Food and Agriculture Organization of the United Nations

ARAB AND NEAR EAST PLANT PROTECTION BULLETIN

ANEPPB

ISSUE 98 (2) August 2026

الجمعية العربية لوقاية النبات
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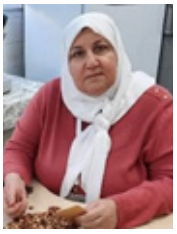

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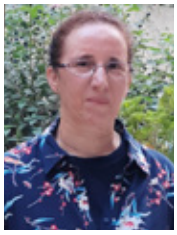

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Contents

EDITORIAL

A Network Approach to Protection Against the Transboundary Spread of Pests and Diseases in the Near East and North Africa (NENA) Region

The Near East and North Africa (NENA) region faces growing threats from transboundary plant pests and diseases that endanger agricultural productivity, food security, biodiversity, and agribusiness. Agriculture is further strained by climate change, water scarcity, land degradation, and increased agricultural trade, all of which raise the risk of pest and disease spread, threatening both high-value horticultural and staple food crops that support livelihoods and food systems. The 14th Arab Congress of Plant Protection, themed "Plant Health for Sustainable Food Security," held in November 2025 in Algiers, Algeria, provided a valuable forum to assess these challenges in the NENA region and globally (Kumari *et al*., 2025).

Fruit crops such as citrus, date palm, olive, grapevine, fig, etc., are facing severe impacts from transboundary pests and diseases. Key threats include citrus greening, caused by *Candidatus Liberibacter* and spread by both the African citrus psyllid (*Trioza erytreae*) and the invasive Asian citrus psyllid (*Diaphorina citri*), Bayoud disease in date palm caused by *Fusarium oxysporum* f.sp. *albedinis*, and Olive Quick Decline Syndrome caused by *Xylella fastidiosa,* spread by several phloem-feeding insects. Invasive pests such as the red palm weevil (*Rhynchophorus ferrugineus*) continue to spread across the region, causing significant economic losses. The risks also affect staple food crops, including wheat, barley, maize, rice, legumes, potato, and forage crops, which remain highly vulnerable to threats such as wheat stem rust, *Puccinia graminis* f. sp. *tritici* (Ug99 and related races), fall armyworm (*Spodoptera frugiperda*), desert locust, maize chlorotic mottle virus, bacterial wilt (*Ralstonia solanacearum*) of potato, banana bunchy top virus, and banana wilt caused by *Fusarium oxysporum* f. sp. *cubense* Tropical Race 4 of banana.

Legume crops such as chickpea, lentil, faba bean, cowpea, common bean, pea, soybean, and groundnut are equally vulnerable to the transboundary movement of pests and pathogens (Kemal *et al*., 2026). Diseases, including Fusarium wilt, Ascochyta blight, anthracnose, rusts, chocolate spot, bacterial blight, Cercospora leaf spot, charcoal rot, and viral diseases, including Bean common mosaic virus (BCMV), Bean common mosaic necrosis virus (BCMNV), Cowpea aphid-borne mosaic virus (CABMV), and Soybean mosaic virus (SMV), can spread through infected seed and

insect vectors. Parasitic weeds, broomrapes (*Orobanche crenata* and *Orobanche foetida*), are particularly concerning, as these can cause yield losses exceeding 80–100% under severe infestations in several legumes (faba bean, lentil, chickpea, pea, and other legumes). Their small, long-lived seeds are easily spread through contaminated seed lots, farm tools and machinery, irrigation water, livestock movement, and agricultural trade, posing a significant biosecurity risk.

Invasive insect pests, including bean fly *(Ophiomyia* spp.), cowpea aphid (*Aphis craccivora*), whiteflies (*Bemisia tabaci*), pod borers (*Maruca vitrata*), and storage pests such as bruchids, further reduce crop productivity and grain quality while aiding the spread of plant pathogens. The Khapra beetle (*Trogoderma granarium*) is another major threat, as it is one of the world's most destructive quarantine pests of stored agricultural commodities, and it can spread through infested grain, seed shipments, storage facilities, packaging, and transport systems, threatening grain reserves and agribusiness value chains across. Invasive plant-parasitic nematodes, such as root-knot nematodes (*Meloidogyne* spp.), cyst nematodes (*Heterodera* and *Globodera* spp.), lesion nematodes (*Pratylenchus* spp.), and burrowing nematodes (*Radopholus similis*), also pose a significant and often overlooked transboundary threat.

Effectively addressing these increasingly interconnected threats necessitates the establishment of a coordinated NENA Plant Health Network. Such a network should integrate National Plant Protection Organizations (NPPOs), agricultural research institutions, CGIAR centers, FAO, national genebanks, universities, diagnostic laboratories, extension systems, seed certification authorities, and private-sector partners. Such collaboration would enhance regional surveillance, early warning systems, pest diagnostics, pest risk analysis, and real-time information exchange. It would also harmonize phytosanitary regulations and emergency response mechanisms across countries, helping to protect seed systems and prevent the spread of diseases, insect pests, nematodes, and parasitic weeds.

The CGIAR Germplasm Health Units (GHU) model serves as a strong reference for developing such a network (Kumar *et al*., 2021). CGIAR GHUs have established internationally recognized systems for phytosanitary risk assessment, molecular diagnostics, pathogen indexing, germplasm therapy, quarantine compliance, and quality assurance. These measures ensure that only healthy, pest-free germplasm is exchanged for research, breeding, conservation, and variety dissemination, while minimizing the risk of introducing or spreading quarantine pests and diseases.

In addition to safe germplasm exchange, the network should establish a regional clean plant program modeled on successful initiatives such as the U.S. National Clean Plant Network and strengthen certified seed systems for sexually propagated crops (Al Rwahnih *et al*., 2025). Regional Clean Plant Centers would supply certified disease-free planting materials for clonally propagated crops, including citrus, olive, grapevine, date palm, and potato. Accredited seed health laboratories would ensure the phytosanitary quality of seeds for cereals, legumes, and forage crops. Such a program would also support accredited nurseries, community seed producers, and commercial seed enterprises, thereby improving productivity, protecting farmer investments, and enhancing regional trade and export competitiveness.

Recent advances in plant health technologies present significant opportunities to strengthen regional biosecurity and address the growing threat of transboundary pests and diseases (Kreuze *et al*., 2023). Next-generation diagnostics and portable detection platforms enable rapid and sensitive identification of pathogens and pests across borders, laboratories, nurseries, and farms. Whole-genome sequencing and metagenomic technologies improve pathogen discovery, strain characterization, and outbreak tracing, allowing scientists to accurately identify emerging pests and their introduction pathways (Fox *et al*., 2025). At the landscape scale, remote sensing technologies such as satellites, UAVs, hyperspectral imaging, and GIS provide continuous crop health monitoring and support early detection of disease hotspots (Blasch *et al*., 2026). Artificial intelligence and machine learning further enhance these tools by automating disease recognition, integrating surveillance data, and supporting real-time decision-making (FAO, 2025; Ghimire *et al*., 2026). Epidemiological modeling, socioeconomic analysis, and spatial risk mapping also help plant health authorities predict pest establishment, seasonal spread, and potential socioeconomic impacts under

various climate and trade scenarios (de Souza *et al*., 2025).

Integrating advanced technologies into the regional Plant Health Network will strengthen surveillance, early warning, risk assessment, and coordinated response. Combined with harmonized phytosanitary protocols, safe germplasm exchange, and certified clean planting materials, these measures help countries shift from reactive to predictive, intelligence-driven plant health systems. This approach protects food security, agricultural biodiversity, and resilient agribusiness value chains in the face of climate change and increasing transboundary risks.

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INVASIVE, NEW PESTS AND NATURAL ENEMIES

Iraq

University of Kerbala Researchers Report the First Record of Cucumber green mottle mosaic virus (CGMMV) in Iraq

A research team from the University of Kerbala has achieved a significant scientific milestone by reporting the **first identification and coding-complete genome sequence** of **Cucumber green mottle mosaic virus (CGMMV)** in Iraq. CGMMV is one of the most destructive viruses affecting cucurbit crops, particularly cucumber and watermelon, causing substantial losses in crop yield and fruit quality.

The research team consisted of Athraa Aqeel Hadi, Dr. Mushtak Talib Mohammad Ali, Dr. Sienaa Muslim Al-Zurfi, and Prof. Adnan A. Lahuf, all from the Department of Plant Protection, College of Agriculture, University of Kerbala.

The researchers employed metatranscriptomic sequencing using advanced Next-Generation Sequencing (NGS) technology to analyze symptomatic cucumber leaf samples collected from commercial plastic greenhouses in northern and central Iraq. The study successfully recovered the complete coding genome of the virus, comprising 6,398 nucleotides with four open reading frames (ORFs), including the complete 5' and 3' untranslated regions. Comparative genomic analysis revealed the highest nucleotide similarity with previously reported isolates from the Netherlands, China, and the United States.

Molecular diagnosis using RT-PCR further confirmed that approximately 45% of the tested cucumber samples were infected with CGMMV, indicating that the virus is widely distributed in Iraqi cucumber production systems.

The complete genome sequence of the Iraqi isolate has been deposited in the National Center for Biotechnology Information (NCBI) under GenBank accession number PZ167520.1, making this genomic resource publicly available to researchers worldwide. This work provides an important foundation for future studies on the evolution, diagnosis, and management of CGMMV and will contribute to the development of effective disease control strategies for cucurbit crops in Iraq.

The findings of this study were published in the American Society for Microbiology journal Microbiology Resource Announcements**,** Volume 15, Issue 7**.** DOI**:** https://doi.org/10.1128/mra.00354-26

University of Kerbala Researchers Report the First Record of *Arabidopsis latent virus 1* in Iraq

A research team from the **University of Kerbala** has achieved a significant scientific milestone by reporting the **first coding-complete genome sequence** of ***Arabidopsis latent virus 1 (ArLV1)*** in Iraq. This achievement highlights the growing role of advanced genomic technologies in the detection, characterization, and surveillance of plant viruses and their genetic diversity.

The research team included Athraa Aqeel Hadi, Dr. Mushtak Talib Mohammad Ali, Dr. Sienaa Muslim Al-Zurfi, and Prof. Adnan Abduljalil Lahuf, all from the Department of Plant Protection, College of Agriculture, University of Kerbala.

The study employed metatranscriptomic sequencing using Next-Generation Sequencing (NGS) technology to analyze asymptomatic cucumber leaf samples associated with thrips insects collected from commercial plastic greenhouses in northern and central Iraq. The analysis led to the first detection of ArLV1 in Iraq. The virus possesses a bipartite genome consisting of RNA1 (5,553 nucleotides) and RNA2 (3,582 nucleotides), with more than 99% nucleotide identity to previously reported isolates from the Netherlands.

The complete coding genome sequences of the Iraqi isolate, ArLV1-Iraq1, have been deposited

in the National Center for Biotechnology Information (NCBI) under GenBank accession numbers PZ167518.1 (RNA1) and PZ167519.1 (RNA2), making these genomic data publicly available to the international scientific community and providing an important reference for future studies on the evolution, diversity, and epidemiology of plant viruses.

This achievement demonstrates the value of **high-throughput genome sequencing** in detecting latent plant viruses that may remain asymptomatic in their hosts, thereby strengthening crop health surveillance programs, supporting sustainable agricultural production, and contributing to food security in Iraq.

The manuscript has been **accepted for publication** in the American Society for Microbiology journal **Microbiology Resource Announcements**.

University of Kerbala Researchers Complete the First Whole-Genome Sequencing of *Alternaria alternata*, the Causal Agent of Black Point Disease in Wheat in Iraq

A research team from the University of Kerbala has achieved a significant scientific milestone by **generating the first whole-genome sequence and assembly of Alternaria alternata**, the fungal pathogen isolated from wheat seeds causing Black Point disease in Karbala Province, Iraq. This achievement represents an important contribution to agricultural and molecular research in Iraq.

The research team included Ms. Zainab Latif Hameed from the Department of Field Crops, College of Agriculture, Dr. Ban Taha Mohammed from the College of Education for Pure Sciences, Dr. Zuhair Mohammed Jeddoa from Al-Zahraa University for Women, and Prof. Adnan A. Lahuf from the Department of Plant Protection, College of Agriculture, University of Kerbala.

The researchers first confirmed the identity of the pathogen through morphological characterization and multilocus molecular analysis using four genetic markers. Subsequently, whole-genome sequencing (WGS) was performed using state-of-the-art Next-Generation Sequencing (NGS) technology. The assembled genome had a total size of 34.99 Mb with a GC content of 50.98%, demonstrating a high-quality genome assembly.

The complete genome sequence and associated genetic data of the Iraqi isolate Karbala-1 have been deposited in the National Center for Biotechnology Information (NCBI) public database, making these valuable genomic resources accessible to researchers worldwide and further strengthening the international scientific presence of the University of Kerbala.

This study provides new insights into the genetic basis of the pathogenicity of *A. alternata* and establishes a valuable genomic resource for future research. The findings are expected to support the development of more effective diagnostic tools and disease management strategies for Black Point disease, contributing to improved wheat production and enhanced food security in Iraq. This achievement was published at Microbiology Resource Announcements, Vol. 15, No. 7, https://doi.org/10.1128/mra.00283-26 .

University of Kerbala Researchers Complete the First Whole-Genome Sequencing of *Macrophomina phaseolina*, the Causal Agent of Okra Root Rot in Iraq.

A research team from the University of Kerbala has achieved a significant scientific milestone by generating the **first whole-genome sequence and assembly** of *Macrophomina phaseolina* isolated from okra plants affected by root rot disease in Karbala Province, Iraq. This achievement represents an important contribution to genomic research on plant pathogens in Iraq.

The research team consisted of Leith Hassan Kriedy, Dr. Rajaa Ghazi Abdalmoohsin, Dr. Yasir Nasser Alhamiri, and Prof. Adnan. Lahuf, all from the Department of Plant Protection, College of Agriculture, University of Kerbala.

The researchers first confirmed the identity of the fungal isolate through morphological characterization and molecular analysis using the internal transcribed spacer (ITS) genetic marker. Subsequently, whole-genome sequencing (WGS) was performed using advanced Next-Generation Sequencing (NGS) technology. The assembled genome had a total size of approximately 50.3 million base pairs (Mb) and contained more than 15,700 protein-coding genes, with a genome completeness of 96.3%, demonstrating the high quality of the genome assembly.

The complete genome sequence of the Iraqi isolate Karbala-1 has been deposited in the National Center for Biotechnology Information (NCBI) under GenBank accession number **JBVIJA000000000.1**, making this valuable genomic resource publicly available to researchers worldwide. The genome provides an important reference for future studies on the genetic basis of pathogenicity, host adaptation, and the evolutionary biology of this economically important soil-borne fungal pathogen.

This achievement represents a valuable addition to the scientific output of the University of Kerbala and opens new opportunities for developing improved diagnostic methods and effective management strategies for root rot disease, thereby contributing to the protection of agricultural crops and strengthening food security in Iraq.

The findings of this study were published in the American Society for Microbiology journal **Microbiology Resource Announcements**, **Volume 15, Issue 7**. **DOI:** https://doi.org/10.1128/mra.00294-26

University of Kerbala Researchers Report the First Record of *Jasmine virus H* in Iraq.

A research team from the **University of Kerbala** has achieved a significant scientific milestone by reporting the **first occurrence of *Jasmine virus H* (JaVH)** in Iraq. The virus was identified infecting **Arabian jasmine (*Jasminum sambac*)**, representing an important contribution to the study of viral diseases affecting ornamental plants in the country.

The research team consisted of Zainab Fadhil Akhobasha and Prof. Adnan A. Lahuf, both from the Department of Plant Protection, College of Agriculture, University of Kerbala.

The researchers employed High-Throughput Sequencing (HTS) based on a metatranscriptomic approach to analyze jasmine leaf samples exhibiting yellowing and mosaic symptoms collected from several nurseries in Karbala Province. Genomic analyses, together with RT-PCR molecular diagnostics, confirmed the presence of *Jasmine virus H*. The complete genome sequence of the Iraqi isolate showed a high degree of nucleotide similarity to previously reported isolates from China.

The complete genome sequence of the Iraqi isolate, designated JaVH Iraq-1, has been deposited in the National Center for Biotechnology Information (NCBI) under GenBank accession number PZ155373.1, making this valuable genomic resource publicly available to researchers worldwide and providing an important reference for future studies on the evolution and epidemiology of this virus.

This discovery represents the **First official report of *Jasmine virus H* in Iraq** and highlights the importance of applying advanced genomic sequencing technologies for the early detection and characterization of plant viruses. The findings will contribute to protecting ornamental plants and support plant health surveillance programs in Iraq.The results of this study were published in the British journal **New Disease Reports** (2026), **53:** e70129. DOI: https://doi.org/10.1002/ndr2.70129

First Report of *Popillia japonica* in Iraq

Popillia japonica (Coleoptera: Rutelidae – EPPO A2 List) is first reported in Iraq. The pest was reported causing severe damage to soybean (Glycine max), a new crop for Iraq. The identity of the pest was confirmed by morphological and molecular tests. The phylogenetic analysis showed that the local isolate of P. japonica was identical to or very close to isolates from Canada, China, and the USA.

Further studies are needed to assess the presence of *P. japonica* on other crops and in other regions of Iraq. **Source:** Fadel AR, Sadiq FH, Lilo HM (2026) Molecular diagnosis of Japanese beetle, *Popillia japonica* larvae infesting soybean crop in Iraq. Arab Journal of Plant Protection 44(1), 115-118. https://doi.org/10.22268/AJPP-001368. **EPPO Reporting Service 2026 no. 05 – Invasive Plants].**

New Record of *Eurytoma Samsonowi* Vassiliev, 1915 (Hymenoptera, Eurytomidae) from Iraq.

The eurytomid wasp *Eurytoma samsonowi* Vassiliev, 1915 (Hymenoptera, Eurytomidae), has been recorded as a new species infesting apricot seeds in Baghdad. The study was conducted in an apricot orchard in Al-Tarmia District, Baghdad Province, in February 2025. This study could help identify, monitor, investigate further, and control apricot eurytomid wasps. [**Nagham M. Khudair and Qasim H. Ahmed (Iraq),** Department of Plant Protection, College of Agricultural Engineering Science, University of Baghdad, Baghdad, Iraq. Bulletin of the Iraq Natural History Museum, 19 (1): 129-137, 2026]. https://doi.org/10.26842/binhm.7.2026.19.1.0129

Syria

First Record of Pectobacterium sp on Sunflower Plants in Syria.

During the growing seasons of 2021-2022 and 2022-2023, distinct symptoms on sunflower plants were observed in the Damascus Countryside governorate. In this study, *Pectobacterium* sp. was isolated for the first time from sunflower plants in Syria. Plant samples showing disease symptoms were collected (blackening, rotting, creamy exudates, foam production) during the 2022-2023 season from 9 locations of the Eastern Ghouta region, Damascus Countryside governorate (Al-Nashabiaa, Hazrama, Al-Ahmadia), and bacteria were isolated from these samples. Diseased samples were characterized by the presence of ulcers, creamy and foamy secretions, in addition to variegated brown areas on the stem and flower disc. Seven bacterial isolates were obtained and tested by biochemical tests. In addition, to satisfy Koch's postulates, artificial inoculation of sunflower plants with these isolates was conducted, and characteristic symptoms were reproduced. The results obtained showed that two bacterial isolates were identified as *P. carotovorum* and one bacterial isolate as *P. atrosepticum*. [**Aldous, M., M. Abo Ghorrah and A.E. Alshbeeb (Syria),** Arab Journal of Plant Protection, 44(1):130-133, 2026]. https://doi.org/10.22268/AJPP-001382

First Report of Southern Blight Disease of Sugar Beet, *Beta vulgaris* Caused by *Athelia rolfsii* in Syria.

Symptoms of yellowing, leaf wilting, brown-black lesions, and root rot with white mycelium growing on it were observed in sugar beet fields (Hama Governorate, Syria) during the summer of 2022. The fungal pathogen was identified as *Athelia rolfsii*, a species that causes sugar beet root rot, for the first time in Syria. The classification of the pathogen was based on the morphological and cultural taxonomic characteristics of the mycelium and the sclerotia of the fungus grown on the nutrient culture medium PDA. The mycelium was cottony, and the fungal hyphae had clamp connections and brown sclerotia with diameters ranging from 0.5 to 1 mm. Within 8 days of incubation at 25±3°C, the isolate grew well on PDA medium, with radial growth at a rate of 3-4.5 mm/day. Koch's postulates confirmed that the fungus *A. rolfsii* is the causative agent of sugar beet root rot and was not a secondary fungal contaminant. [**Alkhlif, R., F. Azmeh and W. Al-Matni (Syria),** Arab Journal of Plant Protection, 44(1):126-129, 2026]. https://doi.org/10.22268/AJPP-001364

First Record of the Parasitoid *Lysiphlebus testaceipes* (Cresson, 1880) (Hymenoptera: Braconidae: Aphidiinae) on the Black Citrus aphid *Toxoptera aurantii* (Fonscolombe, 1841) in Syria.

During the research and investigation of parasitoid species associated with the black citrus aphid *Toxoptera aurantii* on citrus plants (Citrus spp.) at the Bouqa Center for Plant Research and Production, affiliated with the Faculty of Agricultural Engineering at Lattakia University, Latakia, Syria, during the spring months (March and April) of the years 2022, 2023, and 2024. Samples of *T.aurantii* and its mummies were collected from infested plant leaves using transparent bags, then transferred to the economic entomology laboratory. Each sample was isolated in a separate 2ml tube, examined under a stereomicroscope, and identified based on the taxonomic key of Starý (1976). the parasitoid Lysiphlebus testaceipes was identified. This represents the first record of this species on the black citrus aphid. **[Amena A. Alrostom*[1], Ensaf H. Akel[2], and Nabil H. Abo Kaf[1]** (Syria), [1]Plant Protection Department, Faculty of Agriculture, University of Latakia, Latakia, Syria. [2]General Commisson for Agricultural Scientific Research, Latakia Research Center, Syria. Syrian Journal of Agriculture Research- SJAR 13(2): 13-19 April 2026].

Turkey

First Report of *Euphorbia davidii* in Türkiye

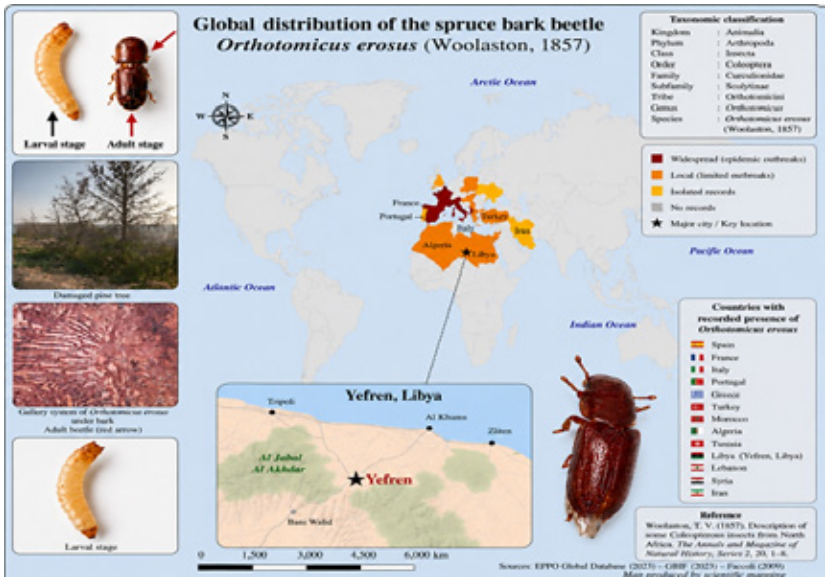
Euphorbia davidii (Euphorbiaceae) is an invasive alien plant in the EPPO region and was added to the EPPO A2 list in 2025. It is native to North America (USA and Mexico) and has shown negative impacts on crop yields in Argentina where it was introduced in the 1980s. It is recorded in a number of EPPO countries where it is reported as established, transient and in some countries with an unclear status. A new record for *E. davidii* is reported from Türkiye from the Sakarya province in 2026. Here, the species occurs along roadsides. Further monitoring of the population is required to ensure that it does not spread and cause damage in agricultural areas surrounding the current population.

Source: Aslan S, Yaşayacak H (2026) A new invasive record for the flora of Türkiye: Euphorbia davidii Subils (Arsız Sütleğen) and proposal of new Turkish scientific names for 5 taxa. Bağbahçe Bilim Dergisi 13, 15-21. **EPPO Reporting Service 2026 no. 05 – Invasive Plants].**

Libya

First Record of the Mediterranean Pine Engraver (*Orthotomicus erosus*) and its associated Fungal community on (*Pinus halepensis*) in Libya, North Africa.

This study was conducted in Yefren City, southwestern Tripoli, Libya, during April and May 2026 to investigate the decline of Aleppo pine (*Pinus halepensis*) trees. The results revealed that 60% of the examined trees were infested by the Mediterranean pine engraver bark beetle, *Orthotomicus erosus*. The infestation was characterized by spiral galleries beneath the bark, accompanied by progressive tree wilting and mortality. Population density assessment showed an average of 60 adult beetles m^{-2}, with extensive feeding and breeding galleries beneath the bark, along with blue staining of the sapwood.



Direct isolation of fungi associated with the surfaces of adult beetles yielded four fungal species: *Sporothrix schenckii, Ophiostoma piceae, Aspergillus flavus*, and *Penicillium digitatum*. In contrast, seven fungal taxa were isolated from the larval surfaces, namely *Ophiostoma piceae, Sporothrix schenckii, Aspergillus flavus, Penicillium digitatum, Beauveria bassiana, Graphium* sp., and *Leptographium bhutanense*. Isolation of fungi from pine wood galleries showed that *Sporothrix schenckii* occurred at frequencies of 61.1% and *Alternaria* sp. at 38.9% on malt extract agar (MEA), whereas their frequencies on potato dextrose agar (PDA) were 43.8% and 56.2%, respectively. Fungal isolation from bark galleries revealed that *Leptographium bhutanense* was the predominant species on MEA (57.1%), followed by *Alternaria* sp. (28.5%). On PDA, *Sporothrix schenckii* and *Alternaria* sp. were recovered at frequencies of 61.1% and 38.9%, respectively. The occurrence of *Orthotomicus erosus* and its associated fungal community in the study area represents the first documented record of this bark beetle and several associated fungi in Libya. [**Farhat Ali Sh Aboizkhar (Libya),** Faculty of Science ,Department of Botany ,University of Al-Zentan, Libya, 2026]. Farhatabouzkhar@gmail.com

RESEARCH HIGHLIGHTS

Algeria

Weed Plants as Alternative Sources of Infestation for the Date Palm Mite *Oligonychus afrasiaticus* (Acari: Tetranychidae) in the Ziban Oasis, Algeria.

The yellow date palm mite, *Oligonychus afrasiaticus* (McGregor), commonly known as "Boufaroua" in North Africa, is one of the most destructive pests affecting date palm production in the Ziban region of southeastern Algeria. Despite its economic importance, limited information is available on the ecological role of spontaneous weed flora in maintaining mite populations and facilitating seasonal infestations of date palms. Therefore, the present study aimed to identify weed species that may serve as alternative hosts of *O. afrasiaticus*, to determine their contribution to the seasonal persistence of the mite, and to evaluate how seasonal plant phenology and spatial variation among palm groves influence infestation dynamics. A six-month field survey was conducted from February to July 2021 in seven representative palm groves of the Ziban oases. The occurrence of *O. afrasiaticus* was monitored on date palms and associated weed species in relation to seasonal dynamics and spatial variation among sites. The mite was detected in all surveyed groves, with infestation intensity varying according to microclimatic conditions and grove management practices. Among date palm cultivars, Deglet Nour exhibited the highest susceptibility. A total of 76 weed species were recorded, of which five species (*Cynodon dactylon, Daucus carota, Aster squamatus, Kochia scoparia, and Salsola tetragona*) were confirmed as alternative hosts capable of sustaining mite populations. Infestation patterns showed a clear seasonal progression, with early establishment on herbaceous weeds during spring followed by a shift toward date palms under hot and dry summer conditions. These findings demonstrate that weed communities play a significant ecological role in the persistence and spread of *O. afrasiaticus* within oasis agroecosystems and highlight the importance of integrating targeted weed management into integrated pest management strategies for sustainable date palm protection. [**Deghiche Diab, N., Benouamane, O., Ouamane, A.T., Zguerou, R., Abbas, S., Roumani, M., Mehenni, M., Rekis, A., Nia, B. & Bozdoğan(Algeria), H.** Persian Journal of Acarology**,** 15(3), 150306, 2026].

Diversity and Seasonal Dynamics of Key Insect Pests Associated with Durum Wheat in Two Contrasting Agroecosystems in Northern Algeria.

Durum wheat (*Triticum durum*) is a staple crop in the Mediterranean region, where it faces serious threats from arthropod pests that can significantly reduce yields. This study aimed to assess the diversity and seasonal dynamics of insect pest communities associated with durum wheat under contrasting climatic conditions in northern Algeria. A total of 18 and 20 species were recorded at the semi-arid and sub-humid sites, represented by Bouira and Algiers, respectively, with seven dominant and common species identified at both sites: *Aeolothrips fasciatus*, *Limothrips cerealium*, *Haplothrips tritici*, *Melanthrips pallidior* (Thysanoptera), *Hydrellia griseola*, *Liriomyza trifolii* (Diptera), and *Rhopalosiphum padi* (Hemiptera). Insect populations were present throughout the wheat growth cycle, with abundance peaks occurring in February at Algiers and in May at Bouira. A general decrease in insect numbers was observed with rising temperatures, although this trend varied among species. The findings enhance current understanding of pest assemblages in North African cereal systems and support the development of regionally adapted and ecologically sound monitoring and pest management strategies. [**Nesrine Daghefali[1,2], Meamiche Neddaf Hayet[3],Hocine Khedam[4] Sabrina Chergui[1,5],Yasmina Djitli [1,6],Wardia Chikhi[2], Lounes Saharaoui[2], Hassiba Berrai [1,2] & Samia Daoudi Hacini[1,2]**, Acta Zoologica Bulgarica, 77 (4): 443-456 , December 2025]. DOI: https://doi.org/10.71424/azb77.4.002932

Iraq

A Qualitative and Quantitative Detection of Ochratoxin A and Identification of Ochratoxigenic Fungi in Apple Fruits.

Chratoxin A (OTA) is a mycotoxin produced by several fungal species and is frequently detected as a contaminant in apples. Due to its nephrotoxic, carcinogenic, and immunosuppressive effects, OTA poses a significant public health concern. This case report investigates the presence of OTA in local and imported apples and identifies OTA-producing fungi in Basrah Province, Iraq. Apple samples collected from local markets were examined for fungal contamination. Fungal isolates were identified morphologically and confirmed molecularly through amplification of the ITS1–ITS4 region. The obtained sequences were submitted to GenBank under accession numbers OQ568539.1, OQ568535.1, OQ568530.1, and OQ568528.1. OTA production by the isolated fungi was assessed using Thin Layer Chromatography (TLC), while OTA concentrations in apple samples were determined using High-Performance Liquid Chromatography with Fluorescence Detection (HPLC-FLD). Several fungal genera were detected, with Penicillium, Cladosporium, Aspergillus, and Alternaria being the most common. Molecular identification confirmed Talaromyces purpureogenus, Penicillium fimorum, Aspergillus niger, and Aspergillus hiratsukae. TLC analysis showed that T. purpureogenus and P. fimorum were capable of producing OTA. HPLC-FLD analysis revealed varying OTA levels, ranging from 98.5 ng/g in local apples to 88.5 ng/g in imported yellow apples, with the lowest concentration of 61.2 ng/g detected in imported green apples. These findings confirm the presence of OTA-producing fungi in apples sold in Basrah and highlight a potential food safety concern, emphasizing the need for routine monitoring and improved storage conditions to minimize fungal contamination and OTA formation. [**Manar M. Al-Ahmed , Mohammed A. Fayyadh, Labeed Abdullah Al-Saad (Iraq),** Microbes and Infectious Diseases; 7(2): 1653-1660, 2026].

Population Density and Infestation Rate of the Mediterranean fly, *Ceratitis capitata* and the Peach Fruit Fly, *Bactrocera zonata* in Stone Fruit Orchards in the Najaf region, Iraq.

The Mediterranean fruit fly, *Ceratitis capitata* Wiedemann, and the peach fruit fly, Bactrocera zonata Saunders (Diptera: Tephritidae), are among the most important pests affecting fruit orchards in Iraq and many countries worldwide. The current study was conducted to monitor the population density of these insects and estimate the infestation rate during the 2021/2022 stone fruit season (apricot and peach), using sex attractants in the Kufa and Abbasiya regions of the Najaf region. The results showed higher peach fly population density throughout the study period in the Kufa region, whereas the Mediterranean fly was superior in the Abbasiya region early in the season. Nevertheless, the peach fruit fly eventually outperformed as it was adapted to elevated temperatures. The study recorded the highest infestation rate on apricot fruits (28%) on June 15, 2022, and the highest infestation rate on peach fruits (32%) on July 1, 2022, in the Kufa region. In the Abbasiya region, the highest infestation rate on apricot fruits (46%) was recorded on June 15, 2022, and the highest infestation rate on peaches (48%) was recorded on July 1, 2022. The current study indicated that *B. zonata* has gradually become widespread to the extent that it has surpassed the dominance of *C. capitata* as a major fruit pest. Climate change is likely responsible for the increasing prevalence of *B. zonata* as a pest over the past eight years. [**Abu-Ragheef, A.H., F.J. Al-Behadili, A.H. Al-Sudani and Sh.A. Abbas(Iraq),** Arab Journal of Plant Protection, 44(1):18-23,2026]. https://doi.org/10.22268/AJPP-001366

Efficacy of a single root drench application of thiamethoxam for the management of dubas bug and white date scale on date palms.

Date palms (Phoenix dactylifera) are a vital crop in the Middle East, particularly in Iraq, where infestations by the dubas bug (Ommatissus lybicus) and the white date scale (Parlatoria blanchardi) significantly threaten yield and fruit quality. This study assessed the efficacy of a single soil drench application of thiamethoxam (Actara 240 SC) for controlling these pests in

two cultivars, Barhi and Brem, under field conditions. Treatments resulted in a substantial and sustained reduction in pest populations compared to untreated controls over a 120-day period. Residue analysis using gas chromatography demonstrated systemic absorption and gradual dissipation of thiamethoxam in leaves and fruits, with residues declining below detection limits by 120 days after treatment. The temporal correlation between residue decline and pest suppression underscores the prolonged protective effect of root drenching. These findings support the use of a single root drench as an effective, long-lasting, and potentially more sustainable pest management strategy that reduces the need for repeated foliar applications, thereby lowering labor and chemical inputs.[**Mokhtar Abdulsattar Arif[1], Salvatore Guarino[2].**[1] Plant Protection Directorate, Ministry of Agriculture, Abu-Ghraib 10081, Baghdad, Iraq**,**[2] Institute of Biosciences and BioResources (IBBR), National Research Council of Italy, Via Ugo La Malfa 153, Palermo 90146, Italy.International Journal of Tropical Insect Science, Published April 2026]. https://doi.org/10.1007/s42690-026-01849-9

Efficacy of Entomopathogenic Fungal Isolates *Amesia cymbiformis* and *Acrophialophora jodhpurensis* on the Biology of Black Bean Aphid, *Aphis fabae*.

Black bean aphid, *Aphis fabae* is one of the most important economic and widespread insects worldwide. In the current study, the presence of entomopathogenic fungi was detected from soil samples taken from orchards planted with *Vicia faba* L from four different locations in Najaf Governorate (Najaf city province, Haidariyah, Abbasiya and Mashkhab). Pathogenicity studies showed that isolates of *A. cymbiformis* and *A. jodhpurensis produced* the highest mortality rate on the sixth larval stage of the wax moth insect *Galleria mellonella*, (47.2 and 46.2%, respectively), 5 days after treatment. The results obtained showed that the concentration of 2×10^7 conidia/ml of each of *A. cymbiformis and A. jodhpurensis* gave the highest mortality rate of 78.6 and 77.5%, respectively, 5 days after treatment. The results also showed significant differences in mortality rates among the different insect stages. The first nymphal stage suffered the highest mortality rate of 65 and 64%, 5 days after treatment with the concentration of 2×10^6 conidia/ml of both fungal entomopathogens *A. cymbiformis* and *A. jodhpurensis*, respectively. The results obtained showed a decrease in the rate of nymph production of black bean aphid when using conidial suspension at a concentration of 2×10^6 conidia/ml sterile distilled water for both entomopathogenic fungi, 5 days after treatment. [**Al-Ouboodi, A.Sh.Y. and A.A. Mohammed (Iraq),** Arab Journal of Plant Protection, 44(1):31-39, 2026]. https://doi.org/10.22268/AJPP-001370

A Laboratory Study on the BION® Resistance Inducer against *Fusarium equiseti*, the causal agent of Date Palm Leaf Spot Disease.

The purpose of this study was to assess how much the resistance-inducing agent BION® can reduce infection with the pathogen *Fusarium equiseti*, the causal agent of the date palm leaf spot disease. Additionally, the study assessed the effect of applying various Bion concentrations in inducing resistance and reducing infection with *F. equiseti*. The results obtained showed that spraying Bion on date palm leaves provided protection for the leaves, and the infection level with *F. equiseti* varied among the cultivars tested. Bion application as a spray at the concentration of 1.5 mg/ml, sprayed on date palm leaves three days before inoculation with the fungus, reduced the extent of invasion to 1.9 cm compared to 2.91 cm for the control treatment. The expansion of disease infection following treatment with a Bion concentration of 0.5 mg/ml, three days before inoculation with *F. equiseti*, reached 2.55 cm. [**Ahmed, A.N., E.H.A. Al Arab and N.H. Mohammed (Iraq),** Arab Journal of Plant Protection, 44(1):74-79, 2026]. https://doi.org/10.22268/AJPP-001375

Induction of Peroxidase and Polyphenol Oxidase Enzyme Production in Pumpkins, *Cucurbita pepo* L. to Enhance Resistance to Zucchini Yellow Mosaic Virus Infection.

Results obtained in this study identified the occurrence of Zucchini yellow mosaic virus (ZYMV) on pumpkins, *Cucurbita pepo* plants collected from the Al-Abbasi district, Kirkuk governorate, and Al-Alam district, Salah al-Din governorate. Diagnosis was based on symptoms produced and serological tests (ELISA). Disease symptoms observed were mosaic and deformation of leaves in addition to reduced plant growth. The Shiitake mushroom (*Lentinus edodes*) was superior in reducing virus infection by stimulating virus resistance and increasing the production of the peroxidase and polyphenol oxidase enzymes, and consequently increased yield. The shiitake mushroom (100% treatment) gave the lowest virus disease incidence and disease index of 61.83 and 19.32%, respectively. The 50% shiitake treatment gave the highest specific activity for the peroxidase enzyme, amounting to 0.017 units/mg protein, whereas the Isabion bio-stimulant treatment, which included a mixture of amino acids, gave the highest specific activity for the polyphenol oxidase enzyme, amounting to 0.036 units/mg protein. The results also showed that the biostimulant Isabion treatment gave the highest yield of 5.355 kg/plant. [**Al-Jubouri, I.I.A., M.A.A. Al-Fahad and K.A.M. Al-Jubouri (Iraq),** Arab Journal of Plant Protection, 44(1):89-94, 2026]. https://doi.org/10.22268/AJPP-001374

Impact of Seeding Rate and Herbicides on Growth and Yield of Bread Wheat (*Triticum aestivum*) and Associated Weeds.

The experiment was conducted in two locations during the 2022-2023 season, the first in the Al-Balwat village, and the second in the Hammam Al-Alil district, Nineveh Governorate, Iraq. The study aimed to determine the optimum concentration of chemical herbicides and the optimum seeding rate, and to assess their effects on growth traits, grain yield of bread wheat, and associated weed flora. The experiment comprised two factors: (i) seeding rates (120, 140, and 160 kg ha^{-1}) for the bread wheat cultivar Babylon-113, and (ii) different herbicides applied at varying concentrations, in addition to an untreated control (no herbicide). The measured parameters were: total weed density (weeds m^{-2}), total weed dry biomass (g m^{-2}), plant height (cm), flag leaf area (cm^2), spike density (spikes m^{-2}), number of grains per spike, 1000-grain weight (g), and grain yield (g m^{-2}). The results obtained indicated that the herbicides Traxos R.C. and Discipline R.C. were the most efficient in reducing weed density and dry weight at both locations of Al-Balawat and Hammam Al-Alil, with a control efficiency that reached 58.75, 63.77, 60.53, and 57% for both herbicides and locations, respectively. The herbicide Discipline R.C. had a significant effect on the number of spikes and grain yield at both locations. The seeding rate of 160 kg/ha was better than the other seeding rates in reducing weeds and increasing yield. Grain yield at this seeding rate was higher by 24.05 and 24.90% than the yield of the seeding rate of 120 kg/ha at the two locations, respectively. [**Aljuburi, D.F (Iraq),** Arab Journal of Plant Protection, 44(1):103-109, 2026]. https://doi.org/10.22268/AJPP-001365

Isolation and Identification of Toxin-Producing Fungi Contaminating Nuts and Their Potential Protection Using Mustard Oil.

The current study aimed to isolate and diagnose mycotoxin-producing fungi from nuts (pistachios, hazelnuts, popcorn and cashews) and the possibility of reducing their presence using mustard oil. The results obtained confirmed the presence of seven fungi, with the dominance of *A. niger*, followed by *Penicillium* sp., *Fusarium* sp., *Alternaria* sp., *Cladosporium* sp., *Mucor* sp. and *Rhizoctonia solani*. The results of thin-layer chromatography (TLC) showed that 19 out of 30 *A. niger* isolates were ochratoxin A producers. The results showed that mustard oil inhibited the growth of *A. niger* tested on PDA culture medium. The inhibition rate increased with increasing mustard oil concentration, with the highest inhibition rate (59.25%) at the 15% oil concentration, followed by 53.08% inhibition at the 10% oil concentration and 48.14% inhibition at the 5% oil concentration, with significant differences at P=0.05. [**Abdulaali, R.M., S.M. Ali and A.M. Hussein (Iraq),** Arab Journal of Plant Protection, 44(1):110-114, 2026]. https://doi.org/10.22268/AJPP-001372

Molecular Diagnosis of Japanese Beetle, *Popillia japonica* Larvae Infesting Soybean Crop in Iraq.

This study was conducted during the period 2022-2023 at the Department of Agricultural Research, Abu Ghraib Research Station near Baghdad, within the national program for the propagation and multiplication of high-quality soybean seeds, which is grown for the first time in Iraq, at the Dibbana Agricultural Company research station in the southern Baghdad area. Weekly and monthly plant and soil samples were collected to identify pests and their population density that affect the crop in Iraq. Field studies showed the occurrence of the Japanese beetle, *Popillia japonica,* on soybeans in Iraq. Diagnosis was based on insect morphology with the help of international keys and molecular tests, and identification was confirmed by the Iraqi Natural History Museum. The molecular diagnosis was registered at NCBI GenBank under accession number PP558784.1. This is the first molecular diagnosis of this pest in Iraq. [**Fadel, A.R., F.H. Sadiq and H.M. Lilo (Iraq),** Arab Journal of Plant Protection, 44(1):115-118, 2026]. https://doi.org/10.22268/AJPP-001368

Evaluation of Six Types of Oils for the Control of Cotton Aphid and Their Potential Use as Biopesticides in Organic Farming.

The cotton aphid, *Aphis gossypii* (Hemiptera: Aphididae), is considered one of the most widespread pests affecting many fruit, vegetable, and ornamental plants in both open-field and protected cultivation. This pest damages plants by sucking plant sap and can also transmit numerous plant viruses. In this study, cotton aphids were collected during the 2022 and 2023 seasons to conduct a series of bioassays evaluating six essential oils: clove (*Syzygium aromaticum*), thyme *(Thymus vulgaris*), rosemary (*Salvia rosmarinus*), lavender (*Lavandula coronopifolia*), coriander (*Coriandrum sativum*), and anise (*Pimpinella anisum*), and to determine their effects against cotton aphid adults at different concentrations under laboratory conditions. The results showed that all tested essential oils had varying effects on adult Aphis gossypii. Clove oil was the most effective essential oil, with an LD50 value of 2.98, followed by thyme oil with an LD50 of 3.28 and lavender oil with an LD50 of 4.40. In contrast, rosemary, coriander, and anise oils showed lower effects on Aphis gossypii. The findings indicated that the essential oils of clove, thyme, and lavender, at the tested concentrations, could be used as safe alternatives to synthetic pesticides within integrated pest management programs in organic farming for controlling cotton aphid infestations. [**Alaa Salem, Qasim Ahmed(Iraq),** Department of Plant Protection, Faculty of Agricultural Engineering. Sciences, University of Baghdad, Baghdad, Iraq. Iraqi Journal of Agricultural Sciences,57(4):1124-1033, 2026.] DOI: https://doi.org/10.36103/9cs4r662

Morphology and Molecular Identification of Mealybug, *Phenacoccus solenopsis* and its Endosymbionts in Karbala, Iraq.

The cotton mealybug, *Phenacoccus solenopsis* (Hemiptera, Pseudococcidae), is a significantly important insect pest of cotton and ornamental plants that has become widely spread in most nurseries of Karbala province. Integrating molecular data using next-generation sequencing (NGS) alongside morphological data from a comprehensive collection of live specimens was applied to identify Phenacoccus solenopsis and its endosymbionts in Karbala, Iraq. The morphological identification of the cotton mealybug common in Karbala suggested that it is *Phenacoccus solenopsis*. Identification was confirmed molecularly by obtaining the five chromosome sequences of the Iraqi *Ph. solenopsis* with pairwise identities of 90-97.8%. In addition, this insect's mitochondrial gene mtCOX1 (two sequences) was registered in GenBank under accession numbers PP768170 and PP768171. Furthermore, four endosymbiont bacteria were reported (*Candidatus Syntrophocurvum alkaliphilum*, *Enterobacteriaceae endosymbiont*, *Buchnera aphidicola* and *Candidatus Tremblaya endosymbiont)* associated with this Iraqi *Ph. solenopsis*. All these bacteria were registered in GenBank under accession numbers PP897797, PP897798, PP897799, and PP882706, respectively. This is the first report on the identification of *Ph. solenopsis* with its endosymbiont bacteria, based on morphology

and molecular biology, in Karbala, Iraq. The research results helped to identify and distinguish the species of cotton mealybug using NGS and will prove useful in selecting control strategies to control this pest. [**Abbas, A.H.K. and A.A. Kareem(Iraq),** Arab Journal of Plant Protection, 44(2):183-188, 2026]. https://doi.org/10.22268/AJPP-001386

Survey of Aphid Species Affecting Some Ornamental Nurseries in Karbala Governorate, Iraq.

A survey was conducted during the period 2023-2024 to identify some of the most common aphid species belonging to the family Aphididae on ornamental plants in Karbala Governorate. Few nurseries distributed in over six districts were selected. Collected aphid species were identified using a previously described taxonomic key. The results obtained revealed the presence of Dandelion aphid, *Aphis taraxacicola*, infesting gazania, zinnia, and tecoma plants; green citrus aphid, Aphis spiraecola, infesting Spiraea canescens (Bursera); chrysanthemum aphid, Macrosiphoniella sanborni, infesting Datura and Jasminum sambac plants; and cabbage aphid, Brevicoryne brassicae, infesting ornamental cabbage.[**Al-Hussein, D.Z.H. and T.M.M. Al-Sweedi (Iraq),** Arab Journal of Plant Protection,44(2):189-195, 2026]. https://doi.org/10.22268/AJPP-001389

Evaluation of Nano-Castor Plant Extracts as an Insecticide for Controlling *Callosobruchus maculatus*.

The present study investigated the effect of using the nano-castor plant extract for the control of *Callosobruchus maculatus* (Fab.) during 2023-2024. The results obtained showed that the nano-castor plant extract had a significant effect on the insect's biology, as they decreased the number to 10 eggs/female at the concentration of 0.007 % for the nano-castor oil compared to 110 eggs/female for the control. In addition, the extracts reduced the number of emerging insects from the eggs. The effect of each of the seeds and leaves extract and the castor oil on insect productivity (%) varied. Statistical analysis showed that there was a significant difference in the effect of castor oil on insect productivity compared to the rest of the extracts and the control experiment treatment, and all of that was reflected in the damage caused by insect infestation. The damage (%) caused, following treatments with each of the seed and leaf extracts and oil reached 21.20%, 24.20%, and 15%, respectively. The effect of the treatments on rate of seeds germination varied based on the concentrations used and type of extract, as compared to the control, and the differences were not significant. [**Ameen, T.O. and A.K. Ibrahim (Iraq),** Arab Journal of Plant Protection, 44(2):196-201, 2026]. https://doi.org/10.22268/AJPP-001402

Effect of some Biochemical and Agricultural Treatments on the Control of Cucumber Root and Crown Rot Disease Caused by *Rhizoctonia solani* in Plastic Houses.

The study was conducted to evaluate the effect of root secretions, *Bacillus subtilis* HA-1 and chitosan on the growth rate of isolate Rs14 of *R. solani* in the laboratory, and to assess the potential of some biochemical and agricultural treatments on disease severity of cucumber hybrids infected with root and crown rot disease incited by *R. solani* Rs14 isolate, in addition to their effect on some growth parameters under plastic house conditions. The results obtained showed that grafting of hybrid cucumber on mountain honey gourd was the most effective in significantly reducing infection, followed by the PGC treatment in both hybrids. The grafting treatment also resulted in the highest biological weight for the Captain F1 hybrid, followed by the plant growth cleaner (PGC) treatment. Both treatments resulted in a significant increase in biological plant yield; the grafting treatment caused a 101.60% increase compared to the positive control treatment and a 15.16% increase compared to the negative control treatment, whereas the PGC treatment caused a 100.71% increase compared to the positive control treatment and 14.64% compared to the negative control treatment. The specific enzymatic activity of the peroxidase enzyme increased more than twofold in the combined treatment of

the bacteria + Humzinc and threefold in the activity of the polyphenol oxidase enzyme, and the PGC treatment was superior with an increase of approximately threefold. There was a five-fold increase in the effectiveness of the chitinase enzyme in the grafting and PGC treatments compared to the other combinations in the Seegreen F1 hybrid cucumber.[**Al-Kanaani, F.B., E.M. Al-Maaroof and S.M. Ismail (Iraq),** Arab Journal of Plant Protection, 44(2):210-223, 2026]. https://doi.org/10.22268/AJPP-001390

Effectiveness of some Pesticides in the Control of the Mealybug, *Phenacoccus Solenopsis*.

This study was implemented in 2022. The samples were collected from the ornamental plant *Hibiscus rosa- sinenis* in the garden of the Faculty of Agriculture, University of Basrah, Iraq. The results revealed that 96.16% of the plants were infested with mealybugs in July and 90.22% in August, with the lowest infestation in January (25.00%). It also had the highest adult and nymph densities in July, measuring 40.60 and 36.11 insects/inch^2, respectively. The lowest number of nymphs and adults was recorded in January, at 2.55 and 8.40 insects/inch^2, respectively. The results of the pesticide spraying showed that the mealybug nymphs' mortality rate for the insecticides deltamethrin, lambda-cyhalothrin and imidacloprid were 67.73, 75.75 and 77.75% and the mortality rate of adult insects was 65.83, 69.41 and 74.82%, respectively, when treated with pesticides by the irrigation method. The average mortality rate of nymphs was 50.19, 52.25 and 56.19% and the average mortality rate of adults was 47.12, 51.64 and 55.67%, respectively, when the pesticides were applied by the irrigation method. [**Hamid, D.S., J.M. Khalaf and A.H. Al-Farttoosy(Iraq),** Arab Journal of Plant Protection, 44(2):224-229,2026]. https://doi.org/10.22268/AJPP-001383

Effect of Some Plant Oils and Biological Factors on the Control of Southern Cowpea Beetle, *Callosobruchus maculatus*.

This study was conducted to determine the effect of treating cowpea seeds with four plant oils: cinnamon oil, *Cinnamomum verum*, peppermint oil, *Mentha piperita*, harmal oil, *Peganum harmala* and camphor oil, *Cinnamomum camphora*. These oils were used at concentrations of 2, 4 and 6%, and the exudates of two fungi *Trichoderma longibrachiatum, Trichoderma harzianum*, and the bacteria *Pseudomonas fluorescens* suspension were added in volumes of 1.5, 1.0 and 0.5 ml to control the southern cowpea beetle *Callosobruchus maculatus*. The mortality rate of the southern cowpea beetle adults reached 100% for laboratory-treated cowpea seeds with harmal and camphor at a concentration of 6%, 5 days after treatment. Results also showed that the mortality rate increased with increasing concentration and time of exposure to the oils. The mortality rate of the insect adults reached 59.78, 37.57 and 67.39% when treated with exudate of *T. longibrachiatum* and *T. harzianum* and the bacteria *P. fluorescens,* respectively. The germination rate of seeds treated with oils was 98.88,92.22,93.33 and 96.66% for each of cinnamon, caramel, mint and eucalyptus oils, whereas the germination rate of seeds treated with fungal exudates and bacterial suspension reached 82.20,70.00 and 80.00%. [**Benyan, L.A. and J.M. Khalaf (Iraq)**, Arab Journal of Plant Protection, 44(2):230-236,2026]. https://doi.org/10.22268/AJPP-001399

Evaluating the Efficiency of some Biocides and Spore Suspensions in Controlling the Cotton Aphid, *Aphis gossypii* on Eggplant.

The study of the population density of the cotton aphid, *Aphis gossypii* on eggplant, cv. Badia al-Nasr, showed that the highest density was observed during the month of March, when it reached 80.0, 85.0, 111.5 insect/leaf during early, middle and late periods of the month, respectively. To evaluate the relative efficiency of fungal and bacterial preparations in comparison with the chemical insecticide Actara in controlling the cotton aphis insect *A. gossypii* in the laboratory, the results showed that the fungal preparation *Beauveria bassiana* was the most efficient compared to the other preparations used and reached 78. 56, 82.08, 90.00% for *B. bassiana, Metarhizium anisopliae* and *Bacillus thuringiensis*, respectively. Control treatment

with Actara pesticide reached 90.00%, 7 days after treatment. The relative efficiency of the spores suspensions in the laboratory reached 71.06, 80.16, and 90.00% for *Trichoderma harzianum*, *Cordyceps pseudolloydiis* and *B. bassiana* at concentrations of 18×10^8, 11×10^8, and 23×10^8 spores/ml, respectively, 7 days after treatment. The relative efficiency of the fungal and bacterial preparations in the field experiment reached 71.90, 79.08, and 85.41% for *B. bassiana, M. anisopliae* and *B. thuringiensis* respectively. The relative efficiency of the spores suspension, in the field experiment, 7 days after treatment, was 63.44, 73.21 and 76.36 % for *T. harzianum, C. pseudolloydiis,* and *B. bassiana,* respectively. [**Jassim, S.A. and J.M. Khalaf (Iraq**), Arab Journal of Plant Protection, 44(2): 237-243, 2026]. https://doi.org/10.22268/AJPP-001388

Evaluating the Lethal and Repellent Activities of *Eucalyptus camaldulensis* Essential Oil against the Adults of *Oryzaephilus surinamensis* on Date Palm Fruits.

Date palm fruits are commonly infested by saw-toothed grain beetle, *Oryzaephilus surinamensis,* which can cause substantial damage. Botanical insecticides are gaining attention as a cost-effective and low-risk alternative to chemical insecticides. In this study, we analyzed the volatile compounds of the essential oils of the leaves and seeds of *Eucalyptus camaldulensis* using gas chromatography mass spectroscopy and evaluated the toxicity of these oils against *O. surinamensis*. Two exposure methods were applied, including contact and fumigation. The GC-MS analysis detected many terpene compounds in both of the leaves and seeds essential oil such as eucalyptol, which acts as a respiratory toxicant against insects. The contact method was more effective in controlling adult insects than the fumigation method. The mortality rate reached 76.50 % when the adults were exposed to 1000 mg/L of the leaves essential oil using the contact method. However, in the fumigation method, the same concentration achieved 61.00 % mortality. The concentration of 1000 mg/L of the seeds essential oil gave 65.00 % mortality by using the contact method and 52.00 % mortality by using the fumigation method. Effective repellent activity of the essential oil was achieved and continued for 24 h, indicating that the essential oil effect is not reversible. Because of their high activity, these essential oils could be used to control insects of stored products, and can be used as a component in integrated pest management programs in combination with microbial insecticides, traps, and beneficial insects. [**Alnajim, I., M. Aldarwish, N. Aldosary, H.M. Ali and G.F. Alsaedi (Iraq**), Arab Journal of Plant Protection, 44(2):244-252, 2026]. https://doi.org/10.22268/AJPP-001391

Jordan

Effectiveness of Gradual Heat Treatment in Disinfecting Tomato Seeds from Tomato Brown Rugose Fruit Virus.

Tomato brown rugose fruit virus (ToBRFV) is a highly contagious and stable tobamovirus that threatens global tomato production through its seedborne transmission and ability to break down genetic resistance. This study demonstrates that a novel gradual dry heat treatment protocol (35 to 72°C, culminating at 72°C for 72 h) effectively disinfects naturally infected tomato seeds of ToBRFV. The protocol eliminated viral infectivity, as confirmed by mechanical inoculation bioassays, despite the persistence of viral RNA (with Ct values of 8.26 to 11.50) detected by RT-qPCR. Crucially, this method preserved high seed viability (87 to 94.9% seedlings), overcoming a major limitation of constant high- temperature treatments, which often damage seeds. Transmission electron microscopy revealed significant virion fragmentation, providing a physical basis for the loss of infectivity. These findings establish gradual heat treatment as a robust, nonchemical, and commercially viable strategy to manage ToBRFV in tomato seeds and highlight the critical importance of bioassays in certifying seed health. **[Salem, N. M.(Jordan), Abumuslem, M., Samarah, N., Margaria, P., Jewehan, A., Sulaiman, A., Hattab, D., Ibrahim, I., Hussein, A., and Turina, M**. Plant Disease, 10.1094/PDIS-10-25-2187-RE. Advance online publication, 2026]. https://doi.org/10.1094/PDIS-10-25-2187-RE

Plant Viruses Affecting Major Vegetable Crops of the Families *Solanaceae* and *Cucurbitaceae* in Jordan: A Review.

Jordan has limited water resources and agricultural land. Food security is currently one of the major issues receiving special attention to overcome hunger. Among the one million hectares that are used for crop production, 40,000 hectares are used for vegetable crops of the family *Solanaceae* (potato, tomato, pepper and eggplant) and *Cucurbitaceae* (squash, cucumber, watermelon, and melon) and considered the most important vegetables cultivated in Jordan, and their production is affected by different diseases. Viruses, among other pathogens, infect vegetables and seriously affect both the quantity and quality of these crops. Over the past few decades, many surveys have been conducted in Jordan to investigate the occurrence of different viruses that attack important vegetable crops using biological, serological, and molecular techniques. Many viral pathogens were identified and reported to threaten the production of these crops, and consequently food security in Jordan. The results obtained from these surveys could be used to develop effective strategies for controlling the viruses of economic importance and ensuring the sustainability of the production of important vegetable crops to meet the demands of the growing Jordanian population. [**Odeh, W.H., M.A. Sweiss, F.W. Haj Ahmad and L. Irshaid (Jordan),** Arab Journal of Plant Protection, 44(1):1-12, 2026]. https://doi.org/10.22268/AJPP-001367

Saudia Arabia

Synergistic Control of *Bemisia tabaci* Using *Nesidiocoris tenuis* and *Orius laevigatus* and Its Effects on Tomato Yield.

The whitefly *Bemisia tabaci* is a major pest of greenhouse-grown tomato, causing significant yield and quality losses worldwide. This study evaluated the population dynamics of *B. tabaci* on tomato crops maintained at a maximum temperature of 24 ± 1 °C and assessed the effectiveness of two generalist predators, *Nesidiocoris tenuis* and *Orius laevigatus*, applied individually or in combination under greenhouse conditions in Saudi Arabia. Whitefly populations increased progressively throughout the study, reaching peak densities of 32.24 eggs and 124.00 ± 7.78 nymphs per leaf. Predator release significantly reduced *B. tabaci* populations at both the egg and nymphal stages. *N. tenuis* showed greater efficacy against eggs, achieving a 67.44% reduction, whereas *O. laevigatus* was slightly more effective against nymphs, with a 63.30% reduction. Notably, the combined release of both predators resulted in the greatest suppression of whitefly populations, reducing egg and nymphal densities by 79.50% and 78.02%, respectively, suggesting additive or synergistic interactions between the two predators. The dual-predator treatment also significantly improved yield-related parameters, including fruit number, fruit size, and total yield per plant, without adversely affecting fruit quality. In addition, vitamin C content increased under the combined predator treatment. These findings demonstrate that the integration of *N. tenuis* and *O. laevigatus* enhances biological control efficacy and supports sustainable integrated pest management strategies for greenhouse tomato production.[**Lassaad Mdallel[1,2],Abderrahman Mquitib[1],Abdallah Guerban[1],Bader Sulaiman Sudayri[1],Selman Al-Oudah[1,2] and Soltan MMohamed Al-Eid[2]**, [1]National Organic Agriculture Center, Department of Protection and Biological Control, Ministry of Environment, Waiter and Agriculture, Unaiza 51911, Saudi Arabia [2]Saudi Organic Farming Association, Riyadh 11321, Saudi Arabia. Insects , 17(6), 582,2026]. https://doi.org/10.3390/insects17060582

Syria

Effect of Food Source on the Life Cycle of the Indian Flour Moth, *Plodia interpunctella*.

The impact of different food sources (figs, raisins, dates, pistachio peel, and artificial food) on the life cycle of the Indian flour moth insect *Plodia interpunctella* (Hubner) (Lepidoptera: Pyralidae) was investigated. The results showed that the egg-laying period was 4.58 days, with no significant difference among the different food sources. The average hatching rate was 90.60%, again without significant differences among the food sources. The artificial food produced a significantly shorter larval stage period of 29.75 days compared to other food sources. The pupal stage was 10.75 days long without significant differences among the different food sources. The average adult age was 11.25 days, and the average number of eggs laid by females was 113.80 eggs, with no significant differences among food sources. The full generation period averaged 44.67 days and was shortest with the artificial diet (39.62 days), outperforming raisins and pistachio shells, which exhibited the longest generation periods of 46.50 and 51.25 days, respectively. [**Al-Hamdo, M., M. Abdel-Hay and Kh. El-Tawil. (Syria**), Arab Journal of Plant Protection, 44(1):13-17, 2026]. https://doi.org/10.22268/AJPP-001369

The Effect of Bacterial Isolate of *Pseudomonas fluorescens* on the Growth of Tomato Plants and on Reducing its Infection with Bacterial Speck Disease Caused by *Pseudomonas syringae* pv. *tomato*.

Bacterial speck disease is one of the most important bacterial diseases that affect tomato plants, which spreads in all countries that grow tomatoes in greenhouses and open fields, and causes heavy losses in quantity and quality. Due to the difficulty in combating speck disease chemically, the research was aimed to evaluate the effect of the bacterial isolate *Pseudomonas fluorescens* on the growth of tomato plants and on reducing the infection with bacterial speck disease caused by the bacteria *Pseudomonas syringae* pv. *tomato*. This research was carried out during the 2020/2021 season. Tomato seeds were inoculated with a suspension of beneficial bacteria, P. fluorescens (109 cells/ml), by soaking before planting. Three weeks after transferring to plastic pots, the artificial infection was carried out by spraying each plant with *P. syringae* pv. *tomato* suspension. Readings were made two weeks after infection by estimating the disease incidence and severity and estimating some growth indicators of tomato plants (foliage fresh and dry weight). The results obtained showed a positive effect of the bacterial isolate, *P. fluorescens*, on the growth of tomato plants, by significantly increasing the fresh and dry weight of foliage compared to the untreated control plants. Plants treated with beneficial bacteria also showed a decrease in the disease incidence and severity, reaching 56 and 40% in plants treated with beneficial bacteria, respectively, compared to control plants infected with pathogenic bacteria and not inoculated with beneficial bacteria (89% and 60%, respectively). In conclusion, this study showed that treatment with the beneficial bacteria *P.fluorescens* can be considered as one of the promising components to control bacterial speck disease and reduce the damage it causes on tomato crop. [**Alabid, I.K. and Y.A. Hammad (Syria),** Arab Journal of Plant Protection, 44(1):24-30,2026]. https://doi.org/10.22268/AJPP-001371

The Antagonistic Effect of a Local Isolate of *Trichoderma harzianum* Against Olive Knot Disease in Syria.

Olive knot disease is considered one of the most important diseases affecting olive trees in Syria. The disease is caused by the bacteria *Pseudomonas savastanoi* pv. *savastanoi* (*Pss*). The aim of this study is to test the efficiency of the antagonistic effect of several extracts (ethyl acetate, hexane, and the enzymatic extract BIO-TH-WP) of a commercial isolate of the fungus *Trichoderma harzianum* on nutrient agar (NA), and also to test the direct effect of the fungus *Trichoderma harzianum* on inhibiting the growth of the bacteria *Pseudomonas savastanoi* pv. *savastanoi* grown on potato-dextrose-agar (PDA) medium. The pathogenic bacterium was isolated from infected olive trees in the Al-Kadmous area (Tartous Governorate, Syria). The antagonistic effect of different extracts of the fungus *Trichoderma harzianum* against

the bacteria *Pss* was tested by the disk diffusion method. Paper disks were immersed in specific concentrations of the extracts (ethyl acetate, hexane, and enzymatic extract (BIO-TH-WP)) of the fungus, placed on a Pss lawn, and incubated at 28±2°C for 48 hours. Thereafter, the inhibition rate (%) of the pathogenic bacteria was measured. The results obtained showed that the inhibition rate reached 0.0, 33.3, and 17.7% for the hexane, ethyl acetate, and BIO-TH-WP extracts, respectively. The use of the extracts on two-year-old trees led to a reduction of disease index associated with an increase in the concentration of the enzymes peroxidase and polyphenol oxidase, 90 and 105 days after spraying with the enzymatic extract (BIO-TH-WP). The results showed that ethyl acetate extract and the enzymatic extract BIO-TH-WP can be considered a potential natural source for controlling olive knot disease. [**Ahmad, R.A., M. Al-Samara, I. Alabid and E. Mohamed (Syria),** Arab Journal of Plant Protection, 44(1):40-47, 2026]. https://doi.org/10.22268/AJPP-001373

Fumigation, Contact and Repellent Effect of Essential Oil Extracted from Bottle Brush, *Melaleuca citrina* Leaves Against Tobacco Beetle, *Lasioderma serricorne* Under Laboratory Conditions.

Tobacco beetle, *Lasioderma serricorne* F. (Coleoptera: Anobiidae), is one of the most destructive insects in stored food products, and it is desirable to identify environment-friendly methods to control it. The fumigation, contact, and repellent effects of the essential oil of bottle brush leaves, Melaleuca citrina (Curtis), were investigated to control tobacco beetle adults. A sample of adult beetles was obtained from the Agricultural Quarantine Center in Latakia, Syria, and then reared in the General Insect Laboratory of the Faculty of Agricultural Engineering, Tishreen University. Experiments were conducted during the period from April to June 2024, at 27.5-29.5°C and 56-70% relative humidity. Different concentrations of essential oil were tested by fumigation and contact, and the results showed that all the experimental insects died two hours after treatment with a concentration of 90 µl/L air by fumigation, whereas spraying with a concentration of 1.25 µl/cm^2 killed all insects within 8 hours. The concentration of 0.157 µl/cm^2 showed the highest repellent effect among the tested concentrations (86.67%), 2 hours after treatment. [**Mayhoub, A., M. Oumran and A. Qara Ali (Syria),** Arab Journal of Plant Protection, 44(1):62-67, 2026]. https://doi.org/10.22268/AJPP-001380

Effect of *Spirogyra fluviatile* Alga Extract on *Aspergillus carbonarius* Pathogenic Fungus.

Spirogyra fluviatilis was collected from the Damascus Ghouta region (Deir Al-Asafir), Damascus Countryside governorate. Extraction was carried out using distilled water, methanol and chloroform as solvents. The total content of phenols and flavonoids in all extracts was determined. The effect of different extracts concentrations on *Aspergillus carbonarius* was investigated. The highest content of phenols and flavonoids was found in the methanol extract and reached 236.6±0.89 and 86.47±0.14 mg/g, respectively, and the highest inhibition rate reached 81.05% for the methanol extract at a concentration of 100 mg/ml, and the lowest inhibition rate was 67.89% for the water extract at a concentration of 60 mg/ml. [**Korjak, F.M. and S.Y. Mohammad (Syria),** Arab Journal of Plant Protection, 44(1):68-73, 2026]. https://doi.org/10.22268/AJPP-001376

The Role of Salicylic Acid in Stimulating Acquired Systemic Resistance in Tomato Plants Against Infection with Cucumber Mosaic Virus.

The effect of salicylic acid (SA) on the induction of systemic acquired resistance (SAR) in tomato plants against infection with Cucumber mosaic virus (CMV) was investigated. Plants treated with two concentrations of 1 and 2 mM of salicylic acid, using two application methods, spraying and irrigation, three days before mechanical inoculation with the virus, during the fall of 2022 in Tartous Governorate, Syria. The effect of acquired systemic resistance was assessed by: time required for symptoms development, disease severity, concentration of free salicylic acid and peroxidase activity in experimental plants. The results obtained showed that treatment with salicylic acid delayed the appearance of symptoms of viral infection by up to 21 days compared

to 12 days for the control, and reduced disease severity by 38.3% in the sprayed treatment at a concentration of 2 mM compared to the rest of the treatments. The value of free salicylic acid increased to 124.5 µg/g compared to the healthy control (21.54 µg/g) and the infected plants not treated with salicylic acid (13.73 µg/g). In addition, the peroxidase enzyme concentration increased to 0.209 µmol/mg compared to the healthy control (0.112 µmol /mg), at the time when enzyme activity of infected plants not treated with salicylic acid reached 0.044 µmol/mg. An increase in the content of free salicylic acid and peroxidase activity, a delay in the onset of infection symptoms, and decrease in the disease severity were good indicators for the induction of acquired systemic resistance as a result of treatment with salicylic acid. [**Tahan, W., N.Sh. Slimane, S. Raee and H. Ahmad. 2 Arab Journal of Plant Protection, (Syria),** 44(1):80-88, 2026]. https://doi.org/10.22268/AJPP-001363

Genetic Variation Among Four Local Isolates of *Oidium neolycopersici*, One of the Causal Agents of the Powdery Mildew Disease of Tomato Using Inter Simple Sequence Repeats (ISSR) Technique.

Oidium neolycopersici is one of the tomato powdery mildew pathogens in greenhouses. This study aimed to determine the genetic relatedness and pathogenicity of four local isolates (M8, M10, G12, and R12) of *O. neolycopersici* using the Inter Simple Sequence Repeats (ISSR) technique. The DNA of the isolates was amplified using 23 ISSR primers. The results obtained showed that there was no significant variation in pathogenicity among the tested isolates. Only 11 primers gave polymorphism among the studied isolates, yielding a total of 191 bands; 58 of which were polymorphic, and the polymorphism rate was 31%. The number of polymorphic bands ranged between 1 band with the primer A8 to16 bands with the primer E11, with an average of 5.2 bands per primer. Genetic divergence values were low in general, ranging between 0.05 and 0.26, which means high genetic relatedness between the isolates. The phylogenetic tree was divided into two main clusters: the first included the two isolates M10 (Alkhrab region) and M8 (Alademah region), which had a 95% genetic similarity. The second included G12 and R12 isolates with a high degree of relatedness (92%), but lower than the previous ones, even though the two isolates were collected from the same region (Matn Abu Raya). The results revealed that ISSR technique was effective in detecting diversity and genetic relatedness among *O. neolycopersici* isolates.[**Alio, N., S. Al-maghribi and N. Mualla (Syria), Arab Journal of Plant Protection, 44(1):119-125, 2026].** https://doi.org/10.22268/AJPP-001378

Effect of Two Strains of Plant Growth Promoting Rhizobacteria (PGPR) on the Chlorophyll Content and Virus Concentration in Tomato Plants Infected with Tomato Spotted Wilt Virus Under Protected Cultivation.

Tomato spotted wilt virus (TSWV) is considered an epidemic disease of solanacious crops, causing severe losses in protected cultivations at different regions of the world. This study was conducted to evaluate the efficiency of two strains of plant growth promoting rhizobacteria, *Pseudomonas chlororaphis* MA342, and *Bacillus subtillis* FZB27, in the induction of systemic acquired resistance in tomato plants against TSWV, in greenhouses, by estimating the photosynthetic chlorophyll and virus concentration. The research was carried out on tomato plants grown under protected agriculture, at the Agricultural Research Centre in Lattakia, during the fall and winter of 2019-2020 growing season. The experiment was designed following a randomized complete block design, with 10 treatments and 4 replications of 6 plants for each replicate, making the total number of plants in the experiment 240 plants. The bacteria were applied by seed treatment, root irrigation and foliage spray. Virus inoculation was carried out by thrips, the common vector of TSWV. The following parameters were estimated: Content of photosynthetic pigments (chlorophyll A, B, and carotenoids), viral concentration, and viral inhibition rate (%), 30 days after virus inoculation. Results obtained showed an increase in the amount of chlorophyll A, in plants inoculated with TSWV and treated with PGPR bacteria (0.349-0.517 mg/g), and this was significantly higher than the control treatment (0.142 mg/g). The amount of chlorophyll B in plants inoculated with TSWV and treated with the bacteria (0.201-0.279 mg/g) was also higher than the control treatment (0.166 mg/g), but the difference

was not significant. The application of the bacteria increased the amount of chlorophyll A and B, with highest rate of increase reached 265.49 and 68.07 %, respectively, when the strain B27 was used by the three application methods (seed treatment, root irrigation, and foliage spray). DAS-ELISA readings showed significantly lower concentration of viral antigen in PGPR treated tomato leaves (0.378-0.908), compared with the control treatment (1.202), 30 days after virus inoculation. [**Akel, E.H., Q.A. Al-Rhayeh, H.N. Kawas and I.D. Ismail (Syria),** Arab Journal of Plant Protection, 44(1):95-102, 2026]. https://doi.org/10.22268/AJPP-001381

Population Density of *Zabrus tenebrioides* G. on Wheat and Assessment of the Efficiency of Certain Preparation in Management it.

The results showed that beginning activity larvae *Z. tenebrioides* was in end January in season 2023 and start February in season 2024 during stage emerging wheat, and peak it in weeks (first, second) from February average (1.50, 2.75) larva/ plant in seasons 2023, 2024 respectively, and spots infested different in field according to intensity infested, pupae of larvae were in soil in end February in stage Tillering, and the adults showed in beginning March, and peak of adults numeric on wheat ears in weeks (second, third) of May in stage milking ears average (1.0, 1.25) adult/ m2 in seasons 20.23, 2024 respectively, and decreasing in beginning June to (0.25) adult/ m2 in stage maturity, Using some preparation in beginning infested of larvae such: mixture attract (Imidacloprid 70%+sugar+bran+plant oil), (Asetamiprid 20%+sugar+bran+ plant oil) bioinsecticide fungi Trichoderma harzianum, Sulfur powder, micron Sulfur, Naphthalene. Average efficacy on larvae after month were (93.5, 90.6, 87.3, 47.7, 43.2, 26.8)% respectively. mixture attract (Imidacloprid 70%+ sugar+ bran+ plant oil) were the highest efficient in control the larvae compared with other treatments, then followed mixture attract (Asetamiprid 20%+ sugar+ bran+ plant oil), while Naphthalene was the least efficient. [**Bassam Ibrahim Oudeh**[1]*(Syria), [1]General Commission for Scientific Agricultural Research, Agricultural Scientific Homs Research Center. Syrian Journal of Agriculture Research- SJAR 13(2): 20-27 April 2026].

Seasonal Abundance of Whitefly (*Bemisia tabaci*) on Eggplant in Homs Governorate.

The whitefly (*Bemisia tabaci* Genn.) is considered one of the most dangerous agricultural pests affecting a wide range of economically important crops, including eggplant in central Syria. It causes significant damage by feeding on plant sap and transmitting viruses. Known for its rapid reproduction, especially in warm and protected environments, its development and population dynamics are strongly influenced by environmental factors. This study aimed to investigate the seasonal abundance of *B. tabaci*, estimate the number of its generations, and assess the impact of climatic variables on its different life stages (eggs, nymphs, and adults) under field conditions.The research was conducted at the AlMukhtaria Research Station (Homs) during the 2023 and 2024 growing seasons. Results indicated the presence of four generations in 2023 and five in 2024. The increased temperatures and relative humidity in 2024 contributed to higher insect activity and reproduction, particularly in the adult stage, which showed a significant positive correlation with minimum temperatures. The three developmental stages were variably affected by climatic factors such as relative humidity, solar radiation, and wind speed, highlighting the importance of these variables in determining optimal pest control timing. The findings suggest that integrating climatic data into early warning systems and integrated pest management (IPM) programs could enhance the effectiveness of whitefly control strategies. [**Bayan Almustafa*[1], Dummar Nammour[1], and Bassam Odeh[2]** (Syria),[1]Department of Plant Protection, Faculty of Agricultural Engineering, Homs University, Homs. Syria. [2]Homs Research Center, GCSAR, Syria. Syrian Journal of Agriculture Research- SJAR 13(2): 45-53 April 2026].

Effect of the Biocontrol Agent *Trichoderma harzianum* and the Fungicide Carbendazim White Rot Disease *Sclerotium cepivorum* of Onion Crop.

To evaluate the efficiency of the biocontrol fungus *Trichoderma harzianum* and the fungicide Carbendazim in inhibiting the growth of the pathogenic fungus *Sclerotium cepivorum*, which causes white rot disease of onion crop in the greenhouse, this study was conducted at the Biodiversity Laboratory of the General Biotechnology Authority, Damascus, Syria, where the

fungal isolate SCL1 (causing 89.2% of infection severity) was used. The study included protective spraying with two fungicides, separately, for treating onions infected with the white rot fungus. The disease severity at 4, 8, 12, and 16 days after infection was measured. In addition, some growth indicators and chlorophyl concentration (A, B, and total) were estimated 60 days after inoculation. The results obtained showed that the disease severity 4 days after inoculation in healthy control, the carbendazim and *Trichoderma* pesticide treatments reached 0.0, 1.1, and 1.6%, respectively, with a significant difference with the fungus-infected control (72.5%). Significant differences continued between treatments and the infected non-treated control. Pesticides treatment caused a significant reduction in the severity of the pathogenic fungus infection in the greenhouse, with the superiority of the bio-pesticide compared to the chemical fungicide. On the other hand, the plants treated with *Trichoderma* outperformed the rest of the treatments in the wet and dry weight of the shoot and root growth. The same significant differences were obtained related to onion head weight and chlorophyl content. It can be concluded that the pesticide treatment; biological or chemical, reduced the damage caused by the pathogenic fungus by increasing plant growth and its chlorophyl content. [**El-Kharouf, S.A. (Syria),** Arab Journal of Plant Protection, 44(2):202-209, 2026]. https://doi.org/10.22268/AJPP-001387

Role of Plant Growth-Promoting Rhizobacteria (PGPR) in Inducing Systemic Resistance in Potato Plants Against the Fungal Pathogen *Fusarium oxysporum* f. sp. *lycopersici*.

This study aimed to evaluate the efficiency of rhizobacteria mixtures as biofertilizers in reducing the incidence of Fusarium wilt caused by the fungus *Fusarium oxysporum* f. sp. *lycopersici* in potato plants cv. Sponta, and determine the best control treatment. Three fertilizers were prepared using eight isolates of PGPR rhizobacteria, added at planting, after germination, and at ovulation. Readings of study samples were taken 45 days after infection. The activity of the peroxidase enzyme, the amount of total phenols, and the content of salicylic acid in the leaves were measured. In addition, peroxidase activity, total phenols, and salicylic acid content in the leaves were also measured. The severity of infection, disease index and reduction in disease incidence rate were also determined. The results showed the effectiveness of the studied biofertilizers in increasing the activity of the peroxidase enzyme and the leaf content of total phenols and salicylic acid in the leaves of potato plants infected with Fusarium wilt following all treatments, with significant differences compared to the infected control, and reduced disease index and severity of infection with Fusarium wilt. The treatment with the mixture of eight bacterial isolates and repeated addition (M3D4) outperformed the rest of the treatments and gave the highest values in peroxidase activity (0.19 µmol/mg), and the highest content of total phenols (79.69 mg/100g) and salicylic acid (176.61 µg/mg) in the leaves of potato plants compared to the infected control (0.1, 45.01, 107.12, respectively). The infection rate and disease severity were also reduced with significant differences compared to the infected control, and the M3D4 treatment produced the highest infection reduction rate of 82.33%. These results confirmed the effectiveness of mixed inoculation with eight isolates of PGPR rhizobacteria, upon repeated addition, stimulating systemic resistance in infected potato plants infected with *F. oxysporum,* thus the possibility of using these types of rhizobacteria in biocontrol programs against this fungus is recommended.[**Hammad, Y.A. and S.J. Shadoud(Syria),** Arab Journal of Plant Protection, 44(2):253-263, 2026]. https://doi.org/10.22268/AJPP-001400

Efficiency Evaluation of Local Isolates of *Pseudomonas fluorescens* and *Bacillus cereus* Against *Fusarium oxysporum* f. sp. *lycopersici* the Causal Agent of Tomato Vascular Wilt.

In an attempt to control *Fusarium oxysporum* f. sp. *lycopersici* on tomato, and to reduce tomato yield losses, by the application of local bacterial isolates, isolated from the rhizosphere of tomato plant and *Trifolium purpureum* as biological control agents. Four of these isolates belong to *Pseudomonas fluorescens* and 4 belong to *Bacillus cereus*. Their ability to inhibit infection was tested *in vitro* by two methods: the sectors method using bacterial suspensions and well-plate assay method using bacterial filtrates. The antagonistic activity was evaluated on plants in pots. The results obtained showed that the most effective bacterial isolate in inhibiting

the growth of the fungal pathogen using the sectors method through culture suspensions was *Bacillus cereus* J02 (with a biocontrol efficacy of 20.36%). On the other hand, using the well-plate assay method, the strongest isolate was *Bacillus cereus* I91 (with an inhibition rate of 33.3%). The isolate *Pseudomonas fluorescens* A12 demonstrated the highest reduction in disease index (3.33%) compared to the infesected control (70%). Moreover, it increased growth parameters (plant height, root and shoot dry weight) but did not inhibit the growth of the fungal pathogen *in vitro*. The isolate RIZN belonging to *Bacillus cereus*, isolated from the roots of *Trifolium purpureum*, exhibited inhibition of fungal infection both *in vitro* (25.3%) and on plants (disease incidence 16.67%). These results contributed to the development of a potential biocontrol agent against tomato Fusarium wilt disease. [**Alkhlif, R.A., M.F. Azmeh and M. Abu Ghoura (Syria),** Arab Journal of Plant Protection, 44(2):264-272, 2026]. https://doi.org/10.22268/AJPP-001395

Impact of Infestation with *Eriosoma lanigerum* of Three Apple Cultivars on The Nitrogen and Carbohydrates Content and The Efficacy of The Parasitoide *Aphelinus mali* in Reducing the Infestation rate in Latakia Governorate, Syria.

Eriosoma lanigerum is considered a serious pest that attacks the apple canopy and its roots. It has a negative effect on the world apple fruits production. *E. lanigerum* feeds on sap and causes wrinkling and twisting of the young shoots and it reduces tree vitality. This research aimed to estimate the susceptibility of two apple cultivars Royal Gala and Granny Smith and the rootstock *Malus sylvestris*" to *E. lanigerum* infestation and investigate the effect of the parasitoid *A. mali* in alleviating the *E. lanigerum* infestation. The study was conducted on the apple cvs. Royal Gala and Granny Smith grafted on the rootstock *Malus sylvestris*" at an orchard in Kasab village, Agriculture Directorate, Latakia Province during the 2020-2021 growing seasons. Trees were infested in June, and the pest severity and aerial infestation were estimated four months after the initial infestation. The parasitism rate was also evaluated in July, August and September. The apple cv. Granny smith showed the highest infestation severity (63.45 %) compared with the control (42.74 %). The rootstock "*Malus sylvestris*" had the least infestation severity (43.77 %) compared to the control (25.54 %). Cultivar Granny Smith was the most susceptible to infestation (69.16 %) compared with the control (61.01%). To the contrary, the use of the root stock *Malus sylvestris* gave the lowest aerial infestation (60.00%) compared with the control (43.77%). Parasitism reduced the aerial infestation rate of the cv. Royal Gala by 79.21% compared to 69.57% for the control. Using the rootstock "*Malus sylvestris*" in apple orchards can alleviate the *E. lanigerum* infestation due to its resistance of *E. lanigerum*. In addition, the release of the parasitoid *A. mali* can be an added component for *Eriosoma lanigerum* control. [**Dayoub, S., R. Kharboutly and N. Abo Kaf (Syria),** Arab Journal of Plant Protection, 44(2):273-280, 2026]. https://doi.org/10.22268/AJPP-001396

Enhancement of Cucumber Growth, Production and Protection against Insect Pests by the Endophytic Entomopathogenic Fungus *Beauveria bassiana*.

Two strains of the entomopathogenic fungus *Beauveria bassiana* (Bals.) Vuil. were used in the present study to inoculate cucumber plants using cucumber seed treatment for different durations (2h, 6h, and 10h) in the laboratory, in addition to root dipping in the greenhouse. Their effects on plant colonization, seed germination, growth and production parameters were examined, and their impact in preventing insect pest attack under greenhouse conditions was investigated. The results of the laboratory experiment showed a significant increase in the length and number of roots, and the seedling vigor, 10 days after seed soaking in the fungal suspension for different treatment durations, with no significant effect on germination. Increasing the seed soaking duration also increased the hypocotyl length. Significant increase was observed in leaf number, fruit number, wet fruit weight, wet and dry shoot weight, plant height, and root length, 43 days after fungal application under greenhouse conditions. Both *B. bassiana* strains reduced infestation and severity of agromyzid leaf miners, aphids, and whiteflies on cucumber plants grown in the greenhouse. [**Rajab, L., I. Gazal and M. Ahmad (Syria),** Arab Journal of Plant Protection, 44(2):281-289, 2026]. https://doi.org/10.22268/AJPP-001394

Tunisia

Spatial Distribution and Molecular Characterization of Persistently Aphid-transmitted Viruses causing Yellowing and Stunting in Faba Bean and Chickpea Crops in Tunisia.

Field surveys were conducted in the northeastern and northwestern regions of Tunisia between 2013/2014 and 2018/2019 growing seasons to identify viruses that infect faba bean and chickpea crops. Field observations showed that 18.8% of the faba bean and 21.0% of the chickpea fields surveyed had virus-like symptoms.

These rates exceeded 20% during the growing seasons from 2013/2014 to 2018/2019, and were most common in the 2014/2015 growing season (28.6% of surveyed faba bean fields and 37.5% of chickpea fields showed virus-like symptoms in more than 20%). Totals of 1,538 faba bean and 1,511 chickpea plant samples showing yellowing and stunting symptoms were collected from 144 faba bean and 124 chickpea fields. All collected samples were tested by tissue blot immunoassay (TBIA) using six monoclonal antibodies.

These results showed that chickpea chlorotic stunt virus (CpCSV; *Polerovirus CPCSV*) was the most prevalent in faba bean and chickpea, with incidences of 20.2% and 37.6%, respectively, followed by beet western yellows virus (BWYV; *Polerovirus BWYV*) (13.5 and 9.7%), bean leafroll virus (BLRV; *Luteovirus phaseoli*) (3.7 and 3.3%), and faba bean necrotic yellows virus (FBNYV; *Nanovirus necroflaviviciae*) detected only in faba bean (6.6% of faba bean samples tested). In addition, TBIA results indicated that single virus infections were more prevalent than mixed infections in both crops. Mixed infections were predominantly co-infections involving viruses in *Polerovirus* (*Solemoviridae*), particularly CpCSV and BWYV (93% in faba bean and 69% in chickpea).

Twenty-six samples that reacted positively with different monoclonal antibodies were assessed with reverse transcription-polymerase chain reaction (RT-PCR) using generic and specific primers followed by sequencing of the partial coat protein (*CP*) gene. The sequence analyses confirmed presence of CpCSV, BWYV, BLRV, brassica yellows virus (BrYV; *Polerovirus TUYV*), and turnip yellows virus (TuYV; *Polerovirus TUYV*). Comparative sequence analyses of the Tunisian isolates indicated that 13 CpCSV sequences had nucleotide sequence similarities of 95 to 99% with the reference isolate (EU541266) belonging to serotype I, and six BLRV isolates had similarities of 96 to 99% with BLRV reference isolate (PP333098). One sample (TuCp265-19) had a mixed infection with CpCSV and BLRV.

Six isolates initially detected using BWYV-specific primers were sequenced and analyzed. BLASTn results showed that only three isolates were closely related (98 to 100%) to BWYV (OM419176), while the remaining four isolates were identified as *Polerovirus TUYV* and showed greatest similarity to BrYV (LC428361) and TuYV (OP699039), indicating co-occurrence of two distinct *Polerovirus* species within the analyzed samples. There is no information on the genetic variability of legume viruses in Tunisia, so this study shows that these viruses should be considered when developing disease management strategies to improve faba bean and chickpea production in Tunisia.

[**Samia Mghandef[1],[2], Safaa G.Kumarl[3], Abdulrahman MOUKAHEL[3], Imen HAMDI[1], Arvind VARSANI[4], Asma NAJAR[1]**,[1]Institut National de la Recherche Agronomique de Tunisie (INRAT), Tunis, Tunisie[2] Faculté des Sciences de Bizerte (FSB), Université de Carthage Jarzouna, 7021 Bizerte, Tunisie[3] Seed Health/ Virology Laboratory, International Center for Agricultural Research in the Dry Areas (ICARDA), Terbol Station, Zahle, Lebanon[4] The Biodesign Center for Fundamental and Applied Microbiomics, Center for Evolution and Medicine, School of Life Sciences, Arizona State University, Tempe, Arizona, United States of America. Phytopathologia Mediterranea, Vol. 65 No. 1,2026]. DOI: https://doi.org/10.36253/phyto-16680

Yemen

Occurrence of Potato Cyst Nematode (*Globodera* spp.) as a Threat to the Potato Crop in Yemen.

The potato cyst nematode (PCN) (*Globodera* spp.) was previously regarded as the most detrimental pest to potatoes, causing serious crop losses worldwide. Despite the significance of PCNs, there is currently no data available on their prevalence or the extent of their impact on Yemeni potato cultivation. Therefore, this investigation was conducted to assess the distribution and population density of this pest in the major potato production regions in Yemen and the potato yield loss it causes. During the 2023 production season, a total of 455 soil samples were collected from 145 fields located in 30 regions in Amran, Dhamar, and Ibb governorates. Cysts were extracted using the Fenwick can technique. The results obtained showed that PCNs were detected in all surveyed regions, except for the Daaf region in the Dhamar governorate. This nematode was recovered from 121 fields (83.4%) with densities ranging from 3 to 1,340 cysts/200 g of soil. The highest mean frequency of occurrence (100%), population density, cyst viability, and soil infestation level (SI) were recorded in the Ibb governorate, whereas the lowest mean frequency of occurrence (21.8%), population density, and soil infestation level were recorded in Dhamar governorate. The results also showed significant variation in the mean SI levels of PCN across most surveyed fields within regions, as well as differences between regions within the governorates. Mean SI levels ranged from 1.4 to 190.3 eggs and juveniles/g soil, resulting in an estimated average yield loss ranging from 0.2 to 26.2 t/ha. The results of soil infestation levels with potato cyst nematodes recorded at seven sites in Ibb Governorate and one site in Amran Governorate revealed levels far exceeding the economic damage threshold, leading to severe yield losses and the failure of potato cultivation in these areas. Thus, there is an urgent need to provide farmers with an appropriate strategy for PCN management.[**Showkat, J.K. and M.R.M. Saeed (Yemen),** Arab Journal of Plant Protection, 44(2):173-182, 2026]. https://doi.org/10.22268/AJPP-001384

Ethiopia

Efficacy of Tilt (Propiconazole) Fungicide Applied at Different Rates and Growth Stages Against Spot Form Net Blotch Disease Caused by *Pyrenophora teres* f. sp. *maculata* on Food Barley in North Gondar Zone, Northwestern Ethiopia.

Spot form net blotch (SFNB) is one of the diseases which causes yield loss in barley. This study was initiated to evaluate the efficacy of Tilt fungicide application for the control of the spot form net blotch. Three Tilt rates applied at four growth stages were evaluated using factorial randomized complete block design at four sites with three replications in North Gondar province during 2023. Susceptible local variety Abat Gebs was sown at a rate of 100kg/ha in $3m^2$ plot size. NPS Fertilizer at a rate of 121 kg/ha at planting, and urea at a rate of 100 kg/ha in two applications were used. Data on disease severity, yield and yield components were recorded. Analysis of variance of severities and area under disease progress curve, yield and yield components revealed that there was no interaction effect between fungicide rates and growth stages. There were statistically significant ($P \leq 0.05$) differences in the area under disease progress curve when the fungicide was applied at different growth stages. The lowest area under the disease curve was obtained when the fungicide was sprayed at the 39 growth stage at Debark and Dabat. The highest grain yield (4455.9 and 4377.7 kg/ha) was obtained from plots sprayed with Tilt at 39 growth stage followed by 49 growth stage at Debark. In general, 18.2 and 20.4% yield advantage was obtained from plots sprayed at the 39 growth stage compared to unsprayed control plots at Debark and Dabat, respectively. The severity of net blotch was highly reduced following foliar application of Tilt fungicide at the rate of 0.5 L/ha sprayed at the 39 growth stage. Therefore, this fungicide rate and the mentioned time of application are proposed to be integrated into the cultivation package of food barley. [**Azanaw, A., A. Sintayehu, T. Alemu and T. Tesfaye. (Ethiopia),** Arab Journal of Plant Protection, 44(1):48-54, 2026]. https://doi.org/10.22268/AJPP-001379

GRADUATE STUDENTS THESIS (MSC AND PHD)

Identification Pathovar of *Pseudomonas syringae* which caused Bacterial Wheat Leaf blight and their Resistance Resources in Syria

Wheat is one of the most vital cultivated cereal crops globally. It is influenced by a combination of biotic and abiotic stresses, particularly under the climatic shifts manifested over the past decade. Prominent among these stresses is bacterial leaf blight of wheat, caused by the bacterium *Pseudomonas syringae* pv. *syringae* (*Pss*). The significance and severity of this pathogen stem from its status as one of the most critical seed-borne bacterial diseases in wheat. A field survey was conducted to investigate the distribution and pathogenic variants of *P. syringae* causing bacterial leaf blight across several wheat-growing regions in Syria (Aleppo, Hama, Homs, Tartus, and Latakia) during the 2022–2023 cropping season. Results revealed the widespread occurrence of bacterial leaf blight across all surveyed regions. The disease was recorded in 42 out of 59 surveyed fields (71.2%), with intra-field disease incidence varying across locations. The highest intra-field incidence was recorded in the Al-Ghab region of Hama province, averaging 41% incidence and 42% disease severity. Pathogenicity tests demonstrated that all 56 studied bacterial isolates, collected from all survey sites in Syria, were capable of inducing disease symptoms. Polymerase Chain Reaction (PCR) assays identified 41 bacterial isolates as belonging to the pathovar *P. s.* pv. *syringae*. These findings indicate that the *Pss* pathovar is prevalent throughout all examined wheat-growing areas. Furthermore, nucleotide sequencing of four bacterial isolates representing the studied geographic zones—A19 (Aleppo), T55 (Tartus), Ha7 (Hama/Al-Ghab), and Ho6 (Homs)—confirmed the ubiquitous distribution of this *Pss* pathovar across all study sites. In this study, a highly specific polyclonal antiserum was generated, capable of detecting *Pss* in all its forms. Double Antibody Sandwich (DAS)-ELISA results confirmed that the produced antiserum possessed high specificity toward *Pss*, showing no cross-reactivity with other bacterial genera, such as *Xanthomonas translucens*. Evaluating the reactions of certified Syrian wheat cultivars against the pathogen *Pss* revealed that none of the tested cultivars exhibited a resistant reaction. However, 10 cultivars of bread wheat (Bhooth 6, Bhooth 8, Douma 6, Douma 4, Bhooth 4) and durum wheat (Bhooth 7, Cham 7, Cham 9, Bhooth 5, Cham 3) displayed a moderately resistant reaction, while 8 genotypes out of 34 tested genotypes exhibited a resistant reaction against the pathogen. The interactions between cultivar genotypes and the prevailing environmental conditions at the study sites varied significantly when assessing losses in thousand-kernel weight (TKW) and yield under natural *Pss* disease pressure at two distinct locations, Aleppo and Al-Ghab. The percentage loss in thousand-kernel weight ranged from 3% to 19.4%. The cultivar Cham 10 grown in the Aleppo region recorded the lowest loss, not exceeding 3% TKW reduction, whereas the cultivar Bhooth 9 in the Al-Ghab region sustained the highest loss, reaching 19.4%. This study represents a significant advancement in the diagnosis and prevention of the spread of this bacterium, particularly during the transport and exchange of germplasm. Accurate and timely detection of this pathogen remains vital for implementing effective management strategies aimed at mitigating the spread of this disease**. [Abdo Mohamed Najib Abo Bakr (Syria),** Supervised by: Prof. Dr. Fateh Khatib, Prof. Dr. Mohamed Qasem, Dr. Safaa Ghassan Kumari, Dr. Naim Al-Hussein, Dr. Nader Asaad. Faculty of Agricultural Engineering, University of Aleppo, Syrian Arab Republic, **(Doctorate,2026**)]. bdabobakr@gmail.com.

Identifying and Studying the Pathogenicity of *Fusarium* spp. Species Associated with Dry Rot of Tubers and Potato Wilt in Algeria.

Potato cultivation occupies a very important place in Algeria; this crop is subject to several constraints of biotic and abiotic origins. Among the biotic constraints, fungal diseases associated with the genus *Fusarium* can affect potatoes in open fields (*Fusarium* wilt) and during storage (dry rot), with the risk of mycotoxin accumulation. This study aimed to identify the *Fusarium* species associated with these diseases in the main Algerian producing regions and to evaluate their pathogenicity. To do this, surveys were conducted in open fields and cold rooms, allowing the collection of 152 isolates from symptomatic plants and tubers. In order to evaluate their pathogenic potential, two inoculation methods were used: soil drenching with a spore suspension for wilt, and tuber injection followed by incubation in humid chambers for dry rot. The identification revealed the presence of 13 species belonging to the genera *Fusarium* and *Neocosmospora*. Among them, *F. oxysporum*, *F. venenatum*, and *Neocosmospora solani* were exclusively linked to wilt, while *F. culmorum*, *N. tonkinensis*, and *Neocosmospora* sp. were specific to dry rot. The other species (*F. redolens*, *F. cf. tricinctum*, *F. sambucinum*, *F. cf. incarnatum-equiseti*, *F. nygamai*, *F. brachygibbosum*, and *N. falciformis*) were associated with both types of symptoms. *Fusarium sambucinum* proved to be the dominant species, representing 52.6% of the isolates. Chemotyping of these species showed that they have the ability to produce Zearalenone, Trichothecenes, and Enniatin. Regarding pathogenicity tests, trials showed that *F. oxysporum* and *F. nygamai* were the most aggressive for wilt, while *F. sambucinum* showed the highest aggressiveness on tubers. To our knowledge, this study constitutes the first complete report on potato dry rot and wilt caused by *Fusarium* in Algeria. [**Nadia Azil (Algeria),** Department of Botany, The National Higher School Of Agronomy, EL Harrach, Algiers, Algeria. Supervisor :Prof. Houda Boureghda (**Doctorate, 2026**)].

Genotypic and Phenotypic Diversity of *Phoma* spp. and Related Pathogenic Species on *Fabaceae*: Assessment of Pathogenicity and Host Range - Case of Berseem Clover (*Trifolium alexandrinum* L.).

Phoma spp. and related species constitute a major complex of plant pathogens responsible for anthracnose and root rot in *Fabaceae*. Their identification remains difficult due to the high morphological similarity between species and the complex host specificity. For this purpose, several objectives were investigated: (1) to inventory and characterise *Phoma* spp. and related species associated with food and fodder *Fabaceae* crops in Algeria, with a particular focus on bersim, (2) to assess the inter- and intraspecific genetic diversity of the identified fungal populations, (3) to characterise the identified fungal species using phenotypic markers and assess their pathogenicity. The multilocus approach, based on phylogenetic analysis of the ITS and LSU regions and the *tub2* and *rpb2* genes, identified five genera : *Phoma*, *Ascochyta*, *Didymella*, *Nothophoma*, *Boeremia*, and 14 species within the family *Didymellaceae*. These include *P. herbarum*, *A. nigripycnidia*, *A. syringae*, *D. lethalis*, *B. exigua* and *N. pruni*, which were isolated from pea, alfalfa and bersim and observed for the first time in Algeria. Analysis of nucleotide polymorphism using DnaSP revealed genetic diversity among the species studied. *A. medicaginicola* and *D. pinodella* isolates exhibited the highest levels of diversity, reflecting significant interspecific variability, whilst those of *A. nigripycnidia* showed low genetic diversity, suggesting a

more homogeneous structure. Furthermore, haplotype analyses and network construction carried out using PopArt on *D. pinodella* and *A. nigripycnidia* isolated from Bersim revealed distinct genetic structures. *D. pinodella* exhibits a dominant haplotype that is widely distributed globally (Algeria, Asia, Europe), whereas *A. nigripycnidia* shows greater geographical diversity and limited gene flow. In terms of morphology and cultural characteristics, significant variation was observed among the species studied. Overall agreement between the morphological and phylogenetic data confirmed the value of a multi-phase approach for identifying species belonging to the *Didymellaceae*. Pathogenicity tests reveal considerable variation in the infectivity of the 14 species on *Fabaceae*. The species *D. pinodella*, *D. pinodes*, and A. medicaginicola are characterized by high virulence, with the ability to infect both above- and below-ground parts.

In contrast, the species *D. pisi*, *D. fabae*, *A. nigripycnidia*, *D. lethalis*, and *P. rabiei* exhibit intermediate and variable levels of virulence, with a more pronounced specialization depending on the host or organ. Conversely, *B. exigua*, *A. syringae*, *P. herbarum* and *N. pruni* exhibit low pathogenicity and a limited host range. These results highlight that pathogenicity is dominated by polyphagous and highly aggressive species in infections of both above and below ground parts of the plant. The Bersim pathosystem and the pathogens, *D. pinodella* and *A. nigripycnidia*, proved the most aggressive, the latter showing a notable capacity to infect underground parts, whilst *B. exigua* exhibited lower pathogenicity and a more limited host range. [**Naoul Ghiat (Algeria),** Department of Botany, The National Higher School of Agronomy, ENSA, El Harrach, Algiers, Algeria, The Supervisor : Prof Zouaoui Bouznad (**Doctorate, 2026**)].

Ecology and Biology of Opuntia Cochineal Scale *Dactylopius opuntiae* and Its Natural Enemies

The Opuntia cochineal Scale, *Dactylopius opuntiae* (Cockerell) (Hemiptera: Dactylopiidae), has caused significant economic damage to prickly pear (*Opuntia ficus-indica*) fields in Syria within a short period following its first recorded detection in 2020. This study aimed to investigate the ecology and biology of the insect pest and its natural enemies. The results revealed a widespread occurrence of the pest in cactus fields across both southern and coastal regions of Syria during 2021–2022. A positive correlation was observed between pest population density and both of average temperature and relative humidity, whereas a negative correlation was detected with precipitation. Field investigations conducted under semi-natural conditions at two sites, namely Deir Al-Hajar (Rif Dimashq, southern region) and Banyas (Tartous, coastal region), during the 2021 season demonstrated marked differences in developmental duration. At the Deir al-Hajar site, the mean time required to reach adulthood was 69.8 and 78.6 days for females and males, respectively. In contrast, at the Banyas site, developmental duration was significantly shorter, averaging 41.2 and 48.6 days for females and males, respectively. The pest completed five generations per year at Deir al-Hajar and six generations per year at Banyas during the 2022 season. Under controlled laboratory conditions (26°C, 60% RH, 14-h photoperiod), selected biological and life-table parameters of *D. opuntiae* were evaluated. The mean duration of the first and second nymphal instars of females was 7.39 and 8.47 days, respectively, requiring a total of 15.86 days to reach adulthood. The pre-oviposition period averaged 15.1 days, whereas the oviposition period averaged 40.3 days. Female longevity averaged 55.4 days, with a mean fecundity of 566.1 eggs per female. Egg incubation lasted an average of 33.9 min, with an egg hatchability of 82%. For males, the mean duration of the first and second nymphal instars, cocoon stage, and pupal stage was 7.27, 8.15, 7.90, and 23.28 days, respectively. Adult male longevity averaged 3.3 days. The sex ratio was approximately 1:3 (male: female). Life-table analysis revealed an intrinsic survival rate (l_x) of 0.55, a net reproductive rate (R_0) of 188 females/female/generation, and a mean generation time (T) of 50.42 days. The intrinsic rate of increase (r_m) was estimated at 0.104 females/female/day, whereas the finite rate of increase (λ) reached 1.11 females/female/day. The population doubling time (DT) was 6.67 days. The survey of natural enemies associated with the

Opuntia cochineal Scale, *D. opuntiae*, during the 2021 and 2022 seasons in Syria revealed the presence of several predatory species. Eight species belonging to the family Coccinellidae (Coleoptera) were recorded: *Cryptolaemus montrouzieri*, *Exochomus nigromaculatus*, *Nephus quadrimaculatus*, *Hyperaspis trifurcata*, *Hippodamia variegata*, *Harmonia quadripunctata*, *Scymnus pharaonis* and *Scymnus suturalis*. In addition, *Chrysoperla carnea* (Neuroptera:Chrysopidae) was identified. Among the recorded predators, *H. trifurcata* and S. *suturalis* were documented for the first time in Syria. The most abundant predators were *H. trifurcata* and *C. montrouzieri*. The evaluation of the inoculative release efficiency of *H. trifurcata* during the 2021–2024 study period, conducted in two cactus fields in Qatana (Rif Dimashq), demonstrated successful establishment of the predator in both fields during the 2022, 2023, and 2024 seasons. The predator fed on different developmental stages of *D. opuntiae*, resulting in a gradual reduction in infestation levels. In Field 1, infestation percentages during 2021, 2022, 2023, and 2024 were 32.4, 34.7, 24.69, and 9.56, respectively. In Field 2, the corresponding values were 35.4, 35.06, 25.87, and 14.51%, respectively. [**Firas Assad (Syria),** General Commission for Scientific Agricultural Research, Agricultural Research Center, Hama, Syria, Supervisors: Dr. Ziad Chikh-Khamis and Dr. Mazen Bufaur (**Doctorate**, **2026**)].

Isolation and Phenotypic Characterization of Indigenous *Lysinibacillus sphaericus* and *Bacillus thuringiensis* Strains and Evaluation of their Insecticidal Activity against Selected Dipteran Species.

This research was conducted at the laboratories of the Faculty of Agricultural Engineering, Damascus University; the Biotechnology Laboratory of the Biological Control Research and Studies Center; and the Industrial and Food Biotechnology Laboratory of the General Commission for Biotechnology. The study aimed to isolate and characterize local strains of the entomopathogenic bacteria *Bacillus thuringiensis* (Bt) and *Lysinibacillus sphaericus* (Ls) from diverse Syrian environments, evaluate their efficacy against larvae of the common mosquito *Culex pipiens*, and develop synergistic mixtures to overcome and delay the emergence of mosquito resistance to Ls toxins. A total of 200 environmental samples were collected from eight categories (agricultural, forest, and fallow soils; mosquito and fly breeding sites; aquatic sediments; plant leaves; and dead insect larvae) from western, central, and southern Syria. Five soil sample preparation methods were compared: wet heat (WHM), dry heat (DHM), ethanol (ETM), sodium acetate (SAM), and a combined method (CM). Three isolation media for Bt (NYSM, PEMBA, BtEA) and two media for Ls (NYSM, NYSMs) were evaluated. The isolates were subjected to phenotypic characterization using light microscopy with Coomassie Brilliant Blue staining and biochemical characterization using the Microgen™ Bacillus-ID Kit. Bioassays were conducted according to World Health Organization guidelines (WHO, 2005) to determine the median lethal concentration (LC50) and the 90% lethal concentration (LC90). Three mosquito colonies were established: a laboratory-susceptible colony (S-Lab), an Ls-resistant colony (Ls-Res) selected over 25 generations using the reference strain Ls2362, and a field-collected colony (Field). Sixteen binary mixtures of selected Bt and Ls isolates at different volume ratios (1:1, 1:3, 3:1, 2:3, 3:2) were tested, and the fractional inhibitory concentration index (FIC) and improvement factor (IF) were calculated to determine the nature of the interaction.

The results showed that the most effective soil preparation method for isolating the target bacteria was dry heat (DHM), and that PEMBA medium was the most efficient for Bt isolation, with 100% sensitivity and 79.8% specificity. Forty-nine Bt isolates from soil were classified into nine biochemical profiles and four main crystal morphologies (irregular 40.5%, spherical 32.4%, bipyramidal 13.5%, cuboidal 13.5%). A total of 37 Bt isolates and 11 Ls isolates exhibited high larvicidal activity (mortality ≥80%) against susceptible mosquito larvae. The local isolate Bt.Mb.C.D.2 (LC_{50} = 4.97×10^4 spores/mL) was comparable to the reference strain Bti, while isolate Ls.As.I.A.15 (LC_{50} = 5.65×10^4 spores/mL) outperformed the reference strain Ls2362 (1.57×10^5 spores/mL). Continuous selection for 25 generations led to the development of resistance to Ls in the mosquito colony, reaching 27.1-fold relative to the susceptible colony at the same generation (and 40.7-fold relative to the parental colony at the first generation), with no cross-resistance to Bti.

The selected Bt and Ls isolates, as well as the reference strains, maintained high efficacy against susceptible, resistant, and field-collected mosquito larvae, with significant differences among

each bacterial isolate. Field mosquito larvae exhibited a degree of tolerance to both bacterial species compared to laboratory-reared larvae. Binary mixtures showed considerable variation in interaction; isolate Bt.As.C.B.18 was the only synergistic partner. The mixture Bt.As.C.B.18 + Ls.Il.I.A.7 at a 1:3 ratio achieved the strongest synergy ever observed, enhancing Ls activity by 50.3-fold and Bt activity by 4.25-fold (FIC = 0.074). Conversely, ratios with an excess of Bt (3:1, 3:2) resulted in clear antagonism, emphasizing the importance of empirical ratio optimization. The study concluded that Syrian environments are rich in promising local entomopathogenic bacterial strains, which can form the basis for developing effective and sustainable national bioinsecticides. Furthermore, the study provides a practical strategy based on 1:3 synergistic mixtures that allows restoration of susceptibility in Ls-resistant mosquitoes, thereby reducing the need for chemical pesticides or expensive imported commercial products.[**Faek Abdalla Abdalrazaq(Syria),** Department of Plant Protection, Faculty of Agricultural Engineering. Supervised: Mahmoud Hasan Abu Ghorra and Ayman Mohamed Almariri (**Doctorate, 2026**)].

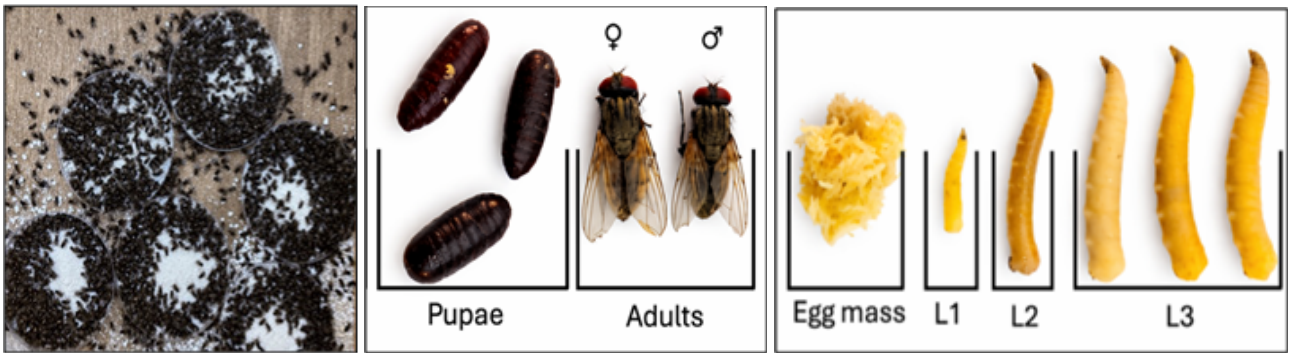
Assessment of *Bacillus* spp., *Beauveria bassiana*, *Metarhizium anisopliae*, and the Insect Growth Regulator (S-Methoprene) for the Biological Control of *Musca domestica* in Jordan.

The house fly, *M. domestica*, is an important public-health and livestock pest in Jordan, particularly in areas affected by animal-waste accumulation and manure transport. This study evaluated *Bacillus thuringiensis israelensis, Metarhizium anisopliae, Beauveria bassiana* and S-methoprene against second-instar larvae of *M. domestica* and established a standardized laboratory rearing system. The laboratory colony completed development from egg to adult in approximately 12 days and from egg to egg in about 16 days.

Larval length increased significantly with age, from 2.794 ± 0.114 mm on Day 1 to a maximum of 12.460 ± 0.114 mm on Day 4, while the weight of ten larvae increased from 0.010 g to 0.365 g over the same period. Adult females were significantly longer than males, measuring 7.989 ± 0.088 mm compared with 7.039 ± 0.088 mm. Bioassays showed clear differences among treatments. Label-based Bti concentrations produced limited mortality, reaching 32.5% at 800 g/20 L, with estimated LC_{50} and LC_{90} values of 1485.48 and 6040.31 g/20 L, respectively.

Directly mixed Bti was more effective, causing 85.0% mortality at 4 g/60 g diet, with LC_{50} and LC_{90} values of 1.952 and 5.152 g/60 g diet. *B. bassiana* showed moderate activity, with mortality reaching 57.5% at 5×10^7 spores/mL. *M. anisopliae* was more effective, causing 93.8% mortality at 5×10^7 spores/mL. S-methoprene showed the strongest response, completely preventing adult emergence at 50 and 100 ppm, with LC_{50} and LC_{90} values of 7.404 and 19.839 ppm. Overall, Bti, *M. anisopliae*, and especially S-methoprene appear promising for integrated management of *M. domestica* in Jordan.

[**Khalaf Ghazi Alenazi (Jordan**), Supervisors: Prof. Salah-Eddin Araj and Prof. Kholoud M. Alananbeh, Committee: Dr. Nehaya Al-Karablieh and Prof. Ihab Husni Mohammad Ghabeish. Department of Plant Protection, School of Agriculture, The University of Jordan, Jordan.(**Master, 2026**). klf8221038@ju.edu.jo



In Vitro Evaluation of Growth and Hybridization Potential of Wild Jordanian *Agaricus* Species with Commercial *Agaricus bisporus*.

Limited information is available regarding the diversity and breeding potential of wild *Agaricus* species in Jordan, particularly under the country's semiarid conditions. This study screened the diversity, growth characteristics, and hybridization potential of *Agaricus* species in Jordan using morphological, physiological, molecular, and statistical approaches. Wild *Agaricus* samples were collected from various ecological zones and identified based on morphological features and sequencing of the Internal Transcribed Spacer (ITS) region. Several wellknown species were confirmed, including *A. bisporus*, *A. campestris*, *A. bernardii*, and *A. bitorquis*, and *A. nevoi* was recorded in Jordan for the first time. The growth performance of mycelia from wild, commercial, and hybrid isolates was evaluated at different temperatures (22, 25, and 28 °C) and on two culture media: potato dextrose agar (PDA) and compost malt extract agar (CMEA). Mycelial growth increased over time across all treatments, with optimal growth generally observed at moderate temperatures (22–25 °C), where mean radial growth reached approximately 4.49 mm, while growth at 28 °C was slightly reduced, averaging 4.00 mm. Overall, CMEA supported higher growth rates than PDA, highlighting the beneficial role of compostderived nutrients. Growth responses varied significantly among isolates, with the wild *A. nevoi* isolate showing superior growth at moderate temperatures, while the commercial *A. bisporus* strain exhibited enhanced growth at higher temperatures. Statistical analysis using factorial ANOVA followed by Tukey's HSD confirmed that temperature, medium, and isolate type had significant effects on growth ($p < 0.05$). Hybrid isolates exhibited intermediate growth patterns between the parental types, reflecting partial expression of traits from both wild and commercial strains. Molecular analyses revealed clear genetic divergence between *A. bisporus* and *A. nevoi* lineages; however, the ITS sequences of the hybrid isolates closely resembled those of the *A. nevoi* lineage, suggesting that ITS markers have limited ability to detect hybridization events, likely due to concerted evolution. Overall, the findings highlight *A. nevoi* as a valuable genetic resource for developing *Agaricus* strains with improved thermal adaptability suited to semiarid environments, contributing to understanding fungal biodiversity in Jordan and providing a foundation for future breeding programs to enhance the sustainability of *Agaricus* cultivation.[**Khaled Fouad Ibrahim Al-Zakkak (Jordan),** Supervisors: Prof. Kholoud M. Alananbeh, Committee: Dr. Dr. Monther Mohammad Tahat and Dr. Hanan Arief Hasan. Department of Plant Protection, School of Agriculture, The University of Jordan, Jordan (**Master, 2026**)]. kal8201383@ju.edu.jo

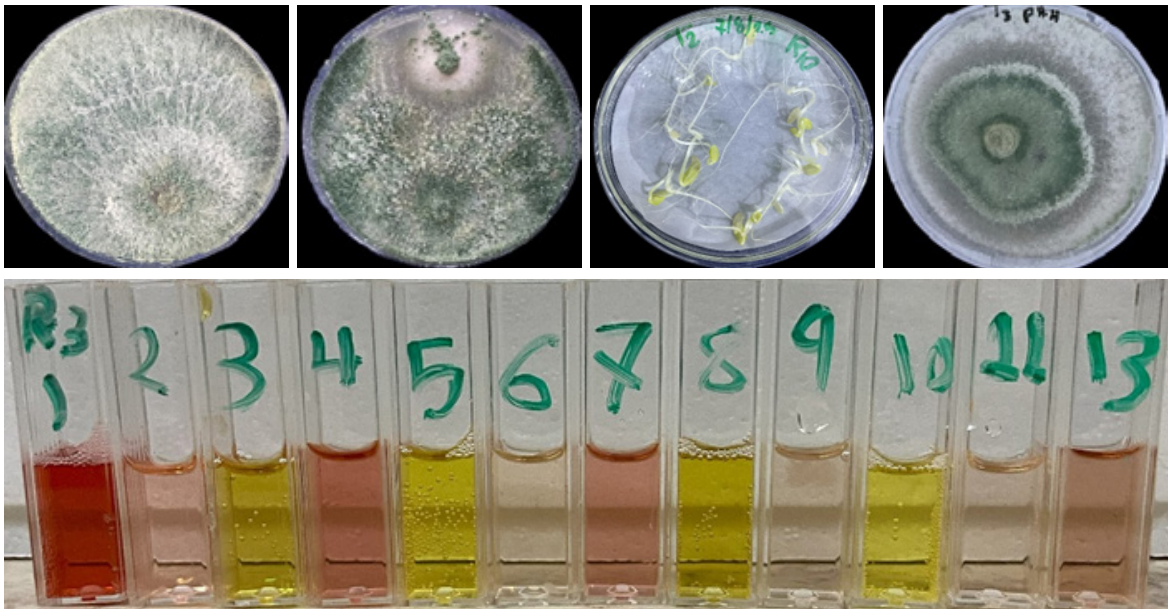
Evaluate the Effectiveness of Local Fungal Isolates in Comparison to Commercial Acaricides against *Tetranychus urticae* under in Vitro Conditions.

The two-spotted spider mite, *Tetranychus urticae* Koch, is considered one of the major agricultural pests in Jordan because of its wide host range, rapid reproduction, and strong ability to develop resistance to chemical acaricides. This study investigated the effectiveness of the entomopathogenic fungi *Beauveria bassiana* and *Metarhizium anisopliae*, each applied alone or in combination with the acaricides Acequinocyl or Cyflumetofen, against *T. urticae* under laboratory conditions. In addition, the compatibility of the fungi with these acaricides and the production of chitinase enzyme by both fungal isolates were evaluated. The results showed that *B. bassiana* was more virulent than *M. anisopliae*, with LC_{50} values ranging from 3.24×10^5 to 3.57×10^5 spores/mL, whereas *M. anisopliae* recorded LC_{50} values between 8.16×10^5 and 9.63×10^5 spores/mL. Mite mortality increased as spore concentration increased, reaching 92.0% for *B. bassiana* and 89.5% for *M. anisopliae* at 5×10^7 spores/mL after 12 days. Compatibility tests for spore germination showed that both acaricides were compatible with fungal isolates, although in mycelial growth tests Cyflumetofen caused significant inhibition of mycelial growth in *B. bassiana*. The combined treatments of fungal isolates with Acequinocyl did not show a noticeable improvement in efficacy because the acaricide alone caused 99% mortality within the first day after application. In contrast, combining Cyflumetofen with the fungal isolates increased mortality at lower fungal concentrations, suggesting that it may enhance fungal performance and may reduce the amount of fungal inoculum needed in control programs. Chitinase activity was detected in both fungal isolates, supporting their pathogenic ability against the mite. Overall, the findings indicated that *B. bassiana*, *M. anisopliae*, and their compatible combinations with selected acaricides have strong potential for the integrated management of *T. urticae* in Jordan. [**Raghad Saleh Abulibdeh (Jordan),** Supervisors: Prof. Kholoud M. Alananbeh and Prof. Salah-Eddin Araj, Committee: Prof. Ahmad Katbeh-Bader and Prof. Ihab Husni Ghabeish Department of Plant Protection, School of Agriculture, The University of Jordan, Jordan. (**Master, 2026**)].rgd8221039@ju.edu.jo

Characterization of Local *Trichoderma* spp. for Hydrolytic Enzyme Activity, Abiotic Stress Tolerance, and Antagonism Against *Fusarium oxysporum* on Cucumber.

This study aimed to characterize local isolates of *Trichoderma* spp. and evaluate their potential as biocontrol agents against *Fusarium oxysporum* in cucumber (*Cucumis sativus* L.) under laboratory, seed, and greenhouse conditions. The isolates were assessed for antagonistic activity, chitinase production, indole compounds, and indole-3-acetic acid (IAA) production, total phenolic compounds, and tolerance to environmental stresses, including salinity, pH, temperature, and ultraviolet (UV) light. The antagonistic assay revealed that isolates *Trichoderma ghananse* (T2) and *Trichoderma longibrachiatum* (T5) exhibited the highest inhibitory activity against *F. oxysporum*. Group (1, 3, and 4). Chitinase production was detected in most isolates through a color change from yellow to purple, except for *T. atroviride* (T1), *T. asperellum* (T4), and *T. asperellum* (T12). Spectrophotometric analysis showed variable production of indole compounds among isolates, positive or negative, while using HPLC, IAA production was specifically detected (HPLC) in *T. atroviride*

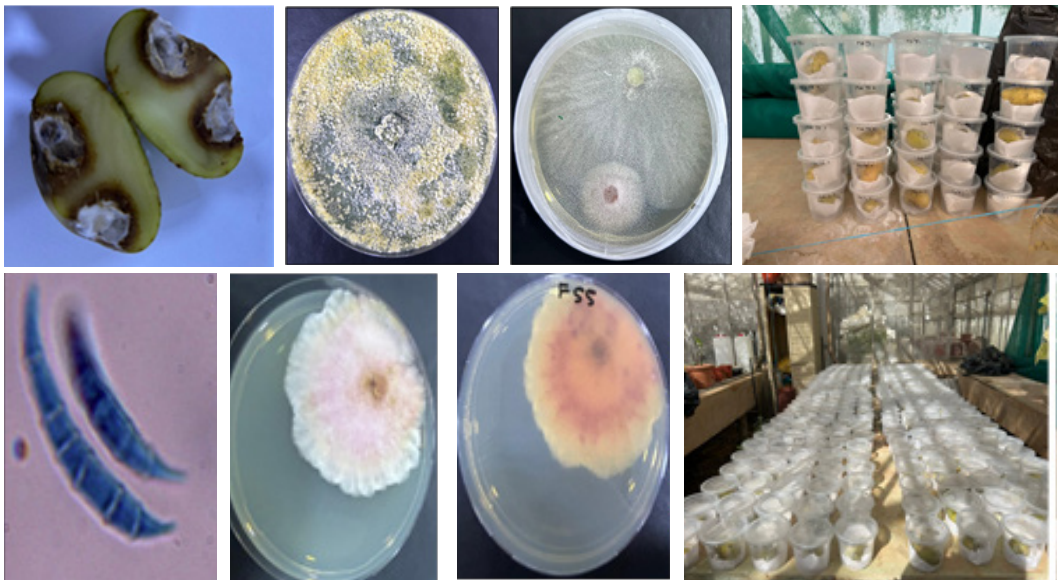
(T1), *T. atroviride* (T6), and *T. harzianum* (T9). In addition, all isolates produced phenolic compounds at different concentrations. Environmental stress assays demonstrated differences among isolates in mycelial growth, sporulation, and pigmentation under varying salinity and pH. Isolate T2 showed mycelial growth at 43.5°C, indicating high thermal tolerance. UV-light exposure had no effects on most isolates, except for T2 and T5 at 20 min of exposure, affecting sporulation. In the seed assay, no significant differences were observed in germination percentage among treatments. However, T2 enhanced shoot growth, while the fungicide + *F. oxysporum* treatment resulted in the lowest growth performance. Under greenhouse conditions, some parameters showed significant variation among treatments, whereas others did not. In conclusion, the findings of this study demonstrated that (T5) significantly reduced the infection incidence of *Fusarium oxysporum* (group 1) on cucumber seeds (28.00%). In the greenhouse pot experiment, *Trichoderma ghananse* effectively reduced cucumber disease incidence and severity the highest control efficacy (83.3%). [**Suhib Jehad Ajaj Alelaimat (Jordan),** Supervisors: Prof. Kholoud M. Alananbeh and Prof. Malik Al-Ajlouni, Committee: Prof. Luma Sharif Al-Banna and Prof. Muhannad Illayan Masadeh. Department of Plant Protection, School of Agriculture, The University of Jordan, Jordan (**Master, 2026**)]. shy8230287@ju.edu.jo



Molecular and Morphological Characterization of Fungi Associated with Dry Rot of Potato and the Evaluation of *Trichoderma* spp. against them.

Potato dry rot disease, caused by *Fusarium* species, is a major post-harvest disease that results insubstantial economic losses during storage. The research study focused on identifying the fungal species that cause dry rot in imported potato tubers in Jordan and tested the ability of specific *Trichoderma* species to combat these pathogens. The study examined 200 potato tubers which had been imported from France, United Kingdom, Denmark, and the Netherlands. The identification of fungal isolates was accomplished using their morphological features and molecular methods by the amplification of the ITS and fRPB2 gene regions. The molecular study showed that *Geotrichum candidum* was the dominant species in the survey with equence similarity ranging from 97.28% to 100%. Multiple *Fusarium* species were also recorded, which included Fusarium oxysporum that showed sequence similarity between 96.55 % and 100%, together with *Fusarium proliferatum*, *Fusarium solani*, *Fusarium nirenbergiae*, *Fusarium fujikuroi*, *Fusarium nygamai*, *Fusarium venenatum*, and *Fusarium redolens*. Additional fungal genera were also detected, including *Clonostachys rosea*, *Clonostachys solani*, *Trichoderma harzianum*, *Trichoderma atroviride*, *Trichosporon caseorum*, and *Melanospora zamiae*. The *Trichoderma atroviide* demonstrated its ability to combat *Fusarium* dry rot through in vitro and in vivo analysis which serve as safe biological control agents. As well, Koch's postulates tests confirmed the role of *Fusarium* species in disease development. This research study develops better disease management techniques through the introduction of environmentally safe substitutes for chemical fungicides, which help minimize

both environmental damage and health hazards. **[Nour Adnan Mahmoud Albaajawi(Jordan),** Supervisors: Prof.Saeid Abu-Romman, Prof. Kholoud M. Alananbeh, Committee: Prof. Mohammad Awad Shatnawi, Dr. Wesam Shahrour, Dr. Monther M. Tahat. School of Agriculture Biotechnology, Al-Balqa Applied University, Jordan. (**Master, 2026**)]. bajawinoor@gmail.com



A Study of the Effect of some Integrated Management Elements in Controlling Fall Armyworm *Spodoptera frugiperda* (Smith) using Pheromone Traps and Natural Enemies on Maize in Latakia Province.

The fall armyworm (FAW), *Spodoptera frugiperda* (J. E. Smith) (Lepidoptera: Noctuidae), is one of the most devastating pests with a worldwide distribution. It attacks a wide range of plants, but maize (*Zea mays* L.) is its preferred host. The study was conducted in 8 fields planted with maize in Latakia Province during the period (April-October) of 2023, which are: Al-Datour-Damsarkho, Alshaati Al'azraq- Mina Al-Bayda, Ghaniri, Al-Qardaha- Ayn al-`Arus, Al-Sharashir, Bakhdarmo, Al-Fawwar, and Hmeimim, and the Economic Insects Laboratory, College of Agricultural Engineering in Latakia Province, Syria in 2023. The research aimed to study the population dynamics of Fall Armyworm and their associated natural enemies on maize fields in Latakia Province, and to study the life table of *Spodoptera frugiperda* on maize in Latakia Province, Syria, under conditions of (28±2 ˚C), RH 75±10%, and photoperiod (14hL: 10hD). Insect stages were collected weekly by hand-picking and pheromone traps. The average number of males/week and other stages (egg mass, larvae, female)/plant/week was calculated, the parasitoid was identified, and the parasitism rate was calculated; and the biological parameters of fall armyworm were analyzed according to the theory of age-stage two-sex life table by using the computer program TWO-SEX MSchart. The results of the study showed that the insect appeared in Al-Mina Al-Bayda, Al-Fawwar, Hmeimim, Al-Sharashir, and Bakhdarmo, where its activity began in the first week of June in Al-Fawwar, then reached its peak in August, September, and October in Al-Sharashir and Bakhdarmo. It was found that the occurrence of fall armyworm varied depending on the date of planting and the stage of plant growth, as the highest occurrence was in the reproductive growth stage compared to the vegetative growth of maize, while the appearance of parasitoids, only the parasitoid *Megaselia scalaris* (Loew) (Diptera: Phoridae) was recorded on the 6th instar larva of the fall armyworm in Al-Mina Al-Baida and Bakhadarmo, where the total parasitism rate reached at 2.48%. As for the life table, the value of intrinsic rate of increase (*r*), the final increase rate (*λ*), and net reproductive rate (*Ro*), Generation time (*T*) were 0.15 females/female/day, 1.16 day, and 85.23 females/female/generation, 29.13 day, respectively.**[Anwar Salim Sayed Ahmad (Syria),** Supervisor: Prof. Dr. Nabil Abo Kaf, Department of Plant Protection, College of Agricultural Engineering, Latakia University, and Associate Supervisor: Prof. Dr. Ali Ramadan, Department of Plant Protection, College of Agricultural Engineering, Latakia University, In cooperation with Dr. Iyad Mohamed, Director of Plant Protection at the Ministry of Agriculture in Damascus, Syrian Arab Republic (**Master**, **2025**)].

Food and Agriculture Organization of the United Nation, Activities of the Near East and North Africa regional office

From Regional Plant Health Leadership to FAO Representation in Jordan: Thaer Yaseen Appointed FAO Representative

10 August 2026

Bringing nearly three decades of experience in plant health, sustainable agriculture and international cooperation, Thaer Yaseen will take up his new assignment as FAO Representative in the Hashemite Kingdom of Jordan on 1 September 2026.

The Food and Agriculture Organization of the United Nations (FAO) has appointed **Mr. Thaer Yaseen** as FAO Representative in the Hashemite Kingdom of Jordan, effective 1 September 2026, marking a new chapter in a career dedicated to plant health, sustainable agricultural development, research, capacity development and international cooperation.

Since joining FAO in 2018 as an Agricultural Officer at the FAO Regional Office for the Near East and North Africa (RNE), **Mr. Yaseen** has played a prominent role in advancing regional work on plant protection and production and in supporting Member Nations in addressing increasingly complex challenges affecting agricultural production, food security and agricultural trade.

Throughout his work with FAO, he has contributed to strengthening cooperation among governments, national plant protection organizations, research institutions, and regional and international partners around key priorities, including transboundary plant pests and diseases, phytosanitary systems, surveillance and early warning, integrated pest management, biological control and sustainable plant production.

Through regional initiatives, technical assistance and capacity-development programmes, he has supported countries in strengthening preparedness and institutional capacities, while promoting regional cooperation, knowledge exchange and more coordinated approaches to emerging plant health challenges.

Since March 2024, **Mr. Yaseen** has also served as Day-to-Day Manager of the FAO Representation in Oman, contributing to the delivery of FAO's country programme and to strengthening collaboration with national institutions and development partners.

Prior to joining FAO, he spent more than a decade as a Senior Researcher at the Mediterranean Agronomic Institute of Bari (CIHEAM Bari), Italy, where he contributed to research, training and international cooperation programmes in plant pathology, integrated plant protection, biological control and sustainable crop production across Mediterranean countries.

Mr. Yaseen holds a PhD in Plant Protection and Production from the University of Bari, Italy. His professional career has been characterized by a strong connection between science, policy and practical action, with a consistent focus on translating technical knowledge into solutions that strengthen national institutions, support farmers and contribute to more resilient agricultural systems.

In his new role, **Mr. Yaseen** will lead FAO's work in Jordan, collaborating closely with the Government,

national institutions, development partners, and other stakeholders to advance more efficient, inclusive, resilient, and sustainable agrifood systems, strengthen food security, and support rural development.

The appointment is also of particular significance to the regional plant health community. **Mr. Yaseen** has long contributed to knowledge exchange and professional cooperation across the Arab region and is a member of the editorial board of the *Plant Protection Bulletin in Arab Countries and the Near East*, where he is listed as FAO Regional Plant Protection Officer for the Near East and North Africa.

The editorial team warmly congratulates **Mr. Thaer Yaseen** on his appointment and wishes him every success in his new responsibilities as FAO Representative in Jordan, and in his continued contribution to sustainable agriculture, plant health and food security in the region.

FAO Appoints Nabil Assaf as Representative in Libya to Support Food Security and Sustainable Agriculture.

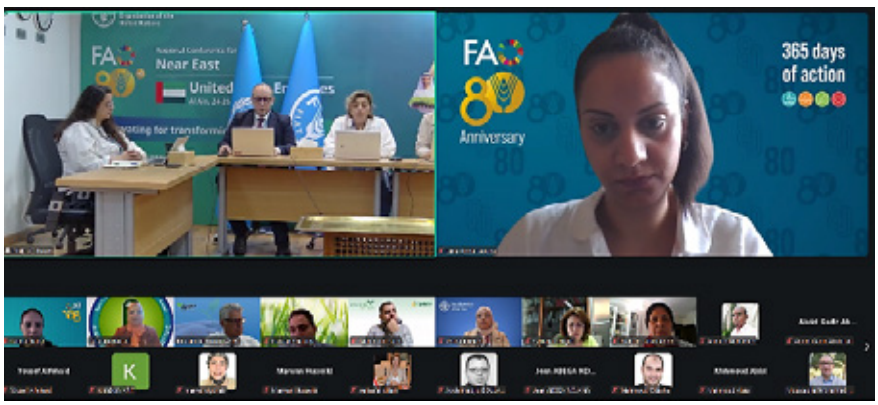
28/7/2026-FAO Libya

The Ministry of Foreign Affairs and International Cooperation of the State of Libya has officially approved the appointment of **Mr. Nabil Assaf** as Officer-in-Charge and FAO Representative a.i. in Libya. In this capacity, Mr. Assaf will lead FAO's engagement in Libya, working closely with national institutions and development partners to support the transformation of agrifood systems, strengthen food security, enhance resilience, and promote sustainable agricultural development. This appointment reaffirms the strong partnership between FAO and the Government of Libya in advancing national priorities and supporting sustainable development.This new position is in addition to **Mr. Nabil Assaf's** current responsibilities as FAO Subregional Coordinator for North Africa and FAO Representative in Tunisia.

The editorial team warmly congratulates **Mr. Nabil Assaf** on his appointment and wishes him every success in his responsibilities as FAO Subregional Coordinator for North Africa and FAO Representative in Tunisia.

FAO Highlights the Role of Rural Advisory Services in Advancing Sustainable Crop Protection and Food Safety across the NENA Region

29/06/2026, Cairo



The Food and Agriculture Organization of the United Nations (FAO), through the Arab Forum for Rural Advisory Services (AFRAS), convened a regional webinar bringing together policymakers, researchers, extension professionals and development partners from across the Near East and North Africa (NENA) region to explore how stronger rural

advisory services can support sustainable crop protection, improve food safety and strengthen agrifood systems.

The webinar highlighted the growing importance of integrated advisory services in helping farmers respond to climate change, emerging pests and diseases, pesticide risks, and evolving food safety and market requirements. Participants emphasized that stronger advisory systems are essential for translating scientific knowledge into practical solutions that enable farmers to adopt integrated pest management (IPM), good agricultural practices (GAP) and responsible pesticide use.

”Rural advisory services are no longer expected simply to transfer technologies. They are expected to help farmers navigate increasingly complex challenges while supporting safer, more productive and sustainable agrifood systems,” said Faten Adada, Agriculture and Rural Development Expert and Day-to-Day Manager of the Rural Transformation Team at the FAO Regional Office for the Near East and North Africa.

Across three technical sessions, participants explored policies, governance and farmer-centred approaches to strengthening rural advisory services. Discussions highlighted the need for stronger coordination among extension services, plant protection authorities, food safety institutions and pesticide regulatory bodies, while showcasing practical experiences with Farmer Field Schools, biological control, integrated pest management, digital advisory tools and pesticide stewardship programmes.

The webinar also underscored the critical role of advisory services in helping farmers implement Codex Alimentarius standards, comply with maximum residue limits (MRLs), improve traceability and meet international market requirements. Participants agreed that investing in advisory capacities, strengthening institutional collaboration and expanding regional knowledge exchange through AFRAS are key to building safer, more resilient and market-oriented agrifood systems across the NENA region.

https://www.fao.org/platforms/afras/news-and-events/news-detail/fao-highlights-the-role-of-rural-advisory-services-in-advancing-sustainable-crop-protection-and-food-safety-across-the-nena-region/en

Bridging Regions, Sharing Solutions: Near East Experience Strengthens Latin America's Response to the Red Palm Weevil

25/06/2026 –Rome-Cairo-Buenos Aires

Experts from Latin America and the Caribbean (LAC), the Near East and North Africa (NENA), Europe and beyond convened virtually for the webinar "Alert and Action | Bridging regions, sharing solutions: Red Palm Weevil management from the Near East to Latin America", highlighting the urgent need for coordinated action against one of the world's most destructive invasive pests.

Organized jointly by FAO's Forest Health and Invasive Species Network for Latin America and the Caribbean (FHISLAC) and the Near East Network on Forest Health and Invasive Species (NENFHIS), in collaboration with the Bio-Hub Regional Center for Information and Exchange on Biodiversity and Restoration, the event brought together technical experts, researchers and policymakers to exchange knowledge and lessons learned on Red Palm Weevil (RPW) management.

Over 280 participants heard that the pest, which has devastated millions of palms across Asia, Africa, Europe and the Middle East, is now emerging as a serious threat in Latin America and the Caribbean. First detected in Uruguay in 2022 and more recently in Argentina, the pest threatens native palm biodiversity, productive sectors such as coconut, oil palm, açaí and heart-of-palm industries, as well as the livelihoods and cultural heritage of communities that depend on these ecosystems.

A key focus of the webinar was the experience accumulated in the NENA region, where countries have spent decades combating the pest. Speakers emphasized that while RPW management is complex and resource-intensive once infestations become established, early action can significantly reduce impacts and improve the chances of eradication.

Thaer Yaseen, Agricultural Officer at FAO's Regional Office for the Near East and North Africa, highlighted the achievements of the Regional Red Palm Weevil Eradication Programme, which has supported countries in strengthening surveillance systems, improving early detection, enhancing farmer and technician capacities and promoting integrated pest management approaches. The programme has also facilitated regional cooperation and knowledge-sharing among affected countries, helping to build a coordinated response to a transboundary threat.

Participants heard from FHISLAC and NENFHIS, two FAO-supported regional networks that foster cooperation, knowledge exchange and capacity development on forest health and invasive species. Representatives highlighted the need for early action, cross-border collaboration and technical knowledge sharing to address transboundary threats such as the Red Palm Weevil, reaffirming their commitment to supporting countries.

Drawing on NENA's proven experience, participants explored various management tools and

technologies, including acoustic sensors, sniffer dogs, drones, mobile applications and seismic monitoring devices for early detection. The webinar also highlighted Farmer Field Schools (FFS) as an effective approach for strengthening field-level surveillance and response by training farmers to identify symptoms, monitor palms, apply integrated pest management practices and report infestations promptly. Experts stressed that both technological and community-based approaches must be supported by strong institutional coordination, regulatory frameworks, sustained investment and public awareness to be effective.

The Near East's decades of experience managing RPW provided valuable lessons for Latin America and the Caribbean, where there remains a critical window for prevention, early detection and rapid response. Participants emphasized that RPW cannot be managed through isolated interventions; effective control depends on an integrated approach linking surveillance, early detection, rapid response, regulated movement of planting material, farmer engagement and continuous follow-up. Sharing these lessons across regions can help countries avoid costly mistakes, strengthen preparedness, and improve their chances of containing the pest before it becomes widespread.

The webinar concluded with a call for continued collaboration through regional networks such as FHISLAC and NENFHIS, recognizing that invasive species do not respect borders. By connecting expertise across regions and sharing practical solutions, FAO and its partners are helping countries move from awareness to action, protecting forests, biodiversity, agricultural production and rural livelihoods from the growing threat of the Red Palm Weevil.

More on this topic

» Guidelines on Red Palm Weevil Management Practices;

» Red Palm Weevil Eradication Programme – Project final report

» Farmer Field School manual for the management of the Red Palm Weevil in the Near East and North Africa region (Arabic)

» Questions and answers on the use of wet and dry pheromone traps and visual inspection procedures for the Red Palm Weevil (Arabic)

» Common mistakes that increase infestation by the Red Palm Weevil and other pests

» External morphology and damage to palm trees

https://www.fao.org/neareast/news/details/bridging-regions--sharing-solutions--near-east-experience-strengthens-latin-america-s-response-to-the-red-palm-weevil/en

From Field to Market: FAO Supports a Transformative Shift in the Quality of Egyptian Dates through Improved Harvest and Post-harvest Practices

23/04/2026- Cairo, Egypt

In a step aimed at achieving a transformative shift in Egypt's date palm value chain, the Food and Agriculture Organization of the United Nations (FAO), in collaboration with the Ministry of Agriculture and Land Reclamation, the Union of Producers and Exporters of Horticultural Crops, and the Central Laboratory for Date Palm Research and Development, is leading integrated efforts to move beyond improving onfarm practices towards ensuring the quality and safety of the final product all the way to the market.

While Egypt has made notable progress in increasing date production volumes, the harvest and post-harvest stages remain among the most critical determinants of product quality and market value. In response, FAO, working closely with national stakeholders, has focused on strengthening this key segment as a decisive driver for reducing post-harvest losses, improving food safety, and enhancing access to domestic and international markets.

Under the framework of FAO project TCP/EGY/4002 – "Technical Support to Build Skilled Professionals for the Egyptian Date Palm Sector", FAO implemented a national specialized training programme on good harvest and post-harvest practices for dates.

The programme was delivered by experts from the Central Laboratory for Date Palm Research and Development, coordinated and organized by the Union of Producers and Exporters of Horticultural Crops, and funded by FAO.

Scope of implementation and beneficiaries

The training programmes were implemented across ten key date production and processing locations, including New Valley (Kharga, Dakhla and Farafra), Giza (Bahariya Oasis), Minya, Aswan, Luxor–Qena, Beheira (Nubaria and Wadi ElNatrun), and Monufia (ElKhatatba).

A total of 150 participants benefited from this phase, including newly graduated agricultural engineers, quality control specialists, and professionals working in farms, packinghouses, and date processing facilities. The programme followed a practical, handson approach, focusing on the application of optimal harvesting methods and sound post-harvest handling practices in line with recognized technical standards.

Redefining quality: from practice to outcome

The programme went beyond the transfer of technical knowledge, aiming to drive practical changes in daily practices that directly determine the quality of the final product. Participants were trained on harvesting techniques that minimize mechanical damage, preserve the market appearance of fruits, and ensure proper timing and handling throughout the harvesting process.

Integrated post-harvest practices

The training covered the full range of post-harvest operations, starting from initial sorting in the field, through transportation and reception at packing facilities, to cleaning, washing, grading, packaging and storage under appropriate temperature and humidity conditions.

Strong emphasis was placed on applying quality control and food safety measures throughout all stages of handling, reducing contamination risks and preserving the physical and nutritional characteristics of dates.

Reducing losses and maximizing value addition

Post-harvest losses represent one of the major challenges affecting the sector's economic returns. Through this programme, participants were equipped with practical solutions to reduce losses during handling, storage and transport, while improving the efficiency of cold storage and freezing techniques.

The training also addressed strategies to minimize pesticide residues in dates, supporting compliance with national and international standards, strengthening consumer confidence in Egyptian products, and enabling access to new markets.

A connected value chain, not isolated stages

These efforts reflect FAO's integrated vision, developed in close collaboration with national partners, which recognizes product quality as a cumulative outcome of interconnected practices—from the field, through harvest and post-harvest, to the final consumer.

In this context, Mohamed Yacoub, Assistant FAO Representative for Programme in Egypt, stated:

"This programme reflects FAO's commitment, in collaboration with national partners, to strengthening agricultural value chains in Egypt by focusing on the stages with the greatest impact on product quality. This contributes to increasing economic returns and enhancing the competitiveness of Egyptian dates."

For his part, Thaer Yaseen, Plant Protection Officer at the FAO Regional Office for the Near East and North Africa, said:

"Harvest and post-harvest practices represent a decisive turning point in determining the quality and market value of dates. When properly applied, they significantly reduce losses and improve market access opportunities."

Towards more competitive Egyptian dates globally

Through this integrated approach, FAO, in partnership with the Ministry of Agriculture and national technical institutions, continues to support the transition towards high-quality date production that meets modern market requirements, while reducing losses and maximizing value addition along the value chain.

This programme represents a practical step towards a more efficient and sustainable date palm sector in Egypt—one that is capable of competing regionally and globally, contributing to food security, and improving the livelihoods of farmers and producers.

https://www.fao.org/egypt/news/detail/from-field-to-market--fao-supports-a-transformative-shift-in-the-quality-of-egyptian-dates-through-improved-harvest-and-post-harvest-practices/en

FAO leads National Programme to Strengthen Egypt's Date Palm Sector through Good Agricultural Practices and Integrated Pest Management

15/04/2026- Cairo, Egypt

The Food and Agriculture Organization of the United Nations (FAO), in collaboration with the Ministry of Agriculture and Land Reclamation of the Arab Republic of Egypt and the Union of Producers and Exporters of Horticultural Crops (UPEHC), has completed the first phase of a national specialized training programme on Good Agricultural Practices (GAP) and Integrated Pest Management (IPM) in date palm orchards.

The programme is implemented under the FAO project TCP/EGY/4002 – "Technical Support to Build Skilled Professionals for the Egyptian Date Palm Sector" and aims to strengthen the technical capacities of agricultural engineers, farmers, and date palm workers, improve productivity and quality of Egyptian dates, and enhance compliance with national and international phytosanitary and food safety standards.

This initiative forms part of FAO's broader efforts to support the development of agricultural value chains and improve product quality. The programme focuses on promoting the adoption of GAP and IPM practices to enhance the sustainability of production systems and strengthen the competitiveness of Egyptian dates in domestic and international markets.

The program included a series of fieldbased training sessions across major date palm production areas in Egypt, targeting agricultural engineers, farmers, and sector professionals. Participants were selected based on defined technical criteria, with a total of 150 trainees from ten key production locations, including New Valley (Kharga, Dakhla, and Farafra), Giza (Bahariya Oasis), Minya, Aswan, Luxor–Qena, Beheira (Nubaria and Wadi ElNatrun), and Monufia (ElKhatatba).

To date, nine training sessions have been conducted across nine production locations, reaching more than 130 participants. The remaining activities will be completed in line with the project's approved national implementation plan.

Technical focus on climatesmart practices and integrated pest management

FAO adopted a practical, field-oriented approach that combines theoretical knowledge with hands-on applications. The training covered the full production cycle of date palms, from site selection and land preparation to orchard management practices.

Key topics included efficient irrigation and balanced fertilization, improved wateruse efficiency, and palm management practices such as pruning, pollination, and thinning, all contributing to improved productivity and fruit quality.

Integrated pest and disease management was a core component of the programme. Participants were introduced to the major pests and diseases affecting date palms in Egypt, as well as the importance of monitoring and early diagnosis, preventive measures, good agricultural practices, and the safe and responsible use of pesticides. These approaches help reduce crop losses, minimize reliance on chemical inputs, and protect human health and the environment.

The program also emphasized climatesmart agricultural practices, linking them to productivity improvement, loss reduction, and sustainable management of natural resources.

Resultsbased approach to capacity development

The training program was designed around a clear results framework to improve productivity, enhance quality management at the farm level, and strengthen compliance with national and international standards related to plant health and food safety.

Pre and posttraining assessments were conducted to measure the programme's impact, and participants were awarded certificates of completion, reflecting FAO's commitment to quality assurance and measurable, sustainable results.

In this context, Thaer Yaseen, Plant Protection Officer at FAO's Regional Office for the Near East and North Africa (FAORNE), stated:

"The effective application of Good Agricultural Practices and Integrated Pest Management is fundamental to achieving sustainability in the date palm sector. These trainings help translate scientific knowledge into fieldlevel practices, supporting improved productivity while ensuring compliance with health and market standards."

For his part, Mohamed Yacoub, Assistant FAO Representative for Programme in Egypt, said:

"This training programme reflects FAO's commitment to supporting the development of agricultural value chains in Egypt through investment in technical capacity building and the promotion of Good Agricultural Practices and Integrated Pest Management. This will contribute to improving the quality of Egyptian dates and enhancing their competitiveness in the market."

Towards strengthening the date value chain

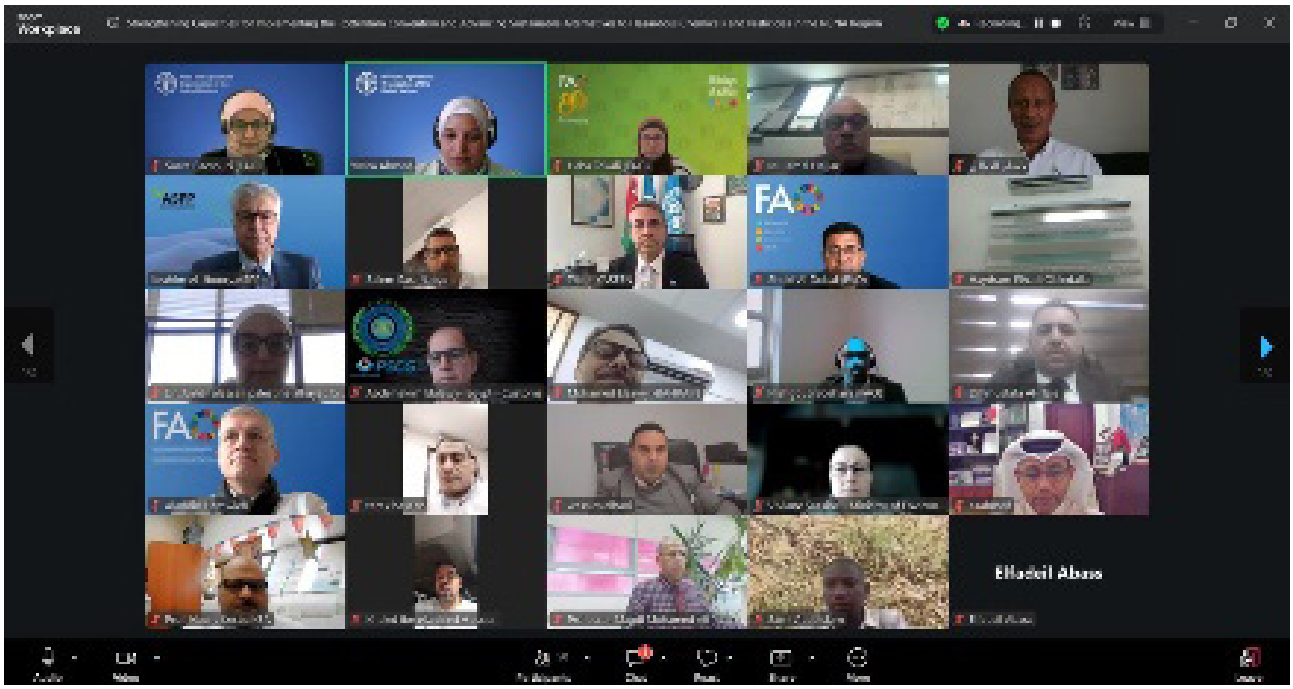
This phase represents the first step in a comprehensive approach to developing Egypt's date palm sector, focusing on preharvest practices. A second phase will follow, dedicated to post-harvest practices, including handling, packaging, storage, reducing pesticide residues, and compliance with export requirements, ensuring stronger integration across the value chain from farm to market.

Through this programme, FAO continues to support national efforts to promote sustainable agricultural production, improve the quality and competitiveness of Egyptian dates, enhance farmers' incomes, contribute to food security, and reinforce Egypt's position as one of the world's leading producers and exporters of dates.

https://www.fao.org/egypt/news/detail/fao-leads-national-programme-to-strengthen-egypt-s-date-palm-sector-through-good-agricultural-practices-and-integrated-pest-management/en

FAO and the Rotterdam Convention Secretariat Strengthen Regional Capacities for Sustainable Pesticide Management under a One Health Approach in NENA.

14/04/2026- Cairo



The Food and Agriculture Organization of the United Nations (FAO), in collaboration with the Rotterdam Convention Secretariat, held a regional virtual training titled: "Enhancing Capacities for the Implementation of the Rotterdam Convention and Promoting Sustainable Alternatives to Hazardous Pesticides in the Near East and North Africa (NENA) Region." The training brought together more than 70 experts and representatives from national plant protection organizations and pesticide registration and management authorities across the region.

The training brought together more than 70 experts and representatives from national plant protection organizations (NPPOs), Designated National Authorities (DNAs), official contact points to the Convention Secretariat, as well as pesticide registration and management authorities from across the region. This training forms part of FAO's efforts to support Member Countries in strengthening their practical understanding of the Rotterdam Convention mechanisms and building national

capacities for the sound management of hazardous chemicals and pesticides, while ensuring a balance between agricultural production and the protection of human health and the environment. In his opening remarks, Thaer Yaseen, Senior Agricultural Officer at FAO's Regional Office for the Near East and North Africa, emphasized that the Rotterdam Convention is a key instrument enabling countries to make informed decisions regarding the trade and import of hazardous chemicals. "The effective implementation of the Rotterdam Convention represents a strategic opportunity to accelerate the transition toward sustainable approaches, such as Integrated Pest Management and biological control, ensuring the protection of agricultural production as well as human health and the environment, particularly in light of increasing challenges related to transboundary pests and climate change in the region," Yaseen said.

Sarra Baccouri, Agricultural Officer at FAO, presented the key technical aspects of the Convention, with a particular focus on the Prior Informed Consent (PIC) procedure, which empowers countries to take informed decisions regarding the import of hazardous chemicals. She also highlighted the criteria for listing chemicals under Annex III of the Convention, as well as mechanisms for information exchange and transparency among Parties.

The training included in-depth technical sessions on alternatives to chemical pest control, featuring successful regional experiences in the biological control of Fall Armyworm in Egypt, sustainable approaches to managing different locust species, particularly the desert locust, and the role of Integrated Pest Management (IPM) in reducing reliance on highly hazardous pesticides. The workshop also featured rich interactive discussions and practical exchange of experiences among participants, reflecting growing interest in strengthening the link between regulatory frameworks and field-level applications, and in adopting innovative and safe pest management solutions. In his closing remarks, Shoki Al Dobai, Senior Agricultural Officer and Team Leader of Transboundary Pests and Diseases at FAO, commended the outcomes of the training, stating:

"Strengthening national capacities and enhancing regional cooperation are fundamental pillars for reducing the risks associated with chemical pesticides and for supporting more sustainable and resilient agricultural systems. Promoting environmentally friendly and biological alternatives is essential to achieving a real balance between increasing agricultural productivity and protecting human health and the environment, in line with the One Health approach."

He further noted that investing in sustainable alternatives and promoting knowledge exchange among countries directly contributes to safeguarding agricultural production and enhancing food security in the region.

This training is part of FAO's support to the implementation of the NENA Plant Health Strategy (2025–2035), which focuses on strengthening plant health governance, promoting sustainable pest management systems, reducing pesticide risks, and building more resilient agricultural systems. FAO reaffirmed its commitment to continue supporting Member Countries in strengthening plant health systems and advancing sustainable pest management practices, ensuring a balanced approach between agricultural productivity, environmental protection, and human health.

https://www.fao.org/neareast/news/details/fao-and-the-rotterdam-convention-secretariat-strengthen-regional-capacities-for-sustainable-pesticide-management-under-a-one-health-approach-in-nena/en

FAO Shares NENA Experience to Strengthen Europe's Readiness for Fall Armyworm

09/03/2026, Metropolitan City of Milan

FAO participated in the first Annual Meeting of the EU-FAWREADY (Enhancing Europe's Readiness for Managing Fall Armyworm, an Invasive Pest Threat) project, held in Milan, Italy, in early March 2026. Mr. Yaseen shared FAO's extensive experience in managing Fall Armyworm (FAW) across the Near East and North Africa (NENA) region, drawing on nearly a decade of field-tested interventions, capacity building, and regional coordination.

The EU-FAWREADY project, funded under the European Union's Horizon Europe Research and Innovation Programme, brings together 25 partners from 14 countries to equip European agricultural stakeholders with tools for early detection and sustainable management of Fall Armyworm.

The Milan workshop convened researchers, national plant health services, biocontrol industries, and international experts to align the project's strategy across its three pillars: Learn, Detect, and Manage.

FAO's NENA Experience: A Model for European Preparedness

In his intervention, Mr. Yaseen outlined FAO's comprehensive response to the FAW threat in the NENA region since its first detection in Sudan and Yemen in 2018. FAO mobilized a portfolio of Technical Cooperation Programmes (TCPs) and the EU-funded Global Action for Fall Armyworm Control, investing over USD 2.5 million across eight projects in 10 countries over seven years (2017-2024).

Key results shared with the EU-FAWREADY consortium included:

» Training and capacity building: Over 9,382 direct beneficiaries trained across the NENA region, including farmers, extension agents, and researchers, through Farmer Field Schools (FFS), Training of Trainers (ToT), and hands-on demonstration plots.

» Integrated Pest Management (IPM): Deployment of biorational insecticides, biological control agents, and pheromone-based monitoring systems that achieved 80-90 per cent reduction in FAW infestation rates at demonstration sites.

» Surveillance and early warning: Rollout of the FAO FAW Monitoring and Early Warning System (FAMEWS) mobile application, with over 12,840 traps and 380 smartphones deployed for field-level monitoring.

» Regional coordination: Establishment of a multi-country coordination framework linking Egypt, Yemen, Jordan, Lebanon, the Syrian Arab Republic, Palestine, Mauritania, Oman, and South Sudan under a unified regional pest management strategy.

» Knowledge products: Development of over 5,000 extension bulletins, technical manuals, awareness videos, and a comprehensive regional reference document on FAW management totalling 140 pages.

Bridging Regions for Global Plant Health

"The lessons from nearly a decade of FAW management in the Near East and North Africa are directly relevant to Europe's preparedness efforts. Our experience demonstrates that early detection, community-based surveillance, and integrated pest management — not reliance on synthetic pesticides — form the foundation of sustainable FAW control. FAO is committed to supporting

knowledge exchange between regions to safeguard global plant health and food security," said Mr. Thaer Yaseen.

Mr. Yaseen's participation underscored the critical importance of South-South and triangular cooperation in addressing transboundary pest threats. The NENA region's journey — from the initial emergency detection of FAW in 2018 to the establishment of functional, country-owned IPM systems by 2024 — offers a practical blueprint for European countries now facing the pest's arrival in Greece, Romania, and other parts of Southern Europe.

Relevance to European Agriculture

FAW, a highly invasive and polyphagous pest native to the Americas, was first detected in Africa in 2016 and has since spread to over 80 countries worldwide. By late 2023, FAW had reached mainland Europe, with confirmed detections in Greece and Romania. Climate change and expanding trade routes are expected to increase the likelihood of its establishment across wider areas of the European continent.

The EU-FAWREADY project, coordinated by the French National Research Institute for Agriculture, Food and the Environment (INRAE), aims to minimize economic, environmental, and social impacts while reducing reliance on synthetic pesticides. FAO's field-validated approaches from the NENA region — particularly in biocontrol, community-based monitoring, and farmer-centred training — align directly with these objectives.

FAO's Continued Commitment

FAO remains committed to supporting global efforts to combat FAW through its Global Action for FAW Control framework. The Organization continues to advocate for integrated, science-based, and environmentally sustainable approaches that protect smallholder farmers' livelihoods and safeguard agricultural production worldwide.

Mr. Yaseen's engagement at the EU-FAO Annual Meeting reflects FAO's broader strategy to leverage regional expertise and foster international partnerships to address emerging transboundary plant health threats, in line with the International Plant Protection Convention (IPPC) framework and the legacy of the International Year of Plant Health.

More on this topic

» **About EU-FAWREADY:** EU-FAWREADY is a Horizon Europe-funded research and innovation project (Grant Agreement No. 101212676, June 2025 - May 2029) led by INRAE (France), with 25 partners from 14 countries. More information: eufawready.eu

» **About FAO's Global Action for FAW Control:** Launched in 2019, the Global Action coordinates sustainable pest control efforts worldwide. More information: fao.org/fall-armyworm

https://www.fao.org/neareast/news/details/fao-shares-nena-experience-to-strengthen-europe-s-readiness-for-fall-armyworm/en

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

Desert Locust Situation

Delegation of the Two Desert Locust Control Commissions Visits FAO Headquarters and Martignani Company in Italy.

A joint delegation from the Commission for Controlling the Desert Locust in the Central Region (CRC) and the Commission for Controlling the Desert Locust in the Western Region (CLCPRO) paid an official visit to the headquarters of the Food and Agriculture Organization of the United Nations (FAO) in Rome from 27 to 30 April 2026. The delegation included the Chairpersons and Executive Secretaries of the two Commissions, Dr Mamoon Al Alawi, Executive Secretary of CRC, and Mr Mohamed Lemine Hamouny, Executive Secretary of CLCPRO.

The visit took place within the framework of the regular meetings of the Chairpersons and Executive Secretaries of the Commissions with FAO senior management and the relevant technical units. It aimed to present the outcomes of the sessions of the two Commissions and the key decisions and recommendations arising from them, as well as to discuss regional priorities in the areas of Desert Locust early warning and preventive control.

The delegation held a series of meetings with the FAO Director-General and several departments and offices concerned with technical, financial and legal matters, resource mobilization, private-sector partnerships, emergencies and resilience. The discussions addressed the current and projected Desert Locust situation, strengthening countries' preparedness for early response, ensuring the financial sustainability of the two Commissions' programmes, and further developing the use of modern technologies, digital tools and drones in survey and control operations.

During the meeting, the FAO Director-General emphasized that the Desert Locust is a transboundary pest requiring sustained regional and international coordination. He also stressed the importance of investing in national capacities and modern technologies to protect food security and the livelihoods of rural communities.

As part of the technical component of the mission, the delegation visited the headquarters of **Martignani**, an Italian company specializing in the manufacture of spraying machinery and equipment, on 29 and 30 April 2026. The delegation reviewed the technologies being developed by the company, particularly electrostatic spraying systems, and explored the possibility of adapting them for use in ground-based Desert Locust control operations employing ultra-low-volume spraying technology.

The delegation also discussed with the company's technical experts the operational requirements for Desert Locust control, including spray-droplet distribution efficiency, spray swath width, nozzle types and spray-cannon movement. The discussions further covered the possibility of conducting technical and field tests to evaluate the performance of the proposed prototypes and their suitability for the environmental and operational conditions prevailing in Desert Locust-affected areas.

The visit reflects the commitment of the two Commissions to strengthening coordination with FAO and benefiting from modern innovations and technical partnerships with the private sector, thereby supporting the development of member countries' capacities and enhancing the efficiency of Desert Locust survey and preventive control operations.

National Training Course on Desert Locust Survey and Control Operations in Egypt Arab Republic of Egypt,

26–30 April 2026

The Commission for Controlling the Desert Locust in the Central Region (CRC), in cooperation with the General Department for Locust Affairs and Agricultural Aviation of the Ministry of Agriculture and Land Reclamation of the Arab Republic of Egypt, organized a national training course on Desert Locust survey and control operations from 26 to 30 April 2026. The course brought together 20 participants working in the national Desert Locust control programme.

The course aimed to develop the participants' technical and field capacities and enhance their skills in planning and conducting survey operations. It also aimed to improve their knowledge of Desert Locust biology, behaviour and different forms; identify environmental conditions favourable for breeding; and strengthen their ability to collect, record and transmit field data accurately and in a timely manner.

The training programme covered the approved principles and methods of ground survey operations, locating Desert Locust populations, and assessing their density, developmental stages and status. It also addressed the use of positioning devices and digital tools to record data and support monitoring and early warning activities. Participants were also introduced to mechanisms for analysing field information and using it to assess risks and direct survey and control teams towards priority areas.

Regarding control operations, the course covered operational planning, the selection of appropriate spraying equipment and pesticides, the calibration of spraying equipment, and the application of ultra-low-volume (ULV) spraying techniques. It also addressed occupational health and safety procedures, environmental protection and the responsible use of pesticides.

The programme combined theoretical sessions with practical exercises, enabling participants to apply the knowledge acquired, exchange experiences and discussing the challenges facing field teams. The course emphasized the importance of maintaining the readiness of personnel and equipment during periods of calm Desert Locust activity to ensure a rapid response when any signs of breeding or aggregation emerge.

This course forms part of CRC's efforts to support the national capacities of its member countries and strengthen the implementation of the preventive control approach. Its outcomes are expected to improve the efficiency of Desert Locust survey, control and early warning operations in Egypt and reduce the risks posed by the pest's spread and its potential impacts on crops, rangelands, livelihoods and food security.

Regional Workshop on Ground and Aerial Spraying Techniques for Desert Locust Control

Agadir, Morocco, 1–7 June 2026

A regional workshop on ground and aerial spraying techniques for Desert Locust control was held in Agadir, Kingdom of Morocco, from 1 to 7 June 2026. It brought together experts, technicians and representatives of member countries of the Commission for Controlling the Desert Locust in the Central Region (CRC) and the Commission for Controlling the Desert Locust in the Western Region (CLCPRO).

The workshop was organized within the framework of the ongoing technical cooperation between the two Commissions. It aimed to develop the capacities of national personnel working in Desert Locust control and enhance their skills in planning and implementing ground and aerial spraying operations, calibrating spraying equipment, and ensuring the safe and effective use of pesticides in accordance with approved technical and environmental standards.

Developing Technical and Field Competencies

The workshop programme included theoretical sessions and practical exercises covering the fundamental principles of ultra-low-volume (ULV) spraying, the characteristics of ground and aerial spraying equipment, and its operation and calibration. It also addressed the factors affecting pesticide application efficiency and the quality of spray coverage.

The workshop further covered the selection of appropriate spraying equipment according to the nature of the infestation and field conditions; the determination of flow rates, application rates and spray paths; and the selection of the appropriate timing for control operations based on Desert Locust behaviour and prevailing weather conditions. The training also included methods for verifying calibration accuracy and evaluating the results of spraying operations to ensure effective control while minimizing pesticide waste and off-target drift.

Strengthening Cooperation and the Exchange of Experience

The workshop provided a technical platform for participants from the Central and Western Regions to exchange knowledge and experience and discuss the operational challenges facing national control teams, particularly those related to equipment readiness, calibration accuracy, staff qualifications, and the implementation of safety and environmental protection standards.

Participants emphasized the importance of regular practical training in maintaining the readiness of national teams. They noted that the effectiveness of control operations depends not only on the availability of equipment and pesticides, but also on personnel's ability to plan operations properly, select appropriate technologies and implement them in accordance with approved technical practices.

The workshop formed part of regional efforts to support the preventive Desert Locust control approach and strengthen early response by building qualified national capacities capable of conducting safe and effective control operations when required. The knowledge and skills acquired are expected to improve the performance of control teams, enhance pesticide-use efficiency and reduce health and environmental risks, thereby contributing to the protection of crops, rangelands, livelihoods and food security in countries vulnerable to Desert Locust threats.

Regional Workshop to Strengthen Desert Locust Early Warning Systems with the Participation of 16 Countries

Launch of eLocust4 and RAMSES V5 to Improve Data Collection, Risk Analysis and Early Response

Cairo, Arab Republic of Egypt, 21–25 June 2026

The Regional Workshop for Desert Locust Information Officers was held in Cairo from 21 to 25 June 2026, with the participation of representatives and experts from 16 countries, along with regional and international commissions and organizations involved in Desert Locust monitoring and control.

The workshop was organized by the Commission for Controlling the Desert Locust in the Central Region (CRC), in cooperation with the Commission for Controlling the Desert Locust in the Western Region (CLCPRO) and the Desert Locust Information Service) DLIS).

The workshop formed part of joint efforts to strengthen cooperation and integration among the three Desert Locust regions, develop information management and early warning systems, and enhance countries' preparedness to address the threats posed by this transboundary pest. This cooperation is particularly important because the success of preventive control depends primarily on the accuracy of field data and the speed with which it is transmitted, analysed and exchanged among countries, thereby enabling early intervention before locust populations develop and spread over extensive areas.

Broad Regional and International Participation

The opening session was attended by Dr Mamoon Al Alawi, Executive Secretary of CRC; Dr Mohamed Lemine Hamouny, Executive Secretary of CLCPRO; and Dr Shoki Al-Dobai, Team Leader for Desert Locusts and Transboundary Plant Pests and Diseases at FAO headquarters in Rome.

Representatives and experts from Egypt, the Sultanate of Oman, the Kingdom of Saudi Arabia, Morocco, Algeria, Tunisia, Mauritania, Sudan, Somalia, Ethiopia, Yemen, Chad and Niger participated in person, along with representatives of the Desert Locust Control Organization for Eastern Africa. Representatives from India, Pakistan and Iran participated remotely.

This broad participation reflected the importance that the countries and organizations concerned attach to strengthening cross-border and interregional cooperation and exchanging information and experience relating to the development of the Desert Locust situation and the environmental areas favourable for its breeding and spread.

Launch of the Latest Desert Locust Information Systems

The regional launch of eLocust4 and the fifth version of RAMSES was a central focus of the workshop. These two systems represent a new generation of digital tools used to collect, transmit, manage and analyse Desert Locust information.

eLocust4 enables field teams to record survey and control data and environmental observations and transmit them rapidly and accurately from remote areas to national Desert Locust information centres. It also helps standardize field data and improve its quality, thereby supporting the continuous monitoring of developments in the Desert Locust situation.

RAMSES V5 enables Desert Locust Information Officers to organize, review and analyse field data; integrate it with geographical, environmental and climatic information; and prepare maps, bulletins and technical reports used for risk assessment and operational decision-making. Integration between the two systems helps identify potential breeding areas and direct survey and control teams towards priority locations.

Developing the Capacities of Information Officers

The workshop included technical sessions and practical exercises covering the new features of eLocust4 and RAMSES V5 and their use in managing Desert Locust information. The training programme also focused on several key areas, including:

- Collecting, reviewing and verifying the quality of field data.
- Managing and analysing information and preparing maps and technical reports.
- Using geographical, environmental and climatic data for risk assessment.
- Improving mechanisms for exchanging information at the national, regional and international levels.
- Supporting early operational decision-making and directing survey and control operations.
- Harmonizing working methodologies and strengthening integration among early warning systems in the three regions.

The workshop provided participants with an opportunity to exchange experiences and expertise and discuss challenges related to data quality and the speed of its transmission and analysis. Participants also completed practical exercises using the latest tools and software for monitoring the Desert Locust situation.

Accurate Information as the Foundation of Preventive Control

Dr Mamoon Al Alawi, Executive Secretary of CRC, emphasized that the workshop represented a strategic step towards building a more integrated and efficient regional system for Desert Locust information and early warning.

He explained that accurate and timely information provides the foundation for sound decision-making and for directing survey and control operations before situations develop into large-scale emergencies. He also noted that the launch of eLocust4 and RAMSES V5 reflected the commitment of the participating commissions and countries to using modern technologies to support preventive control and improve their capacity for risk assessment and early response.

The knowledge and skills acquired during the workshop are expected to improve the quality of data flow at the national, regional and international levels; enhance Desert Locust situation bulletins and reports; and strengthen coordination among the three regional commissions and participating countries. These outcomes will support the sustainability of the early warning system and maintain preparedness to address any potential developments.

These efforts form part of an integrated preventive approach aimed at detecting and managing Desert Locust populations at an early stage and reducing the likelihood of their spread to other areas and countries. This contributes to protecting agricultural production, natural resources and livelihoods, while strengthening food security in countries vulnerable to Desert Locust threats.

Libyan Technical Delegation Reviews Egypt's Experience in Desert Locust Monitoring and Control

Cairo, Arab Republic of Egypt, 5–9 July 2026

From 5 to 9 July 2026, the Commission for Controlling the Desert Locust in the Central Region (CRC) and the General Department for Locust Affairs and Agricultural Aviation of the Ministry of Agriculture and Land Reclamation of the Arab Republic of Egypt hosted a technical delegation from the Desert Locust Control Centre of Libya. The visit took place within the framework of strengthening cooperation and exchanging experience among countries of the Desert Locust Control Commissions in the Central and Western Regions.

The visit aimed to introduce the Libyan delegation to Egypt's experience in Desert Locust monitoring and control and to review the technical and operational systems applied in survey and control operations, information management and early warning. It also provided an opportunity to exchange experience concerning the organization of Desert Locust bases and the enhancement of preparedness to respond to potential developments.

Technical Meetings and Exchange of Experience

The programme included technical meetings at the headquarters of CRC in Cairo, during which the Commission's role in supporting preventive control programmes in its member countries was presented. The meetings also addressed CRC's work in strengthening information exchange and regional coordination and building national capacities in survey, monitoring, control and emergency management.

Meetings were also held with specialists from the General Department for Locust Affairs and Agricultural Aviation. Discussions covered the structure of Egypt's national Desert Locust control programme, mechanisms for planning field operations, the organization of survey and control teams, the management of resources and equipment, and coordination of information flow between field teams and central-level authorities.

The discussions highlighted the importance of collecting accurate field data and transmitting it in a timely manner, as well as using such data to monitor developments in the Desert Locust situation, assess risks and identify priority areas. These measures support early operational decision-making and the efficient deployment of resources and field teams.

Review of Monitoring and Control Operations

The field programme included visits to several Desert Locust bases affiliated with the Ministry of Agriculture and Land Reclamation. The delegation reviewed the functions performed by these bases in monitoring, survey and control operations, as well as their role in monitoring breeding and migration areas and border zones vulnerable to the arrival of Desert Locust populations.

The delegation was also introduced to procedures for preparing survey and control teams; inspecting, maintaining and calibrating spraying equipment; storing and handling pesticides; and applying occupational health, safety and environmental protection requirements. The programme also covered communication arrangements, field reporting, and preparedness and response procedures in the event of sudden changes in the Desert Locust situation.

The field visits provided an opportunity for Libyan and Egyptian specialists to exchange practical experience and discuss the common challenges facing national Desert Locust programmes. Particular attention was given to maintaining the readiness of teams and equipment during periods of calm Desert Locust activity and ensuring a rapid response when emerging indicators require intensified surveys or control interventions.

Supporting Cooperation between the Central and Western Regions

The visit formed part of efforts to expand technical cooperation and knowledge exchange among countries covered by the Desert Locust Control Commissions in the Central and Western Regions. Such cooperation is particularly important because of the transboundary nature of the Desert Locust and its ability to travel over long distances between breeding and distribution areas in both regions.

The visit emphasized the importance of continuing to exchange successful experiences and organizing technical visits among national Desert Locust units. Such activities contribute to developing practical skills, harmonizing field concepts and procedures, and strengthening the flow of information and coordination among countries.

The knowledge and experience acquired during the visit are expected to support the capacities of the Desert Locust Control Centre in Libya and strengthen technical cooperation with the relevant Egyptian authorities and CRC. This will enhance national and regional preparedness, support preventive control and early response, and contribute to protecting crops, rangelands, livelihoods and food security from the threats posed by the Desert Locust.

Commission for Controlling the Desert Locust in the Central Region Strengthens Cooperation with the Kingdom of Bahrain and Reviews Preparations for Its Thirty-fourth Session

Manama, Kingdom of Bahrain, 14–17 July 2026

Dr Mamoon Al Alawi, Executive Secretary of the Commission for Controlling the Desert Locust in the Central Region (CRC) of the Food and Agriculture Organization of the United Nations (FAO), undertook an official visit to the Kingdom of Bahrain from 14 to 17 July 2026. The visit aimed to strengthen technical cooperation with the Ministry of Municipalities Affairs and Agriculture in the

management and control of the Desert Locust and to follow up on preparations for hosting the Thirty-fourth Session of the Commission, scheduled to take place in Manama from 6 to 10 December 2026.

The visit formed part of the coordination between CRC and the Kingdom of Bahrain in preparation for the Session, which will bring together representatives of member countries, partners, and relevant regional and international organizations. Participants will discuss the Desert Locust situation, review implemented programmes and activities, and adopt priorities and future workplans aimed at strengthening preventive control and regional preparedness.

Meeting with the Minister of Municipalities Affairs and Agriculture

Dr Mamoon Al Alawi met with H.E. Eng. Wael bin Nasser Al Mubarak, Minister of Municipalities Affairs and Agriculture, in the presence of the national team responsible for preparing the Thirty-fourth Session.

During the meeting, the Executive Secretary expressed the Commission's appreciation for the Government of the Kingdom of Bahrain's agreement to host the Session. He commended the cooperation between the Ministry and CRC and Bahrain's role in supporting joint regional action.

The meeting explored opportunities to further develop cooperation in Desert Locust monitoring and control, national capacity development, the exchange of experience and information, the maintenance of operational preparedness, and the strengthening of early response. The participants also discussed the importance of regional cooperation in addressing the threat posed by the Desert Locust, given its transboundary nature and the potential impacts of its spread on agricultural production and food security.

For his part, H.E. the Minister confirmed the Ministry's readiness to provide the support and facilities required for the successful organization of the Thirty-fourth Session in a manner commensurate with its technical and regional importance and reflecting the Kingdom of Bahrain's commitment to supporting the Commission's efforts and joint programmes.

Review of Organizational and Technical Arrangements

The Executive Secretary also met with H.E. Eng. Asim Abdullatif Abdullah, Undersecretary for Agriculture. The two sides discussed areas of technical cooperation between CRC and the Ministry and ways to benefit from the Commission's programmes to develop national capacities and strengthen the exchange of experience with member countries.

The discussions covered the organizational, technical and logistical arrangements for the Session, including the meeting programme, the participation of delegations, meeting-room requirements, technical services and interpretation, as well as coordination between the Ministry's team and the Commission Secretariat to ensure that preparations are completed on schedule.

The visit also included coordination meetings with the national organizing team, during which the participants reviewed tasks and responsibilities and discussed essential requirements and the preparatory workplan. These efforts aim to ensure the efficient organization of the Session and provide suitable conditions for the participation of delegations from member countries and invited entities.

Supporting Regional Cooperation and Preventive Control

The Thirty-fourth Session of the Commission represents an important opportunity to assess progress in implementing regional work programmes, discuss the needs and priorities of member countries, and develop joint initiatives in early warning, survey, control, information management and capacity development.

The visit reaffirmed the commitment of CRC and the Kingdom of Bahrain to further developing their cooperation and supporting coordination among member countries. These efforts will strengthen the implementation of the preventive control strategy, enhance preparedness for any potential developments in the Desert Locust situation, and contribute to protecting crops, livelihoods and food security across the region.

(CRC PRIZE)

Call for High-Quality Applied Research Papers

Desert Locust Monitoring, Management and Control

The FAO Commission for Controlling the Desert Locust in the Central Region (CRC) and the Arab Society for Plant Protection (ASPP) invite researchers to submit high-quality applied research papers on the Desert Locust. This joint initiative aims to select, further develop, and publish outstanding research papers.

Priority Topics

Submitted papers must address topics related to the Desert Locust, with particular emphasis on the following areas:

1. Dissemination of modern technologies.
2. Advancement of scientific knowledge.
3. Presentation of best practices related to Desert Locust monitoring, management and control.

All submitted papers will undergo scientific peer review, and authors will be informed of the results upon completion of the review and evaluation process.

Submission and Eligibility

Papers must be submitted electronically through the Arab Journal of Plant Protection (AJPP) website at www.ajplantprotection.org, in accordance with the Journal's established submission requirements and guidelines.

Scientific and Technical Evaluation

Papers meeting the eligibility requirements will undergo a documented scientific and technical evaluation conducted by a joint committee comprising experts nominated by ASPP and the CRC Secretariat. The committee will select the two best papers from among those accepted for publication, based on their scientific quality, practical applicability, and relevance to the priorities of CRC and the needs of its Member Countries.

The Journal's established scientific peer-review and editorial requirements will continue to apply, and authors will be informed of the results upon completion of the evaluation and selection process.

Support and Awards for Selected Papers

Papers submitted and accepted for publication will be exempted from the applicable article processing and publication fees. Accepted papers will be published in the Arab Journal of Plant Protection and may also be disseminated and promoted through communication channels agreed upon by ASPP and CRC.

In addition, the first-place paper will receive an award of **USD 2,000**, while the second- and third-place papers will receive each an award of **USD 1,500**. The Arab Society for Plant Protection will pay both awards directly to the authors of the winning papers.

Submission Deadline

Papers must be submitted no later than **15 November 2026**.

CRC and ASPP encourage all scientists and researchers working in the above-mentioned areas of Desert Locust research to submit their papers at the earliest opportunity and, in all cases, before the stated deadline.

New brochure on Olive Psyllid, *Euphyllura olivina* (Costa, 1839)

The Arab Society for Plant Protection (ASPP) has published a new scientific and extension booklet entiled "Olive Psyllid, *Euphyllura olivina* (Costa, 1839)", prepared by Professor Dr. Ibrahim Al-Jboory,the Vice President of the Arab and Near East Society(ASPP). The booklet presents updated information on the pest's identification, biology, damage, and its relationship with olive phenology using the BBCH scale, in addition to natural enemies and integrated pest management (IPM) strategies. This publication aims to serve researchers, extension specialists, and olive growers throughout the Arab region and is available through the ASPP website. To download the file, click on the link below:

ASPP MEMBER NEWS , SCIENTIFIC ARTICLE ABSTRACTS, AND ACTIVITIES

No Cost of Resistance in Wheat Gene Stack Lines Containing 10 Stem Rust Resistance Transgenes

Genetic resistance is one of the most economical and sustainable approaches to crop protection. However, resistance can be overcome by the evolution of pathogen virulence. Polygenic resistance is generally more durable, but maintaining multiple unlinked resistance genes can be challenging in breeding programs. Gene stacking, which combines multiple cloned resistance genes at a single genomic location, can provide durable polygenic resistance while simplifying inheritance. In this study, Fielder and Robin wheat plants were developed with two gene stacks, each containing five wheat stem rust resistance genes. The stacks were Sr13c/Sr21/Sr22/Sr26/Sr33 and Sr22/Sr35/Sr45/Sr50/Sr55. Multiple transgenic events were combined and evaluated under field conditions. The resulting lines contained 10 resistance transgenes within approximately 90 kb of sequence and showed stable inheritance and expression of the gene stacks after eight generations. The transgenic lines showed high levels of stem rust resistance in the field. In the absence of disease pressure, no consistent differences in agronomic performance were observed between the transgenic lines and control lines over two field seasons. These results demonstrate the potential of resistance gene stacking as a durable strategy for disease resistance in crop production.[**Ming Luo, Aihua Wang, Soma Chakraborty, Shyh Yin Low, Saeid Babaei, Jian Chen, Jianping Zhang, Dhara Bhatt, Brenton Brooks, Oadi Matny, Narayana Upadhyaya, Rohit Mago, Melania Figueroa, Evans Lagudah, Peter Dodds, Brian Steffenson, Michael Ayliffe, Plant Biotechnology Journal 1–16, Accepted: 20 May 2026].** **https://doi.org/10.1111/pbi.70692**

The Plant Health 2026 Conference

was held in Providence, Rhode Island, USA, from August 1–4, 2026, under the auspices of the American Phytopathological Society (APS). Recognized as the largest annual plant pathology conference in the United States, the event brought together more than 1,100 researchers and professionals, featuring dozens of scientific sessions and over 600 posters.

From the Arab Society for Plant Protection (ASPP), Dr. Raied Abou Kubaa, Foundation Plant Services, University of California, Davis (UC Davis), participated in the conference with three scientific presentations, including one oral and two poster presentations. His research focused on the development and application of HiPlex PCR technology for the simultaneous detection of viruses infecting grapevine and strawberry, contributing to the advancement of plant disease diagnostics and the enhancement of plant health programs.

Associations Between Land Use, Climate, and Pathogen Prevalence in Honey Bee Colonies.

Honey bees (*Apis mellifera*) are key pollinators in agricultural ecosystems that face increas- ing pressure from pathogens and environmental change. However, how these environ- mental factors interact remains incompletely understood. To assess associations between climate, landscape composition, and pathogen occurrence in real agroecosystems, we monitored honey bee colonies across 30 apiaries in southern Italy over two years, in sum- mer and autumn. Molecular screening revealed widespread multi-pathogen exposure, with two viruses, Black Queen Cell Virus (BQCV) and Deformed Wing Virus (DWV), and gut trypanosomatid parasite (*Lotmaria passim*) being the most frequently detected. In contrast, *Nosema ceranae*, along with Bee Macula-like Virus (BeeMLV) and Acute Bee Paralysis Virus (ABPV), occurred at lower but still notable frequencies. Infections were generally more frequent in adult foragers than in in-hive bees and larvae, and overall pathogen oc- currence tended to be higher in summer than in autumn. Higher humidity was associated with higher overall pathogen occurrence and coinfection levels, whereas higher temperature showed a weaker association with these outcomes. Associations between landscape composition and pathogen occurrence differed across pathogens: a higher proportion of semi-natural habitats was associated with lower viral occurrence, particularly BQCV and DWV; however, *N. ceranae* was more frequently detected under the same landscape conditions. In contrast, *L. passim* showed context-dependent responses, with landscape effects emerging only through interactions with humidity and temperature. **[Sabri Ala Eddine Zaidat, Raied Abou Kubaa, Giuseppe Cavallo, Andrea Depalma, Fabio Silvestre, Aymen Moghli, Antonio Petragallo, Maria Saponari, Khaled Djelouah, and Giovanni Tamburini.** International Centre for Advanced Mediterranean Agronomic Studies (CIHEAM-Bari), Valenzano, Bari, Italy and Department of Soil, Plant, and Food Sciences, University of Bari Aldo Moro, Bari, Italy and Institute for Sustainable Plant Protection, UOS Bari, National Research Council, Bari, Italy and Department of Plant Pathology, University of California, Davis, CA, USA and Regional Association of Apulian Beekeepers (A.R.A.P.), Lecce, Italy and Department of Ecology and Environment, Faculty of Nature and Life Sciences, University of Sétif 1-Ferhat Abbas, Sétif, Algeria. Published in ***Agriculture* 2026, Volume 16, Issue 13, Article 1459]**. DOI:10.3390/agriculture16131459

Coding-Complete Genome Sequence of Grapevine Leafroll-Associated Virus 13 from Grapevine in California.

Grapevine leafroll-associated virus 13 (GLRaV-13) was detected in a *Vitis vinifera* grapevine collected from Southern California showing leafroll symptoms. The sample was subjected to diagnostic testing at Foundation Plant Services (FPS), University of California, Davis, where RT-qPCR detected GLRaV-13 along with GLRaV-3 and Grapevine virus A. High-throughput sequencing (HTS) was subsequently used to confirm the infection and characterize the virus at the genomic level. Sequencing generated approximately 23 million reads, and genome assembly yielded a 17,564-nucleotide sequence of GLRaV-13 with high and continuous coverage across the genome. Genetic comparisons showed that the California isolate shared 95.23% and 96.33% nucleotide identity with two previously reported isolates from Japan. Genome analysis also identified genes and proteins characteristic of this group of viruses, including replication-associated proteins, the coat protein, and the minor coat protein. This finding is particularly important given the limited number of GLRaV-13 genome sequences currently available worldwide and contributes to expanding knowledge of the genetic diversity of the virus while supporting the development of molecular detection and characterization approaches for grapevine diagnostic and plant health programs. [**Raied Abou Kubaa and Teresa M. Erickson and Haoran Li and Kristian A. Stevens and Maher Al Rwahnih.** Foundation Plant Services, Department of Plant Pathology, University of California, Davis, California, USA and Departments of

Computer Science and Evolution and Ecology, University of California, Davis, California, USA and Department of Plant Protection, School of Agriculture, The University of Jordan, Amman, Jordan. Published in *Microbiology Resource Announcements*, 2026]. DOI: 10.1128/mra.00529-26 .

Comparative transcriptomics of biopesticide-treated olives subjected to *Xylella* infection.

Xylella fastidiosa is one of the most serious plant pathogens, and the De Donno strain of *X. fastidiosa* subsp. *pauca* (XfDD) has caused Olive Quick Decline Syndrome and extensive damage to olive orchards in Apulia, southern Italy. Since no treatments are currently available to eliminate the bacterium from infected plants, there is an increasing need for sustainable approaches that enhance plant defenses and limit the pathogen's impact. This study investigated the mechanisms of action of three biopesticides: *Paraburkholderia phytofirmans* strain PsJN, a natural onion-derived extract rich in organosulfur compounds, and the natural insecticide Sankari©. Experiments were conducted under controlled greenhouse conditions using plants of the susceptible olive cultivar 'Ogliarola salentina', and changes in gene expression were investigated through comparative transcriptomics (RNA-seq) at different times after treatment and following inoculation with XfDD. In vitro experiments showed that the onion extract inhibited XfDD growth in a concentration-dependent manner, whereas PsJN did not directly inhibit the pathogen. At the plant level, all three treatments rapidly altered olive gene expression within 6–12 hours after application, affecting genes involved in plant immunity, hormone signaling, and stress responses. PsJN particularly influenced ethylene-related pathways and activated processes associated with both plant defense and growth, while onion extract stimulated several defense- and immunity-associated genes. Sankari© also triggered an early response involving multiple defense-related genes and pathways. Although these direct transcriptional effects largely declined 15 days after treatment, they became evident again following XfDD inoculation. Plants previously treated with biopesticides exhibited a stronger transcriptional response to XfDD than untreated infected plants, supporting the induction of a long-lasting primed physiological state that enables the plant to respond more effectively to subsequent pathogen challenge. RNA-seq data also suggested a relative reduction in *Xylella* reads in onion-treated plants. Overall, the study demonstrates that the three products act through distinct molecular mechanisms involving immune activation, hormone signaling, and metabolic reprogramming, providing a scientific basis for the further development and use of biopesticides as environmentally sustainable tools for the management of *Xylella fastidiosa* in olive. [**Annalisa Giampetruzzi and Eva M. Molin and Ana Falcón-Piñeiro and José Manuel García-Madero and Raied Abou Kubaa and Tina Kogej and Liesbeth Zwarts and Carmine Del Grosso and Nicoletta Contaldo and Crescenza Dongiovanni and Stéphane Compant and Pasquale Saldarelli.** Institute for Sustainable Plant Protection, National Research Council, Bari, Italy and AIT Austrian Institute of Technology, Center for Health & Bioresources, Bioresources Unit, Tulln, Austria and DMC Research Center, Alhendín, Spain and Acies Bio d.o.o., Ljubljana, Slovenia and Brustem Industriepark, Sint-Truiden, Belgium and Centro di Ricerca, Formazione e Sperimentazione in Agricoltura "Basile Caramia" (CRSFA), Locorotondo, BA, Italy. **Published in:** *BMC Plant Biology*, 2026]. DOI: 10.1186/s12870-026-08671-y

First Report of *Penicillium ulaiense* Causing Whisker Mold on Postharvest Citrus Fruits in Morocco.

Between February 2024 and June 2025, surveys conducted in northwestern Morocco revealed citrus fruits (*Citrus sinensis* and *Citrus* × *limon*) showing atypical postharvest decay symptoms, characterized by dark, water-soaked lesions with zonation and coremia-like structures. These symptoms were detected at only two sites, with a low incidence of 1.6% in the orchard and 0.5% in market samples. Five fungal isolates were obtained from symptomatic tissues on Potato Dextrose Agar (PDA). Morphological characterization identified all isolates as *Penicillium ulaiense*, based on colony and micromorphological features consistent with published descriptions. Two representative isolates (BH_B1 and BH_E2) were selected for molecular analyses. Sequencing of the ITS region and the β-tubulin (*BenA*) gene showed 99–100% identity with reference *P. ulaiense* sequences, and the concatenated alignment comprised 804 base pairs. Phylogenetic analyses placed the Moroccan

isolates within a well-supported *P. ulaiense* clade, clearly distinct from closely related species such as *P. italicum* and *P. expansum*. Pathogenicity assays reproduced typical symptoms on *C. sinensis* fruits, with progressive lesion development and successful re-isolation of the pathogen, confirming its pathogenic role under experimental conditions. This study reports, for the first time, the occurrence of *Penicillium ulaiense* associated with postharvest whisker mold symptoms on citrus fruits in Morocco. It provides new insights into postharvest citrus pathogens in Morocco and establishes a basis for future investigations on the occurrence and epidemiology of this species.[**Hayat Benzahra and Imane Mrabti and Hassan Grijja and Rachid Azenzem and Raied Abou Kubaa and Mohamed Afechtal and Karima Selmaoui.** Laboratory of Botany, Biotechnology and Plant Protection, Faculty of Sciences, University Ibn Toufail, Kenitra, Morocco and Laboratory of Virology, National Institute of Agricultural Research, Kenitra, Morocco and Department of Plant Pathology, University of California, Davis, CA, USA and Research Unit on Nuclear Techniques, Environment and Quality, Regional Centre of Agricultural Research of Tangier, National Institute of Agricultural Research, Rabat, Morocco. **Published in:** *Scientific Reports*, 2026]. DOI: 10.1038/s41598-026-56301-2.

Host-Associated Occurrence of *Wolbachia* in Natural Populations of the Pyriform Scale *Protopulvinaria pyriformis* (Cockerell, 1894) in Moroccan Orchards.

Scale insects are a diverse group of phloem-feeding pests capable of causing substantial damage to numerous cultivated crops. Among them, *Protopulvinaria pyriformis*, recently reported in Morocco, represents an emerging threat to citrus and avocado production. These insects are closely associated with microbial endosymbionts, including *Wolbachia*, an intracellular bacterium known to influence host reproduction, population dynamics, and interactions with host plants. Between June 2023 and March 2025, a survey was conducted in two adjacent citrus and avocado orchards in Kénitra, northwestern Morocco, to investigate the occurrence of *Wolbachia* in natural populations of *P. pyriformis*. A total of 180 individuals were collected, including 150 from sweet orange (*Citrus sinensis*) and 30 from Hass avocado (*Persea americana*), and analyzed by PCR targeting the *coxA* gene. Phylogenetic analysis showed that the Moroccan *Wolbachia* isolate belongs to supergroup A. *Wolbachia* was detected exclusively in *P. pyriformis* individuals collected from citrus, with a prevalence of 90%, whereas all specimens collected from avocado were negative despite high levels of scale infestation. These results indicate a host-associated pattern within the citrus–avocado system investigated, with *Wolbachia* infection associated specifically with scale populations occurring on citrus. This study provides the first global evidence of *Wolbachia* infection in *P. pyriformis* and establishes a basis for future studies investigating the ecological significance of this association and its potential influence on the population dynamics of this emerging pest. [**Imane Mrabti and Hassan Grijja and Hayat Benzahra and Raied Abou Kubaa and Rachid Azenzem and Najiba Brhadda and Rabea Ziri and Khalid Haddi and Mohamed Afechtal.** Lab Virology, National Institute of Agricultural Research (INRA), Kénitra, Morocco and Lab of Plant, Animal, and Agro-Industry Productions, Faculty of Sciences, Univ Ibn Toufail, Kenitra, Morocco and Dept Plant Pathology, Foundation Plant Services, Univ of California, Davis, USA and Research Unit on Nuclear Techniques, Environment and Quality, Regional Center of Agricultural Research of Tangier, National Institute of Agricultural Research, Rabat, Morocco and Lab Molecular Entomology and Ecotoxicology, Dept of Entomology, Federal Univ of Lavras, Lavras, MG, Brazil. Published in: Neotropical Entomology Volume 55 Article 46,2026]. DOI: 10.1007/s13744-026-01395-6 .

Use of High-Throughput Sequencing for Improved Virus Detection in Strawberry Certification.

To protect global strawberry production, clean plant programs rely on rigorous certification and quarantine testing to prevent the spread of disease. For decades, biological graft indexing has been the “gold standard” for virus detection; however, it often fails to identify viruses that remain latent in single infections or viruses requiring extended periods to induce symptoms. High-throughput sequencing (HTS) offers an alternative that identifies all known and emerging viruses independent of the nucleotide sequences of their genomes, including those undetected by traditional bioassays. This study compared HTS with graft indexing using 73 virus-infected donor plants, 584indicator clones, and two replicates to evaluate HTS as a replacement for conventional

graft bioassay testing. Donor material was analyzed via HTS and simultaneously grafted onto two replicates of four Fragaria indicator clones (UC-4, UC-5, UC-10, UC-11). Indicator symptoms were monitored weekly over eight weeks and again following natural dormancy. The RT-qPCR/RT-PCR testing for virus transmission was also conducted at eight weeks and after dormancy. HTS identified viral infections in all donor plants, detecting 17 different viruses across eight families, and revealing mixed infections in 75% of plants. In contrast, 83% of indicators developed symptoms within the current standard of eight weeks post graft. Only 61% of the indicator plants displayed symptoms both before and after dormancy, while 7% remained asymptomatic throughout despite receiving grafts from HTS-positive donors. Given the limitations of biological indexing, this research strongly supports integrating HTS as a frontline detection tool to enhance the reliability and efficiency of certification programs. Daniel Fager, Maher Al Rwahnih, Dimitre Mollov, 2026. Plant Disease, published online 30 Jul 2026. Department of Botany and Plant Pathology, Oregon State University, Corvallis, USA; Department of Plant Pathology, University of California, Davis, USA; Foundation Plant Services, University of California, Davis, USA; Department of Plant Protection, School of Agriculture, The University of Jordan, Amman, Jordan.https://doi.org/10.1094/PDIS-04-26-0788-RE

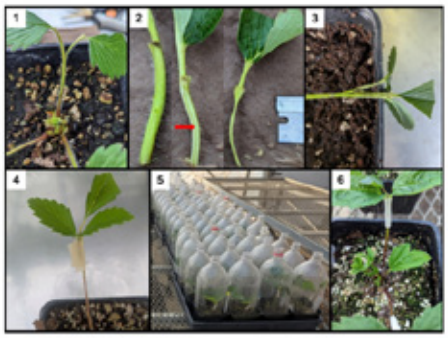


Figure 1. Graft inoculation process illustrating the preparation of the indicator plant and donor leaf (1-2), grafting the donor leaf to the indicator (3-5), and the after care and evaluation of the grafted indicator (6).

First report of grapevine virus B in muscadine grape (*Muscadinia rotundifolia* (Michx.) Small) in Florida

Grapevine virus B (GVB) had previously been reported in muscadine grape in the United States but had not been molecularly confirmed in Florida. Initial screening of 60 muscadine vines using published RT-PCR and RT-qPCR assays failed to detect GVB. High-throughput sequencing (HTS) of selected samples subsequently identified GVB, including a genetically divergent variant, as well as mixed infections with grapevine leafroll-associated virus 2 (GLRaV-2). A nearly complete 7,575-bp GVB genome showed only 84% nucleotide identity with its closest GenBank match. Based on the HTS-derived sequences, a new RT-PCR assay was developed and detected GVB in 11 of the 60 previously screened vines (18%). Sequence analysis revealed mismatches in the target regions of published primers and probes, explaining the failure of previous assays to detect this divergent variant. This study provides the first molecular confirmation of GVB in muscadine grape in Florida and highlights the importance of sequence-informed diagnostics for reliable virus detection. **Ahmed G. Mohamed, Kristian Stevens, Islam El Sharkawy, Maher Al Rwahnih, Violeta Tsolova,2016.Plant Disease, April 2026.**Center for Viticulture and Small Fruit Research, Florida A&M University, Tallahassee, FL, USA; Foundation Plant Services, University of California, Davis, CA, USA. **https://doi.org/10.1094/PDIS-05-26-1021-PDN**

ICARDA

Developing Syrian skills in seed health and quarantine to enhance seed flow in Syria with the aim of stimulating agricultural production to achieve food security and biodiversity conservation

As part of ongoing efforts to rebuild agricultural capacity and strengthen the national plant health systems in Syria, and with support from the Government of Japan, the Germplasm Health Unit of the International Center for Agricultural Research in the Dry Areas (ICARDA), through its Seed Health Laboratory team (Dr. Safaa Kumari and Mr. Abdul Rahman Moukahel), organized a specialized training course entitled “Modern Techniques and Protocols for the Detection of Seed-borne Pests in Cereal and Legume Crops”. The course was held from May 17 to 21, 2026, at ICARDA’s newly established Seed Health Laboratory, funded by the Germplasm Health Units (GHUs) of the Consultative Group on International Agricultural Research (CGIAR).

This laboratory supports the safe importation of pest- and disease-free seeds, contributing to the recovery of agricultural production and genetic diversity in Syria, while simultaneously reinforcing ICARDA's firm commitment to agricultural research and development in the country.

The training brought together 22 agricultural specialists from key national institutions in Syria, including the General Commission for Scientific Agricultural Research (GCSAR), the General Organization for Seed Multiplication (GOSM), and the General Authority for Borders and Customs (GABC), reflecting the importance of coordinated action among research, seed production, and agricultural quarantine services. The course was designed to enhance technical knowledge and practical skills in seed health testing, phytosanitary inspection, quarantine procedures, and detection of seed-borne pests affecting strategic cereal and legume crops. Through lectures, laboratory demonstrations, and hands-on practical sessions, participants were introduced to internationally recognized approaches for seed health testing and phytosanitary risk management, including visual inspection, sampling procedures, detection methods, laboratory quality practices, and the role of seed health testing in preventing the introduction and spread of pests and diseases through seed and germplasm movement. The course also emphasized the importance of producing and distributing healthy seeds as a foundation for improving agricultural productivity, enhancing food security, and facilitating the safe exchange of genetic material and agricultural trade.

The course also highlighted the role of ICARDA's GHU network in safeguarding the safe international movement of germplasm and supporting national partners in strengthening their diagnostic and quarantine capacities. As part of the training program, participants visited ICARDA's Seed Health Laboratory facilities in the Aleppo office and Tell Hadya station, where they gained practical experience in seed health testing procedures, certified seed production, variety evaluation, and quality control. These visits linked classroom and laboratory learning with field-based and institutional applications, reinforcing the connection between plant health, seed systems, and agricultural recovery.

The training course coincided with ongoing international efforts to strengthen agricultural infrastructure in Syria, including crop protection, pest control, seed quality improvement, and facilitating the safe exchange of genetic resources. Given the pivotal role agriculture continues to play in livelihoods, food production, and resilience building, such initiatives are essential for rebuilding support systems for farmers and national food security.

This course demonstrated how science, institutional cooperation, and international partnerships can be integrated to enhance plant protection services and ensure access to healthier, safer, and higher-quality seeds for farming communities in Syria and the region.

NEPPO

Workshop on the Electronic Phytosanitary Certification System (ePhyto)

May 11–12, 2026, Casablanca (Kingdom of Morocco)

Background

The Secretariat of the International Plant Protection Convention (IPPC) is responsible for developing international standards for phytosanitary measures with the aim of preventing the spread and introduction of pests affecting plants and plant products, as well as facilitating safe international and regional trade.

Among these measures are phytosanitary certificates, as standard number 12 (ISPM12) states: "The issuance of phytosanitary certificates is used to attest that consignments meet phytosanitary import requirements and applies to most plants, plant products and other regulated articles traded internationally. "Furthermore, point 55 of this standard states: "The National Plant Protection Organization (NPPO) should apply safeguards against the fraudulent falsification of paper phytosanitary certificates, such as using special paper, watermarks or special printing, for example."

Objectives

1. Present the benefits of participating in the electronic phytosanitary certification system (ePhyto).
2. Share the experiences of regional countries currently engaged in the electronic phytosanitary certification system (ePhyto).
3. Encourage regional countries to participate in the electronic phytosanitary certification system (ePhyto).
4. Establish an executive program to assist countries wishing to join the electronic phytosanitary certification system (ePhyto).

Participants

- Near East and North Africa Plant Protection Organization (NEPPO).
- Food and Agriculture Organization (FAO), Sub-regional Office for North Africa.
- International Plant Protection Convention (IPPC).
- Members of the Plant Quarantine and Transboundary Pests Working Group of the Near East and North Africa Plant Protection Organization.
- Member countries of the Near East and North Africa Plant Protection Organization.
- Non-member countries of the organization within the region.

Celebration of the International Day of Plant Health: "Plant Biosecurity for Food Security"

May 12, 2026, Casablanca (Kingdom of Morocco).

- **Plant health** is a fundamental pillar of food security and the resilience of agricultural systems, especially with the exacerbating impacts of climate change, increased trade exchange, and the threats of transboundary pests.
- **Countries worldwide** celebrate the International Day of Plant Health on May 12th each year. This day established by the United Nations to raise public awareness about the importance of protecting plants in combating hunger, protecting the environment, achieving economic development, and promoting sustainable trade.
- **The International Day of Plant Health** represents a key legacy of the International Year of Plant Health 2020.
- **This year's International Day of Plant Health** calls on everyone to raise awareness and take the necessary actions to preserve the health of plants, animals, humans, and the environment under the slogan: **"Plant Biosecurity for Food Security"**.
- **International Standards for Phytosanitary Measures (ISPMs)** form the foundation of phytosanitary regulations.
- **This highlights the role** of the Near East and North Africa Plant Protection Organization (**NEPPO**), which serves as a framework and a forum for regional cooperation, coordination, and technical exchange among countries in the region to implement phytosanitary measures.

Within this framework, NEPPO in cooperation with the Food and Agriculture Organization (FAO) Sub-regional Office for North Africa is celebrating this year, 2026, by dedicating a special session to the importance of International Standards for Phytosanitary Measures across public, academic, and official phytosanitary control levels.

Researcher Spotlight

Hosam Mohammed Khalil El-Gepaly



Prof. Dr. Hosam Mohammed Khalil El-Gepaly is a Professor of Biological Pest Control in the Biological Control Department, Plant Protection Research Institute (PPRI), Agricultural Research Center (ARC), stationed at the Shandaweel Research Station in Sohag. With over 23 years of career experience, his expertise spans applied entomology, parasitoid biology, international consultancy, and field program management. He earned his B.Sc. from Sohag University (2000), followed by an M.Sc. (2007) and a Ph.D. (2014) from Minia University, focusing his postgraduate research on natural enemies in sorghum/corn systems and aphidophagous predator parasitoids. He has authored more than 25 peer-reviewed publications in international journals.

Scientific Breakthroughs and Research Distinction Dr. El-Gepaly's research is highlighted by a breakthrough of global significance: he was the first researcher to discover and formally record the egg parasitoid *Telenomus remus* in Egypt. This finding has profound implications for the biological control of the invasive Fall Armyworm (*Spodoptera frugiperda*) across North Africa.

Moving beyond laboratory findings, he subsequently supervised Egypt's first-ever field release of this parasitoid across 10 hectares, translating taxonomy into applied conservation.

International Consultancy and Institutional Development As a certified FAO consultant, Dr. El-Gepaly designed and inaugurated the first biological control laboratory in Jordan's history at Deir Alla during an FAO Emergency Response Project (February–May 2022). He authored the facility's operational manuals, trained local technical teams in mass-rearing Trichogramma and Telenomus parasitoids, and submitted strategic Integrated Pest Management (IPM) recommendations directly to the Jordanian Ministry of Agriculture.

Additionally, across multiple FAO and Canadian-funded projects (including GCP/GLO/220/EC, TCP/EGY/3706, and GCP/EGY/039/CAN), he led training programs for over 300 participants in Upper Egypt, supervised 72 gender-inclusive Farmer Field Schools (in Aswan, Beheira, and Kafr El-Sheikh), and served as the Lead Technical Author and Editor of the 2024 FAO publication, *"Protocols for the Production of Natural Enemies"*.

Global Platforms and Leadership Dr. El-Gepaly has represented Egypt at premier global forums. In June 2023, he delivered a keynote address on Egypt's biocontrol experience at the Global Forum on Biological Control (GFBC) in Nairobi, Kenya, helping co-develop a global roadmap for scaling up biological control across Asia, Africa, and the NENA region. He also represented the FAO at a 2022 Fall Armyworm preparedness workshop in Mauritania. At PPRI, he supervises postgraduate researchers, directs national invasive species programs, and leverages his expertise in FAMEWS digital monitoring, biopesticides, and pheromone systems to replace chemical reliance with science-based biological alternatives.

Salwa Sayed Mohamed Abdel Samad

Dr.Salwa Sayed Mohamed Abdel Samad is Professor of Biological Control, Plant Protection Research Institute (PPRI), Agricultural Research Center (ARC), Egypt. She received her B.Sc. in 1987, M.Sc. in 1996 on natural enemies of insect pests attacking leguminous crops, and Ph.D. in 2002 on the biological control of aphids in wheat fields to reduce pesticide pollution, which was later published by Scholars Press, Germany. Over a scientific career spanning nearly 39 years, she has specialized in biological control and Integrated Pest Management (IPM), focusing on the use of parasitoids, predators, entomopathogenic nematodes, and fungi for sustainable pest management. She was promoted to Full Professor in 2012 and has published more than 35 peer-reviewed scientific papers, supervised numerous postgraduate theses, and serves as a reviewer for several national and international scientific journals. In 2025, she was appointed Expert at the Plant Protection Training and Consultancy Center. Dr.Salwa, as Head of the Biological Control Research Department (August–December 2025), is a member of the Scientific Promotion Committee of the Plant Protection Research Institute, and acts as evaluator and reviewer for projects funded by the Academy of Scientific Research and Technology (ASRT) and the Science, Technology and Innovation Funding Authority (STDF).

She has participated in more than 17 national and international research projects in collaboration with organizations including FAO, ICARDA, ASRT, and international development agencies. Notable projects include the "Integrated Management Strategy for Date Palm Plantations" (2017–2020) and projects on biological control of *Tuta absoluta* and olive pests in cooperation with the Universities of Barcelona and Córdoba. She has delivered numerous training courses, workshops, and Farmer Field Schools throughout Egypt and has published scientific and extension articles on biological control and IPM in regional and international outlets. She also contributed to several

scientific publications, including the ASPP Scientific Terminology Dictionary (2017) and the FAO book *Sustainable Management of Date Palm Pests and Diseases: Concepts and Techniques* (2025). She has received numerous awards and recognitions from Egyptian and Arab institutions, including the World Intellectual Property Organization (WIPO) Photo Exhibition Award for Egypt in Food and Agriculture (2023), and an award from the Egyptian Minister of Agriculture and Land Reclamation in 2024.

GENERAL NEWS

Retirement of Dr. Raymond K. Yokomi and Dr. Angelantonio Minafra

The Arab Society for Plant Protection would like to express its sincere appreciation to Dr. Raymond K. Yokomi and Dr. Angelantonio Minafra on their retirement after many years of dedicated scientific work and contributions to the field of plant pathology.

Dr. Raymond K. Yokomi is a highly regarded researcher in citrus diseases in the United States. With a scientific career spanning over five decades at the USDA Agricultural Research Service (USDA-ARS), he has made significant contributions to the research and management of several important citrus diseases. His work has primarily focused on Citrus tristeza virus (CTV) and Citrus Stubborn disease, as well as Huanglongbing (HLB) and the transmission of plant pathogens by insect vectors. His research has greatly enhanced citrus disease management and has provided valuable support to both researchers and the citrus industry.

Dr. Angelantonio Minafra, a senior researcher at the Institute for Sustainable Plant Protection, Italian National Research Council (IPSP-CNR) in Bari, Italy, has dedicated many years to studying viruses and viroids affecting Mediterranean woody crops, particularly grapevines, olives, stone fruits, and figs. His research has involved serological and molecular diagnosis, characterization of viral genomes, high-throughput sequencing (HTS), and other molecular diagnostic methods. He has also been an active member of the Closteroviridae Study Group of the International Committee on Taxonomy of Viruses (ICTV) and the International Council for the Study of Virus and Virus-like Diseases of the Grapevine (ICVG), making substantial contributions to plant virology research and fostering international scientific collaboration.

On this special occasion, the Arab Society for Plant Protection extends its heartfelt gratitude to Dr. Yokomi and Dr. Minafra for their many years of scientific dedication and their invaluable contributions to the plant pathology community. We wish them good health, happiness, and all the best in the years to come.

International Conference on Biotechnology and Sustainable Agricultural Development (ICBSAD 2026), Faculty of Agriculture – Cairo University.

The Faculty of Agriculture – Cairo University is pleased to announce the International Conference on Biotechnology and Sustainable Agricultural Development (ICBSAD 2026), scheduled to be held from 9 to 12 November 2026 at the Library and Information Center, Faculty of Agriculture – Cairo University.

The conference is held under the patronage of:

- Prof. Dr. Mohamed Sami Abdel Sadek, President of Cairo University.

Under the supervision of:

- Prof. Dr. Mahmoud El-Saeed, Vice President for Postgraduate Studies and Research.

Managed and implemented by:

- Prof. Dr. Ayman Yehia Amin, Dean of the Faculty of Agriculture – Cairo University.
- Prof. Dr. Neveen Bahaa El-Din Talaat, Vice Dean for Postgraduate Studies and Research.

The conference aims to bring together a distinguished group of scientists, researchers, experts, and innovators from around the world to exchange knowledge and experience and discuss the latest scientific developments and trends in biotechnology and sustainable agricultural development. This will contribute to strengthening international scientific cooperation and supporting innovation to achieve the Sustainable Development Goals.

For more information about the conference, its scientific themes, and registration and participation procedures, whether by delivering a research paper as an Oral Presentation or presenting a scientific poster as a Poster Presentation,

please visit the conference website: https://icbsad.conferences.ekb.eg/

For inquiries and further communication, please contact the organizing committee by email:

ICBSAD@agr.cu.edu.eg

We look forward to your active participation and distinguished scientific contributions to this important international event.

General Directorate of Agricultural Research and Policies (TAGEM) – Türkiye

The General Directorate of Agricultural Research and Policies (TAGEM), operating under the Ministry of Agriculture and Forestry of the Republic of Türkiye, is the country's leading public institution for agricultural research, innovation, and technology development.

TAGEM coordinates a nationwide network of research institutes covering crop production, livestock, fisheries and aquaculture, plant health, animal health, food and feed, soil and water resources, agricultural biotechnology, climate-smart agriculture, and genetic resources. Through scientific research and innovation, TAGEM supports sustainable agricultural development, food security, climate resilience, and the competitiveness of Türkiye's agricultural sector.

As an active partner in international research and development, TAGEM collaborates with leading global and regional organizations, including CGIAR Centers, FAO, IAEA, AARINENA, and numerous universities and research institutions. TAGEM plays a key role in advancing regional cooperation, knowledge exchange, and capacity building across Europe, Central Asia, the Near East, and North Africa.

Bornova Plant Protection Research Institute

The Bornova Plant Protection Research Institute, operating under the General Directorate of Agricultural Research and Policies (TAGEM) of the Ministry of Agriculture and Forestry of the Republic of Türkiye, is one of the country's leading research institutions in plant health, integrated pest management, and biological and biotechnical control. The Institute conducts national and international research projects focusing on monitoring plant pests, developing biological and biotechnical control methods, managing quarantine pests, protecting plant health, and promoting sustainable agricultural production. In addition, through collaboration with public institutions, universities,

and international organizations, the Institute carries out training, technology transfer, and capacity-building activities, making significant contributions to Türkiye's research and implementation capacity in plant protection.

Within the Institute, the Biotechnical Control Laboratory successfully implements the Sterile Insect Technique (SIT), an environmentally friendly and sustainable approach for managing the Mediterranean fruit fly (*Ceratitis capitata*). Established through international cooperation with the Joint FAO/IAEA Centre, the programme has enabled the operational implementation of genetic sexing strain mass rearing, irradiation-based sterilization, quality control procedures, and field releases of sterile male insects in Türkiye. The programme also includes continuous population monitoring, evaluation of release effectiveness, and scientific studies supporting area-wide integrated pest management.

During the AARINENA Online Technical Seminar on "Irradiation Applications in Sterile Insect Technique (SIT) Programs for *Ceratitis capitata*", held on 14 July 2026, Dr. Ümran Akkan Demirer, representing the Bornova Plant Protection Research Institute, presented the operational experience of Türkiye's Sterile Insect Technique programme, including mass rearing, sterilization, quality control, and field application activities.

Nuclear Energy Research Institute (NÜKEN)

The Nuclear Energy Research Institute (NÜKEN), operating under the Türkiye Energy, Nuclear and Mineral Research Agency (TENMAK), conducts research in strategic fields such as energy, nuclear technology, mining, and particle physics. NÜKEN is Türkiye's leading institute in ionizing radiation, particle accelerators, nuclear energy, and nuclear technology, promoting the safe and beneficial use of these technologies for both society and the environment.

Located at the NÜKEN Ankara campus, the institute houses numerous specialized research laboratories. It also operates advanced radiation technology facilities, including a Proton Accelerator Facility, a Gamma Irradiation Facility, and an Electron Accelerator Facility. Through this state-of-the-art infrastructure, NÜKEN carries out research and development projects, as well as scientific and technical studies, in collaboration with national and international partners.

NÜKEN maintains active collaborations with leading international scientific organizations such as the International Atomic Energy Agency (IAEA), CERN, OECD Nuclear Energy Agency (OECD/NEA), and SESAME, participating in joint research projects, technical cooperation programs, and international agreements. In particular, the institute has played a pioneering role in Türkiye in promoting the application of nuclear techniques in agricultural research.

Within its agricultural research laboratories, NÜKEN conducts studies that utilize nuclear techniques as powerful tools to address agricultural challenges that cannot be effectively solved using conventional methods alone. Research and training activities focus on a wide range of applications, including the Sterile Insect Technique (SIT), mutation breeding, nitrogen-15 (^{15}N) applications for soil fertility and plant nutrition, evaluation of disease resistance in mutant plant lines, and the implementation of food irradiation technology in the food industry.

During the AARINENA Online Technical Seminar on "Irradiation Applications in Sterile Insect Technique (SIT) Programs for Ceratitis capitata", held on 14 July 2026, Dr. Dilan Özmen, representing the TENMAK Nuclear Energy Research Institute, presented "Irradiation Technology for Sterile Insect Production: Dose Optimization and Quality Assurance."

Khalifa International Award for Date Palm and Agricultural Innovation

UAE Leads International Efforts to Develop Innovative Solutions to Combat the Red Palm Weevil

The Secretariat General of the Khalifa International Award for Date Palm and Agricultural Innovation, an affiliate of the Zayed Humanitarian Legacy Foundation, in cooperation with the International Affairs Office at the Presidential Court of the United Arab Emirates, participated in the semi-annual meeting of the Technical Steering Committee of the Coalition for Red Palm Weevil Control (C4RPWC). The meeting was hosted in the Kenyan capital, Nairobi, from July 21–24, 2026, with the participation of an elite group of international experts and researchers. The meeting reviewed the progress achieved in research and innovation programs and discussed the development of the first integrated package of scientific solutions and applied technologies for the sustainable management of the red palm weevil, contributing to the protection of date palms, the enhancement of food security, and the support of sustainable agriculture globally.

Overview C4RPWC Biannual Technical Steering Committee Meeting

Mohamed EL- Said El - Zemaity

The biannual meeting of the Technical Steering Committee (TSC) of the Consortium for Red Palm Weevil Control (C4RPWC) was held in Nairobi, Kenya, from 21 to 24 July 2026 at the International Center of Insect Physiology and Ecology (icipe) and International Livestock Research Institute **(**ILRI) campuses. The following individuals participated in the meeting alongside the program management team: C4RPWC TSC members, workstream leads, and donor representatives.

Program Management Team

Dr. Augusto Becerra, ICARDA (Program Director); Dr Mojeeb Stanikzai, ICARDA (Program Manager); Dr. Hamadttu Elshafie, ICARDA (Head of Technical Team)

Technical Steering Committee Members

H.E. Prof. Abdelouahhab Alboukhari Zaid (Advisor on RPW testing in the UAE); Dr. Saâdia Lhaloui (Advisor on RPW testing in Morocco); Prof. Mohamed El - Said El - Zemaity (Advisor on RPW testing in Egypt); Dr. Bernhard Loehr Advisor to WS1 (Climate-resilient biobased management); Dr. David Morris Johnston-Monje Advisor to WS2 (Biotechnological innovations), Prof. Gerrit Hoogenboom Advisor to WS3 (Digital innovation); Dr. Romeno Faleiro Advisor to WS4 (GAP in palm systems); Dr. David J. Spielman Advisor to WS5 – Socioeconomics, adoption, and scaling.

Workstream Leads

Dr Samira A. Mohamed, icipe Workstream lead 1 (Climate-resilient biobased management); Dr Leena Tripathi, IITA Workstream lead 2 (Biotechnological innovations); Dr. Mukund Patil, ICRISAT Workstream lead 3 (Digital innovations). Dr. Mohamed Ali Bob, ICBA Workstream lead 4 (GAP in palm systems); Dr. Hamadttu Elshafie, ICARDA Head of Technical Team and Workstream lead 5 (Pathways to scaling)

Donor (UAE) Representatives

Fatema Almulla - Senior Specialist, Development, UAE Presidential Court; Shatha Alaydaroos - Project Study and Development Specialist, UAE Presidential Court

Support Staff

Samar Negida, ICARDA (Communication and Knowledge Management Officer); Wael El-Gaaly (Accountant, ICARDA).

The Consortium for Red Palm Weevil Control (C4RPWC) is a global research-for-development partnership led by the International Center for Agricultural Research in the Dry Areas (ICARDA) and funded by the International Affairs Office of the UAE Presidential Court and the Gates Foundation. The consortium brings together international research centers, universities, government institutions, private sector partners, and national organizations to develop science-based, environmentally sustainable, and scalable solutions for the containment and control of Red Palm Weevil (RPW). C4RPWC is organized around five interconnected workstreams that collectively transform scientific knowledge into practical solutions for Red Palm Weevil (RPW) management (WS1: Climate-Resilient, Bio-Based RPW Management; WS 2: Biotechnological Innovations for RPW Control; WS 3: Digital Innovation and Big Data Analytics; WS 4: Good Agricultural Practices (GAP) for RPW Management; WS 5: Translating Research to Action – Pathways to Scaling).

The meeting objectives include: Review the Consortium's progress during its first year of implementation; Provide scientific and technical guidance on ongoing research and implementation activities; Engage with Workstream Leads to strengthen collaboration and integration across the Consortium; Visit the laboratory and research facilities of our Consortium partners in Nairobi; and Develop recommendations for the Program Management Team and the Founding Committee to guide the next phase of implementation. The C4RPWC also seeks to end the IPM Solution Bundle. This first iteration of the C4RPWC Solution Bundle provides farmers, extension services, municipalities, and RPW management programs with a package of technologies and practices that are available today or sufficiently validated for field use. The bundle represents the consortium's current recommendations based on scientific literature, technology assessments, field validation activities, and practical experience. It is intended to support immediate action while additional innovations emerging from the consortium's research pipeline continue to be developed, validated, and integrated into future versions of the Solution Bundle.

Congratulations

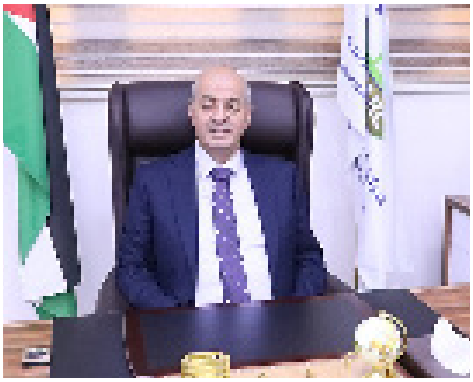
Dr. Nizar Haddad, Incoming Director General, ICARDA

The Arab Society for Plant Protection, its editorial board and members, congratulate our colleague Dr. Nizar Haddad, former Director General of the National Center for Agricultural Research in Jordan and Director of the Food and Agriculture Organization (FAO) in the Kingdom of Saudi Arabia, on his appointment as Director General of the International Center for Agricultural Research in the Dry Areas (ICARDA).

We pray to the Almighty to provide the Near East and North Africa region with the agricultural renaissance it deserves, particularly in developing crop cultivation in dry areas, and for ICARDA to restore the glory it enjoyed when its headquarters was in Aleppo, Syria.

His professional and administrative career and qualitative contributions enable him to advance agricultural research and achieve sustainable food security at regional and international levels.

Dr. Zakaria Abdullah Musallam



The Arab Society for Plant Protection extends its heartfelt congratulations to Dr. Zakaria Abdullah Musallam on his appointment as the Acting Director General of the National Center for Agricultural Research in the Hashemite Kingdom of Jordan.

This appointment is a testament to his scientific and administrative competence, as well as his extensive experience in serving the agricultural sector and advancing scientific research. The Society, along with all its members, expresses pride in and appreciation for his efforts to support plant protection and his significant contributions to addressing various pest issues affecting palm trees in the region.

ASPP wishes him continued success in his new role, which will undoubtedly strengthen agricultural research and benefit the agricultural sector in both Jordan and the Arab world.

Dr. Yassin Ibrahim Al-Nassan

The Arab Society for Plant Protection has the honor to extend its warmest congratulations and most sincere wishes to Dr. Yassin Ibrahim Al-Nassan on assuming his duties as Director General of the General Commission for Scientific Agricultural Research in Syria. While taking pride in Dr. Yassin as one of its members, the Society wishes him every success in utilizing his distinguished

scientific capabilities and extensive international expertise honed across both academic and applied spheres to lead the drive for progress and achieve a qualitative leap that elevates scientific agricultural research in Syria. We also look forward to his expected role in fostering cooperation and building effective scientific partnerships that support capacity building and direct innovation toward creating resilient agricultural systems that achieve food and environmental sustainability, with plant health as a vital pillar.

Academic Qualifications:

Dr. Yassin is a researcher and academic specializing in plant protection and biotechnology, possessing over twenty years of scientific and administrative experience in scientific research, laboratory management, business development, and international project management. He obtained his academic degrees as follows:

- **Postdoctoral Fellowship** in Microbiology, University of Sherbrooke, Canada (2017).
- **Ph.D.** in Plant Protection, University of Tuscia, Italy (2015).
- **Executive MBA**, Barito Business School, Sweden (2025).
- **Diploma and Master's** in Integrated Pest Management, International Centre for Advanced Mediterranean Agronomic Studies (CIHEAM - IAMH), Italy (2012).
- **Master's** in Plant Protection, University of Aleppo, in collaboration with the National Commission for Biotechnology and the International Center for Agricultural Research in the Dry Areas (ICARDA) , Syria (2011).
- **Postgraduate Diploma** in Plant Protection, Damascus University, Syria (2006).
- **Bachelor's Degree** in Agricultural Engineering (Specialization in Plant Protection), Damascus University, Syria (2004).

On August 3, 2026, the General Commission for Scientific Agricultural Research held an expanded meeting chaired by Director General Dr. Yassin Ibrahim Al-Nassan (via video conference), attended by the Commission's staff, including Deputy Directors General, department directors, and heads of research divisions and centers. During the meeting, several key topics were discussed, most notably:

- Reviewing the future vision of the Commission, alongside drafting the scientific research plan for the upcoming phase.
- Identifying challenges and setting scientific research priorities in both the plant and livestock agricultural sectors.
- Enhancing coordination and integration among various research departments to ensure the achievement of national objectives.
- Focusing on digital transformation and artificial intelligence to serve scientific research and the Commission's staff.

In his address, Dr. Yassin emphasized the need to direct efforts toward agricultural innovation, link scientific research and outputs to real-world field conditions, and transfer research outcomes directly to fields and farmers to advance Syria's agricultural sector.

Comprehensive Agricultural Center Concludes Integrated Pest Management Course for Medjool Date Palms

The Comprehensive Agricultural Center (CAC) has successfully concluded its training course entitled “Integrated Pest Management of Mejhool Date Palm Pests”, with the participation of a distinguished group of agricultural engineers, farmers, and stakeholders from the date palm sector.

The course was designed and delivered by Eng. Farah Shafiq Al-Naimat, with valuable contributions from Professor Dr. Ibrahim Al-Jboory, Dr. Zuhair Al-Balawneh, Dr. Mohammad Asad, and Eng. Ibrahim Al-Atrash, who enriched the training program with their extensive scientific knowledge and practical experience.The course covered the latest methods and technologies for the diagnosis and management of major date palm pests within the framework of Integrated Pest Management (IPM), contributing to improved production efficiency and the achievement of sustainable agricultural practices.

The Comprehensive Agricultural Center continues to offer specialized training programs in line with its mission of enhancing agricultural capacities and transferring knowledge and technology to professionals working in the agricultural sector.

The Workshop Addressed the Red Palm Weevil Pest and the Primary Pests Attacking Date Palms in Jordan

In cooperation with the Ministry of Agriculture and with support from the United Nations Development Programme (UNDP), the Jordanian Dates Association (JODA) held a concluding workshop yesterday, Tuesday, May 19, 2026. The workshop addressed the red palm weevil and other primary pests of date palms in Jordan in light of climate change.

The event took place at the Agricultural Engineers Association building in the Al-Karameh area, in the presence of the Director of the Central Jordan Valley Agriculture Directorate, JODA President Eng. Anwar Haddad, international experts in the field, specialists from the Ministry of Agriculture and relevant regional agriculture directorates, and date palm farmers. Participants discussed mechanisms for strengthening pest control plans and strategies.

Najran University Granted U.S. Patent for a Nanosensor to Detect Insecticides

Summary

Najran University has been granted a U.S. patent for a nanostructured sensor designed to detect the insecticide **imidacloprid**.

The sensor features **high sensitivity** and a **response time of less than 10 seconds**.

The innovation is intended to improve pesticide detection in aquatic environments and advance environmental monitoring applications.

Najran University has been awarded a new patent by the **United States Patent and Trademark Office (USPTO)** for the development of a highly sensitive **electrochemical nanosensor** for detecting the insecticide **imidacloprid**. The innovation was supported by the **Saudi Ministry of Education** through its Institutional Funding Program.

The patented technology is based on a **hybrid nanocomposite** consisting of **silver nanoparticles deposited on porous carbon supported by locally sourced hematite ore**. The material was synthesized using a simple, low-cost wet chemical method. The sensor offers **high sensitivity, excellent selectivity, operational stability, a response time of less than 10 seconds, and can be reused repeatedly without compromising its analytical performance**.

The innovation aims to provide an advanced analytical tool for the **rapid and accurate detection of imidacloprid**, one of the most widely used insecticides in crop protection. It is capable of detecting **extremely low concentrations in aquatic environments** while minimizing interference from other chemical compounds, thereby improving the reliability of environmental monitoring and analytical measurements.

This achievement is part of the ongoing efforts of the **Center for Advanced Materials and Nanotechnology Research at Najran University** to develop cutting-edge applications in **advanced materials, nanotechnology, and environmental sciences**, and to produce innovative research solutions that address national development priorities while facilitating the transfer of scientific knowledge into practical applications with tangible societal impact.The patented invention was developed by the research team comprising:

- **Dr. Farid Abu Rajeh Haraz**
- **Dr. Mad Abu Rashid**
- **Dr. Mohed Faisal**
- **Dr. Saeed Al-Suraihi**
- **Dr. Mabkhout Al-Sayari**
- **Dr. Mohammed Jalalah**

International Dates Council Discusses Strategy to Enhance Partnership and Develop the Sector Globally

Riyadh, April 29, 2026

The International Dates Council (IDC) held a strategic workshop on April 29, 2026, in Riyadh, focusing on the future of the palm and dates sector, as well as partnership and investment opportunities with the private sector. The event drew broad international participation to discuss future partnership models, enhance the private sector's role in developing and sustaining this vital industry, and support its global market presence.

Dates as a "Superfood" and Economic Driver

Speaking at the workshop, Her Royal Highness Princess **Sarah bint Bandar bin Abdulaziz**, Executive Director of the International Dates Council, explained that this workshop comes at a time when the global food system is facing accelerating challenges."It has become essential to transition the dates sector from a traditional focus on production to achieving sustainable global competitiveness, especially given the growing global shift toward viewing dates as a 'superfood' and a promising economic driver that supports food security and promotes green economy trends."

International Experts Participation

The workshop sessions featured high-level discussions with the participation of prominent industry leaders and experts, including:

- **Dr. Mubarak Al-Suwailem:** Executive Director of Public Affairs at Milaf International Company (Kingdom of Saudi Arabia).
- **Anass Bachar:** Co-founder of Africa Organics (Kingdom of Morocco).
- **Dr.Ali Al-Araimi:** CEO of Oman Agricultural Development Company (Sultanate of Oman).
- **Chae Jawadi:** General Manager of Candor Foods (Republic of India).
- **Mohsen Boujbel:** Chairman of the Board of Boujbel Company (Republic of Tunisia).
- **Dr.Iman Al-Freidi:** General Manager of Strategy and Business Development.

A Strategic Roadmap: Key Recommendations

The sessions concluded with several key recommendations aimed at ensuring the sector's long-term sustainability:

- **Establishing a Joint Committee:** Forming a joint committee between the International Dates Council and private sector partners to identify partnership priorities, coordinate efforts, and monitor program implementation within a clear governance framework that balances strategic vision with practical execution.

- **The International Dates Observatory:** Supporting the initiative to establish the observatory in the **Kingdom of Bahrain** by enhancing data sharing and exchanging specialized studies.
- **Quality and Standards:** Adopting unified quality programs and standards, alongside launching joint global marketing initiatives to promote dates as a healthy and functional food product.
- **Global Advocacy:** Working toward adopting an **"International Year of Dates"** in cooperation with government entities and international organizations.
- **Manufacturing Innovation:** Enhancing development programs for innovative downstream and value-added industries based on data, while fostering the exchange of global expertise in this field.

CIHEAM Bari Education

A Great Day at CIHEAM Bari: Celebrating Talent, Diversity and Shared Futures for the Academic Year 2025–2026 **Diploma Awarding Ceremony** at CIHEAM Bari. Every diploma tells a story. A story of **#commitment**, **#growth**, **#interculturalexchange** and shared ambitions for a more sustainable future. Today, we celebrate the students who successfully completed the first year of our Master's programmes in: Integrated Pest Management of Fruit Trees and Vegetable Crops (IPM) Mediterranean Organic Agriculture (MOA) Sustainable Water and Land Management in Agricultural Ecosystems (W&L) 34 students from 10 countries, bringing together diverse **#experiences**, **#cultures** and **#perspectives** around a common goal: advancing sustainable agriculture and rural development across the Mediterranean, Africa and the Middle East. A particularly encouraging achievement is the growing participation of **#women** in our educational programmes, with 19 female students and 15 male students, reflecting our commitment to inclusive and equitable capacity building. A special moment of the ceremony is dedicated to the "**Confagricoltura Donna" Award**, celebrating talent, research and innovation in agricultural sciences. The award ceremony opened with remarks by Beatrice Brizzi, Director of **Confagricoltura** Puglia, followed by the introduction of the prize by Elisa Aquilano, President of Confagricoltura Donna Puglia. The award is presented to Hilda Kimata (Kenya) for her MSc thesis: "Designing and Validating a Low-Cost Capacitive LoRa-Based Sensor Node for On-Farm Smart Irrigation Applications" (AY 2024–2025). Her research highlights the role of innovation and digital solutions in addressing agricultural challenges, supporting more efficient and sustainable management of natural resources. The ceremony also recognise the achievements of the other candidates, who receive a certificate of appreciation: Rea Losha (Albania) – MOA programme, Sabrina Khemies (Algeria) – IPM programme, Wafa Bouhjar (Tunisia) – SARe programme. Beyond academic knowledge, these young professionals have built lasting connections, exchanged ideas across borders and strengthened the skills needed to address some of the most pressing challenges facing food systems, natural resources and rural communities. We are proud to accompany them on this path and look forward to seeing the impact they will create in their countries and communities. Congratulations to all our students. Your achievements are our greatest success. https://l1nk.dev/zl8i7xe

Announcement: Argelander Career Talk at the University of Bonn

Title: Inspiring the Next Generation of Scientists: Prof. Luma Al Banna's Argelander Career Talk

Target Audience: Doctoral Students, Postdocs, and Early-Career Researchers

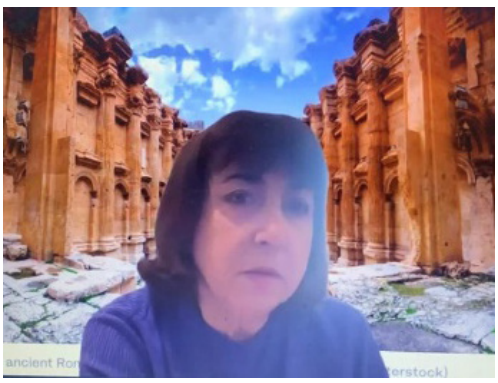
Dr. Luma Al Banna, a Professor in the Department of Plant Protection at The University of Jordan and the official ambassador of the University of Bonn in Jordan, recently (April 14, 2026) served as a keynote speaker in the Argelander Career Talk series at the University of Bonn, Germany. Drawing on her extensive tenure at The University of Jordan since 1996 and her deep administrative leadership, Prof. Al Banna dedicated this specialized session to empowering doctoral candidates and postdoctoral researchers.

Unlike general career services, this program at the University of Bonn focused on the Argelander pillars of Orientation, Qualification, and Financial Support, providing high-level strategic guidance for those transitioning into specialized roles within and outside of academia. Prof. Al Banna's journey serves as a roadmap, from her Ph.D. at UC Davis as a Fulbright Scholar to her sabbatical at the University of Bonn (2013–2014). Over the last four years, she has remained a vital link between the two regions, participating in the Annual Ambassadors Workshops, International Days (2024, 2025), and the Ceremonial Opening of the Academic Year in Bonn.

Strategic Career Advice for Young Researchers:

- **Seek International Mobility:** Leverage prestigious global fellowships early in your career to establish a diverse scientific network.
- **Adopt a Multidisciplinary Approach:** Integrate traditional foundational knowledge with modern innovative tools and cross-disciplinary technologies to address complex research challenges.
- **Publish with Purpose:** Prioritize research and publications that provide tangible value to both the scientific community and local policy frameworks.
- **Balance Leadership with Science:** Embrace administrative roles to strategically shape the future of your field. Prof. Al Banna's own leadership includes serving as Department Head for 10 years, Assistant Dean for Alumni (2 years), and Assistant Dean for Community Services. She also emphasized the impact of coordinating JICA training courses, serving as the IREX Focal Point for Employment Readiness, and her current year of service as the School Coordinator for Employment Readiness.
- **Expand Your Global Footprint:** Actively pursue international and local collaborations to amplify the reach and impact of your scientific contributions.

Department of Plant Protection Hosts International Guest Lecture by UC Riverside Professor on Global Bacterial Plant Pathogens



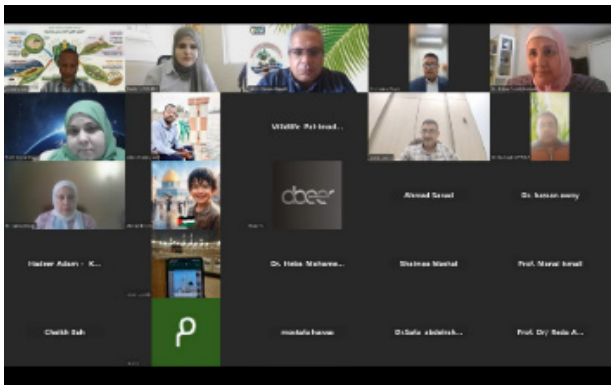
The Department of Plant Protection at the School of Agriculture, The University of Jordan, recently hosted a highly successful online guest lecture on Monday, June 1, 2026, at 8:00 PM (Amman Time) via Zoom. The event was organized as part of the advanced course *Ecology and Management of Plant Diseases*, instructed by Prof. Luma Al Banna, in close coordination with the school's Community and University Committee. The distinguished

seminar, titled "*Xylella fastidiosa* and *Candidatus* Liberibacter: Fastidious bacteria driving global crop disease," was delivered by our honorary professor, **Prof. Isgouhi Kaloshian**, a world-renowned plant pathologist from the University of California, Riverside.

During the advanced seminar, Prof. Kaloshian provided invaluable scientific insights into two of the most critical bacterial threats endangering global agriculture today. A major focus of her presentation was dedicated to Citrus Greening (Huanglongbing), where she comprehensively illustrated its profound economic importance, its devastating impact on global citrus production, and the latest modern integrated management strategies required to combat its vector-borne spread. The lecture offered an exceptional opportunity for attendees to explore cutting-edge concepts in plant pathology, disease ecology, and contemporary agricultural biosecurity under the guidance of a leading international expert.

The virtual event witnessed an outstanding turnout, fostering a vibrant and high-level scholarly exchange that reached a truly global audience. The diverse assembly brought together faculty members and academic staff from The University of Jordan, alongside dedicated graduate and undergraduate students. Crucially, the seminar attracted widespread interest beyond the university gates, welcoming researchers and engineers from the Ministry of Agriculture, as well as prominent agricultural professionals and stakeholders representing both the public and private sectors. Reflecting the international reach of the seminar, professional plant pathologists also joined the session from Lebanon, Germany, Canada, the United States, Sudan, and Algeria; this international cohort included distinguished former visiting professors to Jordan, proud alumni of our university currently working abroad, and esteemed international colleagues. The School of Agriculture and the Community and University Committee extend their deepest gratitude to Prof. Isgouhi Kaloshian for sharing her expertise and to all the colleagues, students, and external sector partners whose active participation contributed to the success of this vital international academic exchange.

Scientific Webinar on Biodiversity and Its Role in Biological Control



The Association of Agricultural Research Institutions in the Near East and North Africa (AARINENA), in collaboration with the Plant Protection Research Institute – Agricultural Research Center (ARC) in Egypt, organized a scientific webinar entitled **"Biodiversity and Its Impact on the Role of Biological Control"**, held virtually via Zoom.

This event was part of AARINENA's ongoing efforts to strengthen scientific collaboration and foster knowledge exchange in the field of sustainable biological control. It brought together a distinguished group of experts and researchers from the region to highlight the critical role of biodiversity in supporting sustainable agro-ecosystems and enhancing food security.

Speakers:

The webinar featured several specialized researchers from Egypt. Prof. Dr. Hosam ElGepaly (B.C. Dep.) discussed the role of biodiversity in the biological control of the Fall Armyworm. Dr. Ahmed Saeed Sand (Vegetable and Aromatic Plant Mites Dep.) spoke about the role of actinomycetes in biological pest control. Prof. Dr. Rasha Zeinhem (Stored Products Pest Department) addressed major stored-product pests and their control strategies

Prof. Dr. Amira Nagm (Horticulture Pest Department) presented on the most important insect pests affecting fruit crops in Egypt.

Dr. Karim El-Shaarawy highlighted the Date Palm tree as a habitat for both pests and natural enemies.

The session was moderated by Prof. Dr. Salwa Abdel-Samad, a Professor of Biological Control and Integrated Pest Management and a Plant Protection expert at the Agricultural Research Center (ARC) in Egypt. She played a key role in coordinating and enriching scientific discussions on the importance of biodiversity for enhancing biological control strategies and promoting agricultural sustainability.

This activity is part of a series of events organized by AARINENA to promote regional cooperation in agricultural research and disseminate knowledge on sustainable environmental solutions to address pest challenges in the Near East and North Africa region.

The full recording of the webinar is available on AARINENA's official YouTube channel via the following link:

https://youtu.be/eD8ub4Te03M?si=6fTaybzlU0xf7g7R

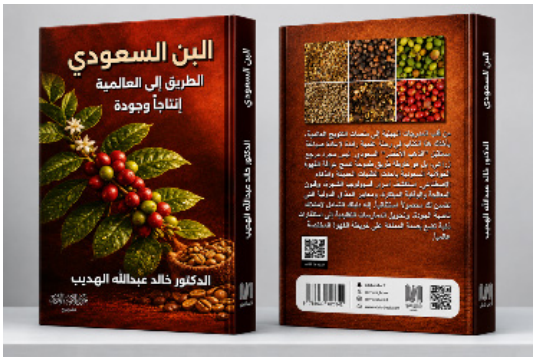
BOOKS

Integrated Pest Management in the Era of Climate Change and Artificial Intelligence

Spanning 446 pages and seven core chapters, this book addresses the Integrated Pest Management (IPM) system from a renewed scientific perspective that fully accommodates the consequences of climate change and the applications of artificial intelligence. Chapter One establishes the conceptual foundations of integrated crop management and fertilization management as a control tool. Chapter Two examines the mechanisms of ecological imbalance driven by climate change, the shifting epidemiological maps of insect pests, and the biodiversity implications of chemical control, alongside a technical review of chromatic traps and their AI-assisted enhancement. Chapter Three delves into the integrated management of insect pests specifically — from early monitoring and scouting to entomopathogen applications, bioeconomic models, and a detailed applied case study on the management of the red palm weevil (Rhynchophorus ferrugineus). Chapter Four theorizes plant disease from a strategic standpoint, employing the disease triangle and disease tunnel models, and examines the genetic basis of host–pathogen interactions, resistance concepts, and economic threshold determination. Chapter Five is dedicated to weeds and the challenges of their biological control, while Chapter Six develops the philosophy of plant defense, induced resistance responses, and genetic modification mechanisms. The framework is crowned by Chapter Seven, which embodies the digital transformation of IPM — proposing a global early-warning protocol and presenting AI-supported integrated management programs for two applied models: seed and seedling damping-off, and aphid infestation on wheat. The book constitutes a rare Arab academic and field reference that addresses university faculty, researchers, and advanced practitioners alike. [Prof. Fadhel Abd Al-Hussein Khalil Al-Fadhl, Prof. Akram Ali Mohammed Al-Khuza'li, Prof. Ahmad Mohammed Hussein, First Edition, 2026].

Saudi Coffee: The Path to Global Recognition in Production and Quality

Dr. Khalid Abdullah Alhadeeb – Saudi Arabia, 2026



In Saudi Arabia, the coffee tree embodies a unique story of harmony between the people and the land, as well as a cultural and economic legacy that spans centuries across the Arabian Peninsula. For hundreds of years, this tree has been intrinsically linked to the national identity. Today, it is transforming from a mere traditional cultivation passed down through generations into a promising strategic sector that strongly contributes to shaping the Kingdom's economic future, in line with the ambitious goals of Vision 2030.

The Saudi coffee industry is concentrated in the southwestern region, specifically in the towering highlands ranging in elevation from 800 to 2,000 meters above sea level. This unique geography and distinctive climate give authentic Saudi Kholani coffee its luxurious aromatic characteristics and rare flavor, which today qualify it to take center stage at specialty coffee events worldwide.

To achieve these aspirations, this book » Saudi Coffee: The Path to Global Recognition in Production and Quality » has been designed to serve as a comprehensive technical and practical guide for every farmer, investor, and aspiring entrepreneur in the Saudi coffee sector, designed to bridge the gap between traditional practices and modern agricultural science, while providing specialized knowledge ranging from plant physiology to standard propagation techniques and grafting. This guide emphasizes the importance of the "Arabica" variety, which is well-suited to Saudi terrain, and covers the application of modern agricultural engineering systems, smart irrigation programs, and advanced fertilization techniques.

Modern technology is also deeply integrated into the landscape, as digital transformation emerges as a guardian of coffee fields, utilizing remote sensing and artificial intelligence in the early detection of tree pests and seedling diseases. This also enables rapid intervention that preserves ecological balance and farm sustainability.

In the value-added sector, farmers implement critical protocols starting with the selective harvesting of cherries at their optimal ripeness, followed by using advanced processing methods, including the natural, washed, and honey processes, to transform them into green coffee. The final product is sorted and graded according to internationally recognized sorting and grading standards, along with meticulous cupping evaluations and professional storage that ensures the coffee beans remain at the peak of their aromatic quality throughout their journey through the supply chain.

Today, the strategic focus on the future of "green gold" in Saudi Arabia is backed by knowledge and innovation, transforming Saudi Kholani coffee, a symbol of local hospitality, into a leading national product that competes in international markets and carries the Saudi identity to the world.

Plant Protection and Phytosanitary Directorate News – Q1-2026, Ministry of Agriculture, Jordan

Date Palm Pest Control Campaign (Dubas Bug and Scale Insect

The Jordanian Ministry of Agriculture, through the Directorate of Plant Protection and Phytosanitary, in cooperation with the Jordan Valley and Northern Ghor Directorates of Agriculture, implemented a control campaign against date palm pests (white scale insect and Dubas bug) in the Jordan Valley region. Conducted between June 7 and June 18, 2026, the campaign is part of ongoing efforts to curb the spread of these pests, prevent sudden outbreaks, and stop their transmission to other regions. These measures aim to safeguard the Jordanian palm sector,

which is highly promising, from substantial economic losses. The campaign's activities covered a total area of 4,591 dunams, benefiting 129 farmers. This was achieved by providing appropriate control supplies to smallholders and farms lacking adequate equipment, while supervising control operations across larger farms. A total of 106.5 liters of specialized pesticides, provided by the Ministry of Agriculture, were used during the campaign.

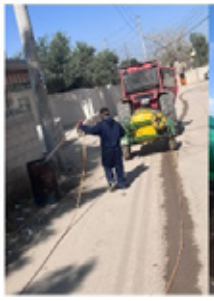



The First National Campaign for Housefly Control Launched in Deir Alla and Southern Shuna

The Directorate of Plant Protection and Phytosanitary, in cooperation with the Directorates of Agriculture, announced the execution of the "First National Campaign for Housefly Control," Implemented during the period from September 9-21/2026, covering a total area of 537.4 km^2 across the Deir Alla and Southern Shuna regions, with a specific focus on the Baptism Site and the Dead Sea hotel area. The campaign utilized an integrated, advanced control strategy that included liquid spraying of specialized pesticides in breeding hotspots and waste containers, morning and evening thermal fogging, and the application of newly formulated paint pesticides to walls in livestock barns and facilities, which proved highly effective.

Additionally, mechanical control was deployed by distributing 120 wooden traps to capture adult flies, alongside the integration of modern technology such as drones. The campaign resulted in the consumption of 3341.5 liters/kg of various pesticides, achieving a remarkable success with an 88.25% reduction in fly populations caught in monitoring traps compared to the same period last year, significantly improving satisfaction among visitors to the Baptism Site and Dead Sea hotels.




Red Palm Weevil campaign in the Azraq District.

The Directorate of Plant Protection and Phytosanitary and the Jordan Valley Agriculture Directorate carried out micro-injection operations and treated infested trees as part of the National Campaign to Combat the Indian Red Palm Weevil from April 25 to 29, 2026. During this period, 627 palm trees were inspected, and the 308 infested trees were treated with [...] liters of the specialized pesticide 'Erytor'. A total of 19 farmers benefited from this campaign."

The United Nations Development Program (UNDP) under the Global Environment Facility (GEF) Small Grants Program (SGP).

Ministry of Agriculture (Directorate of Plant Protection and Health, and the Agriculture Directorate of the Jordan Valley and Azraq) in cooperation with the Jordan Dates Association (JODA) within a project studying the efficiency of Red Palm Weevil management and control in the Hashemite Kingdom of Jordan. This covers the period from June 2025 until the end of May 2026, with support from the United Nations Development Program (UNDP) under the Global Environment Facility (GEF) Small Grants Program (SGP).

The project aims to limit the number of palm trees infested with the Red Palm Weevil, verify that control and inspection services reach the largest possible number of farmers—especially smallholders—and ensure the implementation of the unified national protocol for control across all palm farms, while evaluating its field effectiveness and efficiency.

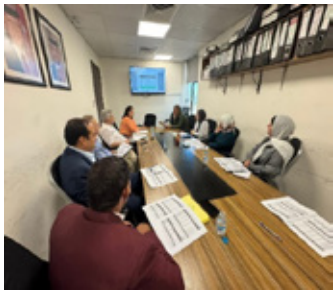
To achieve these goals, the project relied on an integrated system of field activities that included:

1. Organized awareness sessions and seminars to communicate the project's objectives. Held five sessions across various regions (Middle Ghor, Azraq, Southern Ghor, Northern Ghor, and Central Ghor), directly benefiting 206 farmers and specialists and aligning with the national plan's goals.
2. Carried out a comprehensive survey of palm farms using trained specialist teams to gather data on Red Palm Weevil infestation and monitor its spread.
3. Conducted re-inspection operations on farms and trees previously treated by Ministry of Agriculture teams to confirm the absence of re-infestation and evaluate the effectiveness of implemented control measures.

The project has concluded with several key recommendations, including: Key Recommendations upon Project Conclusion:

1. Adopt Advanced Detection Technologies: Replace traditional sensory inspection methods with modern, early-detection technologies to improve accuracy and efficiency.
2. Regulate Offshoots and Nurseries: Ensure all processes involving the uprooting, transportation, and nursery establishment of offshoots are subject to direct supervision and licensing by the Ministry of Agriculture directorates in all regions. This measure guarantees pest-free status before any domestic or international distribution.
3. Implement Disposal Protocols: Rigorously follow the approved destruction and incineration protocol for infected trees as an essential part of the master action plan.
4. Accelerate Digital Transformation: Rapidly develop a unified digital database for all stakeholders, incorporating geospatial positioning (GPS/GIS) for each farm. This system will record tree counts, varieties, and infestation history to enhance tracking capabilities and support early warning systems.






Participation of the Directorate of Plant Protection and phytosanitary in meetings and virtual sessions, where the participation included the following:

Within the framework of enhancing Jordan's participation in the work of the International Plant Protection Convention (IPPC), the Plant Health Department participated on June 24, 2026, in a training session on the Online Comment System (OCS). The session introduced participants to the process of submitting and managing comments on draft international plant health measures in a unified electronic manner.

The session included a practical overview of key system functions, such as entering, reviewing, and tracking comments, which helps improve the efficiency of national contact points' and experts' participation in the international standards development process. It also provided an opportunity for participants to ask questions and share practical experiences with the system, thereby enhancing the quality and effectiveness of Jordan's contribution to the work of the International Plant Protection Convention.

Within the framework of Jordan's role in the Standards Committee of the Near East and North Africa Plant Protection Organization (NENA), the Plant Health Department participated in two virtual meetings on June 11-24, 2026, to prepare for the regional capacity-building workshop for the International Plant Protection Convention (IPPC).

The meetings focused on discussing the workshop's program and main pillars, reviewing the working group's action plan for 2026, and identifying the technical topics to be addressed during the workshop to align with the priorities of the region's countries and support the enhanced implementation of international standards for phytosanitary measures. The meetings also featured an exchange of views among team members on mechanisms to develop regional work and enhance coordination and cooperation among member states in preparing and reviewing international standards.

Stakeholders from the Housefly Department participated in the national online workshop on the use of vermicompost in sustainable agriculture, organized by the Arab Organization for Agricultural Development from June 14–16, 2026. The workshop aimed to impart the technical skills necessary for efficiently producing bio-organic fertilizers using earthworms and production units, and to apply these techniques in the field to reduce reliance on fertilizers and improve the quality of plant production.

Implementing Training Courses Related to the Olive Portfolio.

The Plant Protection and Phytosanitary Directorate Conducts 13 Training Courses on Integrated Pest Management for Olives Across All Governorates.

In cooperation with the Olive Directorate and in coordination with agricultural directorates across all governorates, the Plant Protection and Phytosanitary Directorate conducted a comprehensive series of official training courses spanning the Kingdom from north to south, aiming to enhance the skills and expertise of approximately 400 olive farmers and mill owners in proper agricultural practices to ensure high-quality production.

These courses, totaling 13 training sessions to date, focused on enabling participants to implement various Integrated Pest Management (IPM) methods, including agricultural practices such as pruning, fertilization, and tillage, alongside mechanical methods like using yellow sticky traps and food baits to monitor and control the olive fruit fly, while demonstrating scientific methods for their preparation, installation, and seasonal maintenance. Furthermore, the training emphasized using chemical pesticides only as a last resort and within the narrowest limits, to minimize the long-term harmful environmental impact of chemicals and preserve the beneficial insects (biological control agents) present in the agricultural ecosystem.

High risk of spreading of Tropilaelaps mercedesae in Eastern Europe, after new detection in Turkey

August 14, 2026

One of the emerging concerns for honey bee health is the reported occurrence and potential further spread of the mite *Tropilaelaps mercedesae* to Eastern Europe, especially after the video release by PHIRA-Science, on *the mite* detection by Dr. Asli Ozkirim on 26 July 2026. The footage was shared by Tirebolu beekeepers, and the location in the video is identified as Artvin region in Turkey near to Georgian border, where a quarantine had been initiated. Artvin is a legally designated isolated area where the *Apis mellifera caucasica* species is under genetic protection, which makes the finding even more important.

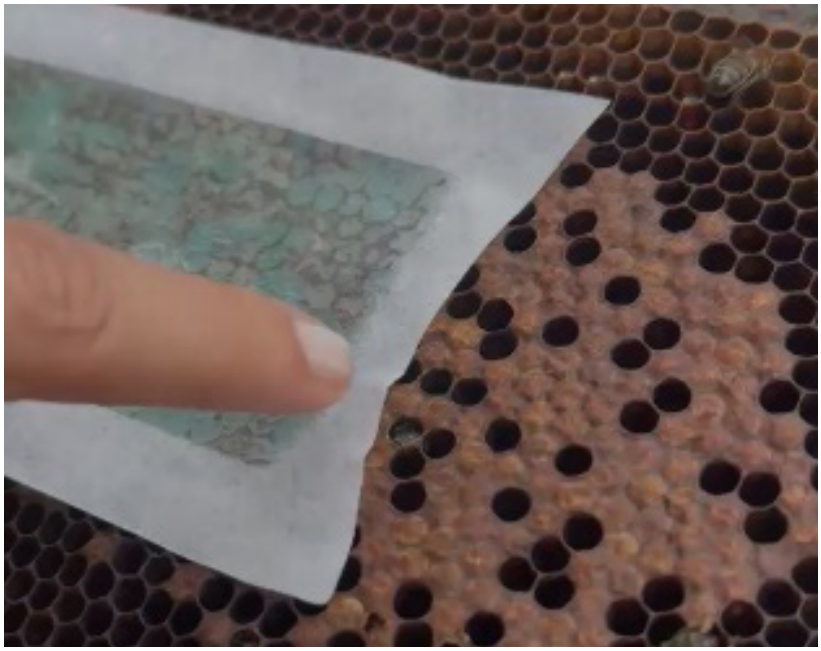
PHIRA- Science mentions: "This is not being presented as an official government confirmation of *Tropilaelaps* in Turkey, but is evidence of what was observed during this particular inspection".

However, the appearance of infestation in the colony shown in the video appears to be high, which might suggest the mite was present there for some time and is not a recent introduction. Detections have been previously reported in parts of Georgia (2024) and Russia (2025), while concerns have also been raised regarding its possible presence in Armenia, Azerbaijan and Iran. These reports underline the need for urgent and strengthened surveillance and preparedness, particularly in countries at risk of introduction.

In response to this situation, and in line with the recommendations previously issued by the Apimondia Working Group on Good Veterinary Practices in Apiculture, **Apimondia's Scientific Commission on Bee Health is proposing a set of practical coordinated actions with Apimondia members and relevant national authorities in Eastern European Countries and Asian Countries (to be announced soon)**. A hands-on training workshop in Kazakhstan on August 17-18 will also provide an opportunity to strengthen technical capacity and harmonize surveillance approaches.

The last updated map of *Tropilaelaps* mite is available here from ANSES: https://sitesv2.anses.fr/en/minisite/abeilles/geographical-spread-exotic-mite-tropilaelaps-spp-presence-suspected-belarus-and-0

We believe we should act now, without delay. The first countries to be alerted could be: Ukraine, Bulgaria, Belarus, Romania, Greece, Cyprus. We should reinforce the need for prevention, early detection, and rapid response as primary strategies.**Fani Hatjina, Chair of Bee Health Commission**



Selected Research Papers

- **Detection and Occurrence of Airborne *Xanthomonas hortorum* pv. *carotae* in Carrot Seed Production Systems.** Jeness C. Scott and Jeremiah K. S. Dung, Published Online:2 Mar 2026. https://doi.org/10.1094/PDIS-11-24-2472-SC
- **Monitoring the Occurrence and Distribution of Stewart's Wilt of Maize in Iran.** Hosna Alvandi, S. MohsenTaghavi, Sadegh Zarei, Maryam Ansari, Maede Heidari, Amal Fazliarab, Milad Aeini, Perrine Portier, and Ebrahim Osdaghi, Published Online:18 Feb 2026. https://doi.org/10.1094/PDIS-03-25-0509-SR
- **Use of Basic Substances and other Natural Compounds as Alternatives to Synthetic Fungicides for the Control of Grapevine Downy and Powdery Mildews.** Simone Piancatelli, Marwa Moumni, Gabriele Cantalamessa, Sarah Mojela Makau, Mehdiye Tunç, Yann Davillerd, Eva Pilar Pérez-Álvarez, Teresa Garde-Cerdán, and Gianfranco Romanazzi,Published Online:20 Feb 2026. https://doi.org/10.1094/PDIS-11-24-2480-RE
- **Extent of Stem Colonization of Spanish *Xylella fastidiosa* Strains in Olive: A Proximal Sensing Approach for Early Detection of Infection**. Miguel Román-Écija, Concepción Olivares-García, Blanca B. Landa, and Juan A. Navas-Cortés, Published Online:17 Feb 2026. https://doi.org/10.1094/PDIS-11-24-2327-RE
- **Evaluation of Organic Carriers for Field Inoculation of Brassica napus with Sclerotinia sclerotiorum.** Pippa J. Michael, Sarita J. Bennett, Rachael Crockett, Ashmita Rijal Lamichhane, and Mark C. Derbyshire, Published Online:16 Mar 2026. https://doi.org/10.1094/PDIS-03-25-0617-RE
- **Invasive Risk of *Solenopsis invicta* (Hymenoptera: Formicidae) in China under current and Future Climate change Scenarios.** Haroon, Riaz Hussain, Cai Wang, Shengnan Zhang, Eur. J. Entomol. 123: 136-147, 2026. DOI: 10.14411/eje.2026.014
- **Influence of Extreme Climatic Effects on Butterfly Assemblages in a Mediterranean Landscape, with New Records of threatened and Endemic Species.** Juan José LUCAS LÓPEZ, Juan Ignacio ARCE CRESPO , José María REY-BENAYAS, Eur. J. Entomol. 123: 122-133, 2026. DOI: 10.14411/eje.2026.012
- **An Investigation of the Presence of *Xylella fastidiosa* in Cicadomorpha Specimens Collected in different Habitats in Poland.** Monika Kałużna, Grażyna Soika, Wojciech Warabieda, Plant Protect. Sci., ,62(2):146-162, 2026. DOI: 10.17221/207/2024-PPS
- **Integrated Pest Management Strategies for Controlling Phthorimaea *(Tuta) absoluta*: Advances in Biological, Pheromone, and Cultural Control Methods**. Chen Zhang , Yu-Xin Wang , Xu-Dong Liu, Asim Iqbal, Qing Wang and Yu Wang, Insects, 17(4), 441, 2026. https://doi.org/10.3390/insects17040441
- **Insecticidal Evaluation of Spinosad against the Hide Beetle, *Dermestes maculatus* DeGeer (Coleoptera: Dermestidae).** Shakila Khatun Bristy, Md. Nadim Aktar, Ataul Ahad, Md.Saiful Islam, Paraskevi Agrafioti , Christos G.Athanassiou and Md.Mahbub Hasan, Insects, 17(4), 375, 2026. https://doi.org/10.3390/insects17040375
- **Evaluation of High-Efficacy Insecticides and Control Efficacy using UAV Application against the Sea Buckthorn Fruit Fly, *Rhagoletis batava obscuriosa***. Yang Zhou and Jipeng Jiao,Insects, 17(4),380, **2026.** https://doi.org/10.3390/insects17040380
- **Temperature Effects on the Virulence and Horizontal Transmission of *Beauveria bassiana* Against *Zeugodacus cucurbitae* with SIR Model Analysis**. Ying Fu, Jingpeng Xie, Zhongshi Zhou, Lang Fu, Jian Wen and Fengqin Cao, Insects 2026, 17(5), 475, 2026. https://doi.org/10.3390/insects17050475
- **Isolation, Identification and Measurement of Virulence Against the Potato Tuber Moth, Phthorimaea operculella, of Metarhizium robertsii ML-2.** Lingying Zhang, Zaotang Su,Yaning Wang, Zhao Qiu,Yijie Zuo,Yuhe Dai,Bin Chen and Guanli Xiao, Insects, 17(5), 474; 2026**.** https://doi.org/10.3390/insects17050474

Events of interest

September 06-09, 2026	Agbiol 2026. VIII. International Conference on Agricultural, Biological & Life Science, Istanbul, Turkey. www.agbiol.org
October 6-9 2026	17th International Agriculture Symposium "AGROSYM 2026", Bosnia and Herzegovina. https://agrosym.ues.rs.ba
November-2 De- 29 cember 2026	IV. International Biological and Life Sciences Congress (BIOLIC 2026) Porto Bello Hotel Resort & Spa, Antalya, Turkey. www.biolic.org
August 19-25, 2028	13th International Congress of Plant Pathology (ICPP) during on the Gold Coast in Queensland, Australia. https://www.icpp2028.org

SELECTED PEST AND INSECTS

Olive Psyllid Re-emerges as an Important Pest in Syria and Jordan During Spring 2026

Climate change has contributed to the resurgence of several insect pests that were previously kept in check by natural biological regulation. Of particular note is the olive psyllid, *Euphyllura olivina* (Costa, 1839) (Hemiptera: Psyllidae), which emerged as a significant pest during the spring growing season of 2026 in olive orchards across northern Syria, especially in the Harim and Salqin districts of Idlib Governorate, and in several olive-producing regions of Jordan. Another pest that regained prominence after years of limited importance is the olive moth, *Prays oleae*. Its resurgence coincided with olive psyllid outbreaks. The olive moth, a recognized Mediterranean pest with three annual generations, attacks leaves, flowers, and fruits, causing substantial yield losses under conducive conditions.

Given the olive tree's economic, ecological, and cultural value, the Arab Near East Plant Protection Bulletin (ANEPPB) has recently highlighted several important olive pests, such as the Olive Pit Scale, Olive Bark Beetle, and Olive Leaf Weevil. This issue emphasizes the olive psyllid as an "old but newly important" pest whose recent outbreaks merit renewed attention.

The olive psyllid is a principal pest of olive trees (*Olea europaea* L.) throughout the Mediterranean Basin. Its life cycle is closely aligned with spring phenology, particularly inflorescence development, flowering, and fruit set. Both nymphs and adults feed on sap from flower buds and young shoots, producing abundant white waxy secretions and honeydew. These exudates promote sooty mold development, disrupt pollination, reduce fruit set, and can negatively impact both yield and fruit quality. Infestation severity varies depending on climate, olive cultivar, orchard management practices, tree density, and the abundance of natural enemies. During seasons when favorable temperatures coincide with flowering, psyllid populations may increase rapidly, leading to economically significant damage.

Text and photos prepared by Professor Dr. Ibrahim Al-Jboory, © 2026,

Abundant Occurrence of *Melyris rostrata* (Coleoptera: Melyridae) on Globe Thistle (*Echinops* spp.) in Amman, Jordan

A high density of the brownish-red soft-winged flower beetle, ***Melyris rostrata*** (Reiche & Saulcy, 1857) (Coleoptera: Melyridae), was observed and collected during July 2026 in the Rabia district of Amman, Jordan, on flowering globe thistle (*Echinops* spp.) (Asteraceae). Globe thistle is a perennial Mediterranean plant characterized by its distinctive spherical, spiny blue-purple flower heads that bloom from June to July.

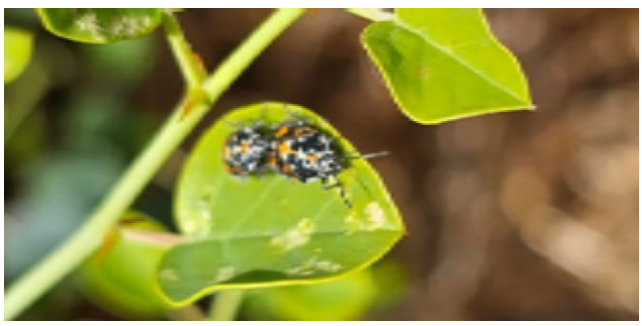
The flower heads of Echinops spp. attract numerous flower-visiting insects, including M. rostrata, which feeds primarily on pollen and nectar. Members of the family Melyridae are generally regarded as beneficial insects because they contribute to pollination and enhance local biodiversity. The remarkable abundance of adults on flowering globe thistle indicates a strong seasonal association between this beetle and its host plant in the Mediterranean environment.

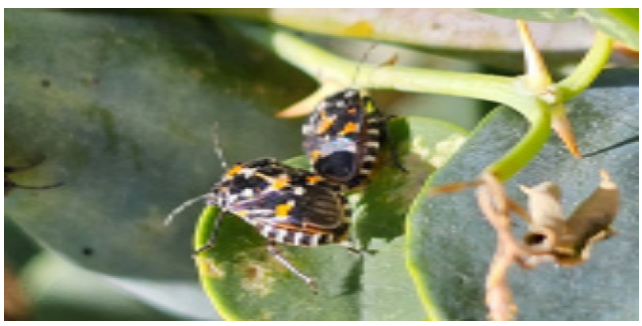
Text and photos prepared by Professor Dr. Ibrahim Al-Jboory, © 2026,

Variegated caper bug

The variegated caper bug (***Stenozygum coloratum*** [Klug, 1845]) is a true bug in the order Hemiptera and the family of stink bugs (Pentatomidae). Measuring 5 to 6 mm in length, it has a brightly colored shield on its back ranging from black to yellow and orange. It is commonly found in the Eastern Mediterranean region. Katbeh recorded it in 2000 during a survey of Heteroptera in Jordan and noted its presence in Iran and Eritrea, while Al-Jboory collected it in July 2026 in the Rabyia area of Amman. It specializes in caper plant species (genus Capparis) to complete its life cycle and reproduce, as adult insects require capers to trigger reproductive activity. When caper leaves dry out, the bug's nymphs and adults can migrate to alternative wild hosts and some crops and trees, such as sunflowers, tobacco, Cruciferae plants, citrus, and figs; however, it has not been recorded on these crops in Jordan, but rather on wild plants growing near the capers themselves. It is not considered an agricultural pest, but it sometimes leaves white scars on the leaves that can lead to leaf drop. Candan et al. (2021) studied the Morphology of Spermathecae and Eggs of ***Stenozygum coloratum***. The caper plant is also attacked by another bug species, the painted bug (***Bagrada hilaris*** (Burmeister), which was recorded by Al-Jboory in Iraq in 2003.

Text and photos prepared by Professor Dr. Ibrahim Al-Jboory, © 2026,





The Editorial Board of The Arab and Near East Plant Protection Bulletin greatly appreciates the contributions of several Arab scientists in this issue.

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