eurytomidae), *Pnigalio argaules* Fer. & Amp (Eulophidae), and *Calloccleonymus* sp., *Chlorocystus* sp. (Pteromalidae), and one parasitoid of subfamily Ichneumonidea, family Braconidae *Psytalia (Opus) concolor* Szépli. 3 parasitoids were recorded in Jubata Al-Khashab area (*P. argaules*, *E. urozonus*, *Chlorocystus* sp.), 5 parasitoids each in Khan Arnabah (*P. concolor*, *P. argaules*, *E. urozonus*, *E. martellii*, *Calloccleonymus* sp.) and Qatana (*P. concolor*, *P. argaules*, *E. urozonus*, *E. martellii*, *Chlorocystus* sp.), and 4 parasitoids in Hula (*P. concolor*, *P. argaules*, *E. urozonus*, *Calloccleonymus* sp. The results of the field evaluation of the effectiveness of the parasitoid *P. concolor* on the olive fruit fly showed the difference in the percentage of

parasitism in different regions and the difference in time in one region. The average percentage of parasitism in Khan Arnabeh was 7.31%, in Qatana 3.55%, and in Houla 4.56%. The highest percentage of parasitism during the study period was on October 23, and the lowest was on September 23 in the three study areas. The effect of some factors on the parasitoid *P. concolor* on the olive fruit fly were investigated and the preferred stage of the host for the parasite was determined. It was found that the parasite prefers to parasitize the larvae of the third stage, followed by the full-grown larvae of the host. The effect of the size of the olive fruits (*Olea europaea* L.) of different varieties (Mawi, Istanbouli, Sorani and Qaisi) on the parasitism rate was studied. The results showed that the percentage of parasitism was affected by the cultivar Olives, the size of the fruit, so that the intruder preferred to parasitize the small-sized fruits infested with the insect for all different varieties, and the percentage of parasitism on the different varieties differed according to the size of the olive fruit of the tested variety, where the variety Maui (its smaller fruits) was the most preferred variety for the parasitoid. Then the varieties (depending on the size of its fruits), Istanbouli, Sorani and finally Al-Qaisi, which is characterized by the large size of its fruits. Parasitoids species diversity was assessed using three indicators: species richness (S) Shannon index (H) and similarity index (SQ). Diversity indices varied between fore sites. The highest value of Shannon-Winner index was recorded at the locality Qatana (1.457), whereas the lowest was at the Jabata Al-Khashab (0.767). The highest value of similarity index (SQ) was recorded between Khan Arnabeh and Qatna, where the similarity was complete. The effect of the host (fruit fly, olive fruit fly) on some of the morphological and biological characteristics of *P. concolor* was studied, and the results showed that there was an effect of the host on the morphological and biological characteristics of the parasite, and the size of the parasite bred on fruit flies was greater than the size of the parasite bred on olive fruit flies, This applies to the average length of the front wing, the average length of the hind leg of the male and female, and the length of the egg-laying machine of the female. By studying the effect of the host on some of the life characteristics of the parasitoid, the results showed that the average duration of development of females and males, and the average lifespan of the entire insect for both males and females was longer on fruit flies than on olive fruit flies, and the average number of eggs laid by one female for the parasite emanating from Fruit fly more than the average number of eggs of female parasitoid raised on olive fruit fly. The results of evaluating the effect of some food sources on some biomarkers of *P. concolor* showed that sugars and amino acids are an important food source for the parasite to increase survival, fertility and biological activity. [Moaz Nabil Zouriky (Syria) Plant Protection Department, Faculty of Agriculture, Damascus University, Principal Supervisor Abdunabi Bashir, Co-Supervisor Ghassan Ibrahim (Master, 2021)].

Effect of Prey on some Biological Characteristics of the Predator *Hippodamia variegata* and Assessment of Genetic Similarity for some of its Biotypes

The study was conducted during the period 2015 – 2020 and aimed to determine the effect of the diets on the biological indicators of the variegated ladybug, *Hippodamia variegata* (Goeze) (Coleoptera: Coccinellidae). The diets covered two different types of aphids, black bean aphid (*Aphis fabae* Scop.) and cabbage aphid (*Brevicoryne brassicae* L.) (Hemiptera: Aphididae). The developmental time, survival rate for immature stages, longevity, fecundity, hatchability, fertility, and the prey consumption were evaluated under controlled laboratory conditions (25±1 °C 65% ±5 RH 16 h : 8hr L:D). Individuals fed on *A. faba* displayed significantly the shorter larval and generation developmental time of 9.17 and 16.19 days, respectively, and Higher survival rate for immature stages of 57.00%. On the other hand, females fed on *A. faba* displayed significantly higher daily fecundity of 25.13 eggs/female, total fecundity of 886.20 eggs/female, real fertility of 713.63 fertile eggs/female compared with those fed on *B. brassicae*. The hatchability showed no significant difference between the two tested preys. Individuals fed on *A. faba* displayed significantly the highest Predation Efficiency for larval stage 30.16 nymph/larva/day, also highest Predation Efficiency for adult (females) was 56.80 nymph/females/day. The Predation Efficiency of females was significantly higher than males on all tested preys. The research also aimed to study the Polymorphism of the predator individuals depending on the number and pattern of spots located in different locations on each elytron, and the results showed that the different shapes of the collected samples were divided into four categories according to the number of spots on each elytron, and into 26 different shapes, each characterized by a specific number of spots and the position and shape of these spots on each elytron. The study also aimed to determine the genetic diversity of the aphid predator; *H. variegata* in different areas of Syria using the SRAP technique (Sequence-related Amplified polymorphism). The number of amplified fragments was 101 bands, 99 of which were polymorphic with a polymorphism rate of 97.99%. The study results of the degree of genetic diversity of the predator's individuals *H. variegata* showed that

the highest value for percent disagreement values was 0.904 between samples from (Damascus and Fedio-Latakia) and (Homs and Fedio-Latakia), whereas the lowest value for percent disagreement values was 0.271 between samples (Damascus and Sweida). The phylogenetic tree showed that the studied populations were divided according to their geographical distribution into two main groups; the first group included samples collected from the regions of Damascus, Sweida, and Homs with a genetic distance of 15.51, while the second group included samples collected from the regions of Tartous, Jabla (Beit Yashout), and Fedio (Lattakia) with a genetic distance 11.08. [Alaa Ramadan Muhammad (Syria) Biotechnologies, Faculty of Agriculture, Damascus University, Supervisor Abdul-Nabi Bashir, Co-Supervisor Salam Lownd, (Master, 2021)].

Molecular Identification of Some Plant Viruses Associated with Some Insects Distributed on a Number of Plant Hosts in Karbala Province Using Next Generation Sequencing Method.

The aim of this study was to identify the plant viruses and their insect vectors that are common on various plant hosts in Karbala Province using different molecular techniques. The insect (Whiteflies and leafhoppers) samples distributed on a number of plant hosts were collected, DNA and RNA extracted from these insect samples and cDNA was prepared using the RNA extracted. The Polymerase Chain Reaction (PCR) technique was applied utilizing specific primer sets for the diagnosis the viral species of the most common viral genera (*Begomovirus*, *Carlavirus*, *Potyvirus*, *Torradovirus*) transmitted by these insects. The Next Generation sequencing (NGS), specifically the Transcriptome method, was used to identify the plant viruses and their insect vectors. The results showed the superb capability of the NGS compared with PCR in diagnosing a number of plant viruses associated with the whitefly insect which included Alfalfa mosaic virus, Broad bean wilt virus, Zantedeschia mild mosaic virus, *Pittosporum cryptic virus-1*, Grapevine leafroll-associated virus, Tomato spotted wilt orthotospovirus and Tomato spotted wilt virus. On the other hand, *Pittosporum cryptic virus-1* and *Grapevine leafroll-associated virus* were identified in the leafhopper insect. Additionally, the majority of plant viruses found were in significant genetic variation compared with the global viral strains and this is possibly the main reason for the unsuccessful PCR test in diagnosing the plant viruses transmitted by the studied insects. Furthermore, the draft genome of the whitefly mitochondria was determined for the first time in Iraq using the NGS technique. This genome comprised 8 Protein-coding genes (PCGs), two ribosomal RNA genes and two genes of transfer RNA. This finding confirmed that the species of whitefly insect common in the Iraq environment is *Bemisia tabaci* MEAM1. Moreover, the almost complete genome of leafhopper mitochondria was uncovered using the NGS method and was found to contain 13 Protein-coding genes (PCGs), two ribosomal RNA genes and 13 transfer RNA genes. This discovery confirmed that the leafhopper species is *Maiesias dorsalis* and this finding is the first record in Iraq. This study reveals the importance of NGS application in molecular diagnosis of plant viruses and their vectors due to its fast and precise performance comparing with other traditional molecular approaches. However, the relatively high cost and bioinformatic analysis experience needed for the NGS data are the main obstacles that prevent or slow down application of NGS commonly. [Mohammed Dawood Salman(Iraq), Supervision Dr. Adnan Abdaljeleel Lahuf, Plant Protection Department, Agriculture College, University of Kerbala Karabala, Iraq (Master, 2021)].

Contribution to Study of Tan Spot Disease of Wheat caused by *Pyrenophora tritici-repentis* (Died.) Drechs. : Assessment of the Diversity of the Virulence Gene ToxA and search of Resistance Resources against Race 1 and race 5.

Tan spot of wheat caused by the fungus *Pyrenophora tritici-repentis* is one of the main diseases that are rampant throughout North Africa and the Middle East regions. Surveys carried out across cereal growing areas in Algeria during the two growing seasons 2014/2015 and 2015/2016 have allowed us to get a collection of 87 isolates. The morphological characterization of the isolates showed a thick or thick, very cottony mycelium, sometimes fluffy. Its colour was white or green-grey; usually, a green pigment is produced in the medium. Sporulation potential evaluation and radial growth of the cultures at a temperature of 25°C revealed a very high significant difference between the isolates. The genetic diversity of 85 Algerian isolates was evaluated using 8 SCoT and 8 SSR markers. The results revealed an important genetic variability. All SCoT primers used showed polymorphism. However, only 2 SSR primers were polymorphic showing. To look for sequence variations in ToxA virulence gene, isolates collected during the 2006/2007 and 2010/2011 growing seasons were added. This included 44 from Algeria, 14 from Tunisia, and 58 from Syria. PCR conducted on 213 DNA, showed that 150

isolates, which is 70 % of those studied, harboured ToxA. Sequencing and sequences alignment of 25 isolates sequences selected among those of the three countries showed a variation in two Algerian isolates. Hence a new haplotype of ToxA has never been described before. Isolates showing ToxA variation were identified through inoculation on a differential set of wheat, as belonging to race 2; this is the first report of this race in Algerian fields. Infiltration of culture filtrates of the two isolates on Glenlea leaves, which is a susceptible Ptr ToxA toxin cultivar produced by the ToxA, confirmed that mutation is silent. Finally, a search of resistance resources against races 1 and 5 of *P. tritici-repentis*, involved 116 wheat genotypes. Reaction evaluation was carried out, first on seedlings under controlled conditions, following by a second test to confirm resistant genotypes reaction under controlled conditions, then confirmed on the field. The results showed 13 genotypes resistant to race 1, and 23 resistant to race 5. Among them, 7 genotypes are resistant to both races. This is also the first report of resistance resources against this disease in Algeria. [Ouraa Noureddine, Supervised by Pr. Hamida Benslimane. National High College of Agriculture (Ecole Nationale Supérieure d'Agronomie), Department of Botanic, Algiers, Algeria. (Doctorate, 2021)].

Study of Net Blotch of Barley caused by *Pyrenophora teres* (Died.) Drechsler: Structure of the Pathogen Population and Effectiveness of Fungicide Treatments.

The net blotch of barley is one of the significant leaf spot diseases in Algerian fields; it is caused by the fungus *Pyrenophora teres*, which occurs in two forms, *P. teres* f. *teres* (*Ptt*) and *P. teres* f. *maculata* (*Ptm*). A survey in barley growing areas was carried out during two growing seasons, allowing us to get 212 isolates sampled across 42 locations in 17 provinces. A molecular analysis conducted in all isolates led to establishing the importance of the two forms *Ptt* and *Ptm*, as well as their geographic distribution in Algeria. The results showed that *Ptt* is the dominating type of net blotch. The cultural characterization of 50 isolates (38 *Ptt* and 12 *Ptm*), through several cultural characters, showed four distinct colony colours and three morphotypes distinguished by the texture and aspect of their mycelium. Our observations allowed us to note that the cultural characters did not allow the distinction between the two forms *Ptt* and *Ptm*. Their aggressiveness was also assessed *in vitro*, using three important traits; sporulation rate, disease severity, and mycelial growth rate. The results highlighted a highly significant difference among studied isolates, including the sporulation rate and mycelial growth. The disease severity recorded, resulting from inoculation of the 45 isolates (34 *Ptt* and 11 *Ptm*) on the susceptible variety Saida, enabled us to note a predominance of very aggressive isolates. The sensitivity of the Algerian population of *P. teres* to the three groups of fungicides; Quinone outside inhibitors (QoIs), Succinate dehydrogenase inhibitors (SDHIs) and Demethylation inhibitors (DMIs), was also evaluated through target gene analysis for 212 isolates using pyrosequencing (in case QoIs and SDHIs), *in vitro* sensitivity tests using microtiter test for six fungicides, and *in planta* sensitivity tests under glasshouse conditions for three fungicides. Results show the absence of all tested mutations conferring QoIs or SDHIs resistances. Then that the pyraclostrobin and azoxystrobin belonging to the QoI group were the most efficient fungicides *in vitro*, whereas fluxapyroxad displayed the best disease inhibition *in planta*. The comparison of EC₅₀ values recorded for each form of net blotch showed a significant difference in efficiency treatments. [Lammari Hamama Imène, Supervised by Pr. Hamida Benslimane. National High College of Agriculture (Ecole Nationale Supérieure d'Agronomie), Department of Botanic, Algiers, Algeria, (Doctorate, 2021)].

Survey of Phytophagous Mites and their Natural Enemies on Cotton Crop in Al Hassakah Province – Syria.

This research aimed to study population dynamics of phytophagous and predatory mites in a cotton field located at Al Dabbaghia in Al-Hassakah governorate during 2019 and 2020, to survey the presence of acaropathogenic fungi, and also to explore the presence of phytophagous and predatory mites on cotton in different regions of Al-Hassakah. The results showed the presence of only one phytophagous mite species, *Tetranychus urticae* Koch, during the two seasons of study. Concerning the predatory species, their presence was observed only at the end of 2020 season: *Euseius scutalis* (6 specimens) and *Neoseiulus* sp. (one nymph). The results also showed the presence of *T. urticae* on two weed species grown around the studied field: *Malva sylvestris* (37 individuals) and *Sinapis harra* (14 individuals) found on April 30, 2020. The density of *T. urticae* did not differ between 2019 and 2020 (the mean was 0.27±0.03 mites/ leaf in 2019 and 0.24 ± 0.03 mites/leaf in 2020).

In 2019, the first appearance of *T. urticae* was on 19 July, and its density increased and reached the highest level on 10 August. However, in 2020, the first appearance of *T. urticae* was on 3 August, and its density increased and reached the highest level during the second week of October. The results also showed that the highest density of *T. urticae* was observed in the apical leaves of cotton plants during the two seasons of the study. The highest infestation rate by *T. urticae* was observed during harvest in the two seasons. Concerning the severity of the injury, the highest degree was observed in 2019, where 16 % of the leaves of the mid-level cotton plant showed stippling and reddening. In this study, four genera of pathogenic fungi and one genus of bacteria that accompanied *T. urticae* were isolated from 150 samples collected from cotton fields in Al-Hassakah governorate. *Aspergillus* sp. (1) was the most frequent species, with a percentage of 23.33%, while *Penicillium* sp. was the lowest (6.66%). Other fungal genera (*Neozygites* sp., *Aspergillus* sp. (2), *Beauveria* sp.) appeared at a moderate rate (18.66, 14.66, 13.33%, respectively). The percentage of the bacteria *Bacillus* sp. was 23.33 %. Although the results of this study give general principles about the dynamics of phytophagous mites on the cotton crop, associated biological control agents, and affecting factors, they may be considered important in terms of application, especially in the possibility of using biological control agents to reduce phytophagous mite populations and in determining the optimal time for chemical intervention when necessary. [Ammar Khalaf Daher(Syria), Department of Plant Protection, Faculty of Agriculture, Al Baath University, Syria (Master,2021)].

Special Topic:Ants in Saudi Arabia

Monomorium (Hymenoptera: Formicidae) of the Arabian Peninsula with Description of Two New Species, *M. hegyi* sp. n. and *M. khalidi* sp. n. We present a revised and updated synoptic list of 44 Arabian *Monomorium* species, including two new species of the *M. salomonis* species-group: *M. hegyi* sp. n., and *M. khalidi* sp. n. We propose the following new synonyms: *M. abeillei* André (= *M. wahibiense* Collingwood & Agošti syn. n.); *M. areniphilum* Santschi (= *M. fezzanense* Collingwood & Agošti syn. n., = *M. hemame* Collingwood & Agošti syn. n. = *M. marmule* Collingwood & Agošti syn. n.); *M. bicolor* Emery (= *M. phoenicum* Santschi syn. n.); *M. harithe* Collingwood & Agošti (= *M. najrane* Collingwood & Agošti syn. n.); *M. niloticum* Emery (= *M. matame* Collingwood & Agošti syn. n.); and *M. nitidiventre* Emery (= *M. yemene* Collingwood & Agošti syn. n.). An illustrated key and distribution maps are presented for the treated species. Ecological and biological notes are given when available. The majority of Arabian *Monomorium* species (24) are endemic to the peninsula. All except one of the remaining species are more broadly ranging Afrotropical and Palearctic species, supporting the view of Arabia as a biogeographical crossroads between these two regions. *Monomorium floricola* (Jerdon), the sole species of Indomalayan origin, is recorded for the first time from the Arabian Peninsula. [Sharaf, M. R.; Mohamed, A. A.; Boudinot, B. E.; Wetterer, J. K.; Hita Garcia F.; Al Dhafer, H. M. and Aldawood, A. S. (Saudi Arabia), PeerJ 9:e10726, 2021]. <https://doi.org/10.7717/peerj.10726>

Description of the Queen of the Arabian Endemic Dolichoderine Species *Tapinoma wilsoni* Sharaf and Aldawood, 2012 (Hymenoptera: Formicidae) with the First illustrated Key to Queens of the Arabian *Tapinoma* Foerster, 1850. We describe the queen caste of the Arabian endemic species *Tapinoma wilsoni* Sharaf & Aldawood, 2012 from the type locality (Dhi Ayn Archaeological Village) located in the southwestern mountains of the Kingdom of Saudi Arabia. We present the first illustrated key to the Arabian *Tapinoma* Foerster, 1850 based on the queen castes. Three species are recognised from the Arabian Peninsula, *T. melanocephalum* (Fabricius, 1793), *T. simrothi* Krausse, 1911 and *T. wilsoni* Sharaf & Aldawood, 2012. [AL-Keridis L. A., Gaber N. M., Aldawood A. S. and Sharaf M. R. (Saudi Arabia), African Entomology, 29(1):233–237, 2021]. <https://doi.org/10.4001/003.029.0233>

An Update to the Taxonomy and Distribution of the Arabian *Tapinoma* Foerster, 1850 (Hymenoptera: Formicidae) with an Illustrated Key and Remarks on Habitats. Ants of the genus *Tapinoma* of the Arabian Peninsula are reviewed, keyed and illustrated, based on the worker caste. Three species are diagnosed, *T. melanocephalum* (Fabricius, 1793), *T. simrothi* Krausse, 1911 and *T. wilsoni* Sharaf & Aldawood, 2012. We present the first illustrated key to the Arabian *Tapinoma*, enhanced by automontage images to facilitate species recognition. New distributional data for species are presented, based on recently collected material from the region and literature records. Information on habitats preference and biology of species are given. [Abdel-Dayem M.S., Aldhafer H. M., Aldawood A. S., and Sharaf M. R. (Saudi Arabia), Biodiversity Data

***Tetramorium sericeiventre* (Hymenoptera: Formicidae) on the Arabian Peninsula, with an Evaluation of its Ecology and Global Distribution.** *Tetramorium sericeiventre* Emery, 1877 is a widespread ant of Africa, Arabia, and neighboring areas. Across its broad range, *T. sericeiventre* shows much variation and many different forms have been described. In the present study, we report additional site records of *T. sericeiventre* on the Arabian Peninsula, and provide information on species variation, habitat, behaviour, and distribution. In addition, we evaluate the global distribution of this species and present a taxonomic diagnosis of *T. sericeiventre* for facilitating species recognition. *Tetramorium sericeiventre* thrives in a wide variety of open habitats, ranging from intact natural areas to sites heavily disturbed by human activity. Genetic analyses would be useful in elucidating the relationships among the many different forms of *T. sericeiventre*. [AL-Keridis L. A., Gaber N. M., Aldawood A. S., Wetterer J. K. & Sharaf M. R. (Saudi Arabia), *Journal of Natural History*, 55:3–4, 177–187, 2021]. <https://doi.org/10.1080/00222933.2021.1899325>

❖ FAO Plant Protection Activities

GLOBAL ACTION FOR FALL ARMYWORM CONTROL

NSP Seminar: A successful NSP seminar on the Global Action for FAW Control (GA) on 28 October 2021 drew over 240 participants to review progress from two years' work under the GA to reduce crop losses due to fall armyworm. A well-received video told farmers' stories in combatting FAW in Kenya and later, presenters answered questions about technical solutions to manage FAW.

First webinar on FAW prevention, preparedness and response organized by the International Plant Protection Convention Secretariat was held 22 October 2021 with 120 participants from Asia, Africa, the Near East, Europe, and Pacific countries. The training was held in English with Arabic, French, and Russian interpretation. A fall armyworm specimen was collected in Solomon Island in August 2021 and the identity was confirmed in September 2021. The pest has also been confirmed on multiple sites in the country. Government, industry and other stakeholders are working to validate and scale up an integrated pest management strategy against FAW.

FAW guidelines in Arabic: The first Arabic-language management guide for FAW has been published, filling a large gap in existing information in this language concerning best practices to manage and control the voracious insect pest that is spreading rapidly.

Fall Armyworm: Invasive pest threatening crops and food security provides advice, assistance, and proposals for mitigating FAW spread and minimizing crop losses, and was produced by FAO's Regional Office for the Near East (RNE) in collaboration with the FAW Secretariat. The FAW GA secretariat interviewed the authors to cover this important publication and published the interview on the FAW GA webpage.

<https://www.fao.org/fall-armyworm/success-stories/detail/en/c/1457528/>



FAO Director-General Qu Dongyu, Deputy Director-General Beth Bechdol, and NSP Director, Jingyuan Xia guided the Fifth Meeting of the Steering Committee on the FAO Global Action on Fall Armyworm Control on November 24th, 2021 and advocated for the importance of partnerships for strategic FAW control. Key achievements have been made in the past few years, FAMEWS (FAO-funded app) has collected over 60 000 reports from 64 countries and has helped specialists track activity and guide countries in effective FAW control. The meeting of the Global Technical Committee on Fall Armyworm Control preceded this meeting on 3rd of November.

Strengthening capacities of NENA countries to mitigate fall armyworm: emergency preparedness and response

The launch of a regional FAO emergency response project to combat fall armyworm (FAW) in the Near East North Africa (NENA) region has meant new training activities in four countries – Jordan, Lebanon, and Syria, plus the West Bank and Gaza Strip. A series of workshops and lectures has provided farmers with detailed information on FAW damage, biology, behaviour, monitoring and possible control methods for FAW, all based on available budgets and local resources.



The training activities follow an inception workshop held on 23 February 2021 for the project that aims to support national capacities in pest surveillance, pest management and biological control tools. Plans are to document natural enemies of FAW already occurring in these countries and investigate the efficacy of sustainable control methods, as well as develop four national work plans that cover the main contingency and response measures against FAW. Virtual training is planned for specialists in FAW monitoring, use of the FAMEWS mobile app, and FAW sustainable management. As part of this, 300 pheromone traps were distributed in Lebanon.

Four demonstration maize fields, ranging from five to 10 hectares, were selected in each relevant country following the suggested FAO monitoring and integrated pest management (IPM) plan. A survey of natural enemies in corn fields was initiated, and promising results have been reported from Syria on Trichogramma, Braconids, Crysoperlla and entomopathogenic fungi. An extensive survey is also running in Jordan, Lebanon, and the West Bank and Gaza Strip.

Farmers trained in necessary skills to deal with insect pests

Meanwhile, IPM farmer field schools (FFS) were established in Jordan, Lebanon, Syria, and the West Bank and Gaza Strip. This brought training programmes to farmers and introduced IPM components and tactics through FFS in the field to manage FAW. Plans were to organize 22 FFS and more than 300 beneficiaries joined training sessions through September and October 2021. Additionally, the project conducted three training-of-trainers (ToT) sessions for FFS, for 107 extension workers in Jordan, Syria, and the West Bank and Gaza Strip.

Before leaving the workshops, some participants expressed their opinions. One said: “The workshop was an added value to our knowledge and experience; we learnt a lot and we became more organized in the FFS area.” Another added: “The training equipped us with the necessary skills and experience. It has highlighted the area of weakness in our previous practices. We learnt new ideas such as agroecosystem analysis, special topics, group dynamics, and insect zoo.”

FAO working with partners on training, equipment

Thaer Yaseen, Regional Plant Protection Officer for NENA in the FAO Regional Office (RNE), has reported that eight countries in the region had reported FAW infestations, and FAO's response has been to provide more than 25 000 bucket traps and 80 000 pheromone lures, designed to cover 50 000 ha. As well, Yaseen suggested that FAO could give scientific support to identify suspected FAW specimens, working in partnership with the Centre for Agriculture and Biosciences International (CABI), and training more than 700 specialists on FAW identification and monitoring.

In addition, training was provided to more than 250 biological control specialists on mass rearing of natural enemies, in partnership with the International Centre of Insect Physiology and Ecology (icipe). Support was provided for production facilities for FAW natural enemies at two laboratories in Yemen and Egypt.

Earlier this year, another regional training was provided on mass rearing and release of FAW natural enemies. Videos were produced on FAW-related topics, including artificial diet preparation and inoculation, rearing of FAW and rearing of parasitoid *Telenomus remus*. More than 500 specialists were trained in using the FAMEWS mobile app, and ten training sessions were held for data validators.

Emergency Preparedness and Response to Strengthen Capacities of NENA Countries to Mitigate the Risk of Fall Armyworm (FAW) in the Region”, TCP/RAB/380

Lebanon

Under the project “Emergency preparedness and response to strengthen capacities of NENA countries to mitigate the risk of Fall Armyworm (FAW) in the region -TCP/RAB/3803”, implemented by FAO with the cooperation of the Ministry of Agriculture (MoA) in Lebanon, the MoA staff continue following the national survey on FAW. In addition, extension trainings on the biology of the pest, damages, monitoring and management were organized in order to raise awareness among farmers and reduce FAW population and its impact on food security. Guidance videos on Fall Armyworm, natural biological control, and trap handling to monitor FAW were prepared and distributed to farmers and agricultural extension services. The natural enemies on FAW in the Lebanese environment were also studied and the most important ones are: the parasitoid *Habrobracon hebetor* (Braconidae); three species of predator bugs *Orius insidiosus*, *Orius minutus* and *Geocoris erythrocephalus* (Anthrenidae); and the wasp *Vespula pensylvanica* (Vespidae). In addition to the presence of generalist predators: the Green lacewing *Chrysoperla* sp (Chrysopidae); three species of coccinellids *Hyppodamia variegata*, *Coccinella septempunctata*, *Scymnus frontalis* (Coccinellidae); the mirid bug *Macrolophus caliginosus* (Miridae); the earwig *Euborellia annulipes* and *Forficula smynensis* (Forficulidae); the praying lacewing *Mantispa styriaca* (Mantispidae).

Jordan

As a part of the regional project implemented by the Ministry of Agriculture with the support of FAO, four training workshops were carried out in the field of integrated pest management of the FAW, which was first recorded in September 2020, in which 80 farmers from different regions of the Kingdom participated. Ibrahim Al-Jboory, the FAO regional consultant, delivered a lecture explaining the biology, ecology, monitoring and integrated pest management concepts and control strategy of FAW as a serious pest invading corn fields. A field visit was organized after the class intervention to transfer the theoretical information directly to the field highlighted the symptoms, larval stages, eggs and crop stages durations and development. The project's local consultant, Sitan Al-Serhan, also gave a brief overview of the measures implemented by the Ministry of Agriculture to support farmers to address this dangerous pest. A training day was also carried out for engineers working

in the field of extension and plant protection on the early warning system (FAMEWS), where the application and its importance in collecting information about the ecosystem, carrying out surveys and analyzing data to take the appropriate decision to control the pest, were also carried out. Thirty meetings of farmer field schools in maize cultivation areas were organized and 20 farmers participated in each school. The meetings curriculum included the exchange of experiences in integrated pest management of fall armyworm, safe use of pesticides, pest stages and damages identifications. A guidance leaflet was also issued to introduce the pest and integrated control measures to reduce its economic damage.

Palestine

Under the project of the Emergency Preparedness and Response to Strengthen Capacities of NENA countries to mitigate the risk of Fall Armyworm (FAW) in the region (TCP/RAB/3803), which mainly aims to increase the resilience of livelihoods to threats and crises in the targeted countries and regions by providing regular information and early warning against potential damage caused by the insect pest. Setting up or improving an existing mechanism for insect identification, monitoring, and assessing potential risks. Capacity building of the involved sector staff to mitigate resilience measures to the Country Programming Frameworks of all FAO-NENA member states.

In West Bank and Gaza Strip (WBGS), several project activities were carried out up until November:

- Farmer field school training in the West Bank and Gaza Strip for the members of the field schools.
- Workshop at Palestine Technical University for bachelor's, Master's and Doctoral students to identify the pest, diagnose infestations, monitoring and control program.
- Workshop on installing, assembling and reading traps for Fall Armyworm, data collection using the Early Warning Application (FAMEWS).
- Receiving cellular devices, traps and pesticides, and distributing them to the beneficiaries
- Establishing an approved and unified mechanism for trap numbering PA000000
- Follow up on the installation and data collection of the traps by the project team, identify problems and troubleshoot.
- Zoom meeting to discuss issues and problems with the application of early warning FAMEWS, and methods of modification of the application.
- Field survey and collecting of natural enemies and insects from corn fields in the West Bank and Gaza Strip to be sent for identification.
- Up to 60 regular field and extension visits by the project team to corn growers to follow up on the management of the fall armyworm.
- Monitoring the demonstration fields in the West Bank and Gaza Strip with promising initial results.

Syria

Syria participates, along with Jordan, Lebanon and Palestine in the Regional Project "Emergency preparedness and response to strengthen capacities of NENA countries to mitigate the risk of Fall Armyworm (FAW) in the region -TCP/RAB/3803", under the supervision of the Food and Agriculture Organization of the United Nations, FAO. This pest was first recorded in Syria in November 2020, and then it is widespread in the governorates of Daraa, Damascus Countryside, Homs, Hama, Deir el-Zor, Raqqa, Idlib, Lattakia, Al-Ghab and finally in Tartous. Among the project activities, information related to the pest and its management was disseminated to all Ministry of Agriculture extension units. A workshop was held in Damascus, where 59 engineers were trained on farmer field schools,

and 30 mobile devices were distributed to facilitators and technicians to use the FAMEWS application which is launched by FAO specific for Fall Armyworm. 12 Farmers Field Schools were established and received 222 farmers who were trained on this new invasive pest and its dangers and damages and urged them to implement the integrated pest management program IPM and to encourage them to use natural enemies, especially the local ones such as *Trichogramma* and *Habrobracon*. Pesticides, monitoring traps and leaflets were also distributed to farmers.

Field surveys were conducted to study the natural enemies of FAW in maize fields and recorded the presence of the parasitoid *Telenomus* sp and the predators: *Creontiades pallidus* (Miridae); *Hippodamia variegata* (Coccinellidae); *Delta* sp (Vespidae); the two bug *Orius* sp. and *Geocoris* sp (Anthocoridae). FAW is currently reared in the laboratory for use in testing local biological enemies and measuring its efficiency to infect eggs as follows:

1. Conducting laboratory parasitism tests of the egg parasitoid *Trichogramma* spp. that showed a parasitism rate between 10 and 30%
2. Conducting laboratory parasitism tests on the larval parasitoid *Habrobracon*, the parasitism rate on the 3rd -4th -5th larval instars was between 20 and 50%; however, the *Habrobracon* parasitoid did not succeed to complete its life cycle, and experiments are still ongoing
3. Recording the presence of external parasitism on *Trichogramma* and this observation is currently under investigation

The area controlled to suppress the population of Fall Armyworm was around 1351 hectares as a parallel biological control unit released natural enemies in infested fields on an area of 50 hectares.

FAO Red Palm Weevil Eradication Programme in the NENA Region

Letters of agreement have been finalized with service providers (KSA partners underway) to implement the activities of the RPW eradication programme and an agreement has been signed between the Ministry of Climate Change and Environment of the UAE, the Food and Agriculture Organization of the United Nations and Khalifa Center for Genetic Engineering and Biotechnology, for the “eradication of the RPW”. 11 meetings and 10 training workshops were held within the training programme for the integrated management of red palm weevil from November 2020 to December 2021. The baseline data on the current status of the RPW and its management capacity in member countries were analyzed. The Arabic version of the FAO manual “Guidelines on RPW Management Practices” published in Oct 2021 <https://doi.org/10.4060/ca7703ar>. Within the framework of the FAO Regional Programme for RPW Eradication, the Near East Plant Protection Organization (NEPPO) sent a questionnaire on state of art of RPW situation and management to the National Plant Protection Organization and also published an advertisement for the selection of experts in the fields of: national phytosanitary measures, phytosanitary treatments, RPW pest free area and certification of plant propagative materials. The organization is working on forming a group of experts in the field of plant health related to the RPW. AOAD experts conducted a scoping mission to Egypt in Oct 21 and to Saudi Arabia in Dec 21 related to the ex-ante socio-economic impact of the RPW. FAO is planning for a regional workshop on FFS curriculum development and master trainers’ to be held in Al-Ahssa, KSA in January 2022.

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

Desert Locust Situation

Warning level: **THREAT**

General situation during November 2021 Forecast until mid-January 2022 Provided by the FAO Emergency Centre for Desert Locust (ECLO).

General Situation

Control operations continue in NE Somalia

Although the current upsurge continues in the Horn of Africa on a much-reduced scale, two hot spots currently remain. First, aerial and ground control operations continue in northeast Somalia against an increasing number of very small, but numerous hopper bands that formed during November. As some infestations will be missed and cannot be treated, a limited number of new small immature swarms will form from the second week of December onwards. As vegetation dries out, the swarms will migrate south to southern Ethiopia and southern Somalia where they could start to appear in northeast Kenya in mid-December and spread west across the northern counties. The scale of any swarm migration from northeast Somalia is likely to be limited, depending on the success of current survey and control operations. Second, a few small spring-bred mature swarms from northeast Somalia arrived in northeast Kenya during the first week of November and then moved back into southern Ethiopia where control operations are in progress. These swarms are likely to lay eggs that will hatch, and small hopper bands could form along the Ethiopia/Kenya border in December.

Elsewhere, hopper groups were treated on the southern coast of Eritrea that developed from a few swarms that arrived from northern Ethiopia and laid eggs in October. Remaining summer infestations were treated in northern Sudan. Small-scale breeding occurred on the southern coast of Yemen. Low numbers of adults began to appear in winter breeding areas along the Red Sea where upcoming breeding may be limited by poor rains. The situation remains calm in other regions.

Western Region: **CALM**

SITUATION. Scattered hoppers and adults from local breeding in Mali; isolated adults in Algeria, Morocco, Niger, and Mauritania.

FORECAST. No significant developments

Central Region: **THREAT**

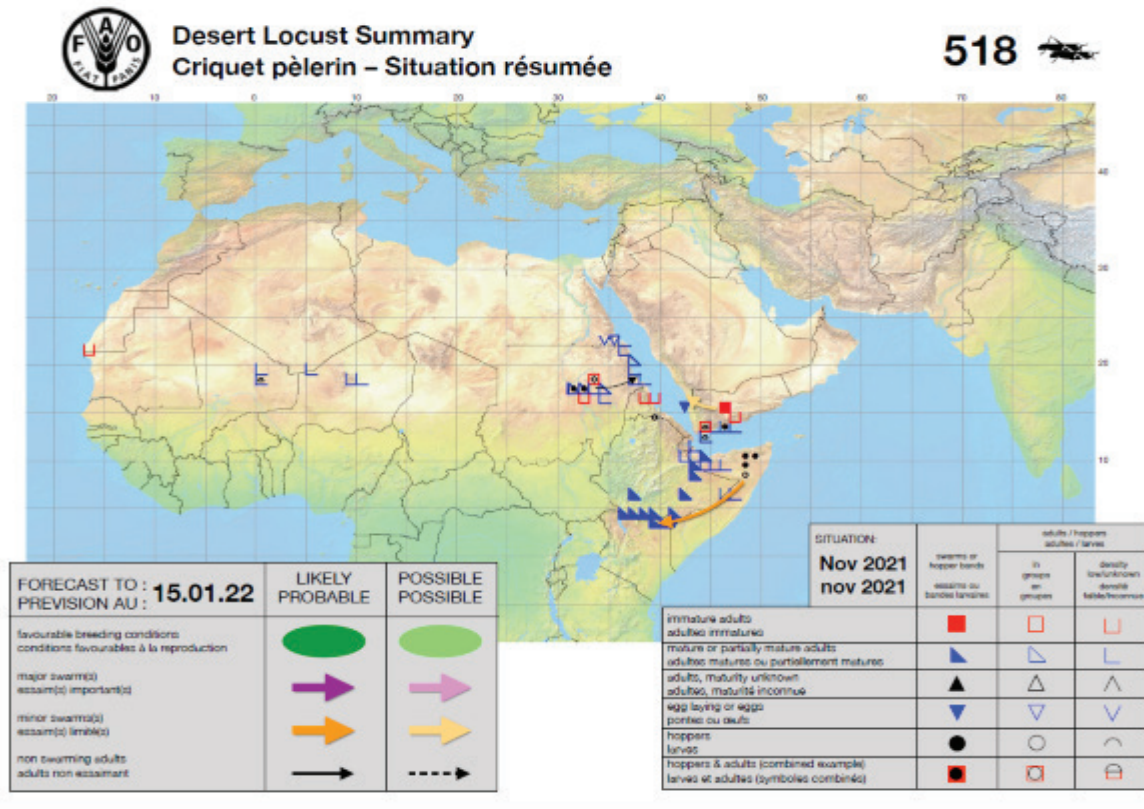
SITUATION. Control operations continue against numerous small hopper bands in northeast Somalia (18 405 ha treated). Mature swarms that arrived in early November in northeast Kenya moved to southern

Ethiopia (2 126 ha). More bands and groups of hoppers and adults form in the interior of Sudan (17 735 ha) and scattered adults and one mature group appear on Red Sea coast; scattered adults appear and lay on Red Sea coast in southeast Egypt (100 ha). Hopper groups on Red Sea coast in Eritrea (97 ha) and scattered adults on the northern coast. Small-scale breeding on southern Yemen coast, immature swarm in the interior, and mature swarm laying and scattered adults on Red Sea coast.

FORECAST. A limited number of swarms will form in northeast Somalia from early December onwards. Egg laying, hatching and band formation are likely along the Ethiopia/Kenya border, supplemented by the arrival of several small immature swarms from northeast Somalia after mid-December. Some swarms could also reach southern Somalia. Small-scale breeding will occur along both sides of the Red Sea in coastal areas of southeast Egypt, Sudan, Eritrea, Yemen, and Saudi Arabia but may be limited by poor rainfall that is predicted.

Easter Region: CALM

SITUATION. No locusts present. FORECAST. No significant developments



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

Other Activities Related to Desert Locust Commission

Joint training on the use of drones to survey and monitor locusts in their breeding areas

The Desert Locust commission in the Western Region (CLCPRO) has organized a joint training on drones to survey and monitor locusts in their breeding areas. This training was attended by participants from all member states of the Commission (10 countries) and 4 participants from the Commission for Controlling the Desert Locust in the Central Region (CRC). The training aims to enhance early warning capabilities and rapid response to locusts in traditional breeding areas. The field training was organized in Mauritania from 1 to 10 November 2021.

The participants were certified to perform drone flights and ensure the essential maintenance and data analysis of drones. The field evaluation confirmed that the drones had simplified locust surveillance implementation and operation. With its “Mono Spectral” onboard camera, the drones allow good detection of vegetation in locust habitats. The “visual” camera allows the survey officer to visually confirm the analysis obtained through the onboard data processing generated by the on-embed computer. Simplified flight programming allows deployment in a short time. Its good autonomy makes it possible to cover a considerable distance quickly (can perform up to 80 km flight).



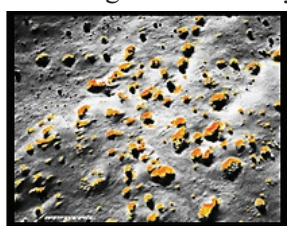
Drones – The eyes in the sky for Desert Locust monitoring

The first use of drones for the detection and surveillance of the Desert Locust in the Western Region

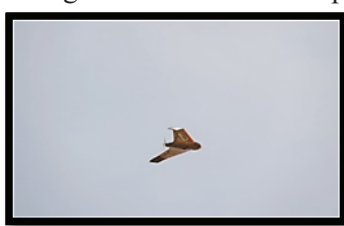
As part of the FAO strategy to develop the Desert Locust detection and field data collection tools through technological innovations, the use of drones for the Desert Locust survey has been launched for the first time this year. As a first phase, 20 drones have been delivered to the Western and Central Desert Locust Regions. The tailor-made model of drones for Desert Locust detection and surveillance is a result of fruitful cooperation of FAO and HEMAV Foundation; and the two-year successful field testing of the model by the FAO Desert Locust Information Service (DLIS), the FAO Commission for controlling the Desert Locust in the Western Region (CLCPRO) and FAO Commission for controlling the Desert Locust in the Central Region (CRC).

In support of putting drones in operation, CLCPRO embarked to acquire and operationalize of 16 drones in its programme of the Desert Locust environment monitoring of for the benefit of its member countries. These customized drones for locust monitoring, differ from the drones available in the market by: customized software that adapts to the device (eLocust3) that scouts use in the field to set up flight missions and exploit the results; data is processed on board of the drone; and the information of interest to the survey officer is chosen over the other, which has a positive impact on decision-making times. The drone's specifications are: HP2 fixed Wing UAV (Width: 1580mm, Height: 185mm), empty weight <2kg, single engine, 2 batteries: LiPo TB48s 5700mAh, 22.8V, engine: 550rpm, 180g, payload: 0.8kg, maximum flight time: 90mn, maximum permissible height: 120m, hovering speed: 15m/s, maximum speed: 30m/s, maximum distance: 80km. The drone is equipped with an embed computer for data processing (Quad core 64 bit - 1.5 Ghz - 4 Gb RAM), 2 cameras: a mono-spectral and an 8-megapixel visual camera, as well as a RockBlock 9603 device for tracking the aircraft via satellite from the National Locust Control Center.

For the first time, and within the framework of the joint survey that was organized by CLCPRO from November 1 to 9, 2021 in cooperation with the National Center for the Control of Locusts and Birds (CNLAA) in Mauritania, the drones were used in real field conditions. The effective and practical field data collection by drones contributed to improved decision-making regarding the selection of the roads and areas to be surveyed in record times compared to traditional methods. Survey operations using drones were carried out as follows: 1- Determining the areas to be surveyed and determining the routes of the roads; 2- Performing reconnaissance flight missions; 3- Recovering and analyzing data and identifying potentially favorable areas; 4- Recording the coordinates of the identified areas; 5- Navigation to specific locations using GPS; 6- Perform traditional exploration (collecting and transmitting data using eLocust3); 7- Perform flights to collect additional information; and 8- Perform daily maintenance at the end of operations. The use of drones for the first time in locust survey operations in the Western Region was successful. It has improved the quality of data collection and transmission, especially in hard-to-reach areas. In addition, the availability of qualified technicians in the region trained by CLCPRO in managing the drones will facilitate the introduction for drones into the national locust monitoring and control systems during the next control campaigns. **Shoki Al-Dobai FAO-AGP**



Preparing the drone mission



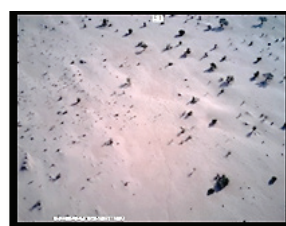
Data collection during the fly



Image of vegetation using a monospectral camera



Photo with visual camera to determine the presence of locusts



End of the drone mission

ARAB SOCIETY FOR PLANT PROTECTION NEWS

Second national meeting on biological control and integrated pest management

The second national meeting on biological control and integrated pest management was held in Damascus, Syria, during the period 29-30 November 2021, and organized by the Biological Control Research and Studies Center, Faculty of Agriculture, University of Damascus, in collaboration with the Arab Society of Plant Protection (ASPP). Around 130-150 participants from different teaching and research institutions in Syria, in addition to three colleagues from ASPP, participated in this event. An important feature of the meeting was the heavy participation of young scientists and graduate students from all Syrian Universities. The meeting was opened with a welcome note by Dr Abdelnabi Basheer, Dean of the Faculty of Agriculture, University of Damascus, followed with a welcome address by the meeting patriot Professor Dr Bassam Ibrahim, Minister of Higher Education and Scientific Research. The first scientific session was dedicated to three speakers from ASPP, the first presentation was by Ibrahim Al-Jboory on “Biological control of the fall army- worm, as an effective alternative to chemical pesticides”, followed by a presentation by Khaled Makkouk entitled “Use of viruses to control bacterial plant diseases”, and the third presentation was by Safaa Kumari on “Integrated management of virus diseases which affect leguminous crops in West Asia and North Africa”. Seven scientific sessions followed, which covered different aspects of biological control. The conference was successful by all standards, as it showed the importance of biological control and the extent of its development in Syria, in addition to the presence of a new generation of researchers working in this field, as well as the development of plant extracts that are safe for natural enemies of pests.



The 3rd International Festival of Jordanian Dates

Dr. Ibrahim Al-Jboory, President of the Arab Society for Plant Protection, delivered a lecture entitled Failures in Date Palm Pests Management at the scientific symposium of the 3rd International Festival of Jordanian Dates on November 22, 2021. This festival, which was organized by the Ministry of Agriculture in the Hashemite Kingdom of Jordan, the Khalifa International Award for Date Palm and Agricultural Innovation, and the Jordan Dates Association (JODA) during the period 21-23 November, 2021 at the Intercontinental Hotel, Amman, Jordan, was one of the important occasions in which producers and manufacturers of Jordanian dates displayed their products and discussed the development of palm cultivation in Jordan. The scientific symposium was a collection of valuable lectures, most of which focused on dates and modern technologies for their manufacture, and important applications on mobile phones that dealt with some technical problems facing producers.



The society participated in Khalifa Award cultural Season 2021

Within the cultural season of the Khalifa International Award for Date Palm and Agricultural Innovation, Dr. Safaa Kumari, Head of Seed Health Laboratory/Plant Virologist (International Center for Agricultural Research in the Dry Areas, ICARDA) and Chairperson of the Publication Committee of the Arab Society for Plant Protection delivered a virtual lecture entitled “The

Importance of Germplasm Health in Preventing Transboundary Spread of Plant Pests and Diseases”

on Monday 29th of November 2021, with the attendance of 120 experts and specialists in the Date Palm cultivation sectors, and representing 19 Arab countries. She presented the importance of plant pests and diseases and their impact on food security, examples of exotic invasive plant pests and diseases that cross borders, as well as international GeneBanks and their strategically important plant origins, how the movement of



germplasm and international health units takes place, and what they are, the measures and procedures followed for the safe movement of genetic assets, in addition to the most important challenges. Dr. Kumari also emphasized that seeds/germplasm is an important pathway for the spread of pests and plant diseases through human activities, by collection and distribution. She then noted that pests have increased significantly recently, through global trade, environmental and climatic changes, insects, and trade in seeds and agricultural products. Dr. Kumari then asked what can we do as a plant pathologist to maintain global diets? The answer was: proper planning and decision, quick action, crops resistant to diseases and insect pests, and the safe exchange of germplasm to prevent the international spread of pests and plant diseases. Finally, she thanked Prof. Dr Abdel Wahab Zayed, the Secretary-General of the Award, and the great role played by the Khalifa International Award for Date Palm and Agricultural Innovation in supporting and developing the date palm cultivation sector and the date production worldwide.

Dr Safaa Kumari, Chairperson of the Publication Committee of the Arab Society for Plant Protection and Head of ICARDA’s Seed Health Lab/Plant Virologist, participated in the Wheat Management Course for Syrian Scientists of General Organization of Seed Multiplication on 2nd November 2021, and presented two lectures “**Virus Diseases of Wheat in CWANA region: Epidemiology & Control**” and “**Major Quarantine Seed-borne Pests of Cereal crops: Detection and Management**”. The course was held at Sheraton Hotel in Aleppo-Syria and around 20 trainees were attended the courses



On November 4th, Dr Safaa Kumari participated in the 3rd online workshop in Pest Risk Analysis, which organized by Abu Dhabi Agricultural and Food Safety Authority, and delivered a virtual lecture entitled “**Safe movement of food and forage crops germplasm at ICARDA**”. Around 65 participants from Arab Countries were attended the workshop.



Additional Email Address for ASPP

Because the ASPP office is facing difficulties with its email address aspp@terra.net.lb, an additional email address was established. All colleagues communicating with the ASPP Office, especially those submitting articles for publication in the Arab Journal of Plant Protection, are encouraged to use both the old address and the new email address: asplantprotection@gmail.com.

The 13th Arab Congress of Plant Protection 2022

Due to the continuation of the Covid-19 pandemic and unstable health situation in Tunisia, the Congress Organizing Committee decided to postpone the congress to October 2022. The Society Executive Committee endorsed the new date and ensured getting the same hotel prices offered earlier.

- 1-The new congress date is October 16-21, 2022.
- 2-Registration deadline: September 1, 2022.
- 3-Abstract's submission deadline (confirmation of earlier submitted abstracts or presenting new ones): April 30, 2022.
- 4-Acceptance of abstracts: 30 June, 2022.
- 5-Deadline for submitting proposals for invited concurrent oral research papers sessions: March 31, 2022
- 6-Second congress announcement: May 31, 2022.
- 7-Third and final congress announcement: July 1, 2022.
- 8-Deadline for hotel booking: July 31, 2022.
9. The email address and the website of the congress will continue to be: info@acpp-aspp.com and www.acpp-aspp.com

We apologize for any inconvenience caused by this postponement imposed on us by conditions beyond our control, and we appreciate your kind understanding. We are looking forward to meeting you all in the fall of 2022 in Tunisia.

The Arab Society for Plant Protection

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

NEWS OF ASPP MEMBERS ABROAD

How the Herbivore Insects Recognize their Host Plant

In order to locate a suitable host plant, herbivore insects exploit several visual and olfactory stimuli that can bring them in the proximity of the plant where the herbivore feed and oviposit. This host searching behavior is influenced by several internal factors, such as insect feeding habit (polyphagy /monophagy), developmental stage and oviposition behavior, and also influenced by external factor such as plant stage and environmental conditions. This process is mediated by visual and chemical stimuli, and the latter having an important role in the long-range attraction behavior. In specific, chemical volatiles (kairomones) emitted from the host plant can play a crucial role in this process. The perception of volatile kairomones is mediated by olfactory receptor neurons (ORNs), located primarily on the insect antenna, which act to convert the chemical signal into an electrical signal that inputs directly to the Central nervous system (CNS). Generally, the ability to find a suitable host plant and its acceptance can be determined by the perception from the insect of plant-specific volatiles or of specific blend of selected ubiquitous volatiles. Polyphagous insects tend to exploit a great range of plant volatiles, while specialist insect herbivores need to show more efficient forms of adaptation, since they are expected to use specific cues. The responses of herbivore insects to volatiles released by their host plants have been shown in several of insect species. Overall, in phytophagous insect the recognition of females to plant volatiles seem to be higher than to males, probably as several of them need to lay their eggs on the suitable host plant. The host selection process can be seen as a continuum reaction between two extremes, namely, insects 'choosing' their host from a distance using olfactory and visual cues, and insects 'selecting' their host only after contact, when gustatory cues are also employed. Understanding insect-plant interactions is of interest not only from an ecological and evolutionary perspective but also for the development of novel crop protection strategies, either by engineering or selecting crop plants for endogenous resistance to insect pests, or by treating crops with specific semiochemicals to make them less attractive. [¹Mokhtar Abdulsattar Arif (Iraq-Italy) and ²Salvatore Guarino ¹Plant Protection Directorate, Ministry of Agriculture, Abu-Ghraib 10081, Baghdad, Iraq; mokhtar.a.arif@gmail.com. ²Institute of Biosciences and Bioresources (IBBR), National Research Council of Italy (CNR), Corso Calatafimi 414, 90129 Palermo, Italy; salvatore.guarino@ibbr.cnr.it

Topical delivery of host induced RNAi silencing by layered double hydroxide nanosheets: an efficient tool to decipher pathogenicity gene function of *Fusarium crown and root rot* in tomato.

RNAi technique was used to regulate *Fusarium crown and root rot* in tomatoes caused by *F. oxysporum* f. sp. *radicis-lycopersici* (FORL), by targeting three essential genes namely FoCYP51, FoChs1, and FoEF2, considering the fungicide site of action. The designed naked dsRNA was delivered on a hexagonal mono-dispersed and biodegradable layered double hydroxide (LDH) nanosheets with 30–90 nm diameter, providing high protection and stability for dsRNA with long term sustained release manner inside plant cells. The laboratory findings revealed the functional role of the three selected genes in reducing FORL's invasive growth on tomato fruits, indicating their involvement in FORL pathogenesis on tomatoes, and could be good targets for disease control using RNAi. Three different practical methods were applied for topical delivery of dsRNA into the plant cells: i) leaves spray; ii) petiole adsorption; and iii) root dipping, demonstrating three significant levels of spray-induced gene silencing (SIGS) efficacy in controlling FORL virulence infecting tomato plants. Significantly, topical spray of dsRNA delivered on LDH nanosheets provided *Fusarium crown and root rot* protection for at least 60 days. Obtained findings introduce critical information data on the potential to exploit spray-induced gene silencing (SIGS) as an effective alternative sustainable strategy for plant disease management. Given the ease design and production of biodegradable nano-delivery systems with high specificity and sustainability, and ease of applicability against many disease caused fungi. The use of target-specific dsRNA as an anti-fungal agent has a lot of promise and provide exceptional potential as a unique disease control and plant protection strategy [Mosa A. Mohamed and Khamis Youssef (Egypt-Brazil), *Physiological and Molecular Plant Pathology* 115, 101684, Plant Pathology Research Institute, ARC, Egypt, 2021].

RESEARCHER FROM IRAQ

Jawad Bulbul Hummood Al- Zaidawi has obtained a doctorate in isolation, characterization and pathogenicity evaluation of entomopathogenic nematodes (EPNs) from local regions. **First**, I have got a bachelor's degree in Plant Protection from the University of Baghdad, Faculty of Agriculture, in 1997. After graduation, I worked in the Atomic Energy Organization to assist the agricultural engineer in the Agricultural Research and food Technology directorate-biological control department laboratories. Specifically, I was a member of staff who has worked in mass rearing of egg parasitoids belonging to *Trichogramma* genus (*Trichogramma* spp.). I have conducted many experiments related to this topic. One of them was about the field releasing of *Trichogramma evanescens* on Spiny Cotton Boll Worm Pest *Earias insulana*. This work was published in Arab Journal in Plant Protection. In addition, I have worked in a mass production project of plant extracts such as extraction of fruits of *Melia azedarach* and evaluation of their efficiency in managing and controlling insect pests. **Second**, I have completed a master's degree in Plant health and biosecurity from Adelaide University, one of the most popular and famous universities in Australia and part of the group of eight worldwide. My master project focused on insecticidal tolerance of insect pests and their effects on natural enemies such as larval parasitoids *Diadegma semiclausum*; one paper was published according to this subject. **Third**, I got a PhD from Ferdowsi Iran on a topic related to Entomopathogens, and my subject was on the isolation, identification and evaluation of native entomopathogenic nematodes. More than ten entomopathogenic nematodes and their associated bacteria were registered in GenBank of NCBI website. The pathogenicity of native nematodes on termites was tested in both lab and field conditions. In addition, I conducted some experiments about the compatibility of entomopathogenic nematodes with some registered pesticides of termites. I have published two papers, and three papers are still under revision. **Currently**, I am working as a senior researcher and Division Director of insect pathogens in the Ministry of Science and Technology, Agricultural Research Directorate, Integrated Pest Management Center of Iraq, on the isolation and identification of Entomopathogens (Fungi and Nematodes) based on morphological and molecular features implementing the promising ones on common insect pests in Iraq.



Entomopathogenic Nematodes as Potential Biological Control Agents of Subterranean Termite, *Microcerotermes diversus* (Blattodea:Termitidae) in Iraq

The infectivity of three species of entomopathogenic nematodes (EPNs) such as *Steinernema*

carpocapsae Weiser (Rhabditida: Steinernematidae), *Heterorhabditis bacteriophora* Poinar (Rhabditida: Heterorhabditidae), and *H. bacteriophora* Poinar (IRQ.1 strain) were examined against subterranean termite *Microcerotermes diversus* (Silvestri) (Blattodea: Termitidae) that is the most economically destructive termite in Iraq. Laboratory and field efficacy of these strains were evaluated to test the feasibility of indigenous EPNs to be used in a biological control program. The biological traits examined included pathogenicity, penetration, and reproduction of EPN species. Filter paper and wood bioassays were conducted using six concentrations: 25, 50, 100, 200, 400, and 600 IJs/termite. In both tests, all strains were virulent against *M. diversus* workers. The LC50 of *S. carpocapsae* in both petri dishes and in containers with sawdust was (57.9 and 15.7 IJs/termite) less than both indigenous (274.2 and 60.8 IJs/termite) and commercial (139.6 and 52.6 IJs/termite) *Heterorhabditis bacteriophora*, respectively. In the field, the percent mortality of the tested workers ranged from 22.5–80 ± 8.3%, 37.5–96.2 ± 8.9%, and 28.7–67.5 ± 6.8% for commercial *H. bacteriophora* and *S. carpocapsae*

and native *H. bacteriophora*, respectively. All EPN strains successfully penetrated the *M. diversus* workers under field conditions, while the results showed that there was a significant difference between the three EPN strains. The percent mortality caused by native *H. bacteriophora* against termites was higher (43.6 ± 2.7%) than both commercial strains of *S. carpocapsae* (36.9 ± 1.6%) and *H. bacteriophora* (29.9 ± 1.4 %). These results highlight the efficiency of EPNs for the control of *M. diversus* workers. [**Jawad B. Al-Zaidawi,¹ Javad Karimi,² and Esmat Mahdikhani Moghadam²**.¹Integrated Pest Management Center, Agricultural Research Directorate, Ministry of Science and Technology Baghdad-Iraq;²Department of Plant Protection, Ferdowsi University of Mashhad, Mashhad, Iran.*Environmental Entomology*, Volume 49(2), 2020, Pages 412–421], <https://doi.org/10.1093/ee/nvaa014>

Molecular characterizations of the entomopathogenic nematodes, *Heterorhabditis bacteriophora* and *Oscheius myriophilus* from Iraq

A survey was conducted in three central regions of Iraq to isolate and identify entomopathogenic and insect parasitic nematodes. Soil samples were collected from 15 sites across three provinces from grassland, date palm, and citrus fields and tested for the presence of nematodes. Out of 100 samples collected, two isolates of nematodes were recognized. The collected specimens were characterized morphologically and then by molecular studies to describe and identify the isolates based on ITS and 18S rDNA genes. Both isolates were recovered from soil samples of citrus and palm orchards located in 3 regions in the city of Baghdad. The isolates were identified by analyzing sequenced results and then by DNA sequences that were blasted against the NCBI database in GenBank. The two isolates were separated into two genera, assigned as IRQ.1 and were identified as *Heterorhabditis* and IRQ.2, which was identified as *Oscheius*. Molecular analysis and phylogenetic relationship of both genera were analyzed, using the DNA sequences of 2 loci. The *Heterorhabditis* species was assigned as *Heterorhabditis bacteriophora*, while the *Oscheius* species was identified as *Oscheius myriophilus*. These species were the first to be reported in Iraq.[**Jawad B. Al-Zaidawi; Javad Karimi ; Esmat Mahdikhani Moghadam** , *Egyptian Journal of Biological Pest Control* volume 29, Article number: 38 (2019)]

RESEARCHER FROM ALGERIA

Dr Samia Laala supported her university qualification in Agronomic Sciences-Plant Pathology on June 2021 at the National Agronomic School (ENSA) - El Harrach - Algiers- Algeria. This defence will empower Dr Samia Laala to direct research work and supervise doctoral theses in Phytopathology.

Dr Samia Laala is a Teacher and Researcher at the Department of Botany (Plant Pathology and Molecular Biology Laboratory) at the National Higher Agronomic School (ENSA-Algiers). She got her Masters in Plant Biotechnology at the University of Angers (France), her Magister in Agronomic Sciences, Phytopathology, in 2010 (ENSA, Algiers) and her Doctorate in Agronomic Sciences (phytopathology) at (ENSA-Algiers) in 2016. She obtained her university qualification in agricultural sciences in 2021.

Her main research areas consist of detecting and studying the genetic diversity of phytopathogenic agents associated with plants. Since 2017, she has been teaching plant pathology and mainly bacterial seeds borne diseases.



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XYLELLA FASTIDIOSA NEWS

Landscape Restoration due to *Xylella fastidiosa* Invasion in Italy: Assessing the hypothetical public's preferences

Since 2013, the olive landscapes have gradually degenerated due to the spread and establishment of *Xylella fastidiosa* subsp. *pauciflora* (hereafter Xf) in Apulia, southern Italy. From 2013 to 2019, a total of approximately 54,000 hectares of olive orchards in the south of this region have been seriously damaged, and their restoration will progressively regenerate the economic, social, cultural and environmental nonmarket benefits. Since there is a willingness to restore the affected landscape in the best interest of the local citizens, this research aims to predict their preference heterogeneity and willingness to pay (WTP) to improve this landscape and continue research and experimentation in relation to Olive Quick Decline Syndrome Disease by the bacterium. For this purpose, a choice experiment method is used. The social field survey includes a representative sample of 683 respondents in three major cities (Foggia, Bari and Lecce) of Apulia region. The results reveal that for the local citizens interviewed, and the most appreciated olive landscape services are cultural heritage and aesthetic values. In addition, the findings revealed citizens' positive appreciation of improving the damaged olive landscape, while respondents are not willing to pay a premium for research. [**Michel Frem, Fabio Gaetano Santeramo, Emilia Lamonaca, Maroun El Moujabber, Elia Choueiri (Lebanon), Pierfederico La Notte, Franco Nigro, Francesco Bozzo, Vincenzo Fucilli, NeoBiota 66: 31–54, 2021**]. doi: 10.3897/neobiota.66.67648

General News

Khalifa International Award for Date Palm and Agricultural Innovation launched the 50 booklets.

H.E. Sheikh Nahayan Mubarak Al Nahyan, Minister of Tolerance and Coexistence, Chairman of the Board of Trustees of the Khalifa International Award for Date Palm and Agricultural Innovation, inaugurated the complete collection of the 50-booklets series initiative, in the Year of the Fiftieth, at Expo2020 premises, on the 9th of December, 2021, in celebration of the 50th United Arab Emirates National Day, and its founding by the late Sheikh Zayed bin Sultan Al Nahyan. His Excellency praised the importance of this initiative as the first of its kind regionally, where one of the Award's objectives is spreading specialized scientific knowledge, to people interested in this field in general and date growers in particular, at the national, regional, and international levels. H.E. Sheikh Nahayan Mubarak Al Nahyan also added that this initiative comes to celebrate the 50th anniversary of the founding of the United Arab Emirates, and in conjunction with the 50th year, and as part of the Award's commitment to meet the vision of H.H. Sheikh Khalifa bin Zayed Al Nahyan, President of

the United Arab Emirates, “May God protect him”, to strengthen the UAE’s leading position in knowledge sharing and empowering target groups of international best practices in date palm cultivation, date production, and agricultural innovation, and the support of H.H. Sheikh Mohammad Bin Zayed Al Nahyan, Crown Prince of Abu Dhabi, Deputy Supreme Commander of the UAE Armed Forces, and the continuous follow up of H.H. Sheikh Mansour Bin Zayed Al Nahyan, Deputy Prime Minister, Minister of Presidential Affairs. Dr. Abdelouahhab Zaid, Award’s Secretary-General, extended his appreciation to all participating researchers, academics, experts, and specialists in date palm cultivation, date production and agricultural innovation, who contributed to the 50 booklets initiative, representing 14 countries, including 11 regional and international organizations, 06 international universities, 06 scientific research centres and 06 Non-Profit organizations, covering 50 scientific topics within 2,500 pages. This initiative, which attracted a wide range of specialized academic expertise from inside and outside the UAE, covered scientific, technical, mentoring, innovative success stories, the use of artificial intelligence and the prospect of the agricultural future and several other topics to support the scientific knowledge sharing concerning the date palm cultivation sector, date production and agricultural innovation, stressing that this series of booklets, in addition to all the Award’s publications, are available to the public through the Award’s electronic library, found at (www.ekiaai.com).

Dryocosmus kuriphilus, a new invasive pest, which threatens chestnut trees in Lebanon

Chestnut (*Castanea* spp. (Fagaceae)) has been widely cultivated in Lebanon for more than 25 years across the mountainous areas, where the climate is suitable for its cultivation. Although the chestnut tree shows resistance to many pests and diseases, a new invasive pest was detected in 2019 for the first time in Lebanon on the bud leaves and identified as *Dryocosmus kuriphilus* (Hymenoptera, Cynipidae) by the laboratory of entomology at the Lebanese Agricultural Research Institute (LARI). The pest is known as the chestnut cynipid gall wasp, and it is considered a major pest of chestnut. It is originated from China, Japan and Korea, and later it was introduced accidentally into the U.S.A in 1974. In the Mediterranean area, the pest has been recorded since 2002 and is widespread in Italy, Greece, France, Croatia, Slovenia and Turkey and now it is reported in Lebanon.



The species is most probably introduced to Lebanon through the movement of infested plant materials. *D. kuriphilus* is a univoltine species, composed entirely of females and reproducing parthenogenetically. The species has one generation per year, and its life cycle depends on altitudes and chestnut cultivars and their phenological stages. Adult females appear in summer between mid-June and late July, which synchronize with the blossom period of chestnut and lay eggs in chestnut buds. The incubation period lasts 30-40 days, and early instar larvae overwinter inside the buds till next spring, corresponding with the growth of new leaves. The larvae develop gall-shaped swellings that live inside them for 30-35 days in high mountainous areas and 20-25 days in lower altitudes. Swelling disrupts the growth of leaves and twigs, weakens the tree’s growth, and reduces fruiting. The use of chemical pesticides against immature stages is inefficient because they are protected inside the galls. The synchrony of the flight of the adults during the blossom restricts the use of some insecticides. No parasites were recorded emerged from the galls in the laboratory. Therefore, this new invasive pest poses a real threat to the chestnut production in Lebanon and to the livelihood of the rural people who depend on it. It became crucial to monitor the life cycle of the species, understand its biology and study the effectiveness of some parasites in order to develop an effective pest management strategy and reduce the level of the damages.

Engineer Zinette Moussa, Head Laboratory of Entomology – LARI, Lebanon, 2021

Amata colonizing olive trees in South Lebanon

Amata is a genus of tiger moths in the family of Erebidae. In Lebanon, two species were reported: *A. mestralii* (Bugnion, 1837) and *A. libanotica* (Bang-Hass, 1906). Immature stages of the genus are polyphagous feeding on low herbaceous plants, including plantain (*Plantago* spp.), dock (*Rumex* spp.), bedstraw (*Galium* spp.), dandelions (*Taraxacum* spp.) and other wild plants, as well as some grasses. However, some species are reported feeding on mosses, lichens and algae. During the beginning of December 2021, mass phenomena of *Amata* larva were spotted in South Lebanon, colonizing olive trees, especially in remain galleries of wood insects preparing for hibernation and on branches and rocky walls feeding on lichens. *Amata* is not considered a pest, and some species are endangered due to loss of habitat and degradation of the ecosystem,



Euphresco project 2019-A-327 ‘Validation of molecular tests for the detection of tomato brown rugose fruit virus in seed of tomato and pepper’

Euphresco published the report of the Euphresco project 2019-A-327 ‘Validation of molecular tests for the detection of tomato brown rugose fruit virus in seed of tomato and pepper’. The report (including a detailed technical Appendix) is available from <https://zenodo.org/record/5776210#Ybc4Ur3MKUI>. A test performance study was organized to evaluate several serological and molecular diagnostic tests for the detection of tomato brown rugose fruit virus on tomato and pepper seeds. Twenty-seven organizations from AT, BE, CA, DE, ES, FR, GB, HR, IL, IT, MX, NL, NZ, PT, RU and SI, including several diagnostic and seed companies, participated in the test performance study. A real international multi-stakeholder activity!

The results of this study showed that the real-time RT-PCR tests (ISHI-Veg and Menzel & Winter) allow the reliable and correct diagnosis of ToBRFV in tomato and pepper seeds. In contrast, DAS-ELISA, conventional RT-PCR and isothermal amplification tests appeared unsuitable for a reliable detection of ToBRFV in tomato and pepper seeds. However, for the isothermal amplification tests this conclusion was based on a limited number of data sets.

Both real-time RT-PCR tests (ISHI-Veg, 2019 and Menzel & Winter, 2021) are currently required for official testing of tomato and pepper seeds according to the most recent version of the EU emergency measures in Commission Implementing Regulation (EU) 2021/1809. The results indicate that there is currently no need to adjust the list of methods for seed testing. However, additional comparisons with a recently developed real-time RT-PCR that targets a different genome region (Bernabé-Orts *et al.*, 2021), could be considered in the future; the real-time RT-PCR test (Bernabé-Orts *et al.*, 2021) was tested by two laboratories outside the scope of the project test performance study and may give comparable results, but more extensive testing is needed.

Dr. Youssef Khamis selected as a member of the Agricultural and Food Research Council of the Academy of Scientific Research and Technology

The board of the Arab Society for Plant Protection sincerely congratulates **Dr. Youssef Khamis** an Associate Professor at the Plant Pathology Research Institute - Agricultural Research Center in Egypt, for being selected as a member of the Agricultural and Food Research Council of the Academy of Scientific Research and Technology. The Agriculture and Food Research Council is one of the scientific formations in the specific councils sector at the academy. It consists of fifteen members from various fields of scientific research and technology from universities, research centers and various work sectors. Each council consists of (5 members) from young researchers and faculty



members, and they are chosen based on scientific excellence, and this distinction is measured according to the internationally recognized standards, such as international scientific publication – h index - citations - impact factor - registered patents - state awards, and (Five members) of the best scientists in Egypt in the field of work of the Council and (five members) experts and public figures, including industry experts in the same area, preferably those with regional and international experiences.

SCIENTIFIC BOOKS

Fall Armyworm is a transboundary pest affecting crops and food security

Fall Armyworm is a transboundary pest native to the tropics of the Americas that first entered West Africa in 2016, causing significant losses to maize crops, which is an important component of food on the African continent. FAW spread has expanded to include 44 countries in Africa during 2017. The insect reached India, China and most of Asia during the years 2018-2019 until its appearance in 2020 in the continent of Australia. The infestation of FAW is attributed to the pest's traits, such as its high ability to fly and to lay many eggs, which enables the pest to settle in the invaded area and cause severe damage to maize and other host crops. The number of host crops reached 350 species, most cereals, considered a food basket and a guarantee of food security for humanity. The Food and Agriculture Organization of the United Nations (FAO) and other organizations have dealt with this outbreak from its onset to the present day. This publication has been developed to provide advice, assistance, and suggestions for mitigating FAW and reducing crop losses. This book comes to clarify the scientific and practical aspects of the nature of this pest and the best management methods, in addition to the experiences of different countries and the success stories and efforts made to combat this pest. The book is the first publication in the Arabic language that deals with this insect in detail. [Al-Jboory, Ibrahim; Yaseen, Thaer; Elkahky, Maged publish by FAO 2021, pp 140]



<https://doi.org/10.4060/cb7104ar>

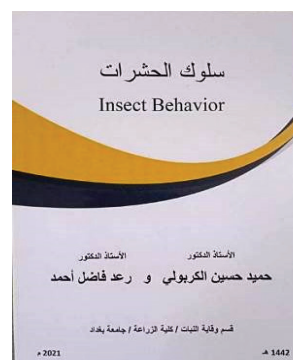
The role of the Arab Society for Plant Protection in spreading awareness of date palm pest management

A new booklet issued by Khalifa International Award for Date Palm and Agricultural Innovation, including the role of the Arab Society for Plant Protection in spreading the awareness and extension in the field of plant pests and date palm in particular. Besides highlighting the society background, the book focused on the new potential appeared pests such as giant mealybugs, African fig fly, green scale insects, white scale insects and a few diseases. Diagrams illustrated simplifying the comprehension of integrated pest management (IPM). The challenges facing date palm pests control were discussed in detail, and solutions were suggested to tackle them properly. Appreciations are extended to the Secretary-General of Khalifa Award for supporting this book and another 49 ones coring on date palm practices and management.



Insect Behavior

The success of insects depends at least in part on their ability to sense and interpret their surroundings and respond to them. Insects can communicate with each other and other species in their environment in several different ways such as chemicals, mechanical, sound, visual signals and others. Behaviour involves studies to understand how insects obtain information from their environment, interpret that information, and respond to it. The sensory system in insects controls complex and straightforward behaviours, for example, to control flight, the air environment must be sensed, and the appropriate response is taken. The range of sensory information used by insects differs from that of humans, we rely heavily on vision information, and although many insect species have developed vision, most of them use the



senses of smell and hearing more than humans. Insects outer surroundings are covered with a layer of cuticle, but it is able to perceive and respond to it through many morphological modifications in the cuticle, which can detect external stimuli of various kinds, and that unique sense organs such as sensory hairs that arise from the cuticle layer and below it detect these stimuli, which can be classified and divided into several types such as chemical, mechanical, visual and thermal. The associated neurons transmit these signals (stimuli) to the central nervous system and give the required response such as movement, searching for food, laying eggs, flying, mating and others. Studying the behaviour of the insect determines how it became a pest, the way it entered the crop and the nature of feeding on it, and then determines the strategy to combat it. The study of behaviour is necessary to decide on the behaviour of insects in a particular ecosystem. Behavioural studies have helped overcome many problems caused by insects, including calculating the potential of biological resistance factors and the study of resistant species. The study of insect behaviour should not be done in isolation from the behaviour of other organisms, and that many successful studies may be achieved in the light of studying these groups together. This book includes eleven chapters. Prof. Dr Raad Fadel Ahmed prepared the first five chapters of this book which include: Principle's of insect behaviours, Perception of environment and sense organs, orientation behaviour, Learning in insects, behaviour and thermoregulation, while Prof. Dr Hameed Hussein Al- Karboli prepared the rest of the other chapters which include: Chemical communication in insects, Insect defence, Insect feeding behaviour, Insect mating behaviour, Oviposition and brood care behaviour and Methods of studying insect behaviour. [Prof. Dr Hameed H. Al – Karboli and Prof. Dr Raad F. Ahmed, University House for Printing, Publishing and Translation, University of Baghdad, Baghdad-Iraq, 156 pp, 2021].

SELECTED RESEARCH PAPERS

- **Detection of Airborne Sporangia of *Pseudoperonospora cubensis* and *P. humuli* in Michigan Using Burkard Spore Traps Coupled to Quantitative PCR.** Julian C. Bello, Monique L. Sakalidis, David E. Perla, and Mary K. Hausbeck, <https://doi.org/10.1094/PDIS-07-20-1534-RE>
- **Natural Infection Rate of Known *Tomato chlorosis virus*-Susceptible Hosts and the Influence of the Host Plant on the Virus Relationship with *Bemisia tabaci* MEAM1.** Arnaldo Esquivel-Fariña, Jorge Alberto Marques Rezende, William M. Wintermantel, Laura Jenkins Hladky, and Daiana Bampi, <https://doi.org/10.1094/PDIS-08-20-1642-RE>
- **Genetic Diversity and Distribution of Korean Isolates of *Burkholderia glumae*.** Okhee Choi, Seunghoe Kim, Byeongsam Kang, Yeyeong Lee, Juyoung Bae, and Jinwoo Kim, <https://doi.org/10.1094/PDIS-08-20-1795-RE>
- **First Report of Bacterial Leaf Spot of *Cucurbita pepo* Caused by *Erwinia persicina* in China.** L. Li, H. L. Li, Y. X. Shi, A. L. Chai, X. W. Xie, and B. J. Li, <https://doi.org/10.1094/PDIS-06-20-1241-PDN>
- **Effectiveness of inundative releases of *Anthocoris nemoralis* (Hemiptera: Anthocoridae) in controlling the olive psyllid *Euphyllura olivina* (Hemiptera: Psyllidae).** Naceur Gharbi, Eur. J. Entomol. 118: 135-141, 2021. DOI: 10.14411/eje.2021.014
- **Scientific knowledge is no more the weakest link to fight the locust plague.** Michel Lecoq, Cirad, Umr CBGP, F-34398 Montpellier, France, Academia Letters Article 1409, June 2021, doi.org/10.20935/AL1409
- **Amino acid changes during the early stages of tomato wilt disease (*Verticillium albo-atrum*).** Geoffrey Richard Dixon, Plant Protect. Sci., 57: 140–147. <https://doi.org/10.17221/136/2020-PPS>

PAPERS PUBLISHED IN THE ARAB JOURNAL OF PLANT PROTECTION (AJPP), VOLUME 39, ISSUE 4, DECEMBER 2021

- Effect of Olive Mill Wastewater of in the Control of Olive Verticillium Wilt Caused by Verticillium dahlia Kleb. K.A. Muhrez, M.Z. Tawil and B. Barhoum (SYRIA).
- Measuring Adoption of Integrated Pest Management Practices by Citrus Farmers in Tartous Governorate, Syria. S.M. Faskha (SYRIA).
- Diagnosis and Inhibition of the Virulence Factor Phaseolone of the Pathogenic Fungus *Macrophomina phaseolina* Using Some Chemical and Biological Methods. A.A.A. Al-Jbory and A.A Hasan (IRAQ).
- Susceptibility Assessment of Two Tomato Hybrids Against *Tuta absoluta* Infestation Under Greenhouse Conditions. A.S. Abdel-Razek, N.M. Abd El-Ghany, M.A. Gesraha, T.A. Elewa and A. Moussa (EGYPT).
- Induction of Systemic Resistance in Tomato Plants Against Tomato yellow leaf curl virus in Protected Cultivation Using a Local Bacterial Isolate of *Bacillus subtilis*. H.M. Ghanem, E.H. Akel, Q.A. Al-

Rhayeh and I.D. Ismail (SYRIA).

- Effect of Spraying Glyphosate Herbicide on *Solanum elaeagnifolium* in Uncultivated Fields and on Physicochemical and Biological Soil Characteristics. F. Bakkour, A. El-Meamar and Z. El-Naser (SYRIA).
- The Effect of Whiteflies on Productivity and Boll Weight of Cotton “Aleppo 118” Variety in Aleppo Governorate. Z. Al-Eisa, M.N. El-Salti, M. El-Nabhan and A. El-Jumaa (SYRIA).
- Evaluation Efficiency of Different Isolate of Actinomycetes for Control of Cucumber Seedling Damping-off Disease Caused by *Rhizoctonia solani* (Khun). M.A. Fayyadh and L.K. Awad (IRAQ).
- Identification of *Fusarium oxysporum* f. sp. *ciceris* Physiological Races in Chickpea Cultivated Areas in Al-Ghab Region, Syria. L. Alloush, S. Al-Maghribi and B. Barhom (SYRIA).
- The Potency of Six Medicinal Plant Extracts Against the Stored Grain Insect Pest *Sitophilus granarius* L. N.B. Jawalkar, S.P. Zambare and M.I. Al Ghannoum (INDIA & UK).
- Determination of the Maximum Appearance Period of *Capnodis tendebionis* L. in Al-Sweida-Syria Governorate and Testing the Efficacy of Some Pesticides on the Pest Adults. M. Bufaur, S. Al-Gkhami, R. Bohamdan, W. Ghanem and M. Dawara (SYRIA).
- Effect of Tomato Yellow Leaf Curl Virus Infection on Some Growth Indicators of Pepper Hybrids Grown Under Plastic House Conditions in Lattakia Governorate, Syria. R.S. Hamdan, I.D. Ismail and I. Akel (SYRIA).

Some events are missing in the following table:

ACPP 16-20 October, 2022, Hammamat, Tunisia

ICPP, 20-25 August 2023, Lyon, France

Other events can also be missing

Events of interest 2022

11-15/7/2022	IX EURAAC Symposium of the European Association of Acarologists in Bari- Italy, https://euraac2022.com/
18-23/7/2022	The 26th International Congress of Entomology, Helsinki, Finland, July 2022. https://ice2020helsinki.fi/
19-23/9/2022	The 11th International Scientific and Practical Conference “Biological plant protection is the basis of agroecosystems stabilization” http://events.fncbzs.ru/personal/apply/

Meranoplus pulcher

Meranoplus pulcher is the first member of the genus recorded from Saudi Arabia and from the vast Arabian Peninsula. Twenty five workers were collected from Al-Baha Province, Shada Al Ala Protectorate and six workers from Raydah Protectorate. Both collections were from pitfall traps placed next to Acacia trees. The soil was extremely dry with abundant dry seeds of shrubs. Despite several hours of observing the nest no additional specimens were found. *Meranoplus pulcher* is, as far as can be ascertained from these two collections, restricted to juniper woodlands of southwestern mountains of KSA (Dr. Abdulrahman Al-Dawood)



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

Abdulnabi Basheer (Syria), Amer J. A. Al-Gerrawy (Iraq), Ziad Barbar(Syria),Houda Kawas(Syria), Abd Alrahman Moukahel (ICARDA), Zahraa M. Baidaq (Syria), Esraa Mahmoud Ahmad(Syria), Mohamed Besri(Morocco), Ziad Aleisa (Syria),Hameed H. Al – Karboli (Iraq), Raad F. Ahmed(Iraq), Walid Naffaa(Syria), Mokhtar Abdulsattar Arif (Iraq), Elia Choueiri (Lebanon), Naima Mahfoudhi (Tunisia), Zainab Badenjki (Syria), Youssef Khamis (Egypt-Brazil), Safaa Neamat Hussein(Iraq), Mohammed Dawood Salman (Iraq), Adnan Abdaljeleel Lahuf (Iraq), Ouraa Noureddine(Algeria), Lammari Hamama Iméne(Algeria), Mostafa Sharaf (Saudi Arabia), Ammar Khalaf Daher(Syria), Mahran Zeity(Syria), Ayat M. Ali (Egypt), Ahmed Sabra(Saudi Arabia), Samy Sayed(Egypt), Moustafa M.S. Bakry(Egypt), Tavga Sulaiman Rashid(Iraq), Ensaf Hassan Akel(Syria), Rania Ebraheem(Syria), Abdulrahman Saad Aldawood(Saudi Arabia), Rima Khaled Al-Halbouni (Syria), Moaz Nabil Zouriky (Syria), Alaa Ramadan Muhammad (Syria),Maged Elkahky(FAO-Rome),Zinette Mousa(Lebanon),Setan Alserhan(Jordan),Rana Samara(Palestine), AlSaraiAlalawi Mamoon (FAORNE),Heba Tokli(FAO-Egypt),Eyad Mohamed(Syria) ,Hazim Zela(Syria),Mohamed Ali Bob(FAO-Egypt), Jawad Bulbul Al-Zaidawi (Iraq),Samia Lala(Algeria),

Special thanks to Engineer Zinette Moussa from Lebanon for her outstanding activity in helping the editorial board editing some news, and sharing another topics to enrich the newsletter.

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

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