



Food and Agriculture
Organization of the
United Nations

ARAB AND NEAR EAST PLANT PROTECTION BULLETIN ANEPPB

ISSUE 96 December, 2025



الجمعية العربية لوقاية النباتات
ARAB SOCIETY FOR PLANT PROTECTION

ARAB AND NEAR EAST PLANT PROTECTION BULLETIN (ANEPPB)

ISSUE 96 December, 2025

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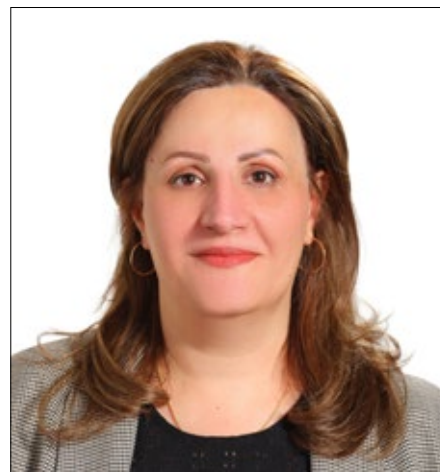
EDITORIAL: Monitoring Vegetation Stress and Health Disturbances: A Remote Sensing Perspective	4
CROP PROTECTION NEWS FROM ARAB AND NEAR EAST COUNTRIES	7
» INVASIVE, NEW PESTS AND NATURAL ENEMIES	7
» RESEARCH HIGHLIGHTS	12
» GRADUATE STUDENT'S MSc AND PHD THESIS ABSTRACTS	34
Activities of the regional office of the Food and Agriculture Organization of the United Nations – Near East and North Africa	45
» FAO LAUNCHES 3RD GLOBAL WORKING CONFERENCE: STRENGTHENING RESILIENCE AND TRANSFORMING AGRIFOOD SYSTEMS	45
» Strengthening Plant Protection To Reduce Mycotoxins: One Health Imperative	46
» FAO Strengthens Plant Protection Systems to Support Food Security in the Arab World	48
» FAO trains 1,000 farmers, introduces innovative technologies, and sets the roadmap ahead.	51
» Regional Solidarity Strengthened as FAO and IPPC Conclude Plant Health Workshop in Oman	53
» Successful Conclusion of the SFDA and FAO “Hack4SaferPlates” to Advance Food Safety in the Near East and North Africa Region	56
» Hack4safeFood: Tackling food safety challenges	58
» IPPC Regional Workshop Opens in Oman to Strengthen Plant Health and Food Security	60
ACTIVITIES OF THE COMMISSION FOR CONTROLLING THE DESERT LOCUST IN THE CENTRAL REGION – FOOD AND AGRICULTURE ORGANIZATION	62
The International Maize and Wheat Improvement Center (CIMMYT)	70
ARAB SOCIETY FOR PLANT PROTECTION NEWS	74
» The 14th Arab Congress of Plant Protection, Algiers, November 3-7, 2025	74
» The Arab Impact Factor report for 2025 is out.	76
» School of Agriculture Faculty and Researchers Shine at the 14th Arab Congress of Plant Protection	77
» Participation of the ASPP Vice President, Dr. Ibrahim Al-Jubouri, in Community Service	78
ASPP MEMBER NEWS	79
Researcher Spotlight	84
General News	88
» National Center for Palms and Dates (NCPD) International Prize 2025	88
» National Celebration of the Jordanian Date Harvest Season in the Jordan Valley	89
» Scientific visit strengthens collaboration between the University of California and Jordanian institutions in clean plant programs	90
PLANT PROTECTION AUTHORITIES NEWS	93
CONDOLENCES, PLANT PROTECTION SCIENTISTS	97
SELECTED RESEARCH PAPERS	99
EVENTS OF INTEREST	100

Monitoring Vegetation Stress and Health Disturbances: A Remote Sensing Perspective

Plants form the foundation of terrestrial ecosystems and are essential for food security and sustaining the biodiversity that underpins resilient ecological and agricultural landscapes. Coordinated efforts to preserve their health while recognising their central contribution to agricultural production and ecological stability are essential. Yet, studies have shown that intensifying production often places considerable strain on natural ecosystems, contributing to soil degradation, biodiversity loss, and various forms of environmental contamination. Climate change adds further complexity. The growing occurrence and intensification of extreme weather events, such as droughts, heatwaves, severe storms, and extended wet and dry periods, affect not only cultivated crops but also rangelands, forests, and other types of natural and semi-natural vegetation. These disruptions hinder the capacity of landscapes to provide food, fibre, and ecosystem services essential for human well-being. As a result, achieving the Sustainable Development Goals, particularly SDG 2 and SDG 15, to achieve food security simultaneously while protecting the environment and sustainably managing and conserving natural resources, remains one of the most pressing challenges of our time.

Vegetation stressors

Across all vegetation types, plants are continually exposed to a wide range of stress factors, defined as any environmental condition or agent that adversely affects growth, physiological processes, or development. These stressors can be broadly categorised into two categories. Abiotic stressors include radiation extremes, salinity, prolonged flooding or waterlogging, lodging, drought, heat stress, elevated atmospheric CO₂, exposure to agrochemicals, chilling and freezing temperatures, nutrient imbalances, and heavy-metal contamination. Biotic stressors encompass pests, pathogens, and other biological agents, which are frequently intensified by primary abiotic stresses. Together, these pressures diminish vegetation function and productivity, leading to lower agricultural productivity, weakened



ecosystem functioning, increased risks of species extinction, and wider threats to global food security. Symptoms such as lesions, chlorosis, premature senescence, and wilting reflect underlying physiological damage in vegetation, ultimately impairing productivity and ecosystem functioning, and, in agricultural systems, reducing both quality and quantity of yield. While the modernisation of land-management practices and crop intensification strategies aim to increase biomass production and resource efficiency, they often heighten vulnerability to biotic stressors such as pests and pathogens, particularly in landscapes dominated by monocultures or simplified vegetation structures. Moreover, global trade and climatic shifts further exacerbate these challenges by facilitating the introduction, redistribution, and adaptation of invasive pests and diseases across new geographic areas. These escalating pressures underscore the need for innovative, rapid, and scalable approaches to monitor vegetation health and manage stressors more effectively.

Role of Biophysical and Biochemical Characteristics

Assessing vegetation productivity, health, infection, or stress conditions is ultimately about tracking how plants capture light, turn that into chemical energy, allocate that energy for growth, and defend themselves under pressure. Biophysical (e.g., canopy height, leaf area index (LAI) and fraction of absorbed

photosynthetically active radiation (fAPAR)) and biochemical characteristics (e.g., chlorophylls, carotenoids, anthocyanins, nitrogen, lignin) provide complementary, mechanistic windows into photosynthesis, growth, yield potential, and early warning of stress or disease by capturing the physiological disruptions.

Depending on the type of stress (caused by biotic or abiotic factors), the initial plant organs affected may vary (leaf, stem or bark, or roots). Yet, stress eventually leads to alterations in metabolic pathways, reduced photosynthetic efficiency, and disruptions in the transport of water and nutrients, which in turn limit the growth, development, and functioning of vegetation. For example, pathogens or insect infestations disrupt metabolic pathways, interfere with the stability of cellular components, and initiate defence reactions that leave measurable biochemical signatures. Early in the infection process, plants often exhibit shifts in chlorophyll and carotenoid concentrations, increased production of phenolic compounds, and elevated levels of reactive oxygen species, all of which reflect underlying stress responses. Biophysical characteristics add another dimension by revealing structural and functional changes that occur as stress is initiated and developed, changes that one may miss by merely considering biochemical characteristics alone. A concrete example is lodging in crops, where the stems weaken and begin to bend or fold. This process can be anticipated through biophysical changes such as modifications in canopy shape or reduced stem stiffness, well before the collapse becomes obvious in the field. Furthermore, alterations in stomatal behaviour or vascular impairment caused by stress factors often reduce transpiration, leading to measurable increases in leaf or canopy temperature. These changes usually emerge before visible symptoms appear, making them especially valuable as early indicators of plant health disturbances and the onset or progression of stress. Accordingly, systematic monitoring, assessment, and prediction of the dynamics of these characteristics on various scales are crucial for evaluating the functioning, productivity, and health of agricultural and natural ecosystems. Yet, measurements of these characteristics at high temporal and spatial scales are highly costly and, to some extent, impossible due to the rapid growth dynamics and phenological changes that can

occur over short periods.

Vegetation Dynamics and Remote Sensing

Remote sensing is vital for addressing these challenges and serves as a powerful source for detecting changes in vegetation condition and their biochemical and biophysical characteristics as early indicators of stress, emerging threats, or disturbances in vegetation cover. The non-destructive, repeated, and large-scale data acquisition capabilities of satellite sensors provide a viable alternative solution to support systematic monitoring and analysis of these dynamics, enabling timely management actions and mitigation strategies. Remote sensing data span a broad range of spectral regions, including visible, near-infrared, shortwave-infrared, thermal, and microwave domains. By examining data from different spectral domains, as well as data obtained across multiple platforms (satellites, airborne platforms, unmanned aerial vehicles (UAVs), and field sensors), with varying spatial resolutions, remote sensing technologies hold a great potential for detailed assessment of vegetation responses to various biotic and abiotic stressors such as detection of drought-induced water stress, lodging, malnutrition due to soil salinity or acidity, poor management practice, nitrogen deficiency or excess and the heightened incidence of disease or pest infestations associated with prolonged heat or wet periods. While satellites and airborne data provide extensive coverage, enabling large-scale monitoring and comparison across sites, species, and environmental conditions, field sensors and UAVs offer detailed, localised information that allows a deeper understanding of the intrinsic responses of individual plants to various stressors at different and subsequent phenological stages.

A substantial body of research has focused on quantifying vegetation's biophysical and biochemical characteristics to assess plant stress and health disturbances using remote sensing. While the launch of new hyperspectral satellite missions has advanced the capacity to assess changes in plant biophysical and biochemical characteristics caused by a wide range of stressors, the difficulty in distinguishing among stressors that produce, to some extent, similar physiological or spectral responses in plants remains. Plant stressors frequently exhibit synergistic interactions, wherein the presence of one stressor exacerbates the

vulnerability to others. For example, water deficit can weaken plants' physiological defense traits and internal functional responses, thereby increasing susceptibility to pathogens and herbivores, which in turn further impair their capacity to manage abiotic stress. The implications of such combined stressors on biophysical and biochemical characteristics, as well as corresponding remote sensing signatures, are complex and pose a constraint for current remote sensing approaches. While the use of field sensors and UAVs, owing to their high spatial and spectral resolutions, may allow, to some extent, the study of these overlapping signals at the field scale, technical challenges involved in their data acquisition and small-scale studies limit their applicability. This is mainly due to the fact that diagnostic models developed using remote sensing data for assessing a particular health disturbance or stress in a specific site may not be directly transferable to another site or season, as landscape heterogeneity and environmental conditions (neglecting the influence of the atmosphere) largely affect the dynamics of the remote sensing signals, restricting the generalizability of such models.

Future Directions

Addressing the shortcomings and complexities of using remote sensing data for monitoring plant health disturbances and stress requires further investigations to fully understand the influence of individual biotic and abiotic factors, and their multiplicative effects on the dynamics of vegetation's biophysical and biochemical characteristics, as well as their spectral signatures at the leaf and canopy levels. Such understanding is essential for improving the reliability of remotely sensed assessment of vegetation health disturbances and stressors. To enhance the generalizability and transferability of remote-sensing models for detecting plant stress, hybrid approaches that combine physical principles with data-driven learning are increasingly being adopted. These approaches integrate physical models, such as radiative transfer models that simulate how light interacts with vegetation, offering mechanistic insight into how stress-induced variation in biophysical and biochemical properties affects the remote-sensing signal, with machine learning models capable of capturing complex, nonlinear relationships within large datasets. Yet, selecting appropriate radiative transfer or machine-

learning algorithms and supporting them with extensive, high-quality field observations are needed to enhance the reliability of stress detection at multiple scales and across varying environmental conditions. High-quality field observations must be collected through dedicated field and laboratory experiments to thoroughly examine plant physiological processes under single and multiple stress factors, as well as their associated biochemical, biophysical, and spectral dynamics.

Freely available Earth-observation data from platforms such as Sentinel-2, whose red-edge spectral bands are particularly sensitive to vegetation condition, and Sentinel-1 synthetic aperture radar (SAR), which provides weather-independent measurements, offer frequent revisit cycles and are highly valuable for analysing temporal variations in vegetation spectral responses and indicating plant stress. These, in addition to data from thermal missions (e.g., ECOSTRESS and Sentinel-3) and the upcoming FLEX (Fluorescence Explorer) mission, will further assist in characterising plant stress by capturing complementary information on canopy temperature, fluorescence, and physiological responses.

Hyperspectral satellite missions, including EnMAP, DESIS, and PRISMA, also offer great potential. Their fine spectral resolution, presented with many narrow spectral bands, enables the detection of subtle variations in biophysical and biochemical characteristics in the early stress stage, thereby improving the capacity to assess diverse stressors. The upcoming hyperspectral missions, such as CHIME (Copernicus Hyperspectral Imaging Mission for the Environment), are expected to significantly advance the field of remote sensing of vegetation and plant health. With an anticipated high revisit time (one to two weeks once the full constellation is deployed), CHIME will provide free and substantially richer temporal records than previous spaceborne hyperspectral instruments. This enhanced data availability will support the development of sophisticated, intelligent models to detect and monitor vegetation stress and disturbances across diverse terrestrial ecosystems.

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Egypt

Tomato brown rugose fruit virus is officially confirmed in Egypt.

In Egypt, tomato brown rugose fruit virus (*Tobamovirus fructirugosum*, ToBRFV – EPPO A2 List) was first reported in 2019 on tomato (*Solanum lycopersicum*). Still, this record was considered invalid by the NPPO of Egypt (EPPO RS 2020/125). ToBRFV was later detected in capsicum samples collected in 2016-2017 (RS 2024/049), but further surveys were required to confirm its presence.

The NPPO of Egypt recently confirmed the presence of ToBRFV on its territory. During official surveys conducted in 2025, the virus was found in tomato fruit samples in the Fayoum and Ismailia governorates. The NPPO of Egypt is carrying out surveillance.

The pest status of tomato brown rugose fruit virus in Egypt is officially declared as: **Present, with limited distribution. [EPPO Reporting Service 2025 no. 8 – Diseases].**

Source: NPPO of Egypt (2025-08).

Pictures : *Tobamovirus fructirugosum*. <https://gd.eppo.int/taxon/TOBRFV/photos>

IRAQ

First record of *Trichoderma harzianum* as a potent biocontrol agent against red palm weevil *Rhynchophorus ferrugineus* (Olivier 1790) in Iraq.

The study reported the first record of *Trichoderma harzianum* as a biocontrol agent against Red Palm Weevil RPW (*Rhynchophorus ferrugineus*) in Iraq. This fungus was isolated from dead RPW larvae, which were sampled in Safwan region, Province of Basra in 2024. The isolate was identified morphologically. Microscopic examination revealed subglobose to globose conidia (1.2-1.7 µm) and flask-shaped phialides (8.70-9.85 µm). Molecular identification was conducted by using PCR amplification using ITS primers produced a 500 bp amplicon, sequenced, and deposited in GenBank under the accession number of LC859937. The sequencing analysis showed 100% similarity with an isolate of *T. harzianum* from China (MF669731).

The bioassay indicated the potential of *T. harzianum* as a biocontrol agent for red palm weevil management in Iraq. However, more research is requested to evaluate the efficacy of this isolate under the field conditions.

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First molecular record of *Thielaviopsis punctulata*, the causative agent of black scorch blight disease on date palms in Iraq.

A laboratory study was conducted on palm tree samples collected from Diyala Governorate, Iraq. The results of isolating and diagnosing samples exhibiting symptoms of black blight infection indicated that the fungus causing the disease is *Thielaviopsis punctulata*. This is the first record of *T. punctulata* as a causative agent of black blight in Iraq. Moreover, the results of the microscopic examination showed that the fungus forms endoconidia from Phialidic conidiophores and also produces aleuroconidia, thick-walled chlamydial spores. In addition, the results of testing the pathogenic ability of the isolates on date palm seedlings showed that all the isolates of the pathogenic fungus showed the ability to cause the disease, but with different percentages compared to the percentage of the disease, where it was 0 in the comparison treatment that was free of pathogenic fungus, and isolate GP2 excelled, as it gave an infection severity of 100%, followed by the two isolates GP0 and GP1, which gave an infection severity of 93.33 and 80%, respectively. [Mohammed NK Hantoosh¹ and Halima Z Hussein² (Iraq), ¹College of Agriculture, University of Diyala. ²College of Agricultural Engineering Sciences, University of Baghdad, 2025]. [doi:10.1088/1755-1315/1252/1/012020](https://doi.org/10.1088/1755-1315/1252/1/012020)

First report of *Alternaria burnsii* as a foliar pathogen of faba bean in Iraq.

The current study highlighted the potential pathogenicity of the causal fungus that causes leaf, stem, and pod spot disease in faba bean. The symptomatic leaves and pods of faba bean were collected from different areas around Basrah city, south of Iraq. The isolation procedure was performed on PDA plates, followed by morphometric and microscopic identification. Briefly, a superficial white/orange-to-creamy mycelium was observed, with a circular, entire edge and a flossy-to-smooth, velvety morphology. The conidia were oval to oblong with 3-6 transverse septa, producing a set of 4-8 long-chain conidia. Molecular analysis of the ITS sequence confirmed the identity of the fungus; the fungus formed a distinct subclade within the *Alternaria burnsii* clade, and the ITS sequence was submitted to the NCBI under the accession number LC769966.1. Pathogenicity tests confirmed the virulence of *A. burnsii* on broad bean leaves under greenhouse conditions. First, disease symptoms were examined on young broad bean leaves five days post-inoculation. White necrotic spots appeared on the aerial parts of the broad bean, and each spot enlarged and coalesced to form necrotic lesions distinguished by black colour. The findings of this study revealed the pathogenicity of *A. burnsii* for the first time in the aerial parts of broad beans in Iraq. [Ofi, B.G., Y.A. Salih and M.H. Abass (Iraq). Arab Journal of Plant Protection, 43(3):304-309, 2025]. <https://doi.org/10.22268/AJPP-001330>

The first report of the fungus *Rhizoctonia solani* as a causal agent of root rot and seedling death of Indian Siris, *Albizia lebbek* in Karbala Governorate, Iraq and its biological and chemical control.

This study was conducted with the aim of isolating and diagnosing the fungus causing root rot and seedling death of *Albizia lebbek* (Indian siris), in the gardens of the College of Agriculture, University of Karbala, and its pathogenicity was tested under laboratory and greenhouse conditions. Four isolates were identified phenotypically: *Fusarium* sp. (F1, F2), *Alternaria* sp. (A1) and *Rhizoctonia solani* (R1). Isolate R1 was significantly superior to other isolates in reducing the germination rate of red radish seeds on water agar, which

reached 0% (100% inhibition) compared to the control treatment where seed germination was 100%. The results of the plastic pot experiment in the greenhouse also showed that the results were consistent with the laboratory experiment, where the R1 isolate was equally superior in reducing the germination rate of *A. lebbek* seeds. Molecular diagnosis showed that the most pathogenic isolate R1 belongs to the fungus *Rhizoctonia solani* and was deposited in the American GenBank under the accession number OQ102237. The results of the laboratory experiment also showed that the effectiveness of the fungus *Trichoderma koningiopsis* in combating the pathogenic fungus *Rhizoctonia solani* with an inhibition rate of 100%.

The results also showed the ability of the *B. velezensis* bacterium to inhibit the growth of the pathogenic fungus isolate on the PDA culture medium, and its highest effect was at concentration 10^{-1} on the growth of the pathogenic fungus, as the inhibition rate reached 95.2% compared to the control treatment 0%. The Beltanol fungicide treatment demonstrated superior efficacy against the pathogenic fungus, achieving infection severity rates of 20.33 and 15.66%, respectively. This was followed by the *R. solani* + *B. velezensis* treatment, which recorded 22.33 and 16.33%, respectively. The latter treatment did not show a statistically significant difference from the *R. solani* + *T. koningiopsis* treatment in reducing disease severity. However, it exhibited a significant difference in lowering both the infection percentage and severity caused by *R. solani*, which were recorded at 24.66% and 17.66%, respectively.

All these treatments significantly reduced infection percentage and severity compared to the *R. solani* alone treatment, which exhibited the highest infection rates of 76.8 and 55.66%, respectively, relative to the control treatment. [Abdalmoohsin, R.G., N.A. Al-Ghazali, A.B. Abu-Duka, and B.A.N. Gamaz. (Iraq). Arab Journal of Plant Protection, 43(3): 292-299, 2025]. <https://doi.org/10.22268/AJPP-001328>

First report of Cotton leaf curl Gezira Alphasatellite and Okra leaf curl Alphasatellite infecting Okra (*Abelmoschus esculentus*) in Iraq.

During the 2023 growing season, a field survey in Al-Yusufiyah, Baghdad, Iraq, revealed typical viral symptoms in okra, with a 30% disease incidence and high whitefly (*Bemisia tabaci*) infestation. Thirty symptomatic samples underwent molecular analysis, including RNA extraction and high-throughput sequencing. Bioinformatics and BLASTx analysis identified a begomovirus complex consisting of Cotton leaf curl Gezira virus (CLCuGV), its associated betasatellite (CLCuGB), alphasatellite (CLCuGA), and Okra leaf curl alphasatellite (OLCuA), with 98%–99% identity to regional isolates. PCR and transmission assays confirmed infectivity and symptom reproduction in okra.

This study reports, for the first time in Iraq, okra as a natural host for CLCuGV and CLCuGB, alongside the presence of CLCuGA and OLCuA. These findings provide critical insight into the viral disease complex affecting okra and highlight the need for effective virus management strategies in Iraqi agriculture. [Mariam H. Al-Helu; Adnan A. Lahuf; Zuhair M. A. Jeddoa (Iraq); Zhongtian Xu; Junmin Li (China). Journal of Phytopathology, 173:e70125, 2025].

Saudi Arabia

First report of *Meloidogyne enterolobii* in Saudi Arabia

The root-knot nematode *Meloidogyne enterolobii* (EPPO A2 List) is reported for the first time from Saudi Arabia. In September 2023, tomato plants (*Solanum lycopersicum*) with stunting and yellowing symptoms were observed in tomato fields in Najran and Jazan regions (in the southern part of the country). Uprooting of plants revealed galled roots. The identity of the pest was confirmed using morphological and molecular testing. In the Middle East, *M. enterolobii* was so far only known to occur in Egypt where it was first reported in 2023 (EPPO RS 2023/140). [EPPO Reporting Service 2025 no. 8 – General].

Source:

Yusuf AG, Al-Yahya F, Saleh AA (2025) First report of guava root-knot nematode (*Meloidogyne enterolobii*) infecting tomato (*Solanum lycopersicum*) in Saudi Arabia. *Plant Disease* (early view) <https://doi.org/10.1094/PDIS-05-25-1039-PDN>

Syria

Additional data on mites from Hama governorate, Syria, with two new record species of Erythraeidae and Tetranychidae families.

This study was conducted as a continuation of previous research conducted during the 2023-2024 seasons, with the aim of investigating phytophagous and predatory mites in fruit orchards and natural vegetation in Hama governorate, Syria. Six species of predatory mites belonging to four families were recorded. Of them, *Allothrombium molliculum* (Koch) (Trombidiidae), *Euseius scutalis* (Athias-Henriot), and *Phytoseius finitimus* (Ribaga) (Phytoseiidae), *Eupalopsellus prasadi* Bagheri & Kanjani (Eupalopsellidae) have been previously recorded in the same governorate. *Erythraeus* (*Erathraeus*) *phalangoides* (De Geer) was recorded for the first time from Hama governorate and *Erythraeus* (*Zaracarus*) *coleopterus* Mortazavi *et al.* was recorded for the first time from Syria. Concerning phytophagous mites, two species of the family Tetranychidae were recorded: *Bryobia vasiljevi* Reck, previously recorded from Hama governorate, and *Bryobia graminum* (Schrank), recorded for the first time from Syria. [Ali Hamadi*, Ziad Barbar*(Syria), Department of Plant Protection, Faculty of Agriculture, Homs University, Homs, Syria. *Journal of Homs University, Agricultural and Biotechnical Science Series*, 47(8): 67-102, 2025].

First record of *Alternaria alternata* causing leaf spot and blight disease on *Ailanthus altissima* in Syria

Tree of heaven, *Ailanthus altissima*, is one of the invasive trees that causes great damage to the ecosystems in the regions in which it grows. At the end of August 2023, leaf spot symptoms were observed on spontaneously growing *Ailanthus altissima* on the campus of Al-Baath University, Syria. The symptoms appeared in the form of small, dark brown spots on the leaflets' edges, and these spots coalesced later to become a large blighted area. The affected part may separate from the leaf edges, transforming the leaflet into a fishbone shape. The infection ultimately led to tree defoliation. Microscopic examination of infected leaves showed that the fungus causing these symptoms is *Alternaria alternata*: the conidia were dark brown in simple or branched chains, 25-35 micrometers in length and 9-12 micrometers in width, with 3-5 transverse septa and 1-2 longitudinal septa or

no septa. Conidia collected from the infected plant were used for the pathogenicity test. According to the published information, this is the first record of *Alternaria alternata* on the tree of heaven in Syria and the Arab region. [Khalil, H.A. and R.N. Yousef. Arab Journal of Plant Protection, 43(3):300-303, 2025]. <https://doi.org/10.22268/AJPP-001342>

First record of *Phytophthium* spp. causing root and crown rot of diseased trees

Phytophthium was initially grouped with closely related species of the *Pythium* group, *Phytophthium vexans* is important waterborne plant pathogens causing root and crown rot disease in plants of different families. An extensive survey of 25 orchards was conducted in kassb, ja,ble and kardaha in Syria during 2017 to 2024 growing seasons. Five orchards of apple and kiwifruit were found infested with a pathogen that causes the decline disease in kassb ja,ble and kardaha. Isolation of pathogen was carried out by using selective media Corn Meal Agar (CMA), And A.R,P.H The pathogen was isolated from soil in the rhizosphere, root and stem rot disease of kiwifruit and apple The fungi were identified according morphologically and confirmed to be Colony morphology of *Phytophthium vexans* isolated from kiwifruis and Apple. [Abdul Rahman Khafateh, (Syria), Lattakia University,2025].

The first record of clubroot disease caused by *Plasmodiophora brassicae* Woron in Syria

In the fall of 2018, a previously unknown disease appeared on a radish crop grown in the village of Khirbet Shin in the western countryside of Homs Governorate (37 km northwest of Homs city, 850 m altitude). Laboratory tests confirmed the disease to be clubroot disease, caused by the fungilike:



Plasmodiophora brassicae Woron.

Symptoms appeared at a single point (34.7903°N 36.4133°E) in the field and on only 2-3 adjacent plants. The symptoms included yellowing, stunting, and wilting of the plants. Upon uprooting the infected plants, spindle-shaped tumors appeared on the root below the tuberous root (Figures 1 and 2). Cross-sections of these tumors, examined under a microscope, revealed giant cells filled with spores of the pathogen (Figures 3 and 4.)

Given that this disease is influenced by soil pH and prefers slightly acidic soils, we measured the soil pH around the roots of infected plants. The pH was found to be 6.49. We monitored the specific location where the infection appeared and the surrounding fields over several subsequent seasons and were unable to observe the disease again on any cruciferous plants. Investigating the source of the infected radish seeds revealed that they were imported from outside Syria.

This supports the hypothesis that the pathogen may have been introduced with seeds contaminated by soil dust containing dormant spores. Nevertheless, this observation confirms that some Syrian soils are suitable for the growth and reproduction of the pathogen, thus indicating a potential risk of its future spread. Especially since its dormant spores can remain in the soil for several years. [Hassan Khalil, Reem Yousef, Suleiman Abbas, Mohsen Hassan (Syria), Department of Plant Protection, Faculty of Agricultural Engineering, University of Homs, Syria, 2025].

Tunisia

First report of *Phacelia tanacetifolia* in Tunisia

Phacelia tanacetifolia (Boraginaceae) is an annual species and is native to North America (USA: Arizona, California and Nevada, Mexico). It is widespread in the EPPO region where it is planted to support bee populations, and it can also be found in ruderal habitats including waste land and along roadsides. *P. tanacetifolia* is reported for the first time in Tunisia where one population of approximately 25 plants was reported from Menzel Ennour municipality (Monastir governorate) The population covered approximately one hectare. The origin of this population is unknown. However, the population is at the edge of a cultivated field and there is the potential that the species was introduced as a contaminant of annual crop seeds. Alternatively the pathway of introduction may have been an accidental escape from individuals planted as garden ornamentals. *P. tanacetifolia* is considered a transient alien plant in Tunisia. [EPPO Reporting Service 2025 no. 8 – Invasive Plants].



Source:

El Mokni AA, Mokni R, El Mokni R (2025) *Phacelia tanacetifolia* Benth. (Hydrophyllales, Boraginaceae): a first report as casual alien to the vascular flora of Tunisia. *Hacquetia*, DOI: [10.3986/hacq-2025-0013](https://doi.org/10.3986/hacq-2025-0013)

RESEARCH HIGHLIGHTS

Algeria

Evaluation of the insecticidal properties of *Ruta* sp from the Northeastern of Algeria.

The FAO reports that insects damage 10%-25% of the world's food production annually. It's crucial to replace synthetic pesticides with natural alternatives that prioritize the environment, health, and the economy. Pesticides have several problems, such as food toxicity, insect resistance, and high treatment costs. Insecticides can contaminate the air, water, and food supply, posing a risk to human health. Surprisingly, botanical products (extracts) from Natural plants have long been recognized as a valuable source of bioactive substances, primarily including secondary metabolites and aromatics that provide chemical defenses against different insects. Most of the already developed drugs were derived from plant species that had previously been used as traditional herbal remedies. This study aims to evaluate the insecticidal activity of the *Ruta* sp hydroethanolic extract against *Tenebrio molitor*.



Five concentrations of *Ruta* extract were topically applied to adults of this insect. The repellent effect was evaluated. After treatment at a concentration of 1 mg/ml, the *Ruta* extract showed a good levels of repellent action (70%), this result confirms that *Ruta*. sp contain a significant amount of secondary metabolites responsible of the insecticidal activity.[**Amira Randa Rimas Meziane, Hind Fenghour, Hanane Segheir, Nessrine Merhoune, Nasreddine Benabdessalem (Algeria). 14th Arab Congress of Plant Protection, 3-7 November 2025, Algeria,(Poster).**]

Life Cycle of Potato Cyst Nematode, *Globodera rostochiensis* in Algeria.

The Potato Cyst Nematodes (PCN) *Globodera pallida* and *G. rostochiensis* are economically important pests for potato crops, which exist globally in most of the potato cultivated areas. Both *Globodera* spp. represent a very serious threat to potatoes in Algeria and throughout the world, particularly due to their classification as a quarantine pest. Information on the life cycle, population densities and yield losses of *G. pallida* and *G. rostochiensis* under different environmental conditions are extremely rare in Algeria. This study aimed to determine the life cycle duration of *G. rostochiensis* on two potato cultivars “Spunta” and “Kondor” under natural conditions over two agricultural seasons. Differences in the pattern of occurrence of nematode life stages on the two potato cultivars were observed. On potato cv. Spunta, the life cycle of *G. rostochiensis* from the penetration of the second stage juveniles (J2) into the roots to the development of new cysts lasted 66 days at 620 DD_{6.2} in spring (seasonal culture) and 59 days at 402 DD_{6.2} in winter (early potato-growing season). However, the cycle length of this nematode on potato cv. Kondor was 73 days at 699 DD_{6.2} and 66 days at 459 DD_{6.2} in spring and winter, respectively. The results contribute to the knowledge of the length development cycle of *G. rostochiensis* populations on different cultivars and its thermal time requirements under Algerian environmental conditions and of its and can be a valuable tool to develop potato cyst nematode control strategies. [**Safia Berrahia and Samira Sellami (Algeria), Laboratory of Phytopathology and Molecular Biology, Department of Botany, National High School of Agronomy, El-Harrach, Algeria. The 14th Arab Congress of Plant Protection, Algeria 3-7/11/2025].**]

Investigating the role of phenylacetic acid in the Bayoud disease.

The present study focuses on isolating and identifying secondary metabolites produced in the interaction between date palm (*Phoenix dactylifera* L.) and the fungus *Fusarium oxysporum* f. sp. *albedinis* (Foa), the causal agent of Bayoud disease. Using gas chromatography coupled with mass spectrometry (GC-MS), we identified phenylacetic acid (PAA) among the metabolites produced by FAO cultivated in liquid medium, as well as in diseased fronds of two date palm cultivars, one susceptible and the other resistant to Bayoud. Crude extracts from healthy leaflets contained low concentrations of PAA, whereas infected leaflets from the susceptible cultivar exhibited high levels of this compound. PAA was not detected in the roots of both healthy and diseased cultivars. To elucidate the role of PAA in pathogenesis, in vitro assays were conducted to assess its effects on Foa's mycelial growth and virulence factors, including conidial production and fusaric acid synthesis. At a concentration of 10⁻² g L⁻¹, PAA inhibited both mycelial growth and virulence factors. At 10⁻³ g L⁻¹, PAA stimulated mycelial growth on day 7 and inhibited fusaric acid production on

day 10. Conversely, PAA increased conidial numbers and fusaric acid production on days 20 and 30. Artificial application of PAA at 10^{-3} g L⁻¹ to the roots of both date palm cultivars induced defense responses within 24 hours, such as the enzymatic activation of phenylalanine ammonia-lyase (PAL) and peroxidase, along with the production of soluble polyphenols. These responses were more pronounced in the resistant cultivar than in the susceptible one. These findings suggest the involvement of PAA in the pathogenesis of Bayoud disease. **[Tassadit Azouaoui-Ait Kettout, Narimane Mehta, Baya Boucenna-Mouzali, Fawzia Beddou, Sofia Ayari-Guentri, Rabéa Gaceb Terrak and Fatma Rahmania. 14th Arab Congress of Plant Protection, 3-7 November 2025, Algeria].**

Insect Fauna in a palm grove in the Oued Souf Region, Southern Algeria.

A study was conducted on the insect fauna in a palm grove in the Oued Souf region, located in the Saharan bioclimatic zone with a mild winter. The Barber trap method was used for sampling in an area of 1 hectare planted with palm trees, interspersed with some weeds. During various field surveys, which lasted for five months (from December to April), we recorded 37 insect species distributed across 8 orders. The most represented order is Coleoptera, with 5 families. The Hymenoptera order is the most abundant, with a relative abundance of 85.11%. The highest diversity index was recorded in February, with a value of 2.01. **[Belhadj Hamida, Higher Normal School (ENS) Kouba, Algeria.**

Date palm - *Fusarium oxysporum* f. sp. *albedinis* interaction: role of the host cell wall polymers.

The main objective of our research is to understand the mechanisms governing the relationship between the date palm (*Phoenix dactylifera* L.) and *Fusarium oxysporum* f. sp. *albedinis* (*Foa*), the causal agent of Bayoud disease. Our focus is on studying the cell wall, a dynamic structure heavily involved in signaling and defense mechanisms. Discriminatory analyses using gravimetric assays, UV spectrophotometry, GC/MS, and Pyrolysis GC/FID techniques allow us to determine the chemical composition of this extracellular matrix and reveal differential behavior between susceptible genotypes and the resistant genotype. The results obtained showed that in the presence of *Foa*, the cellulose content is significantly reduced in TK, while hemicelluloses show a slight increase. Phytochemical screening of compounds resulting from thermal degradation by pyrolysis indicates a decrease in compounds attributed to hexoses (C6) and an increase in those attributed to pentoses. Indeed, the relative abundance percentage of 1,6-Anhydro-D-glucofuranose (levoglucosan) and hydroxyacetaldehyde, two cellulose markers, is significantly reduced. Monomeric structural analysis of lignin reveals that the resistant cultivar contains a significantly higher percentage of guaiacyl (G) monolignols and a lower amount of syringyl (S) and *p*-hydroxyphenyl (H) monolignols compared to susceptible cultivars. The marker molecules for guaiacyl units are: 4-ethyl-guaiacol, 4-methyl-guaiacol, 4-vinyl-guaiacol, isoeugenol, and coniferyl aldehyde, while sinapyl aldehyde is a marker for syringyl units, and phenol for *p*-hydroxyphenyl units. Our results highlight biochemical traits characterizing the cell wall structure of the resistant cultivar, which contributes to a better understanding of the interaction processes in this pathosystem and reveals

the essential role of wall polymers in resistance to Bayoud disease. [**Baya Boucenna-Mouzali, Tassadit Azouaoui-Ait Kettout, Khaled Latreche, Fawia Beddou, Sofia Ayari-Guentri, Fatma Rahmania (Algeria)**, University of Science and Technology Houari Boumediene, Faculty of Biological Sciences, Laboratory for Research on Arid Zone, BP. N° 32, El-Alia, Bab-Ezzouar, 16111, Algiers, **14th Arab Congress of Plant Protection, 3-7 November 2025, Algeria**].

Egypt

Using wood vinegar as a natural pesticide for reducing greenhouse gases to mitigate the effects of climate change, compared with that of indoxacarb against the peach fruit fly, *Bactrocera zonata*.

The current study aimed to evaluate the toxicity of wood vinegar, a natural pesticide made from rice husk, and indoxacarb against the peach fruit fly's third larval instars, one-day-old and seven-day-old pupae. The tested compounds showed toxicity against different developmental stages of the peach fruit fly. Adult flies that emerged from (i) pre-pupae in sand treated with sub-lethal concentrations (LC_{50} =0.36 ppm, 0.87 % ppm of indoxacarb, and wood vinegar, respectively), (ii) from treating 1-day-old pupae in sand with sub-lethal concentrations (LC_{50} 0.44 ppm, 0.98 % of indoxacarb and wood vinegar, respectively), and (iii) from 7-day-old pupae in sand treated with sub-lethal concentrations (LC_{50} 2.86 ppm, 1.25 % of indoxacarb and wood vinegar, respectively), were assessed by the comet test for detecting broken DNA strands in individual eukaryotic cells. Results showed that insects treated with indoxacarb and wood vinegar had significantly increased tail length (TL), tail moment, DNA tail %, and overall DNA damage values in body cells, compared to the untreated control. [**Negm, A.A.K.H., B.A.A. Ali, H.M.G. Elsharkawi and A. Afify. (Egypt)**. Arab Journal of Plant Protection, 43(3):353-360, 2025]. <https://doi.org/10.22268/AJPP-001334>

Potential of certain insecticides in controlling the leaf miner, *Liriomyza trifolii* which attacks faba bean and fenugreek and its effect on some predators.

During 2021 and 2022 growing seasons, two field experiments were carried out to compare the effectiveness of conventional and non-conventional pesticides, against the leaf miner, *Liriomyza trifolii* (Burgess) and its parasitoids on faba bean and fenugreek plants. Ten treatments divided into three groups were evaluated: malathion, aviesect, and carbosulfan in the first group; Naterlo mixed with each of the previous chemical insecticides in the second group; and Naterlo, Agri-flex, Chemisol, and Biofly in the third group. The findings revealed that Naterlo+Aviesect considerably reduced leaf miner larvae population by up to 73% (mortality rate), followed by Naterlo+Malathion 71%. The remaining treatments aviesect and malathion resulted in 65% and 63% mortality, respectively. On the other hand, insect pest population densities were significantly reduced after the addition of the biocides Biofly and Naterlo to the chemical insecticides. The use of natural products is a promising approach as they are less harmful to natural enemies and reduce the danger of contaminated food. [**Abd-Allah, A.A.A. and H.S. El-Tahawe (Egypt)**. Arab Journal of Plant Protection, 43(3):361-365, 2025]. <https://doi.org/10.22268/AJPP-001332>

Analysis of the impact of integrated agricultural practices management on the dynamics of biological enemies and ecological diversity.

Integrated agricultural practices management positively impacts the dynamics of biological enemies and ecological diversity by promoting natural pest control and enhancing ecosystem stability. These practices create complex habitats that support predator and parasitoid populations, reduce pest outbreaks, and maintain functional biodiversity. By reducing reliance on chemical pesticides and incorporating habitat manipulation, cover cropping, and crop rotation, integrated management fosters balanced agroecosystems. This approach contributes to sustainable agriculture by enhancing pest suppression, improving soil health, and conserving beneficial organisms, thereby supporting long-term productivity and environmental health. [Ahmed H. EL Kenawy (Egypt), Biological Control Research Department, Plant Protection Research Institute, Agricultural Research Centre, Giza 12619, Egypt. Journal of Pest Control and Environmental Sciences. 25 (1): 18–21, 2025].

Iraq

Effect of Ultra-violet rays on egg hatching of the sunn pest *Eurygaster testudinaria*.

The mature sunn pest *E. testudinaria* insects were gathered from wheat fields and transported to the laboratory. A physical control method was used as it has been identified as serious pest of wheat yield. It was exposed to varying durations (5, 10, and 15 minutes) of ultraviolet irradiation (UVC) with a 254nm wave length under carefully monitored circumstances to ascertain the impact of radiation on egg hatching. The results indicated that different UVC-irradiation exposure times could affect egg hatchability, culminating in a gradual decrease in egg hatching percentages of 30.95, 16.66, and 2.38% respectively. Thus, UVC-irradiation was found to be an effective method for controlling the sunn pest *E. testudinaria* eggs. [Ahmed Shamkhi Jabbar (Iraq), Plant Protection, Faculty of Agriculture, Al-Muthanna University, Iraq, 2025]. [DOI:10.17582/journal.sja/2025/41.1.248.252](https://doi.org/10.17582/journal.sja/2025/41.1.248.252)

Genetic differentiation in populations of the corn leaf Aphid *Rhopalosiphum maidis* (Fitch) (Hemiptera: Aphididae).

The corn leaf aphid is a major pest causes damage to a range of cultivated crops. Little is known about the population genetics of the species. In this experiment, we examined the population genetic structure of the *Rhopalosiphum maidis* based on nucleotide sequencing of the cytochrome oxidase I (COI) gene and microsatellite analysis. Thirteen microsatellite markers developed for related aphid species were tested for use with *R. maidis*. Nine loci were found to amplify in *R. maidis*. Of these, seven were polymorphic. Nucleotide sequencing showed low variation, with one haplotype dominating in the regions sampled and four other haplotypes, differing by only a single base, occurring at a low frequency. Microsatellites confirmed low levels of diversity, but also showed moderate levels of population structure over local geographic scales, although this structure was not a result of isolation by distance. Over broader geographic scales, cluster analysis showed that populations from all U.S. states and China were almost indistinguishable and population assignment revealed that only 30% of individuals sampled could be correctly assigned to the

population from which they were collected. Populations collected from *Sorghum bicolor* and *Sorghum halepense* could not be discriminated, indicating that *S. halepense* may act as a reservoir for the aphid during times when sorghum is not cultivated. The close similarity between individuals from China and the U.S. suggests that the lack of variation in the species may be explained by the parthenogenetic mode of reproduction, where males are seldom found. **[A. E. Timm¹Research Scientist, L. K. Khalaf ²,Professor(Iraq), and C. Michael Smith³, Distinguished Professor,**¹Department. Agric. Biol., Colorado State University, Fort Collins, CO, United States. ²Dept. Plant Prot., Coll. of Agric. Engin. Sci., University of Baghdad. ³Dept. Entomology, Kansas State University, Manhattan, KS, United States. Iraqi Journal of Agricultural Sciences, 56(1):531-545. 2025]. [DOI: https://doi.org/10.36103/qbawpt60](https://doi.org/10.36103/qbawpt60)

Outbreak of Tobamoviruses and Potexviruses associated with disease epidemics in tomato production area of Iraq.

This study was initiated to examine the tomato-infecting viruses belonging to the *Tobamovirus* and *Potexvirus* genera in Iraq. Field observations and surveys were carried out for three successive cropping seasons (2020/21 to 2022/23) in selected tomato production areas. The purpose was to identify the main viruses associated with tomato epidemics and assess the impact of different tomato cultivars on disease occurrence. A total of 700 tomato leaf samples were collected from seven governorates (Baghdad, Diyala, Babylon, Najaf, Kerbala, Nasiriya, and Basrah) and tested using pathogen-specific immunostrip kits. The survey showed a presence of *Tomato brown rugose fruit virus* (ToBRFV), *Tobacco mosaic virus* (TMV), *Pepper mild mottle virus* (PMMoV), *Cymbidium mosaic virus* (CymMV), *Odontoglossum ringspotvirus* (ORSV), *Cucumber green mottle mosaic virus* (CGMMV), *Pepinoma virus* (PepMV) and *Potato virus X* (PVX) in tomato fields in Iraq. ToBRFV secured the highest relative incidence in tomato fields (7 governorates) followed by PepMV and CymMV and PMMoV (6 out of 7 governorates) and CGMMV, TMV (5 governorates), and PVX (3 governorates). The least was ORSV (only in Basrah). To our knowledge, this is the first comprehensive survey investigating *Tobamovirus* and *Potexvirus* on tomato fields in Iraq and the first report of ToBRFV, PMMoV, CymMV, ORSV, CGMMV and PepMV infecting tomato crops in Iraq. **[Hasaneen K. Obaid and Mustafa Adhab (Iraq), Vol. 56 No. Special Issue ,2025:].** [DOI: https://doi.org/10.36103/bnvh7n83](https://doi.org/10.36103/bnvh7n83)

Effectiveness of locally isolated biological control agents against black scorch disease of date palms .

The study aimed to isolate *Trichoderma longibrachiatum* and *Bacillus subtilis* from healthy date palm (*Phoenix dactylifera*) root samples and to evaluate their antagonistic activity against the pathogenic fungi *Thielaviopsis paradoxa* and *T. punctulata*, the causal agents of black scorch disease in date palms. Both *T. longibrachiatum* and *B. subtilis* exhibited significant inhibitory effects on the growth of the pathogenic fungi when co-cultured on PDA medium. Specifically, *T. longibrachiatum* inhibited the growth of *T. paradoxa* and *T. punctulata* by 50.58% and 60.17%, respectively, whereas *B. subtilis* achieved inhibition rates of 39.99% and 38.09%, respectively. GC-MS analysis of culture extracts revealed that both *T. longibrachiatum* and *B. subtilis* produced several bioactive secondary metabolites. Among the identified compounds

were hexanoic acid; 1,3-benzenedicarboxylic acid, bis(2-ethylhexyl) ester; terephthalic acid, 2-ethylhexyl octyl ester; heptane, 1-(ethenylthio)-; and 4(1H)-pyrimidinone, 2-(ethylthio)-. These findings suggest that *T. longibrachiatum* and *B. subtilis* may serve as potential biocontrol agents against black scorch disease in date palms through the production of antifungal metabolites. [Mohammed N.K. Hantoosh¹ Halima Z. Hussein* (Iraq), Plant Protection Department, College of Agricultural Engineering Sciences, University of Baghdad. Iraqi Journal of Agricultural Sciences, Publication accepted in 2024, publication year 2026].

Constructing and analyzing two types of life tables for the instars of the grape false red mite, *Tenuipalpus granati* in the laboratory.

The grape false spider mite, *Tenuipalpus granati* Sayed (Acariformes: Tenuipalpidae) is one of the significant pests on the grapevines in Iraq.

This research aimed to construct and analyze two types of life tables for the different instars of this mite reared under different constant temperatures of 15, 20, 25, 30 and 35±2°C with relative humidity 50-60±5%, and photoperiod (light:dark) of 16:8 hours. There are two types of life tables, age-specific life tables, known also as age-specific fecundity life tables, and the other is age-specific time life tables, The results obtained showed that the highest value of R_0 was 20.35 at 30°C, and 1.5949 at 35°C for λ , 0.4668 for r_m at 35°C. As for the values of T and DT, the relationship was inversely proportional with temperatures. The highest survival rate (S_x) for protonymph was 88.89 and 88.37% at 30 and 20°C, respectively. The highest survival rate of deutonymph was 91.67 and 88.46% at 30 and 15°C, respectively.

The total number of live eggs (T_x) was 142.50, 207.50, 205.00, 365.00 and 297.50 eggs, and clearly decreased for adults to reach 11.50, 49.50, 50.50, 64.00 and 73.50 at 15, 20, 25, 30 and 35°C, respectively. [Al-Sweedi, T.M.M. (Iraq). Arab Journal of Plant Protection, 43(3):286-291, 2025]. <https://doi.org/10.22268/AJPP-001341>

Functional response of the predator *Chrysoperla carnea* larvae to the eggs of tomato moth, *Tuta absoluta*.

This study was conducted at the College of Sciences, Mustansiriyah University, aimed to examine the functional response of the predator green lacewing, *Chrysoperla carnea* (Stefens) (Neuroptera: Chrysopidae).

The predator is one of the important natural enemies of members of the family Gelechiidae eggs. The results obtained showed that the predator green lacewing, *C. carnea* larvae, exhibited a second-type (Cyrtoid) functional response to various densities of tomato moth, *Tuta absoluta* (Lepidoptera: Gelechiidae) eggs.

The rate of attack coefficient (a) increased, whereas the handling time (T_h) was reduced, and the highest attack coefficient was 2.558 for the second larval stage, and the lowest attack coefficient was 1.509 for the third larval stage. However, the highest handling time was 23.274 minutes for the second larval stage and the lowest handling_time was 10.651 minutes for the first larval stage. [Al-Nadawi, F.A.M.H., B.M. Mohsen, E.M. Al-Obaidi, A.K. Badr and F.H. Sadek.(Iraq).Arab Journal of Plant Protection, 43(3): 380-385, 2025]. . <https://doi.org/10.22268/AJPP-001338>

Molecular confirmation of figs Root-Knot Nematode *Meloidogyne incognita* and its chemical control Integrated with fungal and bacterial formulation.

This study was conducted in one of fig orchards in Bani Muslim region of Babil, central Iraq, for the seasons of 2022 and 2023, to evaluate the efficiency of the single treatment with Oxamyl, Imicyfose or the Biohealth fertilizer in reducing root-knot nematode (RKN) *Meloidogyne incognita* infection and improving figs yield compared to the same treatments followed foliar Oxamyl during the growing season. The nematode was characterized by the adult female perineal pattern, which was confirmed by molecular identification by PCR, which was successful in amplifying the DNA even with a small concentration of one J2 juvenile DNA.

The results of amplified DNA sequence showed 100% genetic sequence similarity with *M. incognita* registered in the GenBank database compared with reference accession number# NC-024097.1 according to the NCBI. The results of the field experiment showed that the efficiency of all treatments in reducing nematodes density increased despite the differences among treatments. The highest reduction in *M. incognita* density in fig roots and soil combined was recorded in the treatment of Biohealth by 58 and 67% where applied alone or followed by foliar Oxamyl during the first season, which increased to 66 and 78% in the second season, respectively. Ground treatment with Oxamyl decreased nematode density by 55.9% in the single treatment to 73.4%, followed by foliar Oxamyl in the second season. It is generally noted that Imicyfose was relatively less efficient, but it also reduced *M. incognita* density by 54 to 56% in the single treatment and by 59 and 70% with the following foliar Oxamyl treatment, respectively. All the treatments lead to a relative increase in the weight of 100 fruits, at least by 28 and 32% in Imicyfose to the highest by 42 and 45% in Biohealth treatments, enhanced with foliar Oxamyl in the two seasons, respectively. [Kandouh, B.H., F.A. Ahmed and M.H. Aldarraji (Iraq). Arab Journal of Plant Protection, 43(3):336-343, 2025]. <https://doi.org/10.22268/AJPP-001337> .

Toxicity effects of *Melia azedaracht* and *Peganum harmala* extract emulsions on the eggs and adults of the cowpea southern beetle, *Callosobruchus maculatus*.

The experiments were conducted at the Integrated Pest Control Laboratories affiliated with the Ministry of Science and Technology at Al-Tuwaitha, to prepare emulsions of the alcoholic extracts of both *Melia azedarach* and *Peganum harmala*. The active compounds in the oil extracts were identified using GC-MS.

The experimental design followed was the complete randomized design, using three concentrations of the prepared emulsions (1000, 2000 and 3000 ppm) and with three replicates, to study their toxic effects on the eggs and adults of the southern cowpea beetle *C. maculatus*. The GC-Mass results indicated the presence of 48 compounds in *Melia azedarach* oil, with the highest content for the compound n-Hexadecanoic acid (25.12%), followed by oleic acid (15.60%), and tetradecanoic acid (8.05%), whereas the cyclotetrasiloxane and octamethyl had the lowest content (0.10%).

Various derivatives of Azaderachtin were also detected. 59 chemical compounds were also detected in *Peganum harmala* oil, with the highest content for n-hexadecanoic acid (20.12%), followed by oleic acid (7.86%), tetradecanoic acid (5.63%), whereas decane had the lowest content (0.11%). The toxicity effect study showed that the highest rate of unhatched eggs was due to the *Melia azedarach* oil emulsion (64.32%), when

used at a concentration of 3000 ppm. As for the *Peganum harmala* oil emulsion, the highest rate of unhatched eggs was 54.79% when a concentration of 3000 ppm was used.

Moreover, the highest adult's mortality rate was achieved when *Melia azedarach* oil emulsion was used at a concentration of 3000 ppm, and reached 87.5% 72 hours after treatment. Meanwhile, the highest mortality rate of insect adults was obtained when using *Peganum harmala* oil emulsion at a concentration of 3000 ppm (33.33%) 72 hours after treatment.

It was evident that the oil emulsions of both *Melia azedarach* and *Peganum harmala* were highly efficient in controlling the insect, and their effectiveness increased with concentration and exposure duration. It can be concluded that the natural extracts investigated in this study can be used as environmentally friendly and safe alternatives to chemical pesticides in combating the southern cowpea beetle *Callosobruchus maculatus*. [Hasan, Z.Kh., S.Z. Bakr and Z.Sh. Ahmed (Iraq), Arab Journal of Plant Protection, 43(3): 386-393, 2025] <https://doi.org/10.22268/AJPP-001329>

Monitoring and control of *Puccinia striiformis* f. sp. *tritici* in wheat fields under rainfed conditions.

The current study was carried out to monitor the arrival date of the primary inoculum of *P. striiformis* f. sp. *tritici* (Pst) in wheat fields in Sulaimani city and the subsequent development of yellow rust disease over two successive seasons. Results obtained revealed that the first inoculum of *Pst* arrived in Bakrajo wheat fields in March 2022 and 2023.

However, the first yellow rust infection on the susceptible wheat cultivar 'Hsad' was observed on April 15 in the first year and April 10 in the second year. The number of uredospores gradually increased with the disease progress, reaching its peak at 51.3 spores/cm² on May 7, 2022, and 187.3 spores/cm² on May 9, 2023. However, the number of uredospores decreased by the end of the first week of June. Uredospore number per square centimetre was higher in 2023 than in 2022.

Yellow rust control was conducted by using two susceptible wheat cultivars, "Hsad" and "Tamuz-2", and two different fungicides, Amistar Xtra and Plant Growth Cleaner (PGC), applied at two different times. Results showed that Amistar Xtra treatment significantly reduced the mean coefficient of yellow rust infection in both wheat cultivars. "Hsad" x Amistar Xtra treatment resulted in 83.2 and 85.1% reduction of yellow rust severity for both applications, respectively, whereas "Tamuz-2" x Amistar Xtra treatment resulted in 42.5 and 45.9% reductions for the first and second applications, respectively. PGC treatment had varying effects on the mean coefficient of infection in both susceptible wheat cultivars. The first application of Amistar Extra resulted in changing the infection type from S to MR in "Tamuz-2", whereas the second application of Amistar Extra changed the infection type to R in Tamuz-2. Both Amistar Extra applications changed the infection type of "Hsad" to R-MR. Application of Amistar Extra significantly increased yield and yield components values in both cultivars suggesting its ability to efficiently control the disease and enhance plant characteristics. [Al-Maarroof, E.M. and S.H. Ali. (Iraq), Arab Journal of Plant Protection, 43(3): 344-352, 205]. <https://doi.org/10.22268/AJPP-001323>

Investigating some Aflatoxin-Producing Fungi in wheat flour and Grains infested with *Trogoderma granarium* and its control with some physical methods.

This study aimed to isolate, diagnose and biotest some associated fungi with wheat grain that infested with khapra beetle, *Trogoderma granarium*. 26 isolates of *Aspergillus flavus* and 10 isolates of *Aspergillus ustus* were isolated from the flour by direct method. Post the testing by the ammonia vapor method, only five isolates of *A. flavus* were selected as strong producers for aflatoxin B₁. Frequency test of isolated fungi from larvae and adults of *T. granarium* showed that the highest frequency of *Cordyceps pseudollodii* was 25 and 23%, respectively. While the lowest frequency of *Cladosporium oxysporum* was 8.33 and 9.37 % respectively. Obtained results exhibited that *C. pseudollodii* filtrate caused mortality to larvae of *T. granarium* at portion 49.11 and for the adults at 29.45 %.

We also found that the 1.0 ml of fungal filtrate caused the highest insect mortality rate 56.89%, whereas 0.5 ml of fungal filtrate caused a mortality of 16.67%. Furthermore, in the current study other physical methods were utilized to control *T. granarium* including ozone gas and microwave radiation. The result displayed that the mortality was 100% for larvae and 96.67% for adults of *T. granarium* after 10 hours exposure of ozone gas. Likewise, the exposure to microwave radiation for 30 seconds caused the highest mortality rate of 100% for insects that provided with food compared to 72.72 % mortality for insects that were deprived from food, and with higher mortality of adults 89.44 % compared to the larvae 83.23%. Results also showed that the mortality percentage increased in pattern with increasing in the exposure period of microwave radiation which recorded 93.25 and 78.33% for the adults and larvae of insects after three days of treatment respectively. [Alhaddad, A.A., I.M. Omran and M.S. AL-Emara. (Iraq), Arab Journal of Plant Protection, 43(3):326-335, 2025]. <https://doi.org/10.22268/AJPP-001339>

Constructing and analyzing two types of life tables for the instars of the grape red mite, *Tenuipalpus granati* in the laboratory.

The grape false spider mite, *Tenuipalpus granati* Sayed (Acariformes: Tenuipalpidae) is one of the significant pests on the grapevines in Iraq. This research aimed to construct and analyze two types of life tables for the different instars of this mite reared under different constant temperatures of 15, 20, 25, 30 and 35±2°C with relative humidity 50-60±5%, and photoperiod (light:dark) of 16:8 hours. There are two types of life tables, age-specific life tables, known also as age-specific fecundity life tables, and the other is age-specific time life tables, The results obtained showed that the highest value of R_0 was 20.35 at 30°C, and 1.5949 at 35°C for λ , 0.4668 for r_m at 35°C. As for the values of T and DT, the relationship was inversely proportional with temperatures. The highest survival rate (S_x) for protonymph was 88.89 and 88.37% at 30 and 20°C, respectively. The highest survival rate of deutonymph was 91.67 and 88.46% at 30 and 15°C, respectively. The total number of live eggs (T_x) was 142.50, 207.50, 205.00, 365.00 and 297.50 eggs, and clearly decreased for adults to reach 11.50, 49.50, 50.50, 64.00 and 73.50 at 15, 20, 25, 30 and 35°C, respectively. [Al-Sweedi, T.M.M. (Iraq), Arab Journal of Plant Protection, 43(3):286-291, 2025]. <https://doi.org/10.22268/AJPP-001341>

A study on the effectiveness of the entomopathogen *Beauveria bassiana* for the control of larvae and adults of the grape leafhopper, *Arboridia kermanshah* under laboratory conditions.

A laboratory study was conducted to evaluate the effectiveness of *Beauveria bassiana* entomopathogenic fungus on some aspects of the biology of the grape leafhopper, *Arboridia Kermanshah* (Homoptera: Cicadellidae). The results of the study showed that when *B. bassiana* fungus was used at three concentrations (0.50, 0.75, and 1.00 mg/ml) had a significant effect on the mortality of the different life stages of the insect. The 1.00 mg/ml concentration caused the highest mortality rate of the nymphal stage of 88.9 and 77.8% of the adult stage after 5 days of treatment. The results showed that there was a direct relationship between the fungus concentration and the mortality rate of the insect pest. [**Assaf, A.A. and H.A.J. Naas(Iraq)**, Arab Journal of Plant Protection, 43(3): 375-379, 2025]. <https://doi.org/10.22268/AJPP-001336>

The role of endophytic fungi isolated from desert and saline soils in the resistance of tomato plants to fusarium wilt disease caused by the fungal pathogen *Fusarium oxysporum* f. sp. *lycopersici*.

This study was conducted during the period from 15/10/2022 to 1/6/2023 and aimed to isolate endophytic fungi from desert and saline soils in several locations around the city of Basrah in southern Iraq. The fungus *Cephalophora irregularis* was isolated from Al-Shawil plant, *Cressa cretica*; *Rhizoctonia solani* from Al-quampar plant, *Trachomitum venetum*, *Xenomyrothecium tongaens* and *Thielavia basicola* from Tartia plant, *Suaeda aegyptiaca* and *Chaetomium* sp. from Jumba (Shweikeh) plant, *Fagonia bruguieri*. Fungi were identified based on its morphological features and molecularly based on the amplification of internal transcribed spacer (ITS) gene region, using the forward primer ITS1 and the reverse primer ITS4. The nucleotide sequence of endophytic fungi was deposited in the GenBank (NCBI) under the number OM245865.1 for *Cephalophora irregularis* with a similarity rate of 99.82% and KX118360.1 for *Rhizoctonia solani* with a match rate of 95.61% and NR154511.1 for *Xenomyrothecium tongaens* with a match rate of similarity rate of 95.62% and MT277121.1 for *Thielavia basicola* with a similarity rate of 96.65% with global isolates deposited in the GenBank. Results obtained showed that the treatment of tomato seeds with fungal suspension of these fungi for 24 hours had a significant effect in reducing incidence and severity of Fusarium wilt disease, and that the best treatment was the treatment of seeds with a nonpathogenic isolate of *R. solani*, as the incidence and severity of infection decreased from 85.0 and 55.00% in the positive control treatment (inoculated with pathogenic fungus only) to 45.0 and 31.00%, respectively. The results also showed that the treatment of tomato seedlings at the age of 30 days with the fungal suspension of endophytic fungi before transferring them to the greenhouse led to a significant decrease in the infection rate and severity compared to the positive control treatment, as it decreased from 80.0 and 52.00% in the positive control treatment to 25.0 and 23.00% in the seedlings inoculated with *C. irregularis*. The results also showed a significant increase in the enzyme peroxidase activity and total chlorophyll and an improvement in some growth indicators in all treatments with endophytic fungi compared to the positive control. [**Awad, L.K.M. and M.A. Fayadh (Iraq)**, Arab Journal of Plant Protection, 43(3):404-413. <https://doi.org/10.22268/AJPP-001331>

Effectiveness of some plant extracts compared with chemical insecticides to control cochineal scale insect, *Dactylopius opuntiae* under field conditions.

This study was conducted in 2021 in the Department of Plant Protection, Faculty of Agriculture, University of Damascus, and in the fields of Qatana region. Alcoholic and aqueous extracts of tobacco, *Nicotiana tabacum* L., eucalyptus, *Eucalyptus camaldulensis* D., chinaberry, *Melia azedarach* L. and aerial parts of amaranth, *Tagetes patula* L. were evaluated for the control of cochineal scale insect, *Dactylopius opuntiae* Cockerell (Hemiptera, Dactylopiidae) and compared with chemical insecticides: chlorpyrifos, dimethoate, and lambda-cyhalothrin, and Sycro (mineral oil). The results obtained showed that the aqueous extracts of the tested plants at concentrations of 2.5 and 5.0% had moderate to low effect against the different stages of the cochineal scale insect, *D. opuntiae*. Whereas alcoholic extracts at a concentration of 5.0% were highly effective against males and nymphs of the insect, and the effectiveness increased with time after treatment.

The average effectiveness rate for the leaves extract of tobacco, chinaberry, amaranth, and eucalyptus plants reached 51.18, 46.25, 39.65 and 32.50% for males; 38.25, 27.15, 25.21 and 20.32% for nymphs, 5 days after spraying, respectively. Whereas the effectiveness of alcoholic extracts was moderate on female insects. On the other hand, both dimethoate and chlorpyrifos pesticides had the highest effectiveness on males, nymphs, and females of the cochineal scale insect, with significant difference with the rest of the treatments.

Whereas the pesticide Lambda-cyhalothrin and mineral oil had a medium effect on the instars of the insect. The results also showed that the effectiveness rate gradually increased with increasing concentration and exposure period. Accordingly, alcoholic extracts of tobacco and astragalus can be recommended for the control of the cochineal scale insect as natural and safe pesticides. [**Hoseh, W., A.N. Basheer and Z. Al-Naser.(Iraq)**. Arab Journal of Plant Protection, 43(3):394-403, 2025]. <https://doi.org/10.22268/AJPP-001324>

Efficiency of *Lecaniicillium lecanii* crude filtrate as a Bioinsecticide against the Sunn Pest, *Eurygaster testudinaria* on wheat plants.

This study investigated extracellular crude secondary metabolites of the entomopathogenic fungus *Lecaniicillium lecanii* as bioinsecticide spray against nymphs and adults of the sunn pest, *Eurygaster testudinaria* (Hemiptera: Scutelleridae), on wheat crop.

The results showed that the highest mortality rate of *E. testudinaria* adults 96.70% was obtained in response to the concentration 100%, 10 days post-treatment. Whereas the mortality rate of 5th instar nymphs reached 100% in response to the same concentration, 5 days post-treatment compared with 0.00 % in the control treatment, under laboratory conditions. In the field experiments, the 100% concentration was more effective compared with the rest of the concentrations.

The study identified compounds in the crude secondary metabolites of *L. lecanii* which are effective in controlling the sunn pest *E. testudinaria* on wheat crops. [**Jabbar, A.Sh., A.S. Mohmed and A.M. Hussein(Iraq)**, Arab Journal of Plant Protection, 43(3):425-428, 2025]. <https://doi.org/10.22268/AJPP-001326>

Impact of organic amendments (vermicompost and fermented cow manure) on managing corn stalk rot disease caused by *Fusarium incarnatum*

This study investigated the efficacy of organic amendments, specifically vermicompost (V) and fermented cow manure (C), at application rates of 625 and 1250 kg/dunam, in managing corn stalk rot disease caused by *Fusarium incarnatum*. Maize (*Zea mays* L.) is a glob

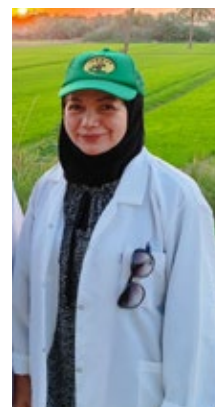
ally vital crop, making the study of its diseases, such as stalk rot, essential for ensuring food security. Field experiments were conducted on five hybrid corn varieties (DKc6664, DKc6777, GS235982, GS235772 and 2341.Rayal) during the spring season of 2024 in Baghdad, Iraq. The results demonstrated that higher application rates (V.1250 and C.1250) significantly reduced disease severity and improved plant growth parameters, including plant height, vegetative mass, and yield components. Vermicompost at 1250 kg/dunam (V. 1250) was particularly effective in reducing disease severity in DKc6664 (16.67%) and DKc6777 (16.67%), while fermented cow manure at 1250 kg/dunam (C. 1250) enhanced root development and seed weight in DKc6777. In contrast, *F. incarnatum* inoculation consistently increased disease severity across all varieties, with the highest severity observed in GS235982 (91.61%). These findings highlight the potential of organic amendments, especially at higher application rates, to improve corn productivity and manage stalk rot disease, even under pathogen pressure. [Dareen S. Jamel, Mena Waleed Hatem, & Tariq A. Kareem(Iraq), Plant Protection Department, College of Agricultural Engineering Sciences, University of Baghdad, Baghdad, Iraq. Vol. 25, No. 2, September 2025]. DOI:[10.23960/jhptt.25350-360](https://doi.org/10.23960/jhptt.25350-360)

Predators of tomato borer *Tuta absoluta* (Meyrick) (Lepidoptera: Gelechiidae) in opened fields tomato in center of Iraq

Tuta absoluta (Meyrick) is an invasive pest in Iraq, that represents a global threat to commercial tomato production, in both open field and greenhouse. Four predators were identified in opened fields tomato in both Baghdad(Abo-Ghreeb) and Wasit provinces(Kut and Sweera) in the season 2024 during March-July; Hemipterous predators: *Nesidiocoris tenuis* (Miridae), *Orius albidipennis*(Anthocoridae), *Metacanthus lineata* (Berytidae) and Neuropterous predator *Chrysoperla carnea* (Chrysopidae).The third predator was considered as the first record in Iraq. [Amer J.A. Al-Gerrawy and Ahmed J.M. Al-Shammary (Iraq), Journal of Entomological Research , 49 (2) : 415-418, 2025]. [https://DOI: 10.5958/0974-4576.2025.00067.5](https://doi.org/10.5958/0974-4576.2025.00067.5)

Effect of Cyanobacterial Biofertilizer and Mulchs on weed management and yield in wheat field.

A field study was carried out in winter 2023–2024 at the Plant Protection Directorate, Abu-Ghraib, Baghdad-Iraq using randomized complete block design (RCBD) to evaluate the effect of Cyanobacterial biofertilizer CB (*Anabaena circinalis* and *Nostoc commune*) with 50% of chemical fertilizers (CF) and sorghum or corn residues mulching at a rate of 6 t/ha alone or with reduce amount of chemical herbicide Time line trio on weed management and wheat yield. The highest



significant results appeared when cyanobacterial biofertilizer and 50% chemical fertilizers combined with sorghum or corn mulches with 50% herbicide (T6, T7) and these results were similar to full dose herbicide with Cyanobacterial biofertilizer + 50% chemical fertilizers (T3) and full dose herbicide with 100% chemical fertilizers (T2) with no significant differences between them. The reduction in weed density was 94.83 and 94.36% of control respectively at 60 DAS, and 94.35 and 93.78% of control at 90 DAS respectively, and the reduction in weed dry weight at 120 DAS was 98.64 and 98.47% of control respectively. Grain yield were 5.42 and 5.40 t/ha respectively. Both mulches increased total phenol in soil compared to un-mulched treatment. This approach can be used as a sustainable agricultural method to improve wheat productivity and weed management in wheat field. [**Sama B. Al-Hashimi¹, Tamara Adnan Ali Alkhateeb², Arwa A. Tawfiq¹, (Iraq)**,¹Department Biology, Coll. Science for Women, Baghdad University, Iraq. ²Plant Protection Directorate, Ministry of Agriculture, Baghdad- Iraq. **14th Arab Congress of Plant Protection, 3-7 November, Algeria, 2025**].

Strategic application of single post-pollination thiamethoxam enhances sustainable pest management and ensures fruit safety in selected date palm cultivars

Date palm (*Phoenix dactylifera* L.) is one of the most economically significant crops in Iraq. However, its productivity is increasingly threatened by major insect pests, particularly the Dubas bug (*Ommatissus lybicus*) and the white scale insect (*Parlatoria blanchardi*), pests that cause a marked reduction in tree vigor and negatively affect both yield quantity and quality. Control of these insects is generally carried out with chemicals; however, excessive and unregulated chemical use contributes to the weakening of biological control efficacy and can lead to the presence of pesticide residues in edible fruit tissues, posing risks to consumer safety and limiting export potential. This study aimed to evaluate the efficacy and the residue of Thiamethoxam (24 %) commercial formula when applied as single application via soil drenching following pollination. The experiment was conducted in a date palm orchard located near Baghdad, using two cultivars – Barhi and Braim – known for their susceptibility to insect infestations. A single application of the insecticide was carried out at a concentration of 75 ml per 200 liters of water, two weeks after pollination, by digging a circular trench around the base of the palm trunk to ensure adequate root zone uptake. Samples of leaves (spear leaves) and developing fruits were collected monthly over a five-month period until fruit maturity.

Pesticide residue concentrations were analyzed using (GC-FID). Concurrently, field assessments were conducted to monitor infestation levels of both Dubas bug and white scale insect. The residue analysis revealed an increase in Thiamethoxam concentrations during the second- and third-month post-application, followed by a gradual decline during the fourth and fifth months. At harvest, residue levels were within the internationally accepted Maximum Residue Limits. Field monitoring also showed a significant reduction in pest infestation levels in treated trees compared to untreated controls. The findings indicate that the strategic post-pollination application of Thiamethoxam provides effective long-term control of key insect pests in date palms while maintaining residue levels within safe limits. This approach supports Integrated Pest Management practices by reducing the

frequency of chemical applications during the growing season and promoting an environment more conducive to the activity of natural enemies such as predators and parasitoids, thereby enhancing the sustainability of production and food safety. [Mokhtar Abdulsattar Arif, Salvatore Guarino²(Iraq),¹Plant Protection Directorate, Ministry of Agriculture, Abu-Ghraib 10081, Baghdad, Iraq; ²Institute of Biosciences and BioResources (IBBR), National Research Council of Italy, Via Ugo La Malfa 153, Palermo, 90146 Palermo, Italy. 14th Arab Congress of Plant Protection, 3-7 November, Algeria, 2025].

Survey and high throughput sequencing revealed mixed infections of cucurbit-infecting viruses in zucchini fields in Iraq.

Zucchini production in Iraq occurs year-round through different cropping systems, open fields, and greenhouses, and the constant presence of the host allows for the maintenance of high whitefly super vector (*Bemisia tabaci*) populations, leading to virus disease outbreaks. Here, we report a high incidence (40 to 50%) of viral symptoms in zucchini fields in Al-Yusufiyah county, Baghdad province, Iraq. High-throughput sequencing and confirmatory PCR revealed mixed infections involving squash leaf curl virus (SLCuV, *Begomovirus cucurbitapeponis*), tomato leaf curl Palampur virus (ToLCPaV, *Begomovirus solanumpalampurensis*), squash vein yellowing virus (SqVYV, *Ipomovirus cucurbitavenaflavi*), and Cucumber vein yellowing virus (CVYV).

Sequence comparisons and phylogenetic analyses reported that most of the virus isolates from the present study are closely related to isolates previously reported from the Middle East, except for CVYV, which is most closely related to isolates from the Mediterranean Basin. This study expands the knowledge of the geographic distribution of SLCuV, ToLCPaV, SqVYV, and CVYV, contributes to the repository of near complete *Ipomovirus* sequences in the GenBank, and shows the high incidence and diversity of zucchini-infecting viruses in Iraq.

[Mohammed S. Mohammed; Adnan Abdaljeleel Lahuf; Zuhair M. Jeddoa (Iraq); Juliana Osse de Souza (USA), Maher Al-Rwahnih (USA, Jordan), Tropical Plant Pathology, 50-67, 2025].



Jordan

Characterization of plant parasitic nematodes associated with aquatic plants in major water bodies of Jordan

This study provides the first characterization of plant parasitic nematodes (PPNs) associated with aquatic plants in Jordan's major water bodies. Understanding nematode diversity is crucial for biodiversity assessments and evaluating potential impacts on ecologically and economically important aquatic flora. Morphological and molecular analyses of samples from various aquatic plants and sediments revealed the presence of specific PPN species in different locations: *Hemicycliophora conida*, *Tylenchorhynchus goldeni*, and *Hemicriconomoides pseudobrachyurum* in the Zarqa River; *Hirshmaniella caudacrena* in the Zarqa River and Wadi Almujip; and *Xiphinema* species in Thermal Waters. These findings highlight the presence of diverse PPN communities in Jordanian aquatic ecosystems.

[**Fadia A. Shaban, N. Salem, M. Wahsha, and Ismail Ibrahim and L. Albanna** (Jordan), Department of Plant Protection, School of Agriculture, the University of Jordan, Amman 11942, Jordan. Marine Science Station, Aqaba Branch, the University of Jordan, Aqaba-77110-Jordan.2025. **The 14th Arab Congress of Plant Protection 3-7/11/2025-Algeria.** Part of a Ph.D. Dissertation. (Poster)].



Lebanon

Streamlining global germplasm exchange: Integrating scientific rigor and common sense to exclude phantom agents from regulation.

This collaborative work by over 180 researchers from 40+ countries addresses the challenges posed by “phantom agents”—putative pathogenic agents named in literature without supporting data on their existence. Those agents remain on regulatory lists, creating barriers in trade and plant certification. Historically identified based solely on symptoms, these agents lack isolates or sequence data, making reliable detection or risk assessment impossible. After reviewing over 120 such agents across 10 key plant genera, we recommend their removal from regulatory lists and call for revised standards aligned with modern diagnostics. This effort seeks to streamline germplasm exchange, benefiting global agriculture by removing the constraints imposed by phantoms. [Tzanetakakis I.E.¹, Aknadibossian V.2, Špak J.³, Constable F.⁴, Harper S.J.⁵, others, Choueiri E.³⁷, et al., 2025. ¹Department of Entomology and Plant Pathology, University of Arkansas System Division of Agriculture, Fayetteville, AR 72701, U.S.A. ²University of Florida, Department of Plant Pathology, Gainesville, FL 32611, U.S.A. ³Biology Centre, Czech Academy of Sciences, CZ 370 05 České Budějovice, Czech Republic. ⁴Agriculture Victoria Research, Department of Energy, Environment and Climate Action, Bundoora, VIC 3083, Australia. ⁵Department of Plant Pathology, Washington State University, Prosser, WA 99350, U.S.A. ³⁷Department of Plant Protection, Lebanese Agricultural Research Institute, Tal Amara, P.O. Box 287, Zahlé, Lebanon. Plant Disease 109: 736-755.] <https://doi.org/10.1094/PDIS-04-24-0745-FE>]

Spatial dynamics of olive fruit fly adults in the framework of a monitoring trap network.

Bactrocera oleae (Rossi) (Diptera: Tephritidae) is a key pest of olive groves. Adult monitoring is carried out by means of attractant traps of different shapes, which give relevant information for pest control such as the presence of adult flies in the field and their trend, female maturity and sex ratio. However, it is still not entirely clear whether a given density is sufficient for providing a reliable representation of flies in an olive grove. To investigate this question, an experiment was planned, consisting of arranging a high-density network of unbaited sticky panels (UTs) between panels baited with ammonium carbonate (BTs) deployed at a density of 2 traps/ha.

The experiment was carried out in Greece, Italy, Lebanon, Spain and Tunisia. The percentage of BT over UT catches varied significantly among the different countries, with BTs ranging from 82% of catches in Italy to 27% in Greece. The Pearson correlation between BTs and UTs was significant under high captures but not significant at low densities. The index of aggregation showed an inverse relationship with baited catches. The distributions of males and females were nearly always positively spatially associated. According to the field data, BTs at the density of 2/ha provide a realistic estimate of the population in the field in the cases of established populations. However, in the periods without population establishment, a denser monitoring trap network is likely required to obtain a reliable estimation of the field population. [**Andrea Sciarretta, Dionysios Perdakis, Linda Kfoury, Tania Travaglini, Marios-Ioannis Sotiras, Flora Moreno Alcaide, Manel Ben Ameer, Elia Choueiri, Mohieddine Ksantini, Ines Ksentini, Ahmad El Bitar, Meelad Yousef Yousef and Theodore A. Tsiligiridis**, Applied Sciences 15: 6285, 2025]. <https://doi.org/10.3390/app15116285>

Detecting new emerging viruses and phytoplasmas of grapevine in Lebanon for developing future adaptation strategies to climate change.

Global warming and environmental changes could lead to the emergence of unknown viruses and phytoplasmas, posing a significant threat to viticulture and the wine industry. Consequently, impacting farmers' incomes, the environment, national economies, and international trade.

A survey was conducted in 52 commercial vineyards in Lebanon during late summer of 2020. RT-PCR and PCR assays were performed on 252 grapevine samples and revealed prevalent single infections of Grapevine GeminiVirus A (GGVA) (9.27%) and Grapevine Garan Dmak Virus (GGDV) (12.7%). Sequence analyses revealed that the Lebanese isolates of GGVA (PQ562408-PQ562417) and GGDV (PV404211-PV404217) were 100% identical with reference sequences in the GenBank. GGDV was detected in both Table (9.27%) and wine (17.82%) varieties, followed by GGVA (9.5%), more prevalent in table grapes (11.25%) than in wine varieties (6.93%). *Candidatus* Phytoplasma solani was encountered in 8 samples and their sequence analysis (PQ533202-PQ533207) revealed their identity with reference samples in the GenBank. A new putative subgroup of the 16Sr group XII (LebB1 isolate) was discovered in one of the Lebanese samples, warranting further studies. This study is the first report of GGVA and GGDV in Lebanon, demonstrating the presence of emerging diseases in Lebanon and suggesting the need for sustainable prevention

and treatment strategies at both national and regional levels. [Christine Bilen¹, Maroun El Moujabber², Amani Ben Slimen², Ornella Incerti¹, Fouad Jreijiri³, Elia Choueiri³. ¹Department of Soil, Plant and Food Sciences, University of Bari 'Aldo Moro', Via G. Amendola 165/A, 70126 Bari (BA), Italy. ²CIHEAM Bari, Mediterranean Agronomic Institute of Bari, Via Ceglie 9, 70010 Valenzano (BA), Italy. ³Department of Plant Protection, Lebanese Agricultural Research Institute, Tal Amara, P.O. Box 287, Zahlé, Lebanon. European Journal of Plant Pathology, 2025]. <https://doi.org/10.1007/s10658-025-03102-4>

Effective control of tomato leaf miner, *Tuta absoluta* (Meyrick) (Lepidoptera: Gelechiidae) using the entomopathogenic fungus, *Beauveria pseudobassiana* Rehner & Humber in commercial high-arched plastic tunnels.

The tomato leafminer, *Tuta absoluta* (Meyrick) (Lepidoptera: Gelechiidae) is a highly invasive pest that causes significant damages to tomato crops globally. Its resistance to commonly used chemical insecticides has made management increasingly difficult, prompting the need for sustainable, effective alternatives.

This study investigated the efficacy of a Lebanese isolate of *Beauveria pseudobassiana* as a biological control agent against *T. absoluta*, compared its performance to *Bacillus thuringiensis* and conventional pesticide mixtures under both controlled, commercial production conditions.

Three preliminary cage experiments were conducted under controlled infestation conditions using larvae reared from field-collected adults. Conidial suspensions of *B. pseudobassiana* were applied following standard protocols. The fungal treatment achieved a 90.7% mortality rate at 20°C, closely matching *B. thuringiensis* (85.4%), and reached 100% mortality at 14°C. Subsequently, two field trials were carried out in commercial high-arched plastic tunnels under natural infestation. In these trials, *B. pseudobassiana* and *B. thuringiensis* significantly reduced leaf mine incidence, with control levels comparable to or exceeding those achieved by calendar-based chemical sprays. In fall production, *B. pseudobassiana* reduced leaf mines to 1.9 mines/leaf by week 11, outperforming chemical pesticides (3.6 mines/leaf) and performing similarly to *B. thuringiensis* (2.6 mines/leaf).

In summer production, *B. pseudobassiana* maintained strong efficacy, resulting in 2.3 and 2.1 mines/leaf at weeks 3 and 4, respectively, compared to 3.1 and 5.8 mines/leaf for *B. thuringiensis*. This is the first study to demonstrate the high efficacy of *B. pseudobassiana* in commercial tomato production, offering broader control than *B. thuringiensis*. These findings conclude that *B. pseudobassiana* is a viable alternative or complementary agent to *B. thuringiensis* in integrated pest management programs, supporting more sustainable tomato production, reduced insecticide use, and improved worker safety.

[Aya Fardoun¹, Nour Ezzeddine¹, Hagop S. Atamian², Hana Sobh¹, Houssam Shaib¹ and Yusuf Abou Jawdah¹. ¹American University of Beirut, Beirut, Lebanon. ²Chapman University, Orange, USA. Egyptian Journal of Biological Pest Control, 35:38, 2025]. <https://doi.org/10.1186/s41938-025-00876-x>

Influence of different sowing time on the appearance of blight on black cumin *Nigella sativa*.

The current study was conducted during the season (2021-2022) In the fields of al-Ghab Research Center in order to determine the effect of two different planting dates on the appearance of blight on the black cumin plant (*Nigella sativa*) and the plant's susceptibility to the disease. The survey included (12) fields.

The cultivation took place on two different dates (1-15 December and 1-15 February). The results confirmed the presence of significant differences between the two dates, where planting succeeded in the second date and the crop escaped from the threat of frost, which weakened the plant in the first date and made it vulnerable to infection. It will serve as a reference for scientists, researchers and agricultural workers to choose the most suitable date for planting the crop to escape the disease that has swept the crop in recent years and caused heavy damage and material losses. Note that references in this field are very rare. [Alaa Khalil, Issam Allaf, Qusai al-Rehiyeh and Ibrahim Alobied, (Syria).Journal of Agriculture Research- SJAR 12(2): 332-339 -April 2025]. <https://agri-research-journal.net/sjar/?p=10619>

The direct and endophytic effects of *Beauveria bassiana* on the infestation of cucumber plants with the cotton aphids *Aphis gossypii* in the greenhouse conditions

The research was carried out at Latakia University, during 2022, and aimed to investigate the direct and endophytic effects of two indigenous isolates of *Beauveria bassiana* (Bals.) Vuil. in protecting the cucumber plant from an infestation of *Aphis gossypii* under greenhouse conditions. The isolate B243 isolated from soil and the isolate N20 endophytically isolated from a cucumber plant were used for these experiments. The pathogenicity of these isolates against the cotton aphid *A. gossypii* was tested in the laboratory by feeding aphids on cucumber leaf discs dipped in the fungal spore suspension.

The results showed a significant decrease in the resulting population size, reaching 44.35 and 58.49% compared with the control for both isolates B243 and N20, respectively. The effect of both isolates on the infestation of cucumber plants with *A. gossypii* was studied under greenhouse conditions using three inoculation methods: foliar spray before infested plants with aphids, foliar spray after infested plants with aphids, and root soaking with the spore suspension as the endophytic effect of the fungus. The ability of the fungus to colonize plant parts was also studied after each of these methods. The results showed that the fungus was able to colonize the leaves, roots, and stems after root soaking only. Application of *B. bassiana*, whether through root inoculation or direct spray after infestation, was effective in reducing the infestation of cucumber plants with cotton aphids in the greenhouse. Both treatments reduced the individual fertility and the community size by a reduction percentage of 85.39 and 74.02% for the community of each of B243 and N20, respectively. [Lobna Rajab, Ibtisam Gazal and Mohammad Ahmad (Syria). Syrian Journal of Agriculture Research- SJAR 12(2): 361-374 -April 2025]. <https://agri-research-journal.net/sjar/?p=10633>

Effect of Salicylic Acid on the development of infection with 0, 2 *Fusarium Oxysporum* f.sp. *ciceris* races on cultivar Ghab4 .

This research aimed to study the effect of salicylic acid on development of infection with races 0 and 2 of *Fusarium oxysporum* f.sp. *ciceris* on chickpea cultivar Ghab4. Studying the antifungal antagonism of salicylic acid for races through Poisoned Food Technique, ten concentrations were prepared from 1 to 2000 µg/ml on PDA, the inhibition percentage was calculated.

The halffield experiment was carried out under the natural conditions of Al-Ghab region at the Agricultural Scientific Research Center, 2021, with a Complete Random Block Design with three replications and three treatments: seed coating, seed soaking, and spraying the plants with salicylic acid in addition to the control. The percentage and severity of infection were recorded on plants at the age of 80 days. The results showed an increase in the percentage of inhibition by increasing the concentration of salicylic acid in PDA culture, the two concentrations of 1000 and 1500 µg/ml completely inhibited the actinic growth of races 0 and 2 (respectively).

The use of salicylic acid was not highly effective in reducing the percentage and severity of infection resulting from infection with race0, while the soaking had significant differences over each of the spraying and coating, followed by the spraying with significant differences with the control infected with race2.

[**Laila Alloush, Sabah AL-Maghribi, Basima Barhom (Syria)**, Syrian Journal of Agriculture Research-SJAR 12(2): 340-350 -April 2025]. <https://agri-research-journal.net/sjar/?p=10622>

Study of life tables of fall armyworm, *Spodoptera frugiperda* on maize under laboratory conditions.

The Fall armyworm (FAW), *Spodoptera frugiperda* (Lepidoptera: Noctuidae), is one of the most devastating pests with a worldwide distribution. It attacks a wide range of plants, and maize, *Zea mays* L. is its preferred host.

This study was carried out during 2023 to estimate the biological parameters of *S. frugiperda* under laboratory conditions. The experiments were carried out under laboratory conditions of 28 ± 2 °C temperature, RH $75 \pm 10\%$ relative humidity and 14:10 hours (light:dark) photoperiod. Biological parameters were analyzed according to the theory of age-stage two-sex life table by using the computer program TWO-SEX MSchart. The results obtained indicated that the value of total larval period was 11.7 ± 0.1 days, with a pupal period of 5.74 ± 0.08 days and adult longevity of 9 ± 0.85 days (females) and 8.53 ± 0.64 days (males). The value of intrinsic rate of increase (r) was 0.1525 females/female/day; the final increase rate (λ) was 1.1648 day; net reproductive rate (R_0) was 85.23 females/female/generation; gross production rate (GRR) was 666.84; generation time (T) was 29.136 days; doubling time (DT) was 4.543 days. Information generated by this study is useful to understand insect population dynamics for use in developing site-specific integrated management strategy for fall armyworm.

[**Ahmad, A.S., N. Abo Kaf and A. Ramadan. (Syria)**, Arab Journal of Plant Protection, 43(3): 279-285. 2025]. <https://doi.org/10.22268/AJPP-001327>

Evaluation of the efficacy of three native isolates of entomopathogenic nematodes against *Tuta absoluta* under laboratory conditions and in pot experiments.

The efficacy of three native isolates of entomopathogenic nematodes: *Heterorhabditis bacteriophora* (H), *H. indica* (Fn) and *Steinernema affine* (313) was assessed against 3rd and 4th instar larvae (both outside and inside leaf tunnels) and pupae of *Tuta absoluta*, a destructive pest in Syria, at 25°C. In the laboratory, the isolates were tested on larvae outside leaf tunnels, at different doses 1, 5, 10, 15, 25 and 50 infective juveniles IJs/larva. The results obtained showed the susceptibility of larval instars to nematode infection, with variation according to the isolate, the concentration, and the larval instar stage inoculated.

The isolate H exhibited the highest mortality rates across all treatments, followed by the isolate Fn, while the isolate 313 had the least virulence. The 50% lethal doses (LD₅₀) for the three isolates against the 3rd and 4th larval instars, were 9.62 and 7.57 IJs/larva for isolate H; 12.33 and 8.24 for isolate Fn; 30.36 and 24.20 for isolate 313, respectively. The two most efficient isolates from the previous experiment, H and Fn, demonstrated the capability to access and kill larvae within the leaf tunnels with no significant difference between them.

The H isolate exhibited mortality rates of 37.12 and 45.66%, whereas the Fn isolate produced mortality rates of 34.33 and 41.12% for 3rd and 4th instar larvae, respectively. Nevertheless, their efficacy on pupae was comparatively lower, with the H isolate displaying the highest mortality rate of 12.33%. In pot experiments, two concentrations (500 and 1000 IJs/ml) of H and Fn isolates were applied, with no significant differences observed between the two isolates. Although their efficacy was limited on pupae, the virulence on larvae instars was evident and increased with heightened concentrations and instar progression, achieving mortality rates for the 4th instar of 94.27 and 83.87% outside and inside leaf tunnels of the H isolate, and 91.66 and 80.10% for the Fn isolate, respectively. These findings suggest that entomopathogenic nematodes adapted to moderately warm temperatures are considered promising effective biological control agents against *Tuta absoluta*. Further in-depth research and practical applications within greenhouses are needed. [Ali, M., N. Allouf and M. Ahmad.(Syria), Arab Journal of Plant Protection, 43(3):366-374, 2025]. <https://doi.org/10.22268/AJPP-001325>

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of 5.74 ± 0.08 days and adult longevity of 9 ± 0.85 days (females) and 8.53 ± 0.64 days (males). The value of intrinsic rate of increase (r) was 0.1525 females/female/day; the final increase rate (λ) was 1.1648 day; net reproductive rate (R_0) was 85.23 females/female/generation; gross production rate (GRR) was 666.84; generation time (T) was 29.136 days; doubling time (DT) was 4.543 days. Information generated by this study is useful to understand insect population dynamics for use in developing site-specific integrated management strategy for fall armyworm.

[Ahmad, A.S., N. Abo Kaf and A. Ramadan. (Syria), Arab Journal of Plant Protection, 43(3): 279-285. 2025]. <https://doi.org/10.22268/AJPP-001327>

Description and Identification of some wild *Agaricus* species grown in western Homs Governorate, Syria.

Field collection missions of wild mushrooms were conducted in the western part of Homs governorate in Syria from early October to late December 2021, and from early November to late December 2022. During the survey, six specimens of wild mushrooms were collected. Morphological characterization of collected specimens, such as pileus, scales, lamellae and stipe measurements, color, odor and the presence of annulus were immediately made.

Molecular identification of these mushroom specimens, using ribosomal DNA internal transcribed spacers (rDNA-ITS) sequencing showed that the collected isolates belong to three different species of the *Agaricus* genus.

These are: *A. bisporus* (OP648153 and OP648159), *A. sinodeliciosus* (OP648154 and OP648156) and *A. qilianensis* (OP648155 and OP648157). This is the first record of the occurrence of these three species in the Syrian environment, and information on these species were deposited in the GenBank database which hopefully will facilitate their domestication and commercialization.

[Hola, B., R. Murshed and M. Jbour. (Syria), Arab Journal of Plant Protection, 43(3):414-424, 2025]. <https://doi.org/10.22268/AJPP-001335>

Integration of some chemical pesticides, fungus isolation and plant growth regulator Ethephon in controlling corn stem borer *Sesamia critica* Led. (Lepidoptera: Noctuidae).

This study was implemented for the period from October 2023 to May 2025 and included two axes. The first axis was conducting a laboratory study in the laboratories of the College of Agriculture/Tikrit University with the aim of isolating and identifying the biocontrol fungi that infect the larvae of the corn stem borer *Sesamia critica* Led. which were cultured on soil samples collected from different agricultural areas in Kirkuk Governorate, and integrating them with ethephon and chemical pesticides (Belt, Denim Fit, Movento) and testing their efficiency in killing the larvae of the corn stem borer *S. critica* Led. The second axis included implementing a field experiment in Kirkuk Governorate/Al-Hawija District to evaluate the effect of integrating some chemical pesticides with fungal isolates and the growth regulator ethephon in resisting the corn stem borer *S. critica* Led. The results of the study reached the following:



The results demonstrated the possibility of using the bait method to isolate fungi pathogenic to the corn stem borer *S. critica*, which were cultured on soil samples collected from different agricultural areas in Kirkuk Governorate. Eighteen fungal isolates were isolated, including *Aspergillus terreus* isolate Has-1, *Aspergillus tubingensis* isolate Has-2, *Aspergillus versicolor* isolate Has-3, and *Fusarium cf. incarnatum-equiseti* isolate Has-4, *Metarhizium anisopliae* isolate Has-5 and *Penicillium citrinum* isolate Has-6 were the most efficient in killing corn stem borer larvae in the laboratory, with the corrected percentage of spore-suspended kill reaching (61.11, 61.27, 64.13, 69.68, 59.36, 59.36)% for the above isolates, respectively.

The most pathogenic isolates were molecularly identified to the species level under the above names and deposited in the global genebank at the NCBI website under global numbers OR758774.1, OR758834.1, OR758840.1, OR758842.1, OR758816.1 and OR758843.1 for the above isolates, respectively. In addition, the diagnosis of the borer was also made. The corn stalk was molecularly genotyped and registered under the name *Sesamia critica* isolate Has-7 and accession number OR758844.1 in the World Genebank.

The fungal isolates showed high activity in producing chitinase and proteinase enzymes. The results showed that *Fusarium cf. incarnatum-equiseti* isolate Has-4 recorded the highest activity in producing chitinase enzyme, reaching 3.35 units/ml. Most of the treatments used in the study showed a prominent role in influencing some aspects of the insect's life. The triple interaction treatment between ethephon at a concentration of 1.25 ml/L, Denim Fit at a concentration of 0.40 g/L, and the fungal isolate *Fusarium cf. incarnatum-equiseti* isolate Has-4 gave the best results, as it reduced the larval transformation rate to 0.0%. The average weight of corn stem borer larvae decreased to 11.07 mg/larva after 9 days of treatment, compared to 14.40 mg/larva. The relative efficiency of killing larvae increased to 96.67% after 9 days of treatment. Increasing the concentration of the plant growth regulator ethephon, when used alone at a concentration of 0.62 and 1.25 ml/L, led to a reduction in the average height of the yellow

corn plant *Z. mays* L., as it decreased with increasing concentration to reach 180.44 and 176.22 cm for the two concentrations, respectively. While the average leaf area increased with increasing concentration when using the plant growth regulator ethephon alone at its two concentrations, as it reached 446.01 and 481.90 cm² for the two above concentrations, respectively.

However, increasing the concentrations of pesticides and fungi did not affect the growth characteristics. When used alone, and when estimating field damage to maize plants resulting from insect infestation, the triple interaction treatment gave the best results, as it reduced the infection rate after 16 days of treatment to 0.0%, and consequently the death of the growing tip decreased to 2.83%. The average number of larvae inside the stem of the infected plant, the number of holes, the number and feeding tunnels, the diameters of the feeding tunnels, and the percentage of the excavated area of the stem decreased to 1.44 larvae/plant, 2.44 holes/plant, 1.33 tunnels/plant, 4.23 mm, and 13.47% for the previously mentioned studied traits, respectively.

[**Hassan Mohammed Khalaf Jassim Al-Jubury (Iraq)**, College of Agriculture, University of Tikrit, Supervised by: Asst. Prof. Ziyad Shihab Ahmed and Prof. Dr. Abdullah Abdul Kareem Hassan (**Doctorate, 2025**)].

A diagnostic and physiological study of the fungi *Thielaviopsis paradoxa* and *Thielaviopsis punctulata* causing black scorch disease in date palm (*Phoenix dactylifera*) and their biological control in Diyala Governorate.

This study was conducted at the College of Education for Pure Sciences/University of Diyala and at the extension farm in Baladruz/Diyala Governorate. The results of the investigation showed the spread of black scorch disease caused by the two pathogenic species *Thielaviopsis paradoxa* and *Thielaviopsis punctulata* in all areas of the governorate included in the study, namely Mandali, Baladruz, Baqubah and Muqdadiyah, and on different varieties, with an infection rate ranging between 2.07 - 6.31%. The highest infection rate was in one of the orchards of Baqubah district at a rate of 6.31%, while the lowest infection rate was recorded in one of the orchards of Mandali district at a rate of 2.07%.

The results of the pathogenicity test for the isolates of both pathogenic species *T. paradoxa* and *T. punctulata* showed the ability of all 32 isolates to infect both the tissues of the fronds and seedlings, and all isolates significantly outperformed the control treatment, which gave an infection rate of 0%. The isolated PG7 isolated from the Tabarzul variety/Mandali district outperformed all *T. paradoxa* isolates in infecting the fronds and seedlings, and gave an infection rate of 97.2% and 100%, respectively, while the isolate GP2 isolated from the Barhi variety/Baladruz district outperformed the rest of the *T. punctulata* isolates in infecting the fronds and seedlings, and gave an infection rate of 86.1% and 100%, respectively.

The filtrate of both pathogenic isolates *T. paradoxa* (PG7) and *T. punctulata* (GP2) caused palm frond death and yellowing of the leaves one week after being placed in the filtrate of each farm and caused seedling death two weeks after being placed in the filtrate. The results of isolating biological factors from the soil and roots of palm trees as well as from the fronds showed that palm trees coexist with a number of strains belonging to the fungus *Trichoderma*, numbering 21 isolates, and the bacteria *Bacillus*, numbering 33 isolates, and they differ in their antagonistic ability towards each of the two pathogenic

species *T. paradoxa* and *T. punctulata*. The isolates T2 and T11 were the most effective in inhibiting each of the two pathogenic fungi, as each of them led to inhibiting the fungus *T. paradoxa* by 66.66 and 50.58%, respectively, and to inhibiting the fungus *T. punctulata* by 76.86 and 61.17%, respectively. Bacterial isolate B8 outperformed the rest of the isolates and led to inhibiting each of the two pathogenic fungi *T. paradoxa* and *T. punctulata* by 39.99 and 38.09%, respectively. The isolates of both pathogenic species *T. paradoxa* and *T. punctulata* showed variation in their ability to grow at different temperatures 20, 30, 40 C, while they did not grow at 10 C and gave the best growth at 30 C. The average growth of *T. paradoxa* isolates after 24, 48 and 72 hours was 3.20, 6.35 and 8.50 cm, respectively, while the average growth of *T. punctulata* isolates was 3.25, 7.27 and 8.50 cm, respectively. The results also showed that the best pH for the growth of *T. paradoxa* isolates is 5, while 6 was the best for the growth of *T. punctulata* isolates.

The results showed that the isolates of both pathogenic species *T. paradoxa* and *T. punctulata* were able to grow differently in PDA, CDA, SA, YDA, WA, CT and LF culture media. The best growth rates were on carrot agar media for both pathogenic fungi, as the growth diameter rates of *T. paradoxa* isolates reached 3.61, 7.25 and 8.5 cm after 24, 48 and 72 hours, respectively, and the growth diameter rates of *T. punctulata* isolates reached 4.18, 8.50 and 8.50 cm after 24, 48 and 72 hours, respectively. The results showed that the average effective concentration of the alcoholic extract of walnut bark in the two pathogenic species *T. paradoxa* and *T. punctulata* was 1584 and 2511 ppm, respectively, while the average effective concentration of the extract in each of the two biological species *T. harzianum* and *T. longibrachiatum* and the bio-bacteria *B. subtilis* was 9549, 10000 and 6309 ppm, respectively. The results also showed that the effective concentration of the biosynthesized magnesium oxide nanoparticles MgONPs in each of the two pathogenic species *T. paradoxa* and *T. punctulata* was 79.43 ppm, while it was 354, 363 and 251 ppm in each of the two biological species *T. harzianum* and *T. longibrachiatum* and the bio-bacteria *B. subtilis*, respectively. The results of the detection of secondary metabolites showed that both pathogenic species *T. paradoxa* and *T. punctulata* produced a number of secondary metabolites in both palm fronds and in the PSB culture medium, including Hexadecenoic acid, methyl ester, phthalic acid esters that kill living cells, and Oxalic acid, which is one of the most important pathogenic factors for pathogens in infecting plants and causing disease. The two biological species, *T. longibrachiatum* and *T. harzianum* and the biological bacteria *B. subtilis* produced a number of biological compounds, including the biological compound 2-Hydroxy-gamma-butyrolactone and Hexadecenoic acid, methyl ester.

The results showed that the alcoholic extract of the walnut bark *J. regia* contains a number of biological compounds, including the fungal antibiotic N-Trifluoroacetylimidazole. In the field, the synergistic treatments of biological factors and their filtrates with nano magnesium oxide MgONPs showed their superiority in reducing the infection rate and severity and in increasing the weight of the root and vegetative groups, wet and dry, compared to the rest of the individual treatments and the comparison treatment. The treatment *B.s.* +F + M + N + *T. paradoxa*, which included adding *B. subtilis* (*B.s.*) bacteria to the potting soil, and spraying the green group with both *B. subtilis* (F) bacteria filtrate, the alcoholic extract of *J. regia* walnut bark (M), and the nano magnesium oxide MgONPs (N) biosynthesized by the alcoholic extract of walnut bark, was superior, as it gave a percentage and severity of infection of 25% and 6.3%, respectively, and gave a wet and dry weight for both the root and green groups of 44.45, 11.89, 53.25, 16.62 g, respectively, compared to the control treatment (pathogenic fungus only), in which the percentage

and severity of infection was 100%, and a wet and dry weight for the root and green groups of 16.40, 5.60, 16.32, 9.67 g. In succession, it was followed by the treatment *T. l.* + F + M + N + *T. paradoxa*, which gave a percentage and severity of infection of 50 and 12.5%, respectively, and the fresh and dry weight of both root and shoot groups reached 46.10 and 12.18, 55.19 and 16.96 g, respectively. The results of the treatments of *T. punctulata* fungus showed the superiority of the treatment *B.s.* + F + M + N + *T. punctulata* in reducing both the infection rate and its severity, as it gave 25 and 6.2%, respectively, and gave a wet and dry weight for both root and vegetative groups of 36.81, 10.99, 44.70, 18.31 g, respectively, compared to the control treatment (pathogenic fungus only), which gave an infection rate and severity of 100% and a wet and dry weight for both root and vegetative groups of 12.83, 4.57, 9.55, 6.69 g, respectively. [Mohammed NK Hantoosh (Iraq), Department of Plant Protection, College of Agricultural Engineering Sciences, University of Baghdad, Iraq. Supervisor: Prof. Halima Zgair Hussein. (Doctorate, 2025)].

Utilization of RNAi gene silencing technology, pectin and organic calcium in growth, yield and marketability of local tomatoes.

Rapid damage to tomato fruits before and after harvest results not only in significant financial losses for farmers, marketers, and consumers but also depletes non-renewable natural resources. Moreover, the increased use of conventional methods such as refrigeration and plastic packaging raises financial costs and carbon pollution. Consequently, researchers have adopted smart breeding approaches such as gene silencing technology (RNAi), alongside the potential use of pectin (an environmental waste product) and calcium (organic materials) to extend the shelf life of tomato fruits. RNAi technology has been harnessed to genetically silence specific plant genes to modify traits, which previously required lengthy and labor-intensive traditional breeding programs. Additionally, multiple genes can be silenced simultaneously through stable inheritance over several generations via double-stranded RNA hairpin loop structures, after identifying the target trait and knowing the genome sequence and size. Pectin is a commercially available, inexpensive complex polysaccharide found in the middle lamella and primary and secondary cell walls of plant cells, which enhances plant growth, resistance, fruit quality, and SHELF life. Calcium plays a role in strengthening cell walls by inhibiting pectinolytic enzyme activity, acts as a secondary messenger enhancing nutrient transport and hormonal signaling, and regulates genetic markers and epigenetic factors in response to environmental stimuli.

This study aimed to develop a new tomato cultivar characterized by firm fruits and extended marketability through employing RNA interference (RNAi) gene silencing technology, alongside improving local tomato fruit marketability, growth, and yield using pectin and organic calcium treatments. The study included a series of laboratory, field, and storage experiments. The gene silencing experiment (laboratory trial) was conducted in the Plant Breeding laboratory at the Agricultural Sciences and Natural Resources University of Khuzestan, Iran, designing a plasmid targeting the Pectate lyase enzyme, one of the rapid enzymes responsible for pectin degradation. The field experiment assessed the growth, yield, and fruit quality response of tomato plants to gene silencing and treatments with pectin and organic calcium, including their overlaps. Harvested fruits were stored under two conditions: room temperature and refrigerated at $10 \pm 2^\circ\text{C}$. Data were recorded for weight loss and firmness at three intervals during refrigerated storage (after 12, 24, and 36 days) and room temperature storage (after 7, 14, and 21 days). Genetically silenced

plants (RNAi-SIPL) showed extended fruit retention on the plant from the pink stage to spoilage (33.7 days) and produced fruits with high firmness (12.2 kg·cm⁻²). Fruits treated with RNAi for the Pectate lyase gene showed the lowest weight loss after 36 days of refrigerated storage (41.4%) and after 21 days at room temperature (41.31%). These results were confirmed by anatomical and enzymatic analyses. Pectin and calcium treatments followed, with fruit retention on the plant lasting 20 days and weight loss of 43.7% after 24 days in the refrigerator and 45.9% after 14 days at room temperature, compared to the control which exhibited the lowest values in the above traits. Genetically silenced plants also outperformed others in most vegetative growth, yield, and fruit quality indicators, followed by plants treated with pectin and calcium and their combination compared to control treatment. [**Maryam Sami Elias(Iraq)**, Faculty Member in the Department of Horticulture and Landscape Engineering / College of Agricultural Engineering Sciences / University of Baghdad, Iraq.(**Doctorate, 2025**)].

A biological control approach: investigation of the potential of endophytic and nematode egg-parasitic fungi against invasion and infection by Cyst and Root-Lesion Nematodes (*Heterodera* spp. and *Pratylenchus thornei*).

Plant-parasitic nematodes significantly impact global agricultural production, causing annual losses estimated at up to USD 216 billion. With the projected increase in the world population, maintaining crop health and yield to prevent these losses is crucial. Wheat (*Triticum aestivum* L.) and sugar beet (*Beta vulgaris* L.) are among the most economically important crops worldwide, sustaining both food security and agro-industry. Plant-parasitic nematodes pose a constant threat to these crops, capable of reducing yields by up to 50%. Various control methods exist for managing plant-parasitic nematodes; however, most rely primarily on nematicides. Due to increasing restrictions on chemical pesticides, particularly nematicides, because of their toxicity and non-target effects on soil biota, there is a pressing need for safer and more sustainable alternatives. This study investigated the biocontrol potential and direct parasitism of four nematode-antagonistic fungi (*Ijuhya vitellina*, *Niesslia gamsii*, *Polydomus karssenii*, and strain JKI72728) against three plant-parasitic nematodes, *Heterodera filipjevi*, *Heterodera schachtii*, and *Pratylenchus thornei*, in the presence of a plant host.

This was primarily achieved through greenhouse evaluations that assessed the impact of fungi on nematode pathogenicity and plant resistance responses. The study also included the development and quantification of egg mortality and antagonism by the fungal strains to explain direct antagonistic mechanisms. Additionally, the study explored the endophytic interactions of the fungal strains and evaluated their potential to enhance plant growth (with and without nematode stress) and increase plant resistance or tolerance to invasion by *H. filipjevi*, *H. schachtii*, and *P. thornei*.

This involved assessing the effects of the fungi on plant growth promotion, nematode infection, and penetration. Nematode reproduction, fungal parasitism of nematode eggs, and effects on nematode penetration were also examined. Furthermore, the influence of the fungi on the morphological, morphometric, and agronomic characteristics of the plant host, both with and without nematode infection, was evaluated. The results highlight the complex interactions among fungi, nematodes, and their host plants. Experiments conducted on wheat and sugar beet demonstrated the effectiveness of fungal treatments (*I. vitellina*, *P. karssenii*, *N. gamsii*, and JKI72728) in reducing the

number of eggs formed in cysts, despite no significant reduction in the number of cysts produced. The study also found that *P. karssenii* and *N. gamsii* delayed and reduced nematode penetration in wheat roots compared to untreated controls. This research provides the first report of a dark septate endophyte (*Polydomus karssenii*) reducing and delaying the penetration of a plant-parasitic nematode in planta, specifically the migratory endoparasitic root lesion nematode *P. thornei*. Moreover, all four fungal strains exhibited endophytic behavior and promoted growth in the physiological traits of wheat and sugar beet, both in the presence and absence of plant-parasitic nematodes.

Overall, this study highlights the biocontrol potential of the four nematode-antagonistic fungi as sustainable biological agents against plant-parasitic nematodes and emphasizes their role in integrated pest management strategies for wheat and sugar beet production. [Osameh Atiya (Turky), University Niğde Ömer Halisdemir University, Türkiye, University Supervisor: Prof. Dr. Halil Toktay, Supervisors: Dr. Abdelfattah A. Dababat, Dr. Wolfgang Maier, Dr. Samad Ashrafi (Doctorate, 2025)]. osamehatiya@yahoo.com

Evaluation of the efficacy of fertilization in conventional and nanoform and some plant extracts for the control of the two-spotted spider mite *Tetranychus urticae* (Koch) (Acariformes: Tetranychidae) on eggplant in the greenhouse

This study aimed to find safe and cost-effective means to control the two-spotted spider mite, *Tetranychus urticae* (Acariformes: Tetranychidae), and reduce its economic damage, while achieving sustainable agricultural development goals, the most important of which are environmental preservation and reduced pesticide use, as pesticides are hazardous pollutants. Laboratory and field studies were conducted to examine some characteristics of the three eggplant cultivars and to



evaluate the effectiveness of fertilization with potassium silicate, humic acid, and salicylic acid in both normal and nano sizes. Additionally, the effectiveness of plant extracts from bitter orange peels, sidr leaves, and harmful seeds and their impact on the two-spotted spider mite were assessed. The results were as follows:

A laboratory studies of several morphological traits and nutritional and secondary compounds in the leaves of eggplant cultivars (Jawaher, Barcelona, and l'juba Iraq) showed no significant difference among the three cultivars in the number of trichomes. However, a significant difference was found among the three cultivars in trichome length, with the Jawaher cultivar significantly outperforming both the Barcelona and l'juba cultivars. The results of the study on leaf area of the three cultivars also indicated a significant superiority of the l'juba Iraq cultivar over both the Jawaher and Barcelona cultivars. As for the main nutritional components in the leaves of the three cultivars, it was found that there is no significant difference between the three cultivars in the leaf content of protein, carbohydrates, fats, and chlorophyll.

The components of the leaves of the three cultivars in terms of secondary metabolites were varied, as the Jawahar cultivar had a higher content of total tannins, gallic acid, ferulic acid, quercetin, and rutin compared to the Barcelona and I'juba Iraq cultivars in these compounds. A Field studies was conducted in a greenhouse belonging to the Department of Plant Protection, College of Agricultural Engineering Sciences, University of Baghdad, Jadriya, and lasted from January to the end of June 2024. A study on the dietary preference of mite on three eggplant cultivars showed that the Jawahar cultivar was the least preferred among the three, while the I'juba Iraq cultivar was the most preferred. The average mite density on the Jawahar, Barcelona, and I'juba cultivars was 4.17, 7.23, and 10.54 individuals/cm², respectively.

The variation in several morphological traits and the content of secondary metabolites in the leaves of the three cultivars may have led to this difference in dietary preference among the three cultivars. A study on the effect of fertilization with potassium silicate, salicylic acid, and humic acid in both normal and nano sizes showed that the mentioned fertilizers, in both normal and nano sizes, led to a reduction in the population density of mites on the three cultivars and for the two sprays. The average number of mites on the Jawahar cultivar treated with the previous fertilizers was 1.71, 2.69, and 2.92 individuals/cm², respectively, while it was 5.23 individuals/cm² for the control treatment. The average number of mites on the Barcelona cultivar treated with the same previous fertilizers was 2.23, 3.25, and 3.66 individuals/cm², respectively, while it was 7.24 individuals/cm² for the control treatment. The average number of mites on I'juba Iraq cultivar treated with the same previous fertilizers was 3.13, 4.24, and 4.76 individuals/cm², respectively, while it was 11.16 individuals/cm² for the control treatment.

The study showed that the three cultivars exhibited different responses to the fertilization treatments with both normal and nano-sized fertilizers. This was evident from the varying percentages of population density reduction of the mite among the three cultivars after using the aforementioned fertilizers in both normal and nano sizes. The highest percentage of density reduction was observed in the I'juba Iraq cultivar, with average population density reductions of 71.6%, 61%, and 56.8%, respectively, after using the previous fertilizers in both normal and nano sizes. This was followed by the Barcelona cultivar, with an average of 69.3%, 55%, and 49.3% respectively for the same fertilizers. The lowest percentage of density reduction was observed in the Jawahar cultivar, with 66.3%, 46.9%, and 42.4% respectively, for the previous fertilizers.

The study of the efficacy of both plant extracts and the pesticide Acramite in both normal and nano sizes showed that the relative efficiency of the extracts and the pesticide varied among them. The highest cumulative relative efficiency was for the nano-sized Acramite pesticide at a dose of 0.4 grams/liter, reaching 87.7%. Meanwhile, the cumulative relative efficiencies for the volatile oil extract of bitter orange peels, the alcoholic extract of harmal seeds, and the alcoholic extract of Sidr leaves were 67%, 68.5%, and 66.8%, respectively. Both the normal and nano-sized Acramite pesticide and the plant extracts reduced economic loss to eggplant yield caused by the two-spotted spider mite infestation. The economic loss in yield after using the nano-sized Acramite pesticide at a dose of 0.4 grams/liter was 7.9%, the lowest among the treatments, while the control treatment showed a loss of 41%.

[Ahmed Mushtaq Abdul Latif (Iraq), Department of Plant Protection, College of Agricultural Engineering Sciences, University of Baghdad, Supervisor: Assistant Professor Dr. Sindab Sami Al-Dahawi **(Doctorate, 2025)**].

Biological valorization of Algerian Aromatic and medicinal plants: A multidimensional approach to Phytochemical profiling and assessment of their Antioxidant, Antimicrobial, and Insecticidal Activities

This study aims to highlight the biological significance of aromatic and medicinal plants native to arid and semi-arid regions of Algeria, particularly the species *Artemisia campestris*, *Anacyclus valentinus*, *Thymus guyonii*, and *Thymus algeriensis*. The research involved the extraction of essential oils and ethanolic extracts, followed by chemical characterization and evaluation of their antioxidant and antimicrobial properties, as well as assessment of certain insecticidal activities relevant to the protection of stored products. Essential oils were obtained by hydrodistillation and analyzed using GC and GC-MS techniques. The results showed that *Artemisia campestris* was mainly composed of β -Pinene (14.6%) and α -Pinene (10.4%), while *Anacyclus valentinus* contained significant amounts of Chrysantenyl acetate (16.1%), cis-8-Acetoxychrysantenyl acetate (19.6%), and t-Muurolol (19.7%). Essential oils of *Thymus guyonii* were rich in Thymol (19.1%), Thymol methyl ether (15.7%), p-Cymene (15.8%), and γ -Terpinene (15.3%), whereas *Thymus algeriensis* oil was dominated by Terpinyl acetate (28.1%). Regarding antioxidant activity, *Thymus guyonii* oil exhibited notable efficacy, with 53.94% DPPH \cdot inhibition at 1000 mg/L and approximately 96.09% ABTS $\cdot+$ inhibition at 100 mg/L (IC_{50} = 31.02 mg/L). Other oils demonstrated considerably lower activity. In contrast, ethanolic extracts showed strong antioxidant potential, consistent with their high content of phenolic compounds and flavonoids, with IC_{50} values ranging from 2.87–28.97 mg/L for DPPH \cdot and 13.27–42.68 mg/L for ABTS $\cdot+$.

The essential oils also exhibited clear antimicrobial activity against several pathogenic strains, with *Thymus guyonii* oil being the most effective, displaying the lowest minimum inhibitory concentrations (MIC), suggesting its potential as a natural preservative for both food and pharmaceutical applications. Regarding insecticidal activity, both *Thymus guyonii* and *Thymus algeriensis* oils were effective against *Sitophilus oryzae*. *Thymus guyonii* achieved 100% mortality within a short exposure period, whereas *Thymus algeriensis* reached 85.1% mortality even with extended exposure time, indicating the potential of these oils for integration into pest management strategies for stored products. Overall, these findings demonstrate the significant potential of the studied plants as sources of natural bioactive compounds with multiple applications in food, pharmaceutical, and agricultural sectors. The study also highlights the need for further research to examine the influence of agronomic and environmental factors on oil yield and composition, as well as to assess their efficacy in real food systems to promote sustainable and practical utilization. [Heffaf Fatiha (Algeria), Lecturer at Higher Normal School of Kouba, Algiers, Algeria].(Doctorate, 2024-2025)].

Survey of parasitic nematodes that infect vegetable crops in Al Madinah Al Munawwarah region, and evaluating of methods to control root-knot nematodes (*Meloidogyne* spp.) on eggplant

The present study includes a survey of parasitic nematodes that is associated with vegetable crops in Al Madinah Al Munawwarah Region, and the efficiency of some safe management methods for root-knot nematodes on eggplant, and comparing them to treating them with a nematicide. The first study was carried out at three locations (Abyar Al-Mashi, Ashira, Al-Awaina) in Al-Madinah Al-Munawwarah Region were surveyed

for parasitic nematodes on five different vegetable crops (eggplant, tomato, zucchini, cucumber, pepper). Total of 233 soil and root samples were collected from vegetable crops during the period from 2022 to 2023. The results of this survey showed the presence of 6 species of parasitic nematodes, among them three species *Tylenchorhynchus cylindricus*, *Helicotylenchus dihystra*, and *Pratylenchus zae* reported abundantly on vegetable crops, the most common species. *Heterodera avenae*, was recorded for the first time in Al-Madinah Al-Munawwarah Region with a high density, while the nematode *Scutellonema brachyurum* was limited.

The stunted nematode and the spiral nematode were more prevalent in the fields of vegetable crops. As for the frequency of occurrence, the stunted nematode had the highest frequency of 32.5% followed by root-knot nematodes at 23.07%. The recurrence rate of spiral nematode was 17.4%, and the ulceration nematode recorded a recurrence rate of 16.48%, while, the cereal cyst nematode recorded a recurrence rate of 8.62%, and the *Scutellonema* nematode recorded the lowest recurrence rate of 2.32%. The study showed that the root-knot nematode *Meloidogyne javanica* had the highest density in the eggplant, pepper and zucchini plants, while the cyst nematode was higher in tomato fields. *Meloidogyne* root-knot nematode *Meloidogyne javanica* and *Pratylenchus* canker nematode have the highest recurrence rate in this Region.

The stunted nematode *Tylenchorhynchus* and the spiral nematode *Helicotylenchus* recorded the highest recurrence rate in Abyar Al-Mashi area, while the *Heterodera* cyst nematode was recorded in El-Awaina area only with a high number density. While the PV values showed that the genus *Heterodera* (187.9) and the root-knot nematode *Meloidogyne javanica* value was 160.94 were the most distinguished among the nematode species on vegetable crops, and the genus *Pratylenchus* was lowest distinguished among the genera. The *Heterodera* was recorded in Al-Awaina location for the first time in Al-Madinah Region.

The second study was about evaluating the efficiency of some safe management methods for root-knot nematodes on eggplant and comparing them to treating them with a nematicide. Nematicides are considered a highly efficient control method, but due to their extreme toxicity and pollution to the environment, researchers were forced to rationalize their use and introduce them with safe methods for managing nematode pathogens in general, especially the root-knot nematode *Meloidogyne javanica*. In this study, laboratory and greenhouse experiments were conducted for the management of Root-knot nematode on eggplant, where garlic extract and poultry manure were used to control it in the laboratory, while twelve treatments were carried out under greenhouse conditions to control root-knot nematode on eggplant: poultry manure only, garlic extract only, nematicides + poultry manure + nematode, nematicides + Nematodes, garlic extract + nematicides + nematodes, garlic extract + nematodes, poultry manure + nematodes, without nematodes, nematodes only, poultry manure + garlic extract+ nematicides + nematodes, garlic extract + manure + nematodes, nematicides only. Laboratory results showed that garlic extract achieved high efficiency in controlling root-knot nematodes (second-stage), with a death rate of 99.5%, while application of poultry manure also significantly reduced the number of larvae by 70.42%.

The results of the greenhouse experiment showed that the use of nematicides + plant extracts, and animal wastes had a clear effect in reducing root galls (NG), resulting from root-knot nematode infestation on eggplant, and the Reproduction factor (Rf) also decreased. This indicates the treatment's effectiveness in reducing egg and larval

counts. The gall index (GI) and the final number of eggs (NE) were low, and the number of egg masses (NM) was also low, and thus this was reflected in the fact that the number of larvae (NJ) in the soil decreased significantly, and this indicates the efficiency of this treatment, followed by the treatment, (poultry manure + extract Garlic+ nematicides + nematode) in terms of the low number of galls and other criteria. The results also indicated that the treatment (poultry manure + nematodes) reduced infection, thereby improving root and shoot growth in eggplant. [**Hafiz Mohamed Dafalla Yousif (Saudia Arabia)**, Department of Plant Protection, College of Food and Agricultural Sciences, King Saud University ,(Master, 2025)].

Molecular identification of *Pseudomonas savastanoi* pv. *savastanoi* isolates obtained from olive (*Olea europaea*) and Athel (*Tamarix aphylla*) using Polymerase Chain Reaction (PCR).

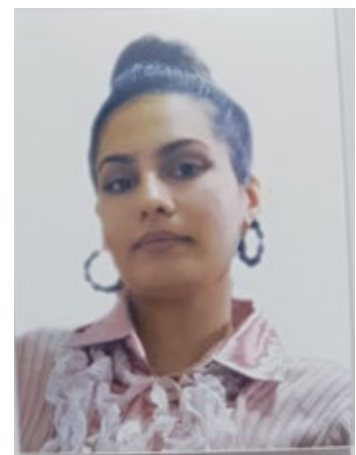
This research aims to molecularly identify isolates of *Pseudomonas savastanoi* pv. *savastanoi* obtained from olive and athel plants using Polymerase Chain Reaction (PCR) technology. This bacterium is the primary causal agent of olive knot disease, a bacterial infection that negatively affects tree growth, productivity, and oil quality. Twenty-three (23) bacterial isolates were collected from infected plants in different regions. These isolates were subjected to pathogenicity testing using the hypersensitivity reaction (HR) assay on pepper leaves, in addition to molecular analysis using specific primers targeting the 16S rRNA gene and the ptz gene to confirm isolate identity and study the genetic diversity among them. The results demonstrated the efficiency of PCR in the rapid and precise diagnosis of this bacterium. They indicated genetic variation between isolates obtained from olive and those obtained from athel.

These findings contribute to improving early-detection methods and practical control strategies for bacterial diseases affecting olive trees, ultimately enhancing plant-protection programs and boosting agricultural production. [**Laila Ali Saleh Khalifa (Libya)**, Department of Plant Protection, Faculty of Agriculture – University of Tripoli, Supervisors: Dr. Nouria Ali Al-Aamri, Principal Supervisor, Prof. Haifa Mohammed Dozan Co-Supervisor (Master, 2025)].

Survey of predacious soil mites (Acari: Mesostigmata) associated with the citrus nematode *Tylenchulus semipenetrans* in citrus orchards on the Syrian coast.

Citrus is one of the most important economic crops in Syria, especially in the coastal region where its cultivation is mainly concentrated. The citrus nematode *Tylenchulus semipenetrans* is one of the main pathogens that threaten citrus cultivation and is difficult to control chemically.

Predatory soil mites, especially of the order Mesostigmata, are natural enemies of plant-pathogenic nematodes and candidates as biocontrol agents. In Syria, the fauna of predatory soil mites of Mesostigmata is still not well known. Therefore, this study aimed to: (1) survey the geographical distribution and population density of citrus nematode communities in different locations of citrus-growing areas in Lattakia and



Tartous governorates, (2) identify the predatory mite of Mesostigmata associated with *T. semipenetrans* in the studied orchards. A total of 150 soil samples were collected from 35 orchards, depending on the cultivated citrus variety (111 samples from Lattakia Governorate and 39 samples from Tartous Governorate), during the period from October 2021 to December 2022. The results showed the presence of *T. semipenetrans* in 33 citrus orchards out of 35 distributed across all districts in Lattakia and Tartous governorates. It was found in all studied orchards in Tartous governorate and in 92% in Lattakia governorate. The highest population density was recorded in Tartous governorate (average number of individuals was 2543/250 cm³ of soil, with 1663/250 cm³ individuals in Lattakia governorate). Nematode population densities were also compared across citrus groups and varieties, as well as with some physical and chemical soil characteristics.

Mesostigmata mites were found in the soils of 17 orchards in Lattakia and Tartous governorates, 14 species belonging to 7 families were identified, with 9 of them and 2 genera recorded as new to the Syrian fauna: 5 species belonging to Laelapidae: *Cosmolaelaps malakutsilus*, *C. lutegiensis*, *Gaelaelaps aculeifer*, *G. oreithyiae*, *Gymenolaelaps myrmophila*. One species from each of the following families: Zerconidae: *Zercon dogani*, Pachylaelapidae: *Pachylaelaps bifurciger*, Trematuridae: *Nentria stylifera*, and Oplitidae: *Oplitis exopodi*, and the genera *Euandrolaelaps* sp. (Laelapidae) and *Vulgarogamasus* sp. (Parasitidae). Generally,

low densities of citrus nematodes were observed in samples containing Mesostigmata mites, particularly the predatory mite *Gaeolaelaps aculeifer*. The high densities of citrus nematodes recorded in this study in some orchards and on some citrus varieties indicate significant potential damage to citrus trees. Furthermore, the presence of some predatory Mesostigmata mites, combined with low densities of *T. semipenetrans*, necessitates assessing their predatory efficacy against citrus nematodes or other plant-pathogenic nematodes and their potential use in biological control programs.

[**Yara M. Ismail, (Syria)**, Department of Plant Protection, Faculty of Agricultural Engineering, Lattakia University, Lattakia, Syria. Supervisors: Dr. Angham M. Boubou, Dr. Nadine N. Ali, (**Master, 2025**)].

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

FAO Launches 3rd Global Working Conference: Strengthening Resilience and Transforming Agrifood Systems

08/12/2025- Cairo/Rome



The Food and Agriculture Organization of the United Nations (FAO) opened the Third Global Working Conference (GWC) of FAO Representatives today in Cairo, with the participation of the Prime Minister of Egypt, H.E. Mostafa Madbouly; the Secretary-General of the League of Arab States, H.E. Ahmed Aboul Ghati and FAO Director-General QU Dongyu. Senior FAO leadership, regional representatives, and FAO Representatives from around the world also took part in the opening session.

Hosted by the Government of Egypt from 8 to 10 December, the 3rd GWC provides a platform for direct dialogue between the Director-General, Core Leaders, Senior Management, and FAO Representatives to strengthen global coordination and reinforce FAO's strategic and operational alignment at all levels of the Organization.

In his address, the Egyptian Prime Minister affirmed that Egypt's hosting of the Conference reflects the state's unwavering commitment to supporting FAO and its pivotal role in enhancing global food security, advancing agricultural and food systems, and assisting the most vulnerable countries in facing humanitarian and economic challenges.

H.E. Madbouly emphasized Egypt's strong belief in its regional role as a key contributor to Arab and African food security. This commitment is demonstrated through the transfer of expertise and advanced technologies to sister countries, the implementation of specialized capacity-building programmes for agricultural personnel, active participation in shaping FAO's regional priorities, hosting regional and technical meetings, and providing direct support to countries most in need in the areas of agricultural production and resource management.

He further stressed that regional integration remains the most effective pathway to

addressing the escalating challenges confronting food systems, particularly in the context of climate change, economic crises, and global disruptions in supply chains.

In his opening remarks, FAO Director-General QU Dongyu called on participants to adopt a proactive, agile, and forward-looking approach to ensure that FAO's strategies and programmes remain responsive to the rapidly evolving global landscape.

He underlined that FAO is operating in an unprecedented environment marked by food insecurity, conflict, climate shocks, and economic instability—conditions that require innovation, modernized systems, and stronger partnerships across all levels of the Organization.

The Director-General highlighted the need to shift from crisis response to resilience building, noting FAO's global leadership in anticipatory action and disaster risk reduction. Between 2023 and 2024, FAO reached an estimated 2 million people annually through anticipatory interventions and supported governments in strengthening policies and legislation to better prepare for future shocks.

The conference will also address FAO's strategic positioning and efforts to accelerate the transformation of agrifood systems, focusing on innovation, improved financing mechanisms, and enhanced operational efficiency. Key initiatives under discussion include the Efficiency Roadmap, the Supply Chain Action Plan, and improvements to procurement and technical delivery through expanded use of digital and AI-driven tools.

During the opening session, FAO launched the Villages Recognition Initiative, which celebrates rural communities for their vital contributions to sustainable agrifood systems, biodiversity conservation, food heritage, and inclusive rural development. The initiative, part of FAO's 80th Anniversary celebrations, is implemented under the FAO Food and Agriculture Museum and Network (MuNe).

In his welcoming remarks, Abdulhakim Elwaer, FAO Assistant Director-General and Regional Representative for the Near East and North Africa, praised the strong partnership between FAO and Egypt across a wide range of flagship programmes, including climate-smart agriculture, farmer field schools, animal health strengthening, value-chain development, water and land management, and digital transformation.

The 3rd GWC builds on the success of the first two Conferences held in Rome (2023) and Bangkok (2024). It aims to reinforce the One FAO approach and ensure the Organization's global network remains aligned and effective in supporting Members to accelerate agrifood systems transformation and advance progress toward the Sustainable Development Goals (SDGs).

<https://www.fao.org/neareast/news/details/fao-launches-3rd-global-working-conference-strengthening-resilience-and-transforming-agrifood-systems/en>

Strengthening Plant Protection to Reduce Mycotoxins: One Health Imperative.

17/11/2025, Hangzhou- China

The Food and Agriculture Organization of the United Nations (FAO) reaffirmed the central role of plant protection in reducing mycotoxin risks and safeguarding food security during the 7th International Conference of Mycotoxicology and Food Security (ICM 2025), held from 17 to 20 November in Hangzhou, China.



Mycotoxins, a highly toxic fungal metabolite, remain a major threat to food safety, public health, agricultural productivity, and international trade. Rising contamination risks driven by climate change, pest outbreaks, drought stress, and inadequate post-harvest practices underscore the urgent need for stronger prevention measures.

Representing the FAO Regional Office for the Near East and North Africa (FAO-RNE), Mr. Thaer Yaseen, Regional Plant Protection Officer, emphasized that plant health is a foundational pillar of One Health, linking the well-being of plants, animals, humans, and ecosystems. His intervention highlighted FAO's science-based strategies to reduce the impact of mycotoxins across the food value chain.

“Healthy plants are the foundation of food security and food safety. By strengthening good agricultural practices, integrated pest management, and improved storage, countries can significantly reduce mycotoxin contamination and protect human and animal health,” Mr. Yaseen stated.

Plant Protection as the First Line of Defense

Estimates indicate that between 25% and 80% of crops worldwide are affected by mycotoxin contamination, leading to substantial economic losses and posing direct risks to human and animal health. To mitigate these dangers, FAO recommends a comprehensive set of preventive interventions, including improved Good Agricultural Practices (GAP), strengthened Integrated Pest Management (IPM), the use of resistant crop varieties, the application of biological control methods, and proper drying and safe storage after harvest.

A One Health Imperative

Mr. Yaseen highlighted that mycotoxins pose risks that extend well beyond the farm:

- » **Human health:** liver cancer, immune suppression, acute toxicity
- » **Animal health:** reduced productivity, transfer of AFM1 into milk
- » **Environmental health:** contamination of soil and waste streams
- » **Economic health:** trade disruptions and loss of market access

“Plant protection is no longer solely an agricultural issue; it is a public health imperative central to the One Health agenda,” he noted.

FAO Key Messages at the Conference

FAO emphasized the following priorities for member countries:

- » Plant protection as a One Health priority connecting plant, animal, and human health
- » IPM as a key tool to reduce insect damage that facilitates fungal infection
- » Climate-smart agronomy to mitigate climate-driven increases in aflatoxin risk
- » Biocontrol technologies as proven, scalable solutions
- » GAP—timely harvest, sanitation, crop rotation—as essential pre-harvest barriers
- » Post-harvest drying, sorting, and storage as critical control points.

FAO's Support to Member Countries

FAO reaffirmed its commitment to continuing its support to countries across the region in their efforts to reduce mycotoxin risks. This includes strengthening plant protection and Integrated Pest Management (IPM) programmes, and assisting countries in the adoption and implementation of Codex Alimentarius standards related to mycotoxin limits in food and feed. FAO also supports the development of early warning systems and risk forecasting models to enable proactive responses to climate-driven and seasonal contamination risks. In addition, FAO is working to enhance national laboratory capacities in sampling, analysis, and quality assurance, while also delivering comprehensive training and capacity-building programmes for farmers, agricultural extension services, and food safety personnel to ensure that preventive practices are effectively implemented on the ground.

A Call for Stronger Collaboration

Mr. Yaseen concluded by calling for enhanced collaboration among the agriculture, environment, health, and trade sectors, noting that effective mycotoxin prevention requires coordinated, multisectoral action under a One Health framework. For more information on the conference, visit: <https://www.icm2025.cn/>

<https://www.fao.org/neareast/news/details/strengthening-plant-protection-to-reduce-mycotoxins-one-health-imperative/en>

FAO Strengthens Plant Protection Systems to Support Food Security in the Arab World.

07/11/2025, Algiers Province



The Food and Agriculture Organization of the United Nations (FAO), in cooperation with the Arab Society for Plant Protection (ASPP), successfully supported the organization of the 14th Arab Congress of Plant Protection, a five-day regional forum held in El-Harrach, Algeria, from 3–7 November 2025 under the theme “*Plant Health for Sustainable Food Security*.” FAO’s high-profile involvement, including keynote addresses, technical symposia, and coordination meetings, raised the visibility of plant health issues and catalyzed strategic outcomes in policy influence, knowledge exchange, and regional cooperation on transboundary plant pests and diseases.

The Congress brought together about 650 plant protection experts, researchers, policymakers, National Plant Protection Organizations (NPPOs), and practitioners from the Arab region, Near East, and North Africa (NENA), providing a high-level platform to strengthen partnerships and harmonize regional responses to plant health threats and sustainable food security.

High-Level Opening Underscores Food Security and Innovation

The Congress was inaugurated by H.E. Oualid Yassine, Minister of Agriculture, Fisheries and Rural Development, who emphasized the need to translate scientific research into actionable agricultural policies and called for adopting digital and precision agriculture tools, including AI-powered early warning systems for pest outbreaks. H. E. announced the upcoming launch of a national plant gene bank to support the development of climate- and pest-resilient crop varieties. The Minister also underscored the importance of regional cooperation to address invasive pests and commended ASPP for organizing the Congress.

FAO Leadership Highlights Plant Protection for Food Security



A cornerstone of FAO’s participation was the keynote address on “***The Role of Plant Protection in Achieving Food Security in the Arab Region***,” delivered by Mr. Thajer Yaseen, FAO Regional Plant Protection Officer, on behalf of Mr. **Abdelhakim El-Waer**, FAO Assistant Director-General and Regional Representative for the Near East and North Africa. He outlined the challenges facing agri-food systems in the region, including climate change, water scarcity, conflict, and pest outbreaks, noting that approximately 66.1 million people experienced hunger in 2023, while 186.5 million faced moderate or severe food insecurity. He emphasized that combating pests requires implementing

integrated pest management systems and enforcing phytosanitary legislation, linking plant health directly to the Sustainable Development Goals, particularly Zero Hunger and Sustainable Agriculture.

FAO's participation also highlighted the importance of phytosanitary measures in limiting the spread of transboundary plant pests in the Near East and North Africa region. The presentation emphasized the shared challenges across the area and the need for regional coordination and harmonized phytosanitary procedures, including early diagnosis, pest risk analysis, and plant certification programs, all within the framework of FAO's regional plant health strategy.

Addressing Critical Plant Health Challenges in the Arab Region

The event, held under the theme “Plant Health for Sustainable Food Security,” served as a high-level platform to discuss urgent challenges in plant protection across the Arab and NENA regions. Presentations featured emerging research areas in plant protection and showcased cutting-edge technologies to enhance pest management and crop resilience. Discussions focused on the impacts of climate change, invasive pests, and diseases, and the pressing need to strengthen agricultural quarantine systems. Senior officials from the Ministry of Higher Education and Scientific Research emphasized the importance of integrating academic research with agricultural innovation to advance evidence-based and sustainable plant protection solutions.

Technical Symposia Showcase Innovations and Regional Strategy

FAO co-organized **three specialized symposia** spotlighting innovation and collaboration in plant protection. The sessions covered AI-driven pest management, climate-resilient crop breeding, invasive pest control, and strengthening phytosanitary systems. Experts presented advanced tools, including remote sensing, high-throughput molecular diagnostics, and biocontrol technologies. These symposia supported implementation of the FAO Regional Strategy for Sustainable Management of Transboundary Plant Pests and Diseases in the NENA Region, promoting regional coordination, information exchange, and capacity building.

Strengthening Partnerships and Regional Coordination

FAO's engagement emphasized collaboration and partnership-building, co-organizing the event with ASPP and Algerian national institutions. Partnerships were reinforced with NEPPO, CIHEAM Bari, AOAD, ICARDA, CGIAR, and the University of California, Davis, ensuring continued cooperation in pest surveillance, quarantine harmonization, and climate-resilient agriculture.

The Congress also served as a coordination platform for NPPOs, enabling joint planning and data sharing for regional pest management. By the event's conclusion, regional alliances were visibly strengthened, and participants reaffirmed their shared commitment to advancing plant health and food security.

Capacity Building, Knowledge Exchange, and Way Forward

FAO's engagement in the Congress had a substantial capacity-building impact through presentations that offered interactive training and knowledge exchange for NPPO staff, researchers, and policymakers. Participants gained hands-on experience with innovative tools, including diagnostic kits, pest forecasting models, plant certification schemes, and biocontrol strategies. The Congress fostered youth participation, with early-career scientists and students actively contributing to discussions and poster sessions—

supporting long-term regional expertise in pest surveillance and IPM. As the event concluded, organizers issued actionable recommendations aligned with FAO's Regional Strategy, setting the stage for strengthened national programs and regional cooperation. FAO's leadership and partnerships reaffirmed plant health as a pillar of food security and sustainable agriculture in the Arab region.

Key Facts about ACPP 2025

The 14th ACPP brought together over 500 participants and featured 413 research contributions from 23 countries, demonstrating strong regional and international engagement. Algeria led with 63% of submissions reflecting robust national commitment to agricultural research and innovation, followed by Syria (6.3%), Tunisia (5.6%), Iraq and Pakistan (3.6%), Egypt (2.2%), and Sudan and Saudi Arabia (1.7%). Contributions from France, Italy, the UK, the USA, Russia, and India added a global dimension to the event.

The scientific program included 213 oral and 200 poster presentations across 26 thematic areas, with leading topics such as biological control, plant extracts, fungal diseases, economic entomology, and pest surveillance—highlighting a shift toward sustainable, science-based pest management.

FAO-supported symposia, youth research initiatives, and interactive workshops reinforced the Congress's role as a regional hub for innovation, collaboration, and capacity building in plant protection.

About ACPP

The Arab Congress of Plant Protection (ACPP), organized by the Arab Society for Plant Protection (ASPP), is the region's leading scientific forum for plant health. Since 1980, it has convened every three years in a different Arab country, bringing together researchers, policymakers, and practitioners to share innovations and address emerging challenges in plant protection.

<https://www.fao.org/neareast/news/details/fao-strengthens-plant-protection-systems-to-support-food-security-in-the-arab-world/en>

FAO trains 1,000 farmers, introduces innovative technologies, and sets the roadmap ahead.

22/09/2025, Cairo

A five-year regional programme led by the Food and Agriculture Organization of the United Nations (FAO) to eradicate the Red Palm Weevil (RPW) has delivered unprecedented results in the Near East and North Africa (NENA) region. These achievements were presented during a virtual regional webinar organized by the FAO Regional Office for the Near East and North Africa to showcase the programme's outcomes, lessons learned, and recommendations. The



event brought together around 87 participants, including government officials, experts, and regional and international partners from 18 countries.

Launched officially in 2022 with generous support from Saudi Arabia, Oman, and the United Arab Emirates, the FAO programme successfully united 18 countries in an unprecedented regional alliance against this invasive pest, considered one of the most destructive threats to date palms and the livelihoods of nearly 50 million farmers in the region. The initiative is recognized as a pioneering regional effort to safeguard date palms, food security, and cultural heritage.

Technological Innovations in the Field

The webinar highlighted the pivotal role of technology in supporting RPW management. The programme introduced innovative tools for monitoring and early warning, including pheromone traps, the attract-and-kill technique, acoustic sensors, and FAO's new "SusaHamra" digital platform, which enables real-time surveillance and data exchange across countries. Successful applications of drone technology and remote sensing were also presented, allowing rapid scanning of palm groves and early detection of hidden infestations. These digital innovations were described as a "game-changer" in the fight against RPW. In addition, the programme supported the development and improvement of integrated pest management methods, evaluating the effectiveness of pesticides and treatment techniques, guided by scientific research and international expertise to ensure safe and effective practices.

Farmers on the Frontline

The impact of the programme's Farmer Field Schools (FFS) was a key focus of the webinar. This participatory training approach placed farmers at the center of control efforts. A total of 46 FFS were established in six countries, training over 1,000 farmers in integrated pest management practices.

Evaluation results showed that farmers' knowledge of RPW increased by more than 50%, while the adoption rate of recommended practices rose from 38% to 67% (a 65% increase). Farmers successfully treated 632 infested palm trees, saving nearly 90% of them. Many reported yield and quality improvements of 20–25%, with some experiencing income gains of up to 75%. Special FFS sessions were also dedicated to women farmers, highlighting their role in protecting this vital crop.

Evaluation Reveals Key Lessons for Sustainability

The evaluation of the regional programme, presented during the webinar, revealed essential lessons for ensuring sustainability. It highlighted that integrating policy support, scientific research, and field implementation was critical to achieving tangible technical and knowledge gains, despite variations in the speed of adoption across countries. The evaluation also confirmed that training hundreds of extension agents and farmers created a strong national cadre of skilled professionals that can be mobilized for future plant health programmes. It urged decision-makers to integrate the programme's output into national plant protection strategies, ensure continued monitoring and control efforts, and launch a second phase of initiatives to expand success and ensure sustainability.

Furthermore, the recommendations emphasized the importance of strengthening regional coordination and data-sharing mechanisms through networks of experts, research institutions, and national plant protection authorities to harmonize responses and address transboundary challenges.

A Knowledge Legacy for the Region

The programme succeeded in developing a comprehensive knowledge package that will serve the region for years to come. This includes technical manuals, practical guidelines, and awareness materials covering all aspects of RPW management. These resources are made freely available through FAO platforms, enabling countries to continue awareness and training efforts based on scientifically sound and technically reliable references.

Regional Cooperation and National Experiences

Participants stressed that regional cooperation, political commitment, and scientific innovation are the cornerstones of sustainable progress in combating RPW. Representatives of several countries, including Saudi Arabia, highlighted their adoption of techniques developed under the programme, with ongoing plans to test further and scale up these innovations nationally to maximize the benefits and apply the most effective modern methods.

The Way Forward

The webinar concluded that the fight against the Red Palm Weevil has reached a critical turning point. With a solid foundation of knowledge, tools, and regional cooperation, countries of the Near East and North Africa are now in a stronger position to protect their palm resources.

The main recommendations included:

- » Expanding Farmer Field Schools and integrating them into national rural development strategies.
- » Strengthening regional cooperation and joint surveillance mechanisms to ensure no country faces the pest alone.
- » Increasing investment in research, innovation, and digital technologies for early warning and rapid response.
- » Promoting gender inclusion and community participation as essential elements of sustainable RPW management.

In closing, FAO reaffirmed its commitment to supporting countries of the region, building on the programme's achievements, and moving forward towards the complete eradication of the Red Palm Weevil. This will be achieved through ongoing research, capacity development, and policy support to ensure a sustainable future for the region's date palm sector.

<https://www.fao.org/neareast/news/details/fao-regional-webinar-highlights-milestones-in-red-palm-weevil-eradication/en>

Regional Solidarity Strengthened as FAO and IPPC Conclude Plant Health Workshop in Oman.

9/11, 2025 – Salalah, Oman

Four-day regional meeting delivers concrete recommendations to advance phytosanitary standards and food security

The **2025 IPPC Regional Workshop for the Near East and North Africa (NENA)**, organized by the Food and Agriculture Organization of the United Nations (FAO) in collaboration

with the International Plant Protection Convention (IPPC) Secretariat, the Near East Plant Protection Organization (NEPPO), and the Ministry of Agriculture, Fisheries and Water Resources of Oman, concluded today in Salalah after four days of intensive discussions and technical sessions.



Held under the theme “*The Importance of Plant Health under the One Health Approach*”, the workshop brought together national plant protection organizations, regional experts, and international partners to advance regional cooperation, strengthen phytosanitary systems, and address emerging threats to plant health and food security.

Key Achievements and Outcomes

The workshop achieved significant progress in multiple areas critical to regional plant health. Participants engaged in comprehensive discussions on draft International Standards for Phytosanitary Measures (ISPMs) under consultation, providing valuable feedback on standards, including the international movement of fresh banana and taro fruit, the establishment of pest-free areas for fruit flies, and field inspection guidelines. These standards form the foundation for national phytosanitary legislation, facilitating safe international trade while protecting plant resources.

The workshop culminated in a set of **regional recommendations** that reflect the region’s collective priorities and technical insights, ensuring that NENA voices are effectively represented in international standard-setting.

Strengthened regional collaboration was a cornerstone achievement, with representatives from **18 IPPC contracting parties** participating, including Algeria, Egypt, Iran, Iraq, Jordan, Kuwait, Lebanon, Libya, Mauritania, Morocco, Oman, Qatar, Saudi Arabia, Sudan, Syria, Tunisia, Yemen and the UAE.

One Health Integration

The workshop’s theme emphasized the critical importance of integrating plant health within the One Health approach, recognizing the interconnectedness of human, animal, and environmental health. Participants explored how plant health serves as a first line of defense in disease prevention and contributes to achieving the Sustainable Development Goals. This aligns with the growing global recognition that plant health must be fully integrated into One Health frameworks to address complex challenges effectively.



Technical Advances and Capacity Building

Significant focus was placed on capacity development and implementation tools, including updates on the IPPC ePhyto, the IPPC Plant Health Campus, and Phytosanitary Capacity Evaluations (PCE). The workshop also addressed emerging challenges, including the impacts of climate change on plant health, safe trade facilitation, and global coordination initiatives such as the management of Fusarium TR4, which poses significant threats to banana production worldwide. Participants also explored the **NENA Plant Health Strategy (2025–2035)** and discussed regional standards for certified propagation materials for key crops, including date palm, olive, and citrus.

Collective Voice of the Region

Delegates emphasized that the regional consultation process empowers countries in the NENA region to articulate a **unified voice in global plant health governance**, ensuring that their priorities and realities are effectively reflected in international standards and policies.

The workshop underscored the importance of **regional solidarity** in addressing transboundary plant pests and diseases. Delegates emphasized that coordinated action and shared expertise are crucial for safeguarding agricultural production, facilitating safe trade, and building resilient food systems.

Conclusion and Recommendations

Participants expressed their gratitude to the Government of Oman for its warm hospitality and support in successfully hosting this event. They also extended their thanks to FAO, the IPPC Secretariat, and NEPPO for their ongoing technical assistance.

Dr. Thaer Yaseen, Regional Plant Protection Officer at the FAO Regional Office for the Near East and North Africa and Head of the FAO Mission in Oman, affirmed that “the successful conclusion of the workshop once again reflects the region’s commitment to

protecting plant resources, ensuring food security, and facilitating safe agricultural trade. The outcomes of the workshop will further support the broader missions of the IPPC, FAO, and NEPPO in safeguarding plant resources from pests, promoting safe trade, and advancing sustainable development.”

The workshop recommended the need to enhance the active participation of countries in the region in the meetings of the Strategic Planning Group (SPG) of the International Plant Protection Convention, and to develop a joint annual action plan to discuss the region’s priorities in plant health. It also emphasized the importance of reviewing the mechanisms for funding regional workshops to ensure transparency and fairness, and called for the IPPC Secretariat to clarify the standards for translating IPPC materials into other languages. The recommendations stressed supporting the efforts of the Near East Plant Protection Organization in developing and formulating regional and international standards, and developing a network of accredited national laboratories in the field of plant health. The workshop also urged countries to join the electronic phytosanitary certification system (e-phyto) and to implement the national capacity evaluation tool, while mobilizing the necessary financial and technical resources through FAO technical cooperation programs and donor agencies. The recommendations highlighted the importance of developing national systems for certified propagation materials and raising community awareness by organizing activities for the International Day of Plant Health, with continued regional consultation to ensure the region’s voice is represented in international policies and standards.

The workshop was organized through a strong partnership among the IPPC Secretariat, the FAO Regional Office for the Near East and North Africa, the FAO Subregional Office for North Africa, NEPPO, and the Ministry of Agriculture, Fisheries and Water Resources of the Sultanate of Oman. This collaborative approach demonstrates a firm commitment to strengthening regional action in the field of plant health.

<https://www.fao.org/neareast/news/details/regional-solidarity-strengthened-as-fao-and-ippc-conclude-plant-health-workshop-in-oman/en>

Successful Conclusion of the SFDA and FAO “Hack4SaferPlates” to Advance Food Safety in the Near East and North Africa Region.

10/9/2025





The Hack4SaferPlates Hackathon concluded today, marking a major milestone in promoting food safety innovation across the Near East and North Africa (NENA) region. Hosted by the Saudi Food and Drug Authority (SFDA), the event was organized by the Food and Agriculture Organization of the United Nations (FAO) as an initiative from the FAO Regional Food Safety Research and Innovation Network, with the goal of fostering innovative and sustainable food safety solutions. The two-day hackathon, held at the SFDA headquarters in Riyadh, was attended by H.E. Dr. Hisham S. Aljadhey, the SFDA CEO.

The hackathon saw broad participation from innovators, developers, and young professionals across the region, who competed to develop cutting-edge solutions to enhance food safety standards across the supply chain, provide early warning and rapid response to food risks, and reduce food loss.

The event featured specialized workshops and mentorship sessions by local and international experts and organization partners, including Berytech, CIHEAM Bari, ESTIDAMAH, Fermendom, FoodSight, and Goumbook. A final pitch competition was judged by a joint jury that awarded the most practical and innovative tech-based solutions suitable for the countries in the region.

“We are proud to have hosted this event and to have harnessed the potential of creative minds from across the region,” stated H.E. Dr. Aljadhey, the SFDA’s CEO. “Our partnership with FAO is a vital step in leveraging technology to enhance food safety. This collaboration embodies our commitment to supporting pioneering initiatives and building a safer, more sustainable food system, which ultimately contributes to consumer protection and strengthens Saudi Arabia’s position as a leading regional center for innovation.”

In his opening remarks, H.E. Dr. Ahmad Mukhtar, Regional Programme Leader (OIC) for FAO Regional Office for the Near East and North Africa, emphasized the importance of collaboration. “The Hackathon is an important milestone for the FAO-led Regional Food Safety Research and Innovation Network. By bringing together bright minds to co-create solutions, we are fostering innovation that strengthens food safety systems and informs efficient policy. This collaborative spirit ensures that our region continues to advance towards healthier, more sustainable, and resilient food systems,” he highlighted.

FAO’s Program Director in Saudi Arabia, H.E. Dr. Nizar Haddad, added that the Hack4SaferPlates hackathon reflects a pioneering model of constructive collaboration between FAO and the SFDA, working together to strengthen food safety standards and drive innovation. This event serves as a practical platform for empowering youth and researchers to transform their creative ideas into actionable solutions through a clear process of evaluation and judging that leads to the development of impactful innovations supporting the Sustainable Development Goals. The initiative further highlights the

Kingdom's commitment to leveraging science, research, and modern technologies to build safer and more resilient agrifood systems, in full alignment with Vision 2030 and international excellence standards.

The Hack4SaferPlates initiative represents a strategic step toward innovation in food safety, aligning with the objectives of Saudi Vision 2030 and the United Nations Sustainable Development Goals – particularly Goal 2 (Zero Hunger) and Goal 3 (Good Health and Well-being).

The SFDA and FAO reaffirm their commitment to expanding the horizons of future collaboration and supporting the development of impactful, tech-driven food safety solutions that ensure sustainable, secure, and safe food systems in Saudi Arabia and beyond. <https://sfda.gov.sa/en/news/4535901>

Hack4safeFood: Tackling food safety challenges

Empowering safe food solutions for all

09/09/2025 - 10/09/2025

Introduction

Led by the Food and Agriculture Organization of the United Nations (FAO), the Regional Food Safety Research and Innovation Network (RFSRIN) in the Near East and North Africa (NENA) region has been established to advance innovation programs for managing and harmonizing food safety and quality systems tailored to local and regional needs. Its objectives include developing innovative solutions and services at both national and regional levels to strengthen food safety, enhance efficient value chain development, and optimize resource utilization. RFSRIN also aims to support capacity development within government institutions to ideate, develop, and scale up conducive



strategies, policies, or programmes that mainstream innovation. The RFSRIN will function as a network for collaborative and innovative activities, addressing various challenges within agrifood systems. By uniting governments, academia, private sector actors, and international partners, the RFSRIN promotes knowledge sharing and the development of science-based food safety solutions. [FAO UN, 19/02/2025, Cairo]

The network co-organizes a Hackathon, hosted by the Saudi Food and Drug Authority (SFDA) in Riyadh, Kingdom of Saudi Arabia, in collaboration with key partners. This programme provides space and technical support for innovators, coders, and policymakers to develop solutions for food safety challenges. The hackathon aims to enhance food safety by identifying, catalyzing, and upscaling solutions tailored to local and/or regional needs.

About (Hack4safeFood)

A hackathon is a programme that brings together people with diverse backgrounds and expertise in one location for a limited period to develop ideas and artifacts. It facilitates open or distributed innovation and aims to tackle complex scientific, technological, and societal challenges by breaking down knowledge barriers.

Hack4safefood is a regional technology and policy hackathon event that aims to unite emerging computer programmers, scientists, policymakers, and private sector representatives to enhance or develop new technological and policy solutions addressing the critical challenges of food safety in the NENA region. Participants will have the chance to win a cash prize, join a six-month incubation programme, and pitch at the FAO's [Science and Innovation Forum](#) in Rome in October 2025. Additional opportunities include scholarships, internships, and access to a vast network of researchers and innovators within the agrifood and food safety ecosystem.

Participants will be encouraged to tailor solutions to local needs and given the flexibility to choose their preferred technology, development tools, and platform. The evaluation will prioritize the impact of the solution over technical proficiency. The Hackathon is open to members of the public who have an interest in innovation, technology, policy, and food safety.

Key project goals:

- » Address regional food security challenges through technological innovation and public policy.
- » Mobilize young people, researchers, developers and decision-makers around concrete solutions.
- » Develop technological or policy prototypes that can be scaled up.
- » Strengthen food safety systems in NENA countries, through traceability, mycotoxin detection and crisis prevention.
- » Build bridges between innovation, investment and public policy.

Highlights: Dual categorization

- » Technology: AI, traceability, monitoring, early warning systems.
- » Policy: circular economy, food waste recovery, regulatory innovations.

Related links

Register and submit your initial idea here by 10 July 2025: [Hack4safeFood:Tackling food safety challenges](#)

<https://www.fao.org/neareast/events/details/hack4safefood--tackling-food-safety-challenges/en>

IPPC Regional Workshop Opens in Oman to Strengthen Plant Health and Food Security

08/09/2025, Salalah-Oman



The Regional Workshop of the International Plant Protection Convention (IPPC) for the Near East and North Africa (NENA) officially kicked off today in Salalah, Oman. Organized by the Food and Agriculture Organization of the United Nations (FAO), in collaboration with the IPPC Secretariat, the Near East Plant Protection Organization (NEPPO), and the Ministry of Agriculture, Fisheries and Water Resources of Oman, the four-day workshop runs until 11 September under the theme “The Importance of Plant Health under the One Health Approach.”

The event brings together representatives from 18 countries, alongside regional and international organizations, to enhance technical cooperation and align regional positions on international phytosanitary standards, while addressing growing threats to agricultural trade and food security.

In his opening remarks, **Dr. Abdulhakim Elwaer**, FAO Assistant Director-General and Regional Representative for the Near East and North Africa, reaffirmed the Organization’s commitment to supporting member countries in combating transboundary plant pests, building resilience to climate change, and ensuring sustainable food systems. “This event reflects the strength of regional collaboration needed to ensure sustainable food systems for all,” he said, expressing appreciation to the Government of Oman for its leadership and generous support in hosting this important regional event.

choosing this sentiment, **Eng. Hamdan Al-Wahaibi**, Director General of Plant Health at the Ministry of Agriculture, Fisheries and Water Resources, expressed Oman’s pride in hosting the workshop. He highlighted the



workshop's importance as a strategic opportunity to strengthen regional cooperation in plant health. We are committed to supporting international efforts to protect agricultural production and ensure food security across our region.

Dr. Thaer Yaseen, FAO Regional Plant Protection Officer and Head of the FAO Mission in Oman, emphasized the workshop's role as a vital coordination platform. "We are here to align our positions on draft international phytosanitary standards and reinforce collective action against shared plant health risks. Regional solidarity is more critical than ever in an era of increasing global trade and pest movement," he said.



The workshop agenda includes technical sessions on draft international standards, pest outbreak and response systems, and discussions on the impact of climate change and e-commerce on plant health. It also focuses on capacity building in diagnostics, pest risk analysis, surveillance, and early warning systems.

The event highlights the importance of regional and international cooperation in protecting agricultural resources from pests and diseases by exchanging experiences and best practices among participating countries. Discussions will cover the review of draft ISPMs, regionally significant pests, and the implications of climate change and digital trade on phytosanitary systems, with a strong emphasis on innovation and digital transformation in this vital field.

The workshop aims to formulate a unified regional position on draft international standards and submit technical recommendations for the 2025 global consultations. It also seeks to strengthen the technical and institutional capacities of participating countries, contributing to sustainable agricultural security across the NENA region.

<https://www.fao.org/oman/news/detail/ippc-regional-workshop-opens-in-oman-to-strengthen-plant-health-and-food-security/en>

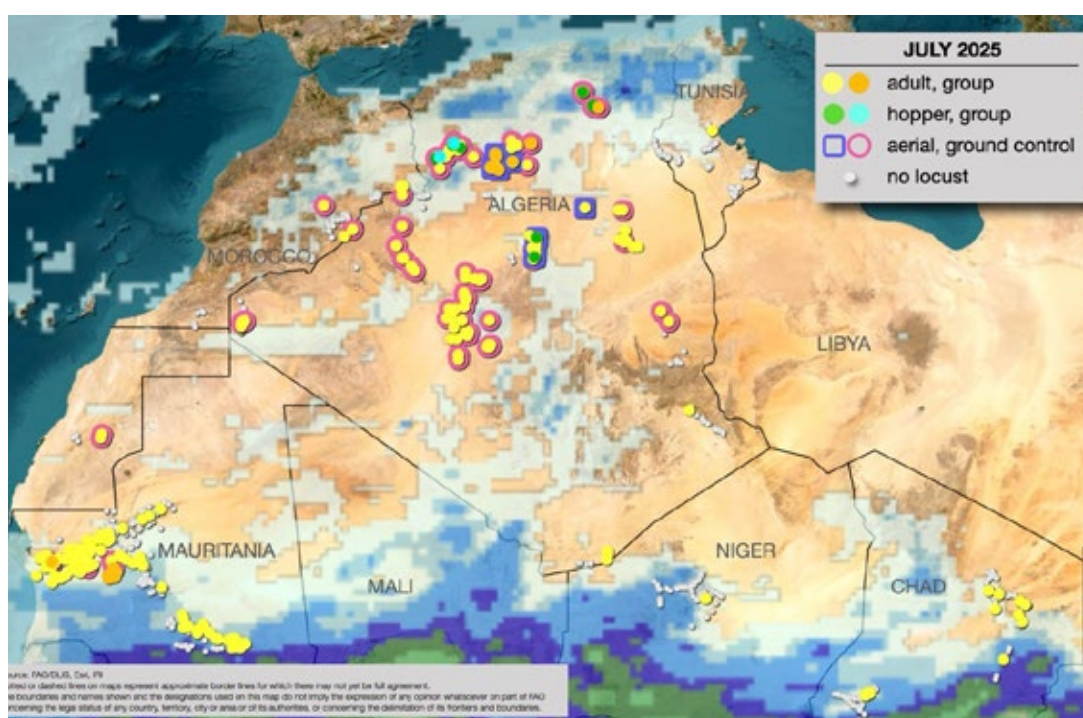


Desert Locust Situation

Activities of the Commission for Controlling the Desert Locust in the Central Region – Food and Agriculture Organization.

General situation during July 2025 Forecast until mid-September 2025

In July, locust outbreaks in northwestern Africa declined significantly. However, due to incomplete information from some countries, it remains uncertain whether the outbreaks have fully ended. There is still a possibility that locust groups may emerge in August in Sahelian countries. In Algeria, some adult and hopper groups were still present, along with many scattered and isolated adults. In Morocco, a few scattered adults were reported, while in Tunisia, very few isolated adults remained. Across the Sahel, isolated adults were detected in Niger and Chad. Mauritania continued to host many scattered and isolated mature adults, and a few adult groups were also observed. The increased rainfall in July across the Sahel has created favourable breeding conditions. Continued surveillance will be essential to monitor potential developments, and preventive control operations will likely be necessary. In the Central Region, a few adult groups were still present in Egypt. Isolated and scattered adults were present in Sudan, where small-scale summer breeding may have begun. Breeding is expected to continue in Sudan and may also start in Eritrea and Yemen. In the Eastern Region, heavy monsoon rains continued along the India–Pakistan border, where only a few isolated adults were present in Pakistan. Very small-scale breeding is likely to occur, though no significant developments are expected.



Summary of the Desert Locust Situation in July 2025

Activities of the FAO Commission for Controlling the Desert Locust in the Central Region.

1. Second Drone Trial Advances Innovative Locust Control Methods in Oman

As part of efforts to promote innovative technologies in desert locust management, FAO, in collaboration with Oman's Ministry of Agriculture, Fisheries, and Water Resources, conducted a second field trial of the Micron U16 spray drone near Sur city from 27 April to 1 May 2025. The mission aimed to build on previous trials conducted in Mauritania by testing recent technical enhancements to the drone under real field conditions. The trial focused on evaluating drone performance in high-temperature environments and refining operational parameters such as flying height, speed, and swath width using structured spray experiments.

The activity brought together technical experts from the Commission for Controlling the Desert Locust in the Western Region (CLCPRO), the Commission for Controlling the Desert Locust in the Central Region (CRC), and national counterparts from Oman. In addition to the field demonstrations, the mission included strategic meetings with Ministry officials and the Acting FAO Representative to ensure coordination, review collaborative activities, and explore opportunities for scaling up drone-based locust control efforts.

Recommendations focused on finalizing the field trial report, initiating the development of drone-based standard operating procedures (SOPs), and encouraging Member Countries to exchange technical knowledge and experiences in drone use. Emphasis was also placed on the importance of aligning operations with aviation regulations and investing in national training to support broader adoption of drone technologies for locust management across diverse terrain.



2. Regional Workshop Strengthens Locust Preparedness in the Western Region

In response to the rising desert locust threat, the Commission for Controlling the Desert Locust in the Western Region (CLCPRO), organized a regional workshop in Tunis, Tunisia, from 21 to 23 May 2025. The workshop brought together representatives from the 11 CLCPRO Member Countries, senior FAO officials, the Executive Secretary of the Commission for Controlling the Desert Locust in the Central Region (CRC), technical experts from FAO HQ, CLCPRO Secretariat, and AGRHYMET. The workshop aimed to assess the current locust situation, develop coordinated response strategies, and prepare for the anticipated summer breeding season.

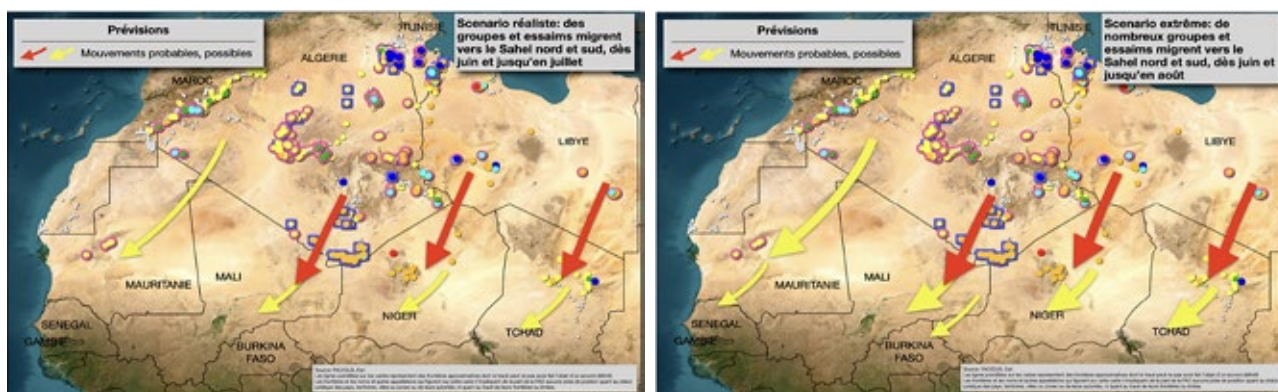
Participants reviewed surveillance data and projected developments across key breeding areas, particularly in the Sahel and Maghreb. A set of three management scenarios—

optimistic, realistic, and extreme—was developed to guide operational planning under varying levels of infestation and response capacity. Budgetary estimates were also discussed to support preparedness and control efforts in the coming months.

The workshop concluded with strategic recommendations to enhance regional coordination, strengthen field capacities, and mobilize resources, reaffirming the importance of early action and solidarity to mitigate the growing locust threat in the Western Region.



Desert locust situation until 8 May 2025



The first scenario is considered possible

The second scenario is considered extreme

3. National Training Enhances Advanced Locust Control Capacities in Saudi Arabia

As part of efforts to strengthen national technical capacity in Desert Locust management, the Commission for Controlling the Desert Locust in the Central Region (CRC), in collaboration with the National Center for Pest and Disease Control (Weqaa), organised a national training course on advanced survey and control operations in Al-Qassim, Saudi Arabia, from 11 to 15 May 2025. The course targeted field officers engaged in locust operations and focused on modern survey techniques, ULV spraying methods, and environmental safety.

Participants took part in both theoretical sessions and hands-on field exercises covering GPS use, sprayer calibration, swath width determination, and data reporting using electronic tools such as eLocust3K. The training also identified a group of high-performing participants for future trainer roles, supporting national capacity-building efforts.

Recommendations were made to improve logistical coordination, enhance equipment availability, and involve top trainees in follow-up courses. The course reinforced Saudi

Arabia's preparedness for future locust threats and highlighted the importance of continued collaboration with CRC in organizing field-based capacity-building activities. The course concluded with a set of recommendations emphasizing the need to continue and expand such specialized training programs to ensure high field readiness and further develop national capacities for proactive and effective desert locust management.



4. Regional Workshop Promotes Innovation in Sustainable Locust Management in Morocco

To enhance regional collaboration and advance scientific efforts in desert locust control, a technical workshop titled “Innovative Technologies for Sustainable Locust Management” was held in Agadir, Morocco, from June 17 to 19, 2025. The event was co-organized by the CRC, CLCPRO, the FAO’s Locusts and Transboundary Plant Pests and Diseases Group (NSPMD), and the Hassan II Institute of Agronomy and Veterinary Medicine (IAV). This workshop was part of the AFD-funded joint Master’s degree program in Locust Management (2023–2027). It brought together regional experts, researchers, and Master’s students to engage in in-depth discussions on forecasting tools, the application of biopesticides, and the climate-related impacts on locust behavior.

Over three days, participants took part in technical sessions, panel discussions, and student research presentations centred on sustainable and environmentally friendly control practices. The event also offered a platform to evaluate academic progress under the Master’s programme and to promote collaboration between academic institutions, regional commissions, and FAO.

Recommendations focus on expanding the use of drone technology, improving digital monitoring tools, and encouraging biopesticides as practical alternatives, underscoring the importance of science-based, climate-resilient locust management strategies.



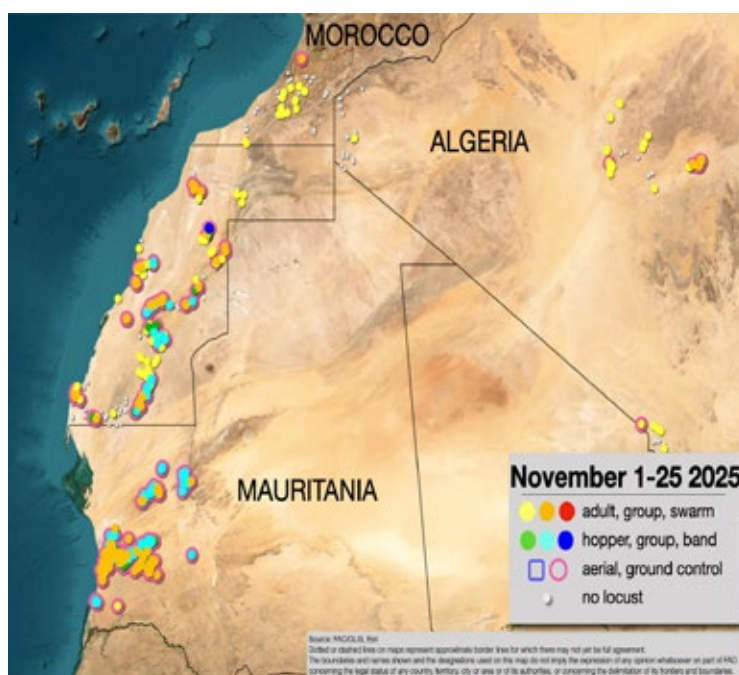
Activities of the Commission for Controlling the Desert Locust in the Central Region – Food and Agriculture Organization.

General Desert Locust Situation During November 2025 and the Forecast Until Mid-January 2026

The desert locust outbreak continues in Mauritania, Western Sahara, and Morocco during November 2025, with high activity levels recorded, including late-instar hopper bands, large groups of immature adults, and small swarms. The light to moderate rains observed in Mauritania, Western Sahara, and Morocco have created favourable conditions for adult maturation, increasing the likelihood of a new breeding generation in the coming weeks. Data indicate that the northward migration of locust groups is ongoing, with some reaching areas near Tiznit in Morocco. This migration is expected to intensify during December as groups coming from Mauritania and unsurveyed areas of Western Sahara continue to mature. In Mauritania, the outbreak remains most severe, with control operations covering over 14,271 hectares as of 24 November—twice the effort made in October. In Western Sahara, some mature groups are still copulating and laying eggs, while new hopper groups in advanced instars are appearing. In Morocco, sightings are gradually increasing, with several scattered groups detected and approximately 4,184 hectares treated. The situation in Algeria, Niger, and Chad is less severe, but still demands close monitoring, as scattered groups may lead to unforeseen developments.

Forecasts and Alerts

The second generation of groups and small swarms is expected to continue migrating northward across Mauritania, Western Sahara, and Morocco. If December rains occur, maturation and egg-laying will start in southwestern Mauritania, with the possibility of breeding spreading north into Morocco and Algeria. There is a high risk of new hopper bands forming in January 2026, which could lead to swarm development threatening northwestern African countries in the spring. Ongoing survey and preventive control operations are vital in Mauritania, Western Sahara, Morocco, and Algeria, with potential preventive actions also needed in Niger and Chad.



Summary of the Desert Locust Situation in November 2025

Activities of the FAO Commission for Controlling the Desert Locust in the Central Region.

1. Inter-Regional Workshop on “Preparedness and Emergency Response Planning for Desert Locust Control”, Salalah, Sultanate of Oman – 7 to 11 September.



Group photograph of participants

The inter-regional workshop on “Preparedness and Emergency Response Planning for Desert Locust Control” was held in Salalah, Sultanate of Oman, from 7 to 11 September 2025. The workshop was jointly organised by the three regional commissions responsible for desert locust management—CRC, CLCPRO, and SWAC—in collaboration with the FAO Country Office in Oman. The event aimed to strengthen regional capacities for emergency planning and enhance coordination among countries to address potential locust upsurges under changing environmental and climatic conditions.

The workshop featured a comprehensive programme combining interactive technical sessions, specialised presentations, and practical training exercises. Discussions focused on the fundamental principles of emergency planning at the national, regional, and international levels, with particular attention to climate variability and environmental change. The programme also included intensive field exercises in Thumrait and the Salalah Plain, where participants applied realistic response scenarios covering survey operations, risk assessment, decision-making, and the activation of communication channels during crises.

The workshop emphasised the use of several advanced digital tools, including DeLCoPA, e-LERT, and the LPMS system. Participants received practical training that enhanced their ability to utilise these systems effectively in emergency preparedness and management. The workshop also served as a platform for experience sharing among participating countries and for presenting case studies on best practices in rapid response and regional coordination.

The workshop helped improve the shared understanding of emergency planning frameworks and enhanced the practical skills of participating countries. It also supported updating national emergency plans based on lessons learned from field exercises. Additionally, it strengthened collaboration between FAO, regional commissions, and member countries and highlighted the importance of sustainable and environmentally friendly control solutions.

The workshop concluded with several recommendations, including supporting member countries in reviewing and updating their national emergency plans, continuing capacity building through joint regional programmes among the three commissions, conducting national simulation exercises with technical involvement from CRC, and exploring the organisation of inter-regional simulation drills to improve preparedness. The workshop also suggested expanding the use of biopesticides and sustainable practices, as well as incorporating modern digital tools into national and regional preparedness and response procedures for desert locust management.

2. **Inter-Regional Workshop on “Application of Environmental Health and Safety (EHS) Standards in Desert Locust Control Operations”, Amman, Jordan – 26 to 30 October 2025.**



Group photograph of participants

The inter-regional workshop on the “Application of Environmental Health and Safety (EHS) Standards in Desert Locust Control Operations” was held in Amman, Jordan, from 26 to 30 October 2025, with the participation of experts from the three regional desert locust commissions (CRC, CLCPRO, and SWAC), as well as officials from the Jordanian Ministry of Agriculture and the FAO Country Office. The workshop aimed to strengthen national and regional capacities in applying EHS standards during control operations and to promote safe and sustainable practices that safeguard worker health and protect the environment.

The programme included advanced technical sessions that introduced EHS standards and reviewed progress made by member countries in their implementation. It also featured specialised training sessions on isolation zones, withholding periods, chemical and biological monitoring procedures, and the use of Safety Data Sheets (SDS). Additionally, the workshop placed a strong emphasis on enhancing knowledge of biopesticides as safer and more sustainable alternatives to chemical pesticides, supported by practical demonstrations on their advantages and environmental benefits in locust control programmes.

A comprehensive field exercise was carried out at an agricultural station, focusing on sprayer calibration, the implementation of occupational safety measures, the use of personal protective equipment (PPE), and procedures for collecting and recording chemical and biological samples. The workshop ended with awareness sessions on first aid, worker health monitoring, and acetylcholinesterase enzyme testing, followed by an

open forum for participant feedback and suggestions.

The workshop significantly strengthened the shared understanding of EHS principles and enhanced participating countries' practical capacity to apply them. It also supported the promotion of biopesticides and helped harmonize EHS implementation approaches across the three regions. The outcomes reaffirmed the commitment of member countries to integrating EHS principles into national locust control plans and improving operational readiness.

The workshop concluded with several key recommendations, including the need for ongoing training and national capacity building, ensuring the regular availability of protective equipment and first aid supplies, promoting the adoption of biopesticides and integrating them into official EHS guidelines, and improving coordination among the three commissions through joint training activities. It also highlighted the importance of regularly updating EHS guidelines to stay current with scientific advances, emerging technologies, and global best practices in environmental health and safety.

SWAC (South-West Asia) 34 concludes with a strong commitment toward collaboration and innovative approaches to locust management

Rome,12/12/2025

Member countries recommit regular coordination and information sharing to enhance locust response readiness



The 34th Session of the FAO Commission for Controlling the Desert Locust in South-West Asia (SWAC) concluded with a renewed commitment to enhance regional cooperation and preparedness against future locust threats. Members endorsed a set of strategic recommendations aimed at strengthening coordination, data management, field operations, and long-term planning. The recommendations emphasized the need for a structured platform to share real-time updates on the locust situation, review progress on planned activities, and ensure collective readiness for potential outbreaks.

Shoki Al-Dobai, SWAC Executive Secretary, commended the member countries for their continued efforts, noting that in 2024–2025, they have successfully translated lessons from the 2019–2021 desert locust upsurge into stronger, more resilient systems on the ground despite the comparatively calm period since. Participants also underscored the importance of interregional collaboration, encouraging continued exchanges with other FAO Desert Locust Commissions in the Central (CRC) and Western Regions (CLCPRO) to harmonize survey and control methods, conduct joint activities, and share best practices and tools.

The four-day Session (9–12 December 2025) in Rome, hosted at the FAO SWAC Secretariat, brought together around 15 participants, including delegates from SWAC member countries: India, the Islamic Republic of Iran and Pakistan, and experts from FAO Afghanistan Office, and the Executive Secretaries of CRC and CLCPRO regions, as well as Expert from Shandong Academy of Agricultural Sciences, China Agricultural University, also took part at the opening day.



Delegates from SWAC Member Countries at the SWAC 34th Session. ©FAO/Teopista Mutesi

Strengthening innovation and technology adoption

Field operations will be further reinforced through the wider deployment of eLocust4 devices for data collection, the expanded use of drones for surveillance and control operations, and comprehensive training on the operation, maintenance, and field testing of these technologies. These activities aim to improve functionality, reliability, and user readiness across the region. SWAC highlighted the need to enhance preparedness through updated national contingency plans. Member countries were encouraged to maintain monthly joint cross-border surveys using the improved approach introduced in 2022, and to jointly review results and take coordinated action where needed.

“Prevention costs far less than response. Therefore, every improvement made to early warning, data sharing, training, and financing saves crops, conserves resources, and protects livelihoods,” Al-Dobai emphasized at the closing of the meeting. SWAC is also committed to continuing to build and strengthen partnerships that enhance regional preparedness and resilience. The 34th Session took place as SWAC commemorated the 61st anniversary of its establishment in 1964, making it the oldest among the three regional FAO Desert Locust Commissions.

<https://shorturl.at/f63Of>

The International Maize and Wheat Improvement Center (CIMMYT)

Updates from the CLIMARES project under the BFS-5 TREATY

Algeria, ACPP November 3–7, 2025

Concurrent Session on Advances in Managing Cereal Nematodes

During the 14th Arab Congress of Plant Protection held in Algeria from November 3 to 7, 2025, a concurrent session led by Professor Amer Dababat (CIMMYT Representative in Türkiye) was dedicated to “Advances in Managing Cereal Nematodes across Arab and Central and West Asia and North Africa (CWANA) Agroecosystems.” The session was organized under the framework of the BFS-5 TREATY project (CLIMARES), which drew

strong interest from participants, reflecting the increasing recognition of nematode management as a vital part of sustainable cereal production in the region.

The Congress gathered over 450 participants from research institutions, universities, government agencies, and international organizations. Importantly, more than half of the attendees were women, emphasizing the growing leadership and involvement of women scientists in plant protection research and policymaking.

The session featured five scientific presentations that showcased recent advances in understanding and managing cereal nematodes. Topics included:

- » Progress in molecular diagnostics for nematode identification
- » The development and deployment of nematode-resistant cereal cultivars
- » Integrated management strategies combining biological and cultural control methods
- » The impact of climate change on nematode dynamics
- » Regional collaboration for nematode surveillance and data sharing across Arab and CWANA agroecosystems

Throughout the presentations and discussion, participants emphasized three main priorities: enhancing national and regional diagnostic capacity (including laboratory infrastructure, training, and harmonized protocols), speeding up the integration of resistance into locally adapted breeding programs linked to seed delivery systems, and expanding scalable, context-appropriate integrated management practices through extension services, farmer engagement, and public–private partnerships. The session also highlighted the importance of incorporating climate-risk projections into surveillance and management planning to ensure investments are resilient to changing pest dynamics. Additionally, it was recommended that BFS-supported initiatives continue to foster multi-country collaborations and shared data platforms to enable rapid detection and coordinated responses across borders.

Overall, the session offered an excellent platform for sharing scientific knowledge, strengthening professional networks, and setting research priorities to improve cereal resilience and food security across the Arab and CWANA regions. The Arab Plant Society shared information about the congress with over 1,000 contacts directly and reached more than 10,000 scientists indirectly, ensuring broad visibility and impact within the scientific community.



Attendance of the 14th ACPP held in Algeria between 3-7 Nov 2025.



Participants of the 14th ACPP held in Algeria between 3-7 Nov 2025.

During the congress, the TREATY team, which included representatives from Jordan, Tunisia, Algeria, CIMMYT (International Maize and Wheat Improvement Center), and ICARDA (International Center for Agricultural Research in the Dry Areas), gathered to discuss the significant progress that has been achieved in the implementation of the Treaty's objectives. The team shared updates on the successful initiatives and activities carried out so far, as well as the challenges encountered along the way. The meeting also outlined the next steps in the implementation process, including developing new strategies and actions to strengthen the network further and ensure the sustainability of their efforts. Plans were made for upcoming collaborative projects and regional partnerships to enhance agricultural biodiversity, improve crop resilience, and advance the collective mission of the Treaty.



Representatives from the CLIMARES project (Tunisia, Jordan, Algeria, CIMMYT, and ICARDA)

Ankara – Türkiye

Summary of the Multi-country Capacity-Building Workshop on the International Treaty on Plant Genetic Resources for Food and Agriculture

Balkan, Central Asia, and Caucasus Regions, November 5–7, 2025, Ankara, Türkiye

A total of 25 participants attended the multi-country capacity-building workshop on the International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA), including a principal wheat breeder from ICARDA (Morocco) and a winter wheat breeder from CIMMYT (Türkiye).

Key presentations during the workshop addressed the following themes:

- » Understanding the foundations of the International Treaty and its role in advancing global efforts on climate change adaptation and food security.
- » Implementation of the Treaty's systems in practice.
- » Turning commitments into outcomes: the Treaty in motion.

The workshop provided a comprehensive overview of the status of plant genetic resources for food and agriculture (PGRFA) conservation and use in the Balkans, Central Asia, and the Caucasus. Participants explored how Access and Benefit-Sharing frameworks can be integrated into national policies, programs, and plans to promote the conservation and sustainable use of agrobiodiversity.

Highlights from ICARDA and CIMMYT Presentations

Dr. Tadesse, Principal Wheat Breeder at ICARDA, discussed accelerated wheat breeding and provided updates on the CLIMARES project. He explained that ICARDA's accelerated breeding methods, which combine traditional and molecular tools, enable the full breeding cycle—from crossing to the distribution of elite genotypes—to be completed in just four years. Over the past 15 years, national programs in the CWANA and SSA regions have released more than 80 bread wheat varieties derived from ICARDA. Within the CLIMARES project, efforts such as pathogen profiling, screening in hotspot and controlled environments, and participatory evaluation of elite germplasm have been successfully carried out, with selected genotypes distributed to partner countries. Workshops and field days were also organized in Türkiye and Morocco. Dr. Tadesse emphasized the importance of BFS-supported projects in bridging the gap between conserving genetic resources and utilizing them in breeding, especially through gene mining, pre-breeding, and capacity-building initiatives.

Dr. Beyhan Akin, the Coordinator of the International Winter Wheat Improvement Program (IWWIP) at CIMMYT, discussed the program's activities across the Balkan and CWANA regions. She highlighted IWWIP's main goals in winter wheat breeding, ongoing speed breeding projects, and the program's international nursery distribution system. Through IWWIP, 145 new wheat varieties have been officially registered in the region.

Dr. Akin also discussed the Landrace Project, carried out in partnership with the Ministry of Agriculture of Türkiye, highlighting its benefits to gene banks, breeding initiatives, and farmers through the preservation and use of local genetic diversity. She provided an overview of the Soil-Borne Pathogens Program and its collaboration with IWWIP to support academic capacity building, particularly by involving graduate students in research and training.

Additionally, Dr. Akin highlighted CIMMYT's broader efforts to strengthen the global seed distribution network, enhance regional capacity, and advance global phenotyping initiatives through collaboration with IWWIP, the Soil-Borne Pathogens Platform, and the Regional Rust Center in Türkiye. She echoed Dr. Tadesse's call for more effective utilization of genetic resources in pre-breeding programs to accelerate future crop improvement efforts.



Participants of the Multicountry Capacity-Building Workshop on the International Treaty on Plant Genetic Resources for Food and Agriculture. Balkan, Central Asia, and Caucasus Regions, November 5–7, 2025, Ankara, Türkiye

The 14th Arab Congress of Plant Protection (ACPP2025) “Plant Health for Sustainable Food Security” Algiers, 3-7 November 2025



The 14th Arab Congress of Plant Protection (ACPP 2025), under the theme “*Plant Health for Sustainable Food Security*” was held during the period 3-7 November 2022 at the Culture Center of the Great Mosque of Algiers. The congress was organized by the Arab Society for Plant Protection (ASPP) in collaboration with the National Higher School of Agronomy (ENSA), representing the Ministry of Higher Education and Scientific Research; and the Directorate of Plant Protection and Technical Control (DPVCT), representing the Ministry of Agriculture and Rural Development and Fisheries in Algeria.

The congress started on Monday 3rd of November with an opening ceremony under the patronage of Professor Kamal Bedari, Minister of Higher Education and Scientific Research represented by Mr. AbdelKarim Tafraqint, Director of the Office of the Minister of Higher Education and Scientific Research, and Professor Oualid Yassine, Minister of Agriculture, Fisheries and Rural Development. The opening ceremony included welcoming remarks from Prof. Tarek Hartani (ENSA of Director), Ms. Sofia Touadi (Director of DPVCT), Dr Ibrahim Adam Ahmed Al-Dakhiri (Director of the Arab Organization for Agricultural Development), Dr. Safaa Kumari (President of the Arab Society for Plant Protection), and Dr. Houda Bourgheda (Chairperson of the Organizing Committee). In the opening ceremony, ASPP president, Dr Safaa Kumari, presented a special plate to Prof. Houda Boureghda, Prof. Tarik Hartani (Director of ENSA), Dr. Abderrahamane Chebli (Vice President of the Congress), and Mrs Sofia Touadi (Director of DPVCT) in recognition of their efforts that contributed to the success of the congress. In addition, the Local Organizing Committee awarded a number of ENSA Professors (Abdelaziz Kedad, Zouaoui Bouzna, Bahia Doumandji, Sallaheddine Doumandji, Hassen Abdelkrim, and Abdelmadjd Benzahra) in recognition of their efforts in teaching and training several generations of agricultural professionals in Algeria, as well as maintaining and ensuring the continuity of moral values and scientific rigor in Algerian universities.

The Opening Ceremony was followed by a keynote address by Dr. Thaer Yaseen (Near East and North Africa Regional Office, FAO, Cairo, Egypt) entitled “The role of Plant Protection in Achieving Food Security in the Arab region.



The congress was attended by more than 350 participants from Arab (Algeria, Egypt, Jordan, Sudan, Syria, Lebanon, Tunisia, Libya, Oman, Palestine, and Saudi Arabia) and non-Arab (USA, UK, Italy, Mexico, Belgium, Nigeria, Turkey, and Pakistan) countries participated in this event. International organizations such as the Food and Agriculture Organization of the United Nations (FAO), the International Center for Wheat and Maize (CIMMYT), the International Center for Agricultural Research in the Dry Areas (ICARDA), the International Institute of Tropical Agriculture (IITA), the Arab Center for the Studies of Arid Zones and Dry Lands (ACSAD), and the Arab Organization for Agricultural Development (AOAD) were also represented in this meeting. The congress program included four symposia focused on different themes, such as use of artificial intelligence and other new innovations in optimizing pest management, Innovations to improve pest management and enhance plant health under Climate change conditions, Invasive and newly emerging pests in the Arab region and means to reduce their negative effect on food security, and Plant health and agricultural quarantine in the Arab region and means of improving monitoring of quarantine pests. Twelve Key notes speakers gave specific presentations in the congress symposia.

Thirty-six oral concurrent paper presentation sessions and three poster sessions were presented, where 360 scientific papers in all plant protection disciplines, such as economic entomology, mites, fungal, viral and bacterial diseases, nematodes, plant extracts, host resistance, chemical control, weeds, biological control, natural enemies, integrated pest management, climate change & plant protection, food safety & plant protection, monitoring and pest surveillance, phytosanitation, beneficial insects, medicinal plants, and abiotic stresses were presented and discussed. The abstracts book was published as a special issue of the Arab Journal of Plant Protection (Volume 43, special issue, November 2025) in both languages Arabic <https://doi.org/10.22268/AJPP-43.S.A012188> and English <https://doi.org/10.22268/AJPP-043.S.E010152>.

In the closing ceremony, the ASPP President, Dr Safaa Kumari, announced the names of the elected members of the new ASPP Executive Committee who will serve for the period 2026-2028 and is composed off the following colleagues:

- » Dr. Ahmad M. Katbeh-Bader (Jordan): President
- » Dr. Safaa Kumari (Syria): Former President
- » Dr. Ibrahim Al-Jboory (Iraq): Vice President and Editor-in-Chief of ANEPPB
- » Dr. Zinette Melhem Moussa (Lebanon): Secretary-Treasurer
- » Dr. Emad M. Ghalib Al-Maarouf (Iraq): Member & Chairman of Translation Committee
- » Dr. Houda Boureghda (Algeria): Member & Chairman of Publication Committee
- » Dr. Hassan Dahi (Egypt): Member & Chairman of Membership Committee
- » Dr Abdulrahman Saad Aldawood (Saudi Arabia): Member & Chairman of Honour and Awards Committee
- » Dr. Khaled Makkouk (Lebanon): Member & Editor-in-Chief, AJPP

CONGRESS AWARDS

Honorary member awards

This award was given to the following colleagues because of their strong support to ASPP activities over an extended period of time:

- » Dr. Khalil Melki, Unifert General Manager, Beirut, Lebanon
- » Dr. Shaker El-Zaidi, Russel IPM General Manager, United Kingdom

Fellow awards

This award was given to the following colleagues for their outstanding professional performance, for being active member of the society and participated in most of its activities, in addition to their active role as members of the Editorial Board of the Arab Journal of Plant Protection:

- » Dr. Elia Choueiri (Lebanese Agricultural Research Institute, Tal Amara, Zahle, Lebanon)
- » Dr. Said El-Zemaity (Faculty of Agriculture, Ain Shams University, Cairo, Egypt)
- » Dr. Nabil Abo Kaf (Faculty of Agriculture, Lattakia University, Lattakia, Syria)

Student awards

A certificate and a financial award were given by Dr. Asma Najar (ASPP Chairman of Honour and Awards Committee) to the top five graduate students who gave presentations during the congress. The student awardees were:

Ms Hadjer Lasmer, *Laboratoire de Phytopathologie et de Biologie Moléculaire, Département de Botanique, École Nationale Supérieure Agronomique, Algiers, Algeria*, who gave an oral presentation entitled “Metabolic profiling and antagonistic activity of *Trichoderma orientale* against *Fusarium culmorum*, the causal agent of wheat crown rot”.

Mr Abdo Abo Bakr, *General Commission for Scientific Agricultural Research (GCSAR), Aleppo, Syria*, who gave an oral presentation entitled “The effect of the bacteria causing wheat leaf blight, *Pseudomonas syringae* pv. *syringae*, on the viability of Syrian wheat varieties under laboratory conditions”.

Ms Kenza Tamrabet, *Department of Agricultural Sciences Faculty of Sciences, University of M'sila, University Pol, Road Bordj Bou Arreridj, M'sila 28000, Algeria*, who gave an oral presentation entitled “Biodiversity of fruit flies which attack cucurbits in Algeria”.

Ms Amina Berkat-Fadel, *Laboratory of Valorization and Conservation of Biological Resources (VALCOR), Department of Biology, University of M'hamed Bougara de Boumerdes, BP35000 Boumerdes, Algeria*, who gave an oral presentation entitled “Efficacy of endophytic bacteria as promising inducers for enhancing immunity in tomato plants and its use in managing *Fusarium solani* and *Alternaria indefessa* pathogens”.

Ms Imane Zaid, *Laboratoire de phytopathologie, département de botanique, Ecole Nationale Supérieure Agronomique, El-Harrach, Algiers, Algeria*, who gave a poster presentation entitled “Evaluation of the pathogenic potential of *Pectobacterium* and *Dickeya* strains isolated in Algeria against a range of host plants”.

The Arab Impact Factor report for 2025 is out

The report of the 2025 Arab Impact Factor has been published recently. This report evaluates and ranks the quality and quantity of scientific research published in the Arabic language and covers all research disciplines. This factor is used to assess academic performance and measure the quality of the journals that publish research results in the Arabic language. The evaluation process is done through analyzing a number of factors including the frequency of citing the published research by other journals, in

addition to the quality and originality of the published articles, the professionalism of the editorial board, regularity of published issues, the system used in evaluating articles, and adherence to the ethical conduct of researchers in conducting scientific research.

The 2025 report includes the assessment of 956 periodicals that publish research in the Arabic language and covers all scientific disciplines. The Arab Journal of Plant Protection (AJPP) received for 2025 an impact factor score of 4.43 and was ranked the top journal. The Arab Society of Plant Protection and the Editorial Board of the AJPP are proud of this achievement, which could not have been materialized without the contribution of distinguished Arab colleagues who evaluated the articles submitted to the journal. The AJPP Editorial Board will maximize efforts in the coming years to keep this journal in the lead. For more information, readers can go to the following link: <https://arabimpactfactor.com/aif-report-2025>

School of Agriculture Faculty and Researchers Shine at the 14th Arab Congress of Plant Protection

The School of Agriculture at the University of Jordan is proud to celebrate the extensive and fruitful participation of its faculty members and research team at the **14th Arab Congress of Plant Protection**, which was held in Algiers, Algeria, in November 2025.



A distinguished delegation from the School of Agriculture, including **Prof. Ahmad Katbeh-Bader**, **Prof. Luma Al Banna**, **Dr. Fadia Shaban**, Teaching Assistants **Eng. Shereen Abu Zahra** and **Eng. Ismail Ibrahim**, and Research Assistant **Motasem Abumuskem**, presented diverse research contributions, highlighting the department's leading role in regional and global plant protection.

Key Research Contributions from the Delegation:

- 1. Prof. Ahmad Katbeh-Bader:** Presented on **“Higher Education in Plant Protection: Preparing Graduate Students to Advance the Field of Plant Protection,”** emphasizing the integration of new technologies, and a PhD research conducted by Zaid Nabas entitled **“The Auchenorrhyncha (Hemiptera) of Jordan”** under the supervision of Prof. Katbeh. Please add comments below according the Arabic above if you agree
- 2. Prof. Luma Al Banna:** Led a major presentation on **“Beyond Borders: Sharing Nematode Resistance for Global Cereal Security,”** co-authored by **Eng. Ismail Ibrahim**, focusing on Jordan's efforts in identifying resistant cereal genotypes.
- 3. Mr. Motasem Abumuskem:** Participated in research on **“Characterizing Diapause in *Heterodera latipons*”** (Cereal Cyst Nematode), **supervised by Prof. Luma Al Banna.**
- 4. Eng. Shereen Abu Zahra:** Presented a study on **“Root Signals Drive *Steinernema feltiae* Aggregation and Repel *Meloidogyne javanica*”** (Entomopathogenic Nematode Interactions), **Supervised by Prof. Luma Al Banna.**

5. Dr. Fadia Shaban: Presented pioneering research on the **“Characterization of Plant Parasitic Nematodes Associated with Aquatic Plants in Major Water Bodies of Jordan,”** co-authored by **Eng. Ismail Ibrahim,** and **supervised by Prof. Luma Al Banna.**

The active involvement of the University of Jordan’s researchers across these vital scientific areas underscores the School of Agriculture’s firm commitment to solving complex agricultural challenges and contributing to sustainable food security.

Participation of the ASPP Vice President, Dr. Ibrahim Al-Jboory, in Community Service



1. Moderate the session, Innovative Contribution from NCPD International Prize, 6th International Dates Conference and Exhibition, Riyadh, Kingdom of Saudi Arabia, 25-26 November 2025.
2. Panel Discussion on Protecting Date Palms in a Changing Climate: Diseases, and Adaptive Solutions. International Dates Conference and Exhibition, Riyadh, Kingdom of Saudi Arabia, 25-26 November 2025.
3. Impact of climate change on pest resurgence, University of Baghdad, College of Agriculture, 29 September 2025.
4. Identification of date palm pests as for their site of infestation, University of Jordan, College of Agriculture 8 December 2025.
5. Early detection of Red Palm Weevil and IPM technology, University of Baghdad, College of Agriculture 17 December 2025.
6. Emerging pests and changes in the behavior of endemic palm pests, and their relationship to climate change, Scientific Symposium Program for the 7th Jordan International Date Palm Festival 2025, Wednesday, 17 December 2025.
7. Job opportunities in the private sector for fresh graduates, University of Jordan, College of Agriculture, 30 December 2025.



Evaluation and validation of acoustic sensors for detecting red palm weevil infestations in date palm trees under various insecticide treatments in the UAE

The Red Palm Weevil (RPW), *Rhynchophorus ferrugineus* (Olivier) is a globally invasive insect pest of many species of palms, including date palm, coconut palm, oil palm and ornamental Palms. The cryptic behavior of hiding and feeding inside the palm trunk makes the visual detection of infestation at an early stage extremely difficult. Portable acoustic sensors like Palmear and PalmProtect show promise for RPW detection by enabling real-time detection with reasonable accuracy and minimal labor. Although the precision of these portable acoustic devices remains modest, they are affordable and accessible tools that can assist gardeners in detecting infestations, supporting manual visual inspections and making decisions. Moreover, these portable detectors can be used by researchers to evaluate field experiments to test and validate the efficacy of control treatments with minimal need for tree dissection, thereby reducing damage to the trees and saving cost. **Mohamed Ali Bob¹, Hamadttu A. F. El-Shafie² and Khalil Ahmed Ammar¹**,¹The International Center of Biosaline Agriculture (ICBA), Dubai, UAE ²International Center for Agricultural Research in the Dry Areas (ICARDA), Dubai, UAE (Outlooks on Pest Management, 36(3): 113-118, June 2025)].

The silent siege: understanding date palm vulnerability to red palm weevil infestation.

Following the widespread invasion of the red palm weevil (RPW) across the Middle East and North Africa, initial infestations in date palms were predominantly observed on the lower trunk and basal offshoots. However, recent field observations in Saudi Arabia indicate a rise in apical infestations, which are harder to detect due to limited access to the palm canopy, especially in taller palms. These apical infestations pose a greater threat as they can serve as sources for adult weevils that spread to neighbouring healthy palms. In addition to these two types of infestation, RPW can infest the trunk just below the crown where aerial offshoots are attached. Consequently, three main types of RPW infestations on date palms are observed: lower trunk, apical, and below crown infestations. The study investigates the role of both basal and aerial offshoots in the development of RPW injuries as well as the measures to be undertaken to mitigate the impact of such infestations. [**Hamadttu Abdel Farag El-Shafie^{*} and Jose Romeno Faleiro²**, ¹International Center for Agricultural Research in the Dry Areas (ICARDA), Dubai, UAE. ²Arlem-Raia, Salcette, Goa, India. Insect Environment 28(3), September 2025]. [DOI:10.55278/CELY4069](https://doi.org/10.55278/CELY4069)

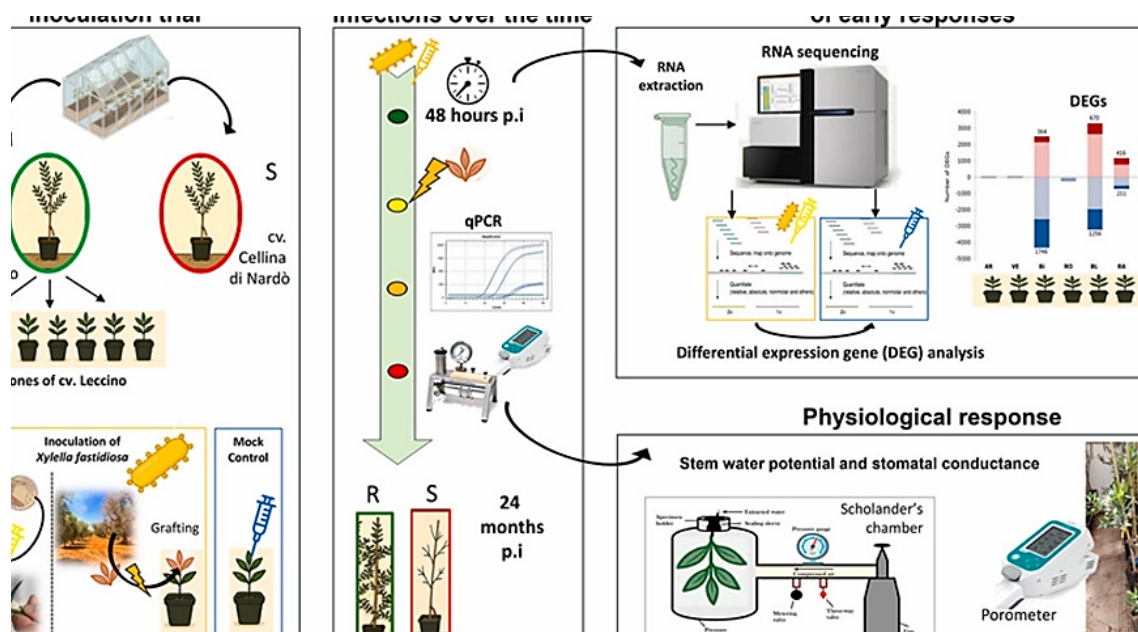
A comprehensive analysis of more than a century of research on red palm weevil, *Rhynchophorus ferrugineus*: trends, gaps, and future directions.

The red palm weevil (RPW), *Rhynchophorus ferrugineus*, a destructive pest of palm species, has become a major concern in global agriculture due to its invasive nature and the complexity of its management. This bibliometric study analyzed 1129 peer-reviewed publications from 1918 to October 2024, revealing a significant increase in research output beginning in the late 1990s. While only 10 publications were recorded between 1918 and 1960, the number rose sharply in the 2000s and 2010s, reaching 181 and 617 articles, respectively. From 2021 to October 2024, 275 publications were identified, indicating sustained scientific interest in addressing the threat of RPW. Saudi Arabia and

Egypt emerged as leading contributors in RPW research, followed by Italy, India, Spain, and China. Thematic analysis categorized the literature into eleven subject areas, with the highest representation in biochemistry, molecular biology & genetics (18.1 %), biology & symbiosis (17.5 %), and ecology & behavior (% 10.8). Pest management-related topics—including biological and chemical control, integrated pest management (IPM), irradiation, machine learning & early detection, pheromone-based systems, and risk assessment—accounted for 44.3 % of all publications. Despite the growing body of research, effective RPW management remains challenging due to the pest's cryptic lifecycle, rapid spread, and resistance to conventional control methods. Limitations in early detection technologies, inconsistent adoption of integrated approaches, and gaps in field-level implementation further complicate control efforts. This analysis highlights the need for interdisciplinary collaboration, innovation in detection and control strategies, and robust policy support to counter the persistent threat posed by *R. ferrugineus*. [Babiker M.A. Abdel-Banat^{a,*}, Hamadttu A.F. El-Shafie^a .Jose R. Faleiro^b. ^aDate Palm Research Center of Excellence, King Faisal University, P.O. Box 400, Hofuf, Al-Ahsa, 31982, Saudi Arabia. ^b225 Mariella, Arlem-Raia, Salcette, Goa, PIN 403 720, India. Journal of Agriculture and Food Research 24 (2025) 102449.

Phenotyping and expression profile of clones of the olive cultivar Leccino for the resistance to *Xylella fastidiosa*.

The severe epidemic of *Xylella fastidiosa* subspecies *pauca* ST53 in olive in Apulia, southern Italy, prompted to evaluate the adoption of resistant germplasm as a possible strategy of coexistence with the bacterium. To date, resistance traits have been identified in four olive cultivars and, among them, Leccino reacts to infections with limited desiccation and a better physiological response, while hosting low populations of the bacterium. In this study, seven Leccino clones were experimentally inoculated in replicates with the Apulian isolate of *X. fastidiosa* subsp. *pauca* and compared over time for the physiological and phenotypic response. At sixteen months after inoculation, the percentages of infected plants ranged from 57.1 % to 100 % among the clones, whose severity of desiccation was variable, causing in four of them 16 %–40 % of dead plants. Measurements over time of stomata conductance and stem water potential indicate that all clones perform better than the susceptible cultivar Cellina di Nardò, although showing a different clone adaptation to the drought stress imposed by the bacterium. Forty-eight hours post-inoculation clones differently perceived the bacterium, responding with the expression of genes related to plant immunity, cell wall remodeling or secondary metabolism. The work addresses the study of Leccino resistance to *X. fastidiosa* subsp. *pauca* with different approaches contributing to the knowledge of the mechanisms of resistance and identifying possible molecular targets useful for the screening of olive germplasm and the exploitation of assisted breeding strategies. [Raied Abou Kubaa, Annalisa Giampetruzzi, Carmine Del Grosso, Serafina Serena Amoia, Giovanni Caruso, Susanna Bartolini, Giuseppe Altamura, Antony Surano, and Pasquale Saldarelli. Institute for Sustainable Plant Protection, National Research Council (CNR–IPSP), Bari, Italy; Department of Soil, Plant and Food Sciences (DiSSPA), University of Bari, Italy; Department of Agricultural, Food and Environmental Sciences (DISA-AA), University of Pisa, Italy; Institute of Plant Production, Scuola Superiore Sant’Anna, Pisa, Italy; and the “Basile Caramia” Research and Experimentation Center in Agriculture, Locorotondo, Bari, Italy. Physiological and Molecular Plant Pathology, Volume 141, Year 2026]. <https://doi.org/10.1016/j.pmpp.2025.103018>

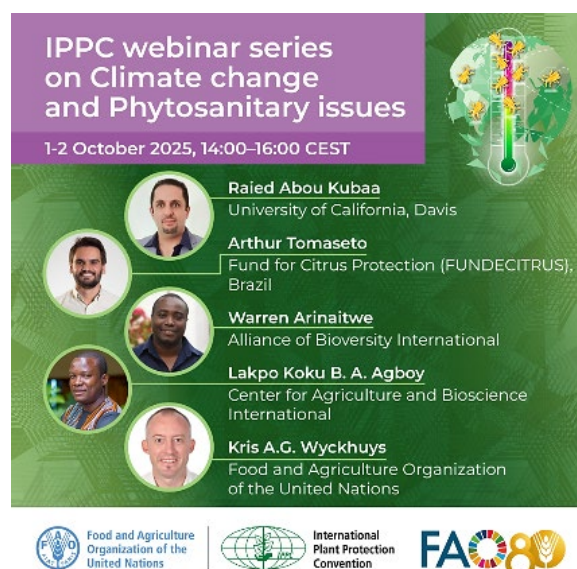


Detection of *Wolbachia* in natural populations of *Ceratitis capitata* (Wiedemann) (Diptera: Tephritidae) infesting Argan Fruits in Morocco.

The argan tree (*Argania spinosa* L. Skeels), native to the sub-Saharan region of Morocco, is an endangered agroforestry species renowned for producing one of the world's most expensive and sought-after oils. However, this valuable resource is threatened by the Mediterranean fruit fly (*Ceratitis capitata* (Wied.)), an invasive pest worldwide. Like other dipteran insects, *C. capitata* has developed mutualistic interactions with prokaryotic endosymbionts, including *Wolbachia*, a facultative intracellular bacterium that could play a role in the biology of this pest. Between 2022 and 2024, a field survey was conducted in the argan forests of Agadir, southern Morocco, to detect *Wolbachia* in natural populations of *C. capitata* and investigate its potential impact on this pest. A total of eighteen wild type specimens were captured to investigate the endosymbionts of this insect pest. Detection of *Wolbachia* was carried out by PCR using a primer pair targeting a specific fragment within the *cox* gene. Amplicons of the expected size were sequenced in both directions, and one sequence was deposited in the GenBank under accession Number PQ285444. Phylogenetic analysis showed that the obtained sequence belongs to the monophyletic clade of the *Wolbachia* B supergroup, known to infect a variety of insect species. To the best of our knowledge, this is the first report of the bacterium being detected and characterized in natural populations of the Mediterranean fruit fly infesting argan fruits in the country. These findings open new perspectives for integrated biological control strategies, offering a sustainable alternative to chemical insecticides for managing this insect pest species in Morocco. [Imane Mrabti, Hassan Grijja, Hayat Benzahra, Najiba Brhadda, Rabea Ziri, Raied Abou Kubaa, Fouad Mokrini, and Mohamed Afechtal. Lab of Virology, National Institute of Agricultural Research (INRA), Kenitra, Morocco; Lab of Plant, Animal, and Agro-Industry Productions, Faculty of Sciences, University Ibn Tofail, Kenitra, Morocco; Department of Plant Pathology, Foundation Plant Services, University of California, Davis, USA; Lab of Nematology, Biotechnology Research Unit, National Institute of Agricultural Research (INRA), Rabat, Morocco. Neotropical Entomology, Volume 54, Page 95, Year 2025]. <https://doi.org/10.1007/s13744-025-01316-z>

Global experts discuss climate change and phytosanitary challenges in IPPC Webinar Series.

The International Plant Protection Convention (IPPC) organized a two-day webinar series titled “Climate Change and Phytosanitary Issues” on 1–2 October 2025, hosted by the Food and Agriculture Organization of the United Nations (FAO). The event brought together experts and researchers from across the world to discuss the impacts of climate change on plant health, pest management, and global biosecurity. Speakers included representatives from leading international organizations such as the European Food Safety Authority (EFSA), the World Bank, the Pacific Plant Protection Organization, the Food and Agriculture Organization (FAO), and Alliance of Bioversity International, among others.



IPPC webinar series
on Climate change
and Phytosanitary issues

1-2 October 2025, 14:00–16:00 CEST

Raied Abou Kubaa
University of California, Davis

Arthur Tomaseto
Fund for Citrus Protection (FUNDECITRUS),
Brazil

Warren Arinaitwe
Alliance of Bioversity International

Lakpo Koku B. A. Agboy
Center for Agriculture and Bioscience
International

Kris A.G. Wyckhuys
Food and Agriculture Organization
of the United Nations

Food and Agriculture Organization of the United Nations | International Plant Protection Convention | FAO

From the Arab Society for Plant Protection, Dr. Raied Abou Kubaa (University of California, Davis) participated with a seminar titled: “Applied Surveillance and Detection of *Xylella fastidiosa*: Timing, Sampling, and Climate Considerations.”. The presentation highlighted innovative approaches for detecting *Xylella fastidiosa* under changing climatic conditions and emphasized the importance of adaptive surveillance strategies to safeguard plant health worldwide. The webinar was attended by **around 300 participants from more than 70 countries**, reflecting broad international interest in addressing phytosanitary challenges under climate change.

Microbial allies recruited by *Bacillus subtilis* JCK-1398 to defend pine trees against pinewood nematode.

Pine wilt disease (PWD) is a devastating disease caused by the pinewood nematode (*Bursaphelenchus xylophilus*). Its substantial ecological disruption harms global forestry and poses serious economic challenges. Although previous research has demonstrated that *Bacillus subtilis* JCK-1398 has the potential to induce systemic resistance in pine trees, the ecological mechanisms underlying its biocontrol efficacy remain underexplored. This study investigated how JCK-1398 treatment influences rhizosphere- and nematode-associated microbial communities to mitigate PWD. Metabarcoding analyses revealed that JCK-1398 treatment increased the abundance of beneficial microbial taxa (e.g., *Nocardioides* and *Mesorhizobium*) in the rhizosphere microbiome. Concurrently, nematode-associated microbial communities became dominated by *Pantoea*, a genus with known nematocidal properties. Isolation and characterization of *Pantoea dispersa* BC11 confirmed that it significantly limits nematode viability. These findings highlight the multifaceted defense that JCK-1398 offers, not only inducing systemic resistance, but also orchestrating beneficial microbiome dynamics. This study emphasizes the potential of manipulating a microbial holobiont for eco-friendly and sustainable disease management. The ability of JCK-1398 to recruit and enhance microbial allies offers a novel framework for developing biocontrol agents, with implications for managing PWD and other plant–pathogen systems. [Mohamed Manna, Ae Ran Park, Jin-Cheol Kim, Young-Su Seo. Journal Scientific Reports 15:9670, 2025].

Transcriptomic analyses of Tomato exhibiting induced resistance to *Ralstonia solanacearum* by *Lysobacter enzymogenes* JCK1421.

Lysobacter enzymogenes is well known for producing extracellular enzymes and bioactive molecules that suppress a wide range of plant pathogens, including fungi such as *Rhizoctonia* and *Fusarium* spp., and oomycetes such as *Phytophthora infestans*. It also exhibits antagonistic effects against Gram-negative bacteria through the type IV secretion system. Interestingly, *L. enzymogenes* JCK1421, isolated from the rhizosphere of pine forests, showed neither antifungal nor antibacterial activity, in contrast to other *L. enzymogenes* strains. However, foliar application of JCK1421 significantly reduced disease symptoms in tomato seedlings challenged with *Ralstonia solanacearum*. To elucidate the underlying defense mechanisms, comparative transcriptome analysis integrated with network and pathway enrichment approaches was performed. Comparative transcriptome and network analyses identified signaling modules activated by JCK1421 in pathogen-free plants and further enhanced upon *R. solanacearum* challenge. In challenged plants, JCK1421 treatment strongly induced resistance-related genes, including those encoding Ca²⁺-dependent proteins and ion channels, hormone biosynthesis components, and mitogen-activated protein kinase cascades—hallmarks of plant immune responses. These findings demonstrate that JCK1421 provides an effective model for investigating microbe-associated defense activation in plants, highlighting its potential as an eco-friendly agent for sustainable crop protection. [Jungwook Park, Hyejung Jung, Taeho Jeong, Ae Ran Park, Mohamed Manna, Duyoung Lee, Jin-Cheol Kim, Young-Su Seo, *Journal Plants*, 14, 3415, 2025].

Characterization of *Lasiodiplodia brasiliensis* causing Banana Black Rot in Korea and Its biocontrol by *Paraburkholderia busanensis* P39 through Volatile-Mediated Microbiome Modulation.

Post-harvest diseases significantly reduce fruit quality and storage longevity, necessitating sustainable management strategies. In this study, we identified *Lasiodiplodia brasiliensis* as the causative agent of black rot in bananas in South Korea, marking the first confirmed report in the region. Morphological and multi-locus phylogenetic analyses were performed for precise species identification. Given the increasing need for biological control solutions, the antagonistic activity of *Paraburkholderia busanensis* P39 against *L. brasiliensis* was investigated through direct and volatile-mediated interactions. Dual-culture assays demonstrated strong antifungal activity of P39 against the pathogen, whereas mycophagy assays further revealed its ability to exploit fungal mycelia as a nutrient source. In addition to direct inhibition, P39 volatiles significantly suppressed black rot symptoms in bananas without physical contact and effectively extended the fruit shelf life. A microbiome analysis of banana peels treated with P39 volatiles was performed to elucidate the underlying mechanisms. Metabarcoding of the bacterial and fungal communities revealed distinct microbial communities, including the enrichment of *Paraburkholderia* and suppression of spoilage-associated bacteria (*Pseudomonas* and *Enterobacter*). Fungal community analysis indicated a significant increase in the abundance of yeast-like fungi, suggesting a microbiome-mediated contribution to fruit preservation. Correlation analysis further supported the role of P39 volatiles in the restructuring of microbial interactions, leading to enhanced disease suppression and delayed ripening. These findings highlighted the dual functionality of P39 volatiles in

pathogen inhibition and fruit preservation, positioning them as promising residue-free alternatives for post-harvest disease management. This study provides critical insights into the microbiome-driven mechanisms underlying biological control and offers a foundation for the development of microbial-based post-harvest preservation strategies. [Mohamed Manna, Taeho Jung, Andy Kim, Duyoung Lee, Young-Su Seo, *Postharvest Biology and Technology* 227, 113621, 2025].

Received 24 February 2025; Revised 25 April 2025; Accepted 25 April 2025; Available online 30 April 2025

Characterization and sustainable management of *Aspergillus welwitschiae*-Induced Black Rot in Egyptian Garlic.

Black rot is a significant postharvest disease that poses a major threat to garlic (*Allium sativum* L.) production globally. In Egypt, the disease has been frequently observed in garlic cultivars Balady and Sids-40. This study aimed to accurately identify the causal agent of black rot symptoms in marketed garlic and propose an effective control strategy. Several isolates of black aspergilli were obtained from symptomatic garlic bulbs, and the representative isolate, SHAMS-18, was subjected to detailed morphological and molecular characterization. Molecular identification using fungal DNA barcoding confirmed the pathogen as *Aspergillus welwitschiae*. Pathogenicity tests on healthy garlic bulbs validated the virulence of *A. welwitschiae*, and the pathogen was successfully re-isolated, fulfilling Koch's postulates. This marks the first report of *A. welwitschiae* as a postharvest pathogen of garlic in Egypt. To mitigate this issue, we developed an eco-friendly control method involving chitosan and gum arabic coating, which significantly reduced the development of black rot symptoms on inoculated peeled garlic cloves. Our findings present the accurate identification and sustainable management of black rot in garlic, offering a viable solution for enhancing garlic storage and reducing postharvest losses. [Mohamed Manna, Yong Tae Jeong, Gamal Ghanem, Daniela Alejandra Garcia Guedez, Hussien M. AboDaham, Young-Su Seo, *Journal of Plant Pathology*, Accepted 24 September 2024; Published 2024].

Researcher Spotlight

“As Editor-in-Chief, it gives me great pleasure to dedicate this section to the rising stars of plant protection, highlighting the achievements of promising young scientists in each issue. We place a special emphasis on empowering women researchers, whose innovative work and fresh perspectives are essential to the evolution of our field. By showcasing their contributions here, we aim to not only recognize their excellence but also to inspire a new generation to lead with confidence. This spotlight serves as a constant reminder of the bright and diverse future of agricultural science in our region.”

We invite mentors and senior researchers to help us identify the next generation of leaders in plant protection. If you supervise a young scientist, particularly a woman researcher demonstrating excellence, please nominate them for our next spotlight. Submit a brief biography and a summary of their work to the editorial team for consideration.

Ismail Ahmed Ismail, PhD

is a Senior Research Officer at the South Australian Research and Development Institute (SARDI) and an Affiliate Associate Lecturer at the School of Agriculture, Food and Wine, Faculty of Sciences, The University of Adelaide. He serves as the Chief Investigator of

the National Fungicide Resistance Project in Australia, funded by *Wine Australia* and the Cooperative Research Centre for Solving Antimicrobial Resistance in Agribusiness, Food, and Environments (CRC-SAAFE).

Dr. Ismail holds a Bachelor's degree in Plant Protection and a Master's degree in Plant Pathology from the University of Baghdad, in addition to a PhD from the University of Adelaide. His current research focuses on fungicide resistance mechanisms, fungal disease epidemiology, and molecular diagnostics, with an emphasis on practical solutions that deliver direct impact to the agricultural industry.



He has contributed 11 peer-reviewed journal articles, 24 conference papers at national and international meetings, 10 industry-oriented publications, and delivered 24 workshops and extension presentations targeting both researchers and growers. His projects include the development of low-cost spore traps and molecular assays for the early detection of fungicide-resistant pathogen populations, as well as monitoring resistance in:

- » *Erysiphe necator* (powdery mildew of grapevine)
- » *Plasmopara viticola* (downy mildew of grapevine)
- » *Botrytis cinerea* (gray mold of grapevine)

Since 2019, Dr. Ismail has coordinated nationwide fungicide resistance surveillance programs across five Australian states, covering more than 15 vineyard regions. These programs integrate fungicide spray records and field sample collection to track the development of resistance.

Internationally, he has shared his expertise through collaboration with the Vineyard Team in California, USA, contributing to podcasts and extension resources on fungicide resistance management. He also collaborates with the research group led by Professor Walt Mahaffee at the USDA/Oregon.

Dr. Ismail's research outputs and extension activities are directly applied to vineyard disease management practices in Australia and abroad.

References: [CRC-SAAFE](#), [VineHealth Australia](#), [Vineyard Team](#), [Grapegrower & Winemaker](#), [University of Adelaide](#), [PIRSA-SARDI](#), [PubMed](#). <https://www.researchgate.net/profile/Ismail-Ismail-2/research> “



Maryam Sami Elias, PhD

Faculty member in the Department of Horticulture and Landscape Engineering at the College of Agricultural Engineering Sciences, University of Baghdad, Iraq. Since the start of her research career, she has focused on plant breeding and improvement using biotechnologies and genetic engineering, and on analyzing their outputs through bioinformatics. She earned a Bachelor of Science in Agriculture from the University of Baghdad in 2005, in the Department of Horticulture and Landscape Engineering, ranking second out of 150 students with excellent grades. Due to her academic excellence, she was sent to Egyptian universities for summer training. She completed her Master's degree in 2011 with a thesis titled "Assessment of the Genetic Distance for Pure Lines of Summer Squash Using AFLP Markers and Producing Single Crosses," aiming to reduce the time needed to develop single hybrids through biotechnologies, graduating with excellent honors. Part of her research was conducted at the Syrian Atomic Energy Authority. She earned her Ph.D. in 2025, focusing on increasing the marketability of local tomatoes and improving food security through RNA interference gene silencing of the enzyme Pectate Lyase, pectin (to reduce environmental pollution and promote sustainability), and organic calcium. Her dissertation, titled "Utilization of RNAi Gene Silencing Technology, Pectin, and Organic Calcium in Growth, Yield, and Marketability of Local Tomatoes," was awarded with excellent honors with distinction, with part of the research performed at the Agricultural Sciences and Natural Resources University of Khuzestan, Iran. Dr. Maryam Sami Elias has published numerous research articles in international and local peer-reviewed journals on plant breeding and improvement using modern biotechnologies and genetic engineering. She has participated in many conferences, seminars, and workshops, delivering lectures on genetic diversity studies using molecular markers. Recently, she received appreciation from the President of the University of Baghdad in recognition of her outstanding scientific efforts, demonstrated by the high citation of her research titled "Investigating genetic relations among watermelon cultivars using molecular DNA markers." She also received the Best Co-Authored Research Award at the First Agricultural Forum organized by the Scientific Research Authority of the Ministry of Higher Education and Scientific Research, under the axis of biotechnologies and agricultural innovation. Additionally, she has received multiple letters of thanks and appreciation. She has supervised many graduation projects for fourth-year students. For more information, contact: maryamsami@coagri.uobaghdad.edu.iq



Ines Ksentini, PhD

PhD, is currently an assistant professor at the Olive Tree Institute, Tunisia. She has special interests in research related to plant protection from insect pests, particularly on olive trees and crops grown in semi-arid regions. This is achieved through the development and implementation of new biological control methods, the utilization of IPM tools, and the preservation of biodiversity. She is keen to study the impact of climate change on insect pests, implement prediction and digitalized tools, and strengthen her experience in e-farming.

In her previous research, she worked on indigenous *Trichogramma* egg parasitoids, their morphological and molecular identification. She studied their specificities and abilities to control some lepidopteran insect



pests, such as the olive moth *Prays oleae* (Lepidoptera: Yponomeutidae) and the carob moth *Ectomyelois ceratoniae* (Lepidoptera: Pyralidae). She also had an experience on interactions between two parasitoids of the codling moth *Cydia pomonella* (Lepidoptera, Tortricidae), namely *Trichogramma cacoeciae* (Hymenoptera, Trichogrammatidae) and *Ascogaster quadridentata* (Hymenoptera, Braconidae). Furthermore, for many years, she has been interested in exploring insect-associated microorganisms for the development of future bioinsecticides. Additionally, she contributed to the development of an electronic trap and monitoring system for the olive fruit fly, *Bactrocera oleae* (Diptera: Tephritidae). Her current research topic is a continuation of the aforementioned ones.

The list of her publications can be seen via Scopus: <https://www.scopus.com/authid/detail.uri?authorId=55921672600>

ResearchGate: <https://www.researchgate.net/profile/Ines-Ksentini>

Her latest accepted research paper is entitled: "Impact of pomegranate cracked fruit on *Ectomyelois ceratoniae* oviposition and behavior" (Authors Ines Ksentini, Taieb Jardak, and Najiba Zeghal), and will be published in the Arab Journal of Plant Protection (Volume 44, Issue 2, June 2026). Ines Ksentini gained a Master's Degree in Natural Sciences from the Faculty of Sciences (University of Sfax) in 2000, a Master of Advanced Studies (D.E.A) in Organic Farming, Methods for Phytosanitary Interventions from the National Institute of Agronomy of Tunisia (University of Carthage) in 2003. Afterwards, she gained her PhD in Biological Sciences from the Faculty of Sciences (University of Sfax) in 2010, and her last diploma is a University Accreditation to conduct research in Agricultural and Environmental Sciences (HDR), gained from the University of Sousse in 2024.

Wanissa MELLIKECHE PhD

She is a researcher specializing in eco-friendly strategies for controlling plant pests and pathogens. She holds two master's degrees in *plant Pathology: Plant-Pathogen Interactions* from the Higher Institute of Agronomy of Algiers, Algeria, and *Sustainable IPM Technologies for Mediterranean Fruit and Vegetable Crops* from CIHEAM Bari, Italy, both completed with distinctive performances.

Wanissa completed an industrial PhD in Postharvest Pathology at the University of Foggia (Italy), carried out in partnership with CIHEAM Bari, CNR Rome, and two private companies. During her PhD, she focused on bridging the gap between academic research and practical applications, with a strong emphasis on industrial collaboration to deliver sustainable plant protection solutions to the market. As part of her doctoral work, she successfully developed three commercial loop-mediated isothermal amplification (LAMP) kits for the rapid detection of toxigenic *Aspergillus* spp. directly from nuts, providing fast and easy diagnostic tools for improved postharvest management. Her research also explored alternative control strategies to reduce reliance on conventional postharvest chemical treatments, including the use of biocontrol agents and ozone as an alternative technology.

She is currently working as a Research Assistant at Swansea University within the Natural Product Biohub, continuing her work on sustainable plant protection and the development of eco-friendly crop health solutions. Her overall goal is to translate innovative research into practical, marketable tools to support safer, more sustainable agriculture. wanissa.mellikeche@swansea.ac.uk



National Center for Palms and Dates (NCPD) International Prize 2025



The NCPD International Prize in the Kingdom of Saudi Arabia, launched in 2022, recognizes excellence in research, innovation, and product development in the date palm sector. It highlights the contributions of established and emerging scientists, including young researchers, women, and girls. It encourages the development of new products and practical technologies that support a more productive and competitive date palm industry.

Applications undergo a rigorous and transparent evaluation process based on a benchmarking framework established by the NCPD Board of Trustees. The Board, comprising esteemed members from the USA, Iraq, Sudan, Japan, Pakistan, and Jordan, and chaired by the Kingdom of Saudi Arabia, brings extensive expertise in science, technology, and product innovation, ensuring fairness, credibility, and adherence to the highest scientific standards.

In 2025, the Prize attracted **205 applications from 35 countries**, underscoring its expanding global influence and reputation for excellence. Following a comprehensive review, the Board of Trustees selected **13 distinguished winners** for this year's edition.

The awards were conferred during a special ceremony held as part of the **6th International Dates Conference and Exhibition**, themed *“Innovation for Sustainability in the Date Palm Value Chain,”* at King Saud University, Riyadh, on **November 25–26, 2025**. His Excellency, the Minister of Environment, Water, and Agriculture (MEWA), extends his appreciation and congratulations to all the laureates for their remarkable contributions and innovative advancements in support of the date palm sector.



National Celebration of the Jordanian Date Harvest Season in the Jordan Valley

September 23, 2025



Under the patronage of the Minister of Agriculture, Dr. Saeb Khraisat, the Jordan Dates Association (JODA) organized on Tuesday a special celebration on the occasion of the Jordanian Date Harvest Day, held for the fourth consecutive year at the Engineers' Syndicate Research Station in the Karameh area of the Jordan Valley, where palm cultivation is concentrated.

The celebration was attended by a number of date farmers and representatives of official institutions, in an annual event that has become a national milestone to honor the efforts of farmers after a full year of care, dedication, and perseverance to produce a distinguished crop that has become a hallmark in global markets.

This year, Jordan's date production is estimated at about **36,000 tons** of the finest date varieties, led by the internationally renowned Medjool, along with Barhi and several other varieties. On the sidelines of the festival, a special exhibition was held displaying samples from this season's harvest, serving as living evidence of the exceptional quality of Jordanian dates, which are witnessing increasing global demand thanks to their excellence and premium quality.

The cultivated area of palm groves in the Kingdom has exceeded **50,000 dunums**, with the number of palm trees approaching one million. Production in Jordan is expected to reach more than **50,000 tons** in the coming years. Jordan exports over **65%** of its date production to more than **55 countries worldwide**. The Jordanian date sector provides more than **11,000 job opportunities**, most of them for women working in date-processing facilities that adopt the latest global technologies in packaging, storage, and marketing making this sector an important economic pillar for both the national economy and the agricultural sector.

The festival also included the honoring of several figures who have supported the Jordanian date sector, recognizing them as honorary members of the association in appreciation of their contributions to enhancing the status of this national product, which has secured an advanced position on the global market map.



Scientific visit strengthens collaboration between the University of California and Jordanian institutions in clean plant programs

Amman – October 2025

Dr. Maher Al Rwahnih, Director of Foundation Plant Services (FPS) and Professor of Plant Pathology at the University of California, Davis, conducted a scientific visit to Jordan, began with a meeting with **H.E. Minister of Agriculture, Mr. Saeb Al-Khreisat**, along with senior officials at the Ministry. The discussion focused on strengthening cooperation in **clean plant production**, enhancing **quarantine and certification programs**, and supporting national efforts to safeguard agricultural productivity. The meeting was followed by meetings and lectures at Mutah University, Jordan University of Science and Technology (JUST), and the Jordan Engineers Association, along with discussions with researchers and specialists in biotechnology and plant health. During his visit, Dr. Al Rwahnih presented an integrated model of the University of California's Clean Plant and Quarantine Programs, highlighting the role of FPS in maintaining clean collections of grapevines, strawberry, sweetpotato, pistachio, olive, and stone fruit crops, as well as the importance of collaboration between universities and research centers in advancing innovation and sustainable agriculture. He emphasized the need to strengthen partnerships between Jordanian research institutions and FPS through joint projects and exchange visits, reaffirming the program's guiding principle: *"Start Clean, Stay*

Clean” Dr. Al Rwahnih also expressed his readiness to share California’s expertise and technologies to support Jordan’s agricultural development. The visit concluded with honorary recognitions from the hosting institutions in appreciation of Dr. Al Rwahnih’s scientific contributions and leadership in advancing clean plant and plant protection programs.

A bibliography of Egyptian Acarology

This comprehensive bibliography serves as a pivotal resource for those interested in the field of acarology in Egypt, documenting the research and findings from Linnaeus through September 2025. It compiles a total of 2,868 references, encompassing a wide range of topics such as taxonomy, ecology, agriculture, pest management, and the medical and veterinary significance of acarology in the region. The references were meticulously gathered from various sources, including online databases, printed literature, and valuable insights from personal communications with acarologists both in Egypt and globally.



Additionally, materials from national and international conferences were included, ensuring a thorough coverage of the subject. While a significant portion of the publications is authored by Egyptian researchers, the bibliography also highlights important contributions from international scholars, underscoring the collaborative nature of acarological research. This extensive compilation is poised to facilitate future studies on Egyptian mites, enabling researchers worldwide to integrate Egyptian acarological data into larger research frameworks. It represents a significant advancement in accessing quality information concerning the acarological landscape of Egypt, which had previously been limited.. [**El-Kawas, H.M.G., Negm, M.W., Halliday, B. A** bibliography of Egyptian acarology. *Egyptian Journal of Agricultural Research*, 103(4), pp. 438-589. 2025]. [doi: 10.21608/ejar.2025.422025.1728](https://doi.org/10.21608/ejar.2025.422025.1728)

Information Note – PRIMA MEDIBEES Project

The PRIMA MEDIBEES Project (Mediterranean Pollinators: Enhancing Resilience, Health, and Sustainability of Honeybee Populations) is an international collaborative initiative funded under the PRIMA Programme. It brings together research institutions, universities, and professional organizations across the Mediterranean Basin to address the growing threats to honeybees, a keystone species for agriculture, ecosystem stability, and food security. The project is structured to support innovation, capacity-building, and evidence-based policymaking.



Objectives of the Project

- » Strengthen the resilience and health of Mediterranean honeybee populations.
- » Improve understanding of biotic and abiotic stress factors affecting colonies.
- » Support sustainable and climate-resilient beekeeping practices.
- » Enhance cooperation between scientists, beekeepers, and policymakers.

Achievements in 2025

In 2025, the MEDIBEES partners conducted coordinated field activities and research across multiple Mediterranean countries. Major achievements include:

- » Implementation of harmonized protocols for pathogen detection and hive monitoring.
- » Large-scale sampling campaigns to assess colony health under climate stress.
- » Development of a digital platform for real-time data sharing and analysis.
- » Training workshops for beekeepers on sustainable management and disease control.



Perspectives

The next phase of MEDIBEES will focus on integrated risk assessment models, advanced technological tools for hive surveillance, and stronger engagement with the beekeeping community. These efforts will contribute to the development of long-term strategies for pollinator protection in the Mediterranean. [**Noureddine Adjlane¹, Soumeya Kaouche¹, Raquel Martín-Hernandez²**, ¹Department of Agronomy, Faculty of Sciences, University of Boumerdes, Algeria. ²Center for Apicultural and Agro-Environmental Research of Marchamalo, Spain. noureddine.adjlane@univ-boumerdes.dz.

Insect Environment Quarterly NAAS Rated Journal

Insect Environment, is a quarterly journal dedicated to popularizing the study, conservation, and observation of insects since 1996. With a NAAS rating of 3.52, our journal consistently publishes diverse content including research papers, review articles, and short communications on significant findings in entomology. We take pride in our expert editorial contributions, timely publications, and global reach—serving as a platform for sharing knowledge and promoting insect conservation worldwide. All accepted papers are uploaded in CABI for enhanced visibility and each article is assigned a DOI by CrossRef, ensuring permanent and reliable access.

The journal board especially welcome authors from Near East and North Africa colleagues to contribute to the journal. *Insect Environment* specializes in publishing new records, short notes, and quick publications that are of high relevance to the entomological community.

We look forward to your valuable contributions and hope to collaborate in advancing insect science and conservation together.



WEQAA Center.. a model for One Health and Sustainable Safe Food

WEQAA CENTER | مركز وقاء

المركز الوطني للوقاية من الآفات النباتية والأمراض الحيوانية ومكافحتها
National Center for the Prevention & Control Of Plants Pests & Animal Diseases



WEQAA Center's Third Quality Forum 2025

Under the Slogan: "Quality... Think Differently"

Wegaa Enhances Institutional Excellence and Launches a New Wave of Qualitative Transformation

In the context of the Wegaa Center's continuous commitment to elevating the efficiency of institutional work and developing the quality system in the plant and animal sectors, the National Center for the Prevention and Control of Plant Pests and Animal Diseases (Wegaa) organized the Third Quality Forum under the slogan "Quality... Think Differently," coinciding with World Quality Week.

This forum is an extension of Wegaa's approach to adopting best institutional practices, fostering a culture of continuous improvement, and launching initiatives that support innovation and improve performance efficiency within the Center. This aligns with the targets of Saudi Vision 2030 to develop the agricultural and environmental sectors and enhance the quality of government services.



International Accreditations Enhance Service Reliability



The forum witnessed a prominent milestone represented by the Wegaa Laboratories in the Eastern Region and Asir Region receiving the International Accreditation Certificate **ISO/IEC 17025:2017** as approved testing entities in the veterinary field, after meeting all international requirements for laboratory competence.

This achievement is added to the previous accreditation of the Jazan laboratory, a step that enhances the reliability of test results, raises the capabilities of national laboratories, and supports control operations and improves the quality of their outputs.

Furthermore, the Center announced obtaining **three international standard certificates**, representing a qualitative shift in its administrative and technical system:

- » **ISO 9001:2015 for Quality Management Systems:** Enhancing institutional efficiency, raising the level of adherence to quality standards, and reducing errors.
- » **ISO 45001:2018 for Occupational Health and Safety Management Systems:** Contributing to improving the work environment and reducing occupational accidents and risks.
- » **ISO 14001:2015 for Environmental Management Systems:** Supporting the Center's efforts in protecting the environment, rationalizing the use of natural resources, and enhancing environmental compliance

Qualitative Sessions Highlight Decision Quality and Innovation

The program included a number of sessions and workshops that addressed vital pillars in quality management, most notably:

- » “Think Differently to Achieve Sustainable Impact... Decision Quality and Performance Excellence”.
- » “Institutional Excellence Leads Innovation Quality in Biosecurity... Weqaa of the Future”.
- » Workshop: “Quality... Think Differently”.
- » Lecture: “Our Safety... We Thought About It with a Different Vision”.

These sessions highlighted the importance of sustainable quality as an institutional approach rather than a complementary option, emphasizing that Weqaa adopts a model based on innovation, results, capacity building, and the development of tools to achieve institutional excellence.

Enhancing Institutional Practices in Line with Vision 2030



The Third Quality Forum embodies Weqaa's commitment to developing a more effective and sustainable work system. It is part of enhancing operational efficiency, improving services to beneficiaries, and raising the reliability of the diagnostic and control system, thereby reinforcing its leading role in protecting plant and animal resources and ensuring food safety and environmental security.

Through this forum, the Weqaa Center continues to build an institutional environment based on quality as a fundamental value, to develop its operations, to activate effective partnerships that support the journey of excellence, and to present an advanced national model for adopting the best global standards in government service quality.

Weqaa Holds Third Forum on Antimicrobial Resistance Awareness Under “One Health” Approach

Event Overview

The National Center for the Prevention and Control of Plant Pests and Animal Diseases (Weqaa), in partnership with the Public Health Authority (Weqaya), organized the Third Forum for Antimicrobial Resistance (AMR) Awareness in Riyadh. Held under the slogan “Act Now: To Protect Our Present and Secure Our Future,” the event drew high-ranking leaders from the health, agriculture, and environmental sectors. The forum coincides with World AMR Awareness Week (November 18–24) and reflects Weqaa’s commitment to raising community and professional awareness, aligned with the National Action Plan on AMR (2022–2025).

Antimicrobial Resistance... A Global Issue Requiring Joint Action



Antimicrobial resistance is no longer merely a health issue; rather, it has become a threat extending to humans, animals, plants, and the environment, necessitating enhanced cooperation among all relevant entities in accordance with the “One Health” approach. The Weqaa Center supports scientific research, awareness, and oversight, and develops tools to help limit the spread of microbial resistance in the agricultural sector.

Key Discussions and One Health Strategy

The forum highlighted that AMR is no longer solely a health issue but a threat extending to humans, animals, plants, and the environment, necessitating a “One Health” approach. The event included three main dialogue sessions discussing:

- » **The role of local and international sectors in combating AMR.**
- » **Partnerships with the private sector to enhance antimicrobial availability and develop biological alternatives.**
- » **Methodologies for academic studies and research in combating microbial resistance.**

Participants emphasized that institutional excellence and smart decision-making are the true gateways to innovation in biosecurity. A pivotal recommendation was the adoption of a “Quality... Think Differently” methodology to ensure sustainable institutional transformation and flexible growth.



Scientific Research Competition

The forum announced the results of the scientific poster competition, which received 42 entries, with 10 candidates shortlisted. The winning research papers provided innovative solutions supporting the rational use of antibiotics:

- » **First Place:** “Genomic survey of multidrug resistant *Salmonella enterica* serovar Minnesota clones in chicken products”.
- » **Second Place:** “AI-Driven One Health Prediction of Horizontally Transferred AMR Genes (blaNDM, blaOXA, blaKPC, mcr-1, mecA)”.
- » **Third Place:** “Isolation of soil bacteria *Bacillus velezensis* WHk23 from Riyadh, Saudi Arabia, as an alternative mosquitocide to overcome resistance against chemical pesticides”.



Broad Participation and Future Goals

The event saw extensive collaboration among government and academic bodies, including the Ministry of Environment, Water and Agriculture, the National Guard, and universities such as King Faisal, King Abdulaziz, Qassim, and Princess Nourah, as well as the World Organisation for Animal Health (WOAH) and the private sector.



This forum represents a crucial step toward sustainable health and food security, reinforcing Weqaa’s role in supporting research and control mechanisms to protect public health and the economy in line with Saudi Vision 2030.

Condolences, Plant Protection Scientists

Obituary Notice – Professor Dr. Mohamed Ibrahim Abdel-Megeed

With hearts full of faith in God's will and decree, the **Arab Society for Plant Protection (ASPP)** mourns the passing of **Professor Dr. Mohamed Ibrahim Abdel-Megeed**, Professor of Pesticides and Integrated Pest Management at the Faculty of Agriculture, Ain Shams University, and former Chairman of the Agricultural Pesticides Committee, Ministry of Agriculture and Land Reclamation, Egypt. The Arab world has lost one of its most distinguished scientists in the field of pesticides, a man who dedicated over six decades of his life to science, research, education, and service to the agricultural community. Through his vast knowledge and dedication, Professor Abdel-Megeed laid the foundations for scientific and research advancement in plant protection and pest management.



Abdel-Megeed leaves behind a rich scientific legacy. He supervised 83 postgraduate theses (48 M.Sc. and 35 Ph.D.) at Ain Shams University and the Institute of Environmental Studies and Research. He enriched Arab and international scientific literature with 61 scholarly publications, including 32 specialized scientific books, 23 Arabic publications, 2 English-language works, and 4 scientific translations for the Food and Agriculture Organization (FAO). In addition, he published 197 scientific papers in peer-reviewed local and international journals.

His influence reached every corner of the plant protection and pesticide field in Egypt. He established research laboratories and centers of excellence, contributed to the development of pesticide analysis systems at the Central Laboratory, and pioneered the introduction of sustainable management of persistent organic pollutants and integrated pest management (IPM) concepts in Egypt and the Arab world.

He was the recipient of Ain Shams University's Distinguished Award in Agricultural Sciences (2007) and held numerous scientific and leadership positions, including Vice-Chairman and Chairman of the Agricultural Pesticides Committee, as well as membership and chairmanship in several national and international scientific committees.

May God bless his soul, grant him eternal rest, and reward him abundantly for his lifelong dedication and contributions. His knowledge and legacy will remain a guiding light for future generations of researchers in plant protection and pesticide science." Indeed, we belong to Allah, and to Him we shall return."

Obituary Dr. Mahmoud El-Solh (1944-2025)

(Prepared by Khaled Makkouk, a colleague and friend of Dr. Solh for almost 50 years)

It is with deep sorrow that I share the news of the passing of Dr. Mahmoud El Solh on November 16, 2025. Dr. El Solh was a leader, a mentor, and a friend whose kindness and guidance left a lasting impression on all who worked with him.

Dr. Mahmoud El-Solh was born in Saida, Lebanon in 1944. He received his B. Sc. (1969) and M. Sc. (1972) degrees from the Faculty of Agricultural and Food Sciences, American University of Beirut, Lebanon. He joined the Arid Land Agricultural



Development (ALAD) Program of the Ford Foundation in the Near East, the predecessor of the International Center for Agricultural Research in Dry Areas (ICARDA). He holds a PhD in Genetics from the University of California, Davis, USA (1978). He had served ICARDA with distinction for nearly 16 years in various capacities – as Lentil Breeder (1978-80), Regional Food Legume Breeder in North Africa (1986-89), Regional Coordinator of the Nile Valley and Red Sea Regional Program (1990-96), and Assistant Director General for International Cooperation (1997-2002). He served as an Associate Professor at the Faculty of Agriculture and Food Sciences of the American University of Beirut between 1980 and 1986. Dr. El Solh served for four years (2002 to 2006) as Director of the Plant Production and Protection Division at the Food and Agriculture Organization of the United Nations (FAO). He served as the Director General of ICARDA from May 2006 to October 2016, the most critical period in ICARDA's 40 years history. Dr. El Solh has in-depth knowledge of the needs and aspirations of the national agricultural research and development systems, particularly in non-tropical dry areas. He has been involved in planning, implementation and evaluation of programs and projects for agricultural research for development; human resources and institutional development of national agricultural systems. More recently, Dr. El Solh has been appointed to be the member of the High Level Panel for Food Security and Nutrition (HLPE) of the Global Committee for Food Security (CFS) cosponsored by United Nations' Food and Agriculture Organization (FAO), International Fund for Agricultural Development (IFAD) and World Food Program (WFP). Dr. El Solh is the author of more than 120 publications/papers and articles including books and chapters of books. Dr. Solh was a strong supporter of the Arab Society of Plant Protection.

The contribution of Dr. Solh to agricultural research and development has been recognized through several prestigious awards and honors, which include: Khalifa International Award for Date Palm and Agricultural Innovation, Abu Dhabi, United Arab Emirates (2016); FAO 70th Anniversary Commemorative Medal for contributions to global food security, alleviation of hunger and malnutrition, and sustainable management of natural resources, FAO, Cairo, Egypt (2016); Gregor Mendel Innovation Prize, granted by the Gregor Mendel Foundation in Berlin, Germany in recognition of Mahmoud Solh and his team efforts in saving/duplicating the valuable plant genetic resources collections at ICARDA GeneBank in Syria (2015); Life Time Achievement Award for Dryland Development granted by the International Commission of Dryland Development (2013), Honorary Doctors Degree by the Swedish University of Agricultural Sciences (SLU), Uppsala, Sweden (2012); Distinction Award for Outstanding Graduate of the University of California – Davis from the College of Agricultural and Environmental Sciences, University of California, Davis, USA (2011); Award from the Faculty of Agriculture and Food Sciences of the American University of Beirut in recognition of Outstanding Achievements in the Agriculture Sector, Beirut, Lebanon.

Dr. Solh was a dedicated scientist who worked hard all through his career to advance agricultural development in the Arab region and beyond. His scientific work led to the development and release of hundreds of improved crop varieties, directly benefiting small holder farmers in the Arab region and across the globe. He was also an advocate for capacity building, mentoring generations of scientists, and strengthening research networks across continents. He will always be remembered as a pioneer and leader for transforming science to solutions that improve the livelihood of farming communities.

Sincere condolences are offered to his family and to all who had the honor of knowing or learning from him. May we continue to carry forward his passion, dedication, and his hope for a better future.

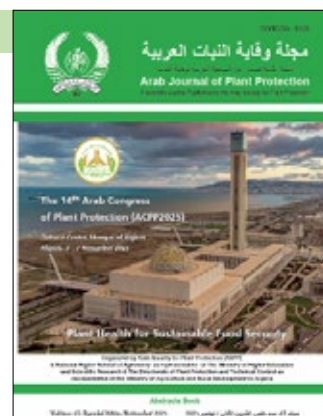
Arab Journal of Plant Protection

Volume 43, Special issue, November 2025

Abstracts of papers presented in the 14th Arab Congress of Plant Protection, Algiers, Algeria, 3-7 November 2025

Edited by Safaa G. Kumari, Khaled Makkouk, Houda Boureghda, Mohammed Biche, Abdul Rahman Moukahel, Nader Asaad, Bahria Khenfous-Djebari and Samira Morsli

<https://doi.org/10.22268/AJPP-043.S.E010152>



SELECTED RESEARCH PAPERS

- **Evaluation of Fungicides for the Management of Glomerella Leaf Spot and Bitter Rot on Apple in North Carolina.** Kendall A. Johnson, Rachel Kreis Douglas, W. Chester Allen, Keith S. Yoder, Sherif M. Sherif, Kerik D. Cox, Wayne M. Jurick II, Aaron Weber, and Sara M. Villani, Published Online:22 Aug 2025. <https://doi.org/10.1094/PDIS-12-24-2773-RE>
- **Yellow Dwarf Viruses: Aphid Transmission Efficiency and Cereal Host Range.** Narelle Nancarrow, Brendan Rodoni, Shu Kee Lam, and Piotr Trębicki, Published Online:22 Aug 2025 <https://doi.org/10.1094/PDIS-11-24-2523-RE>
- **The Oriental latrine fly *Chrysomya megacephala* (Diptera: Calliphoridae) has arrived in Eastern Europe**Short Communication. Alexandru-Mihai PINTILIOAIE, Silviu PETROVAN, Eur. J. Entomol. 122: 141-146, 2025. [DOI: 10.14411/eje.2025.017](https://doi.org/10.14411/eje.2025.017)
- **The Oriental latrine fly *Chrysomya megacephala* (Diptera: Calliphoridae) has arrived in Eastern Europe.**Alexandru-Mihai PINTILIOAIE, Silviu PETROVAN, Eur. J. Entomol. 122: 141-146, 2025. | [DOI: 10.14411/eje.2025.017](https://doi.org/10.14411/eje.2025.017)
- **Comparison of flight behaviour and flight morphology between perching *Lycaena phlaeas* and patrolling *Zizeeria maha* (Lepidoptera: Lycaenidae).** Michio IMAFUKU, Eur. J. Entomol. 122: 73-78, 2025. [DOI: 10.14411/eje.2025.008](https://doi.org/10.14411/eje.2025.008)
- **Fumigant toxicity of allyl isothiocyanate against phosphine-resistant populations of five major stored-grain insect pests.** Sudhan SHAH, Rajeswaran JAGADEESAN, Manoj K. NAYAK, Eur. J. Entomol. 122: 35-41, 2025. [DOI: 10.14411/eje.2025.004](https://doi.org/10.14411/eje.2025.004)
- **Impact of farnesol nanoformulation on the movement of melon aphid and the spread of aphid-transmitted viruses.** Beatriz Dáder, Juan Navarro-Carcelén, María Jesús Pascual-Villalobos, Alba Tejeda, Alberto Fereres & Aránzazu Moreno, Journal of Pest Science, Volume 98, pages 1239–1250, 2025. <https://doi.org/10.1007/s10340-025-01904-3>
- **Toxicity of *Melaleuca raphiophylla* essential oils against *Sitophilus zeamais* and *Sitophilus oryzae*.** Rubens Candido Zimmermann, Ana Marta Schafaschek, Adélia Maria Bischoff, Matheus Beger, Julia Sant'ana, Sofia Bin de Macedo, Milena Ielen, Carlos Eduardo Nogueira Martins, Sarah da Costa Amaral, Rilton Alves de Freitas, Alessandra Benatto, Carolina Gracia Poitevin, Henrique da Silva Silveira Duarte & Joatan Machado da Rosa, Volume 98, pages 1277–1292, 2025.
- **Gut bacteria of the fall armyworm, *Spodoptera frugiperda*, promote host resistance against the toxic effects of lufenuron.** Qianqian Li, Renwen

Zheng, Jinyuan Zhao, Sihan Lu, Yue Liu, Dongyan Huang, Jinhui Zhang, Lijuan Liu, Xin Zhou and Qingfeng Tang, Volume 98, pages 1413–1429, 2025.

- **Damage caused by *Tetranychus urticae* Koch (Tetranychidae) in grapevine leaves *Vitis vinifera* (Vitaceae).** Pavan, Aline Marjana, Da-Costa, Tairis, Picoli Ribeiro, Luiza and Juarez Ferla, Noeli, Volume: 65 Issue: 3 pages: 827-840, 2025. <https://doi.org/10.24349/hif2-77t1>
- **Microbiota dynamic communities in sweet orange infected by “huanglongbing” in Iran: Microbiota Associated with Sweet Orange Infected by Huanglongbing in Iran.** Shiva Safarpour KAPOURCHALI, Mojdeh Maleki, Ali Alizadeh Aliabadi, Saeideh Rajaei, Mohammad Mehdi Faghihi, Mehdi Nasr Esfahani, Vol. 64 No. 1, 2025. <https://doi.org/10.36253/phyto-15662>
- **Isolation and identification of *Fusarium* spp. associated with Fusarium wilt of chickpea (*Cicer arietinum* L.) in Algeria.** Ibrahim Sekkal, Djamel Mahiout, Boubekkeur Seddik Bendahmane, Tahar Farah, Mohamed-Cherif Bentahar, Martina Rickauer, DOI: <https://doi.org/10.36253/phyto-15328>

EVENTS OF INTEREST

January 26-27, 2026	International Conference on Agricultural, Biological and Ecosystems Sciences ICABES on, in Bengaluru, India.
January 28-29, 2026	International Conference on Plant Pathology and Plant-Microbe Biology in Istanbul, Türkiye. https://shorturl.at/fmqSY
July 20-24, 2026	First circular - XVII International Congress of Acarology - Montpellier, France.

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

Mohamed Ali Bob (ICBA), Hamadttu A. F. El-Shafie (ICARDA), Khalil Ahmed Ammar (ICBA), Elia Choueiri (Lebanon), Laurens Tijink (WUR-Netherlands), Ahmed Shamkhi Jabbar (Iraq), Hassan Mohammed Khalaf Jassim Al-Jubury (Iraq), Ismail Ahmed Ismail (Iraq), Mohammed NK Hantoosh (Iraq), Halima Z Hussein (Iraq), Ziad Barbar (Syria), Hany M. Elkawas (Egypt), Maryam Sami Elias (Iraq), Dareen S. Jamel (Iraq), Osameh Atiya (Turkey), Fadia A. Shaban (Jordan), Abdul Rahman Khafateh, (Syria) Hafiz Mohamed Dafalla Yousif (Saudi Arabia), Nouredine Adjlane (Algeria), Amer J.A. Al-Gerrawy (Iraq), Ahmed Mushtaq Abdul Latif (Iraq), Hassan Khalil (Syria), Amira Randa Rimas Meziane (Algeria), Laila Ali Saleh Khalifa (Libya), Safia Berrahia (Algeria), Tamara Adnan Ali Alkhateeb (Iraq), Nadine N. Ali (Syria), Mokhtar Abdulsattar Arif (Iraq), Mohamed Mannaa (Koria-Egypt), Tassadit Azouaoui-Ait Kettout (Algeria), Sendab Sami Al-Dahwy (Iraq), Elia Choueiri (Lebanon), Maher Al Rwahnih (Jordan), Ines Ksentini (Tunisia), Wanissa Mellikeche (Algeria), Belhadj Hamida (Algeria), Ahmed H. EL Kenawy (Egypt), Heffaf Fatiha (Algeria), Adnan A. Lahuf (Iraq), Baya Boucenna-Mouzali (Algeria), Al Sarai Alalawi Mamoon (FAORNE), Heba Tokali (FAO-Egypt), Yosra Ahmed (FAORNE), Lidia Abdelshahid (FAORNE), Shoki Al-Dobi (FAO-Rome), Abd Alrahman Mukahal (ICARDA-Lebanon), Abdel Aziz Al-Barak (NCPD KSA), Abid Hussain (MEWA KSA)

Appreciations

The Arab Society for Plant Protection and the Editor-in-Chief of the Plant Protection Bulletin in the Arab Countries and the Near East extend their sincere thanks and deep gratitude to Engineer Ayman Al-Ghamdi, Executive Director of the Prevention Center, for providing information and content related to the National Center for Plant Pest and Animal Disease Prevention and Control, for the purpose of enlightening the workers in the plant protection department at the center and its various sections. We also appreciate the efforts of Mr. Ahmed Al-Salman for following up on the publication of the topic, hoping that the center will continue to play an active and pioneering role in the field of protecting crops from agricultural pests and plant diseases, through the application of the latest scientific methods, providing technical and advisory support to farmers, and implementing environmentally friendly integrated pest management programs.

Professor Dr. Roshanak Darvishzadeh

The Editor-in-Chief of the Plant Protection Bulletin would like to express my sincere thanks and gratitude to **Professor Dr. Roshanak Darvishzadeh** from the Faculty of Geo-information Science and Earth Observation (ITC), University of Twente, The Netherlands, for writing the outstanding ANEPPB editorial on “Monitoring Vegetation Stress and Health Disturbances: A Remote Sensing Perspective,” in which she focused on the various biotic and abiotic stressors to which vegetation is exposed and the potential of remote sensing to detect differences in these stresses. Thank you, Dr. Roshanak, and I was delighted to meet you in person in Jordan to hear your valuable lecture on the sidelines of the 16th General Conference organized by the Association of Agricultural Research Institutions in the Near East and North Africa (AARINENA) on December 4, 2025, in cooperation with the Food and Agriculture Organization (FAO). I wish you continued success and hope that you will be a speaker at the 15th Plant Protection Conference to be held in 2028.

The bulletin’s editorial board invites society members to submit their scientific findings and news related to plant protection in Arab countries and beyond. We also encourage scientists working abroad to share their information and achievements with colleagues through this bulletin.

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The 14th Arab Congress of Plant Protection, Algiers



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