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# ARAB AND NEAR EAST PLANT PROTECTION BULLETIN ANEPPB

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# ARAB AND NEAR EAST PLANT PROTECTION BULLETIN (ANEPPB)

ISSUE 95 (2) August, 2025

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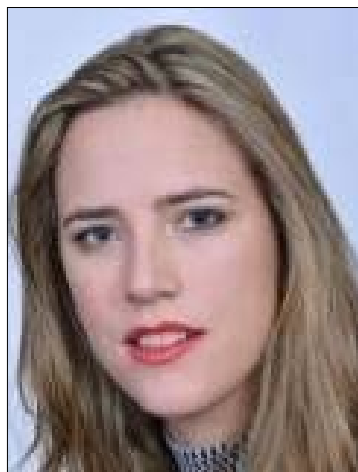
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### **Fusarium wilt Tropical Race 4: The banana wilt threat continues**

Bananas (*Musa* spp.) are one of the most produced and consumed fruits globally and the fifth most traded agricultural product. With more than 1000 types of bananas known, a small number are grown as a staple food crop or fresh market commodity. The Cavendish variety accounts for 47% of global production, making it the most commercialised banana grown worldwide, with approximately 50 billion tons produced annually. The banana industry plays an important role both economically, employing 400 000 people in Latin America and the Caribbean alone, and socially, as a staple food in many developing countries within Africa and worldwide.

One of the most devastating constraints to banana production is Fusarium wilt, caused by the soilborne pathogen *Fusarium oxysporum* f. sp. *ubense* (Foc). The tropical race 4 (TR4) strain of Foc is particularly threatening as it infects the Cavendish banana variety and, therefore, has the potential to devastate the multibillion-dollar industry as well as impact food security and income of millions of farmers and labourers in developing countries. An outbreak of Foc race 1 in the early 1900s destroyed the well-established Gros Michel production industry with the epidemic only coming to an end upon replacement of this variety with the Cavendish variety, since it was discovered to be resistant to Foc races 1. A new race of the pathogen, Foc TR4 has caused a renewed Fusarium wilt outbreak, but this time on Cavendish bananas. Since it was first reported in Southeast Asia, Foc TR4 has continued to spread to 24 countries where, when introduced, has destroyed affected plantations.

As a soilborne pathogen, management of Fusarium wilt is challenging due to the build-up of inoculum in the soil. Factors contributing to this buildup include the survival of Foc as chlamydospores in soil, monoculture plantations of the Cavendish banana, and the perennial nature of the banana crop. Quarantine and exclusion practices, therefore, remain the most successful to restrict the spread of Foc TR4 in commercial plantations. Once the pathogen is present, the only effective strategy for sustainable production is the cultivation of Foc-resistant



varieties. To date, however, there is no resistant replacement available for the Cavendish banana. Consequently, early detection of Foc TR4 plays a crucial role in the management of

the pathogen as it allows for early identification and containment to prevent further spread, thereby attempting to minimise its impact on banana production. In this editorial we will review the status of banana Fusarium wilt TR4 in the Middle East, discuss the epidemiology, disease cycle and symptoms, and management by using a multi-component strategy to prevent the introduction of the disease into disease-free areas.

### **Fusarium wilt TR4 in the MENA region**

Fusarium wilt TR4 first moved outside Southeast Asia when it was discovered in Oman in 2009. After that it was also detected in Jordan, Lebanon and Israel. In the following section, the importance of banana production in the Middle East and North Africa (MENA) region will be introduced, and the known occurrence of Foc TR4 in MENA countries discussed.

#### **Oman**

Banana is produced on approximately 1,420 ha in the Sultanate of Oman. Cavendish is the most popular variety grown, but Fard bananas (AAB) and plantains (ABB) are also planted. Unconfirmed reports of Fusarium wilt surfaced in 2009, but the first outbreaks were confirmed in Sohar in May 2011. Since then, the disease has been discovered in four states: Al-Suwaiq, Saham, Sohar, and Nizwa. Most banana farms in Oman are small (0.5 ha), and new plantations are established with suckers from the same or neighbouring farms.

#### **Jordan**

Foc TR4 was detected in the Shooneh Janoobiyyeh district of the Jordan Valley on approximately 1,000-1,500 ha of an estimated 2,000 ha area on which Cavendish bananas were grown. Approximately 80% of the area was affected, with an incidence of 20-80%. According to local growers, Fusarium wilt has been present in the region since 2005. At the time, however, no disease was found in the neighbouring West Bank of the Palestinian Authority or in Israel.

#### **Lebanon**

Lebanon has a small Cavendish banana industry that produces fruit for local consumption and export to Syria. Fusarium wilt was first detected in the Mansouri and Berghliyyeh regions in October 2013, and the causal agent was subsequently confirmed as Foc TR4. At the time of detection, only 1 ha of bananas was affected. More recent surveillance confirmed that the

disease is widespread in banana production regions in Southern Lebanon.

#### **Israel**

Foc TR4 was isolated from plants with typical Fusarium wilt symptoms at Shfeya plantation along the southern Carmel coastal plain and Kibbutz Ein Gev on the northern banks of the Sea of Galilee in Israel in 2016. The affected plants were destroyed, and the outbreaks were contained and the area placed under strict supervision by the country's plant protection and inspection services. By early 2018, no new cases were observed, but later in the year Foc TR4 was detected in more plots in the Jordan Valley.

### **Epidemiology and disease cycle**

Foc survives as chlamydospores in the soil or banana plant debris, remaining dormant until host root exudates stimulate the spores to germinate. The pathogen spores enter the plant through the root tips and grow long hyphae that infect lateral roots before penetrating the xylem vessels, allowing the pathogen to move through the xylem and colonize the rhizome. In resistant banana varieties, the rapid release of phenolic compounds causes the formation of tyloses and gels that block and lignify the spores and pathogen structures within the xylem, preventing further spread. Active plant defence mechanisms inherent in the plant are stimulated by infection, even in susceptible varieties, although recognition of infection is not fast enough to avoid colonization. Microconidia are produced which restrict the movement of water through the banana plant by infection of the xylem. Spores germinate and continue to spread through the vascular tissue resulting in discoloration and wilting of the plant once the entire xylem system is blocked. The fungus continues to spread into nearby plant tissue and produces chlamydospores or macroconidia, which are eventually released back into the soil when the plant decomposes, thereby ensuring the survival of the pathogen.

The spread of Foc TR4 occurs mainly by passive movement of the pathogen propagules. The main cause of pathogen spread locally and via long-distance is through infected planting material. Runoff water carrying infected soil and plant parts can contaminate reservoirs, drainage canals and rivers, all of which can infect new plantations nearby. Long-distance spread through the transport and movement of inoculum within infected soil attached to farm

machinery, vehicles, the footwear of workers and domestic animals in the area also contribute to the spread of the pathogen. Non-host plants, such as weeds, are also thought to play a role as potential sources for inoculum survival and spread of the pathogen. Once in the soil, Foc TR4 can persist for several decades making it difficult to control once established and near impossible to eradicate.

### Symptomology

The development of symptoms of Fusarium wilt depends on the level of inoculum, the level of resistance or susceptibility of the host, and environmental conditions, with appearance varying between 2 months to several years. The first symptoms are chlorosis in older and then younger leaves over 1-3 weeks, followed by successive wilting and possible splitting of the pseudostem as the pathogen colonises and destroys more vascular tissue. Internally, there is dark-brown discolouration of the pseudostem and rhizome vascular tissue as it is destroyed by the pathogen. The initial (mother) plant eventually collapses, and the follower (daughter) plant begins to exhibit similar symptoms due to the connection of vascular tissue, resulting in contamination by the mother plant. The banana plant usually dies before flowering and therefore bunches are not produced, although surviving bunches contain fruit with no internal or external symptoms. Emerging leaves are stunted and short, and banana rhizomes that are younger than 4 months old will usually not show visible symptoms of the disease.



Typical banana Fusarium wilt symptoms associated with Cavendish bananas. Left: Yellowing of older leaves, with dead leaves hanging down the pseudostem. Top right: Vascular discolouration of the pseudostem. Bottom right: Discolouration of the inner rhizome.

### Management

Fusarium wilt management is challenging due to the survival of inoculum in the soil. The pathogen cannot be eradicated or treated with fungicides, and prevention of its introduction into banana fields using proper biosecurity is thus critical. Once introduced, containment can only be effective if infected plants are diagnosed early, and the infested area properly contained. If not, the disease needs to be managed,

primarily by planting disease-resistant bananas or supporting partially resistant plants using an integrated disease management strategy. The three stages of dealing with Fusarium wilt involves disease prevention, containment, and management.

### **Prevention**

Preventing the spread of Foc TR4 into disease-free areas is the most effective way to manage the disease. A series of actions are involved in prevention that can be categorized into pre-border, on-border, and on-farm measures. Pre-border interventions include certification agencies conducting a pest risk analysis to determine whether material is disease-free and can be imported and transported between and within countries. Additional measures include raising awareness about the disease, conducting training workshops, and building capacity among national and regional agencies are essential. On-border activities refer to efforts that strengthen control capacities as well as regulate the movement of plant material and farming equipment from high-risk regions to disease-free areas. Biosecurity measures can be implemented at country borders, farm gates, and different checkpoints within the farm. While molecular diagnostic tools could offer accurate detection of suspicious material when stopped by authorities, it is still unfeasible to consider its implementation in many countries. On-farm measures include implementing property fencing and establishing entrance control points for visitors and vehicles. It is also important to ensure the use of disinfectants and clean planting material, irrigation water, farming equipment, and vehicles on the plantations.

### **Early detection and containment**

When Foc is already present in soil, complete eradication is not possible. Early detection and containment strategies are therefore of utmost importance to reduce the rate of disease spread in banana plantations. Regular surveillance, a thorough diagnostics program, and collaboration among plant health authorities regionally and nationally contribute towards early detection of the pathogen. This aids in effective decision making regarding whether containment measures should be implemented. Once Foc has been detected in a plantation, this area as well as three to five rows of plants surrounding the detection site are eradicated. The plants are killed and treated with urea or burnt on site. Containment procedures in

commercial plantations involve limiting the movement of people and animals that might spread Foc-containing soil, and sanitising all shoes and farm equipment before workers leave an infected area. Additionally, fencing-off of the diseased area and putting up physical barriers can prevent water run-off to disease-free areas. These containment measures are often not possible to introduce by small-scale farmers and subsistence growers.

### **Management**

Substituting susceptible banana varieties with tolerant or resistant ones is the only way to attain sustainable banana production on Foc-infested soil. Although many active breeding programs and biotechnology laboratories are currently aiming to produce Fusarium wilt TR4-resistant plants, these are yet to be grown on a commercial level by farmers. Chemical control by using fumigants and fungicides does not eradicate the fungus from infested soils, and biocontrol products and soil amendments are often not ineffective. The only way to commercial growers to deal with the disease currently is the use of Foc TR4-tolerant Cavendish somaclones. Disadvantages of these somaclones include a longer growth cycle, compromised yield, and only partial resistance to Foc TR4. Consequently, somaclones are cultivated only in areas where Cavendish banana production is unsustainable due to the presence of Foc TR4. The use of Cavendish somaclones should be supported by integrated disease management options such early identification and eradication of disease plants, the application of biocontrol agents or soil amendments, shortening of planting cycles, planting of cover crops, and intercropping with non-host species. These approaches are expected to lower inoculum levels of the pathogen by promoting soil suppression.

### **Strategy to deal with Fusarium wilt TR4**

A multi-component, proactive strategy is needed to deal with Foc TR4. Such a strategy could consist of the following components:

#### **Awareness**

The first line of defence against Foc TR4 is to be aware of the threat posed by the pathogen, and to have knowledge on actions that can prevent introduction. This information should be shared with growers, plant protection officials and all other stakeholders of country banana industries through extension services and printed or electronic media.

## Clean planting material

The use of clean planting material to establish banana plantations is a critical step in the prevention of Foc TR4 and other destructive banana pathogens. All banana planting material imported into a country should be moved as *in vitro* plants, and not as suckers or bits. This is the primary task of a country's Plant Health authority. If the fungus is already present in a country, the infested fields and region should be placed under quarantine, and the movement of materials from such farms regulated. Banana growers in affected countries should be made aware of the risk of spread to their own farms and need to take the responsibility not to use any planting materials or plantation tools from infested farms.

## Capacity to deal with Fusarium wilt TR4 incursion

Plant health officials from national plant protection organizations (NPPOs), researchers and extension officers need to be capacitated in field and laboratory diagnosis of Foc TR4, and how to deal with the disease once a suspect case is reported. The designated inspector needs to visit the property, take samples and conduct regular surveillance in production regions. If the cause of the disease is Foc TR4, all the necessary precautions need to be taken to prevent the fungus from spreading by declaring and treating the affected site as a quarantine area. The accurate identification of the fungus is crucial, and the outcome of the test should be reported in a responsible way and in consultation with the country's NPPO.

## Biosecurity

Biosecurity measures for Foc TR4 should be introduced at country border, farm border and on-farm level. These measures involve a range of actions, including the listing of Foc TR4 as a quarantine organism, proper inspection services and diagnostic ability, control of farm access, the use of clean planting materials and the implementation of phytosanitary measures. The implementation of farm biosecurity depends on its practicality and growers' financial capacity.

## Research, development and training

Research to prevent and manage banana Fusarium wilt is required before Foc TR4 is introduced into a country, particularly considering small-grower production systems. This involves rapid and accurate detection systems that employ both in-field and remote

diagnostic technologies, the evaluation of popular banana varieties for Foc TR4 resistance and means to manage the disease in small-grower fields. Training of plant health officials, research scientists, extension officers and growers is also important in countries at risk. This should involve means for the early diagnosis of suspect plants, accurate identification of the cause of the disease, and methods to report Foc TR4 to NPPOs and the banana production community.

## Surveillance for Fusarium wilt TR4

Regular national surveys for Foc TR4 should be undertaken, especially in affected and bordering countries. The disease becomes visible once typical Fusarium wilt symptoms develop in Cavendish bananas grown in high-temperature zones, such as in the tropics. If such plants are observed, they should be treated as suspect cases and further investigated.

## Political will

It is crucial that policymakers and community leaders participate in raising awareness among stakeholders on both a national and regional scale to prevent the introduction of Foc TR4 onto banana farms. Ideally, agricultural authorities need to show commitment by carrying out actions to prevent the entry of Foc TR4. This can also include signature of agreements between affected and non-affected countries.

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#### Algeria

##### First Report of *Zaprionus tuberculatus* in Algeria

###### EPPO Report 2025/145

*Zaprionus tuberculatus* (Diptera: Drosophilidae – formerly EPPO Alert List) is first reported from Algeria. The pest was found in fig (*Ficus carica*) fruits collected from orchards in the municipalities of Birtouta and Rouiba (province of Algiers, Northern Algeria). *Zaprionus indianus* (Diptera: Drosophilidae – formerly EPPO Alert List) was also recorded for the first time in figs in Algeria. It had previously only been found in pomegranate in this country (EPPO RS 2021/166). Both species were identified by morphological and molecular tests.

Algeria is a major fig producer.

**Source:** Abdelbaki L, Saidi-Touati M, Serrano C, Yassin A, Boutellis A (2024) New haplotypes of *Zaprionus tuberculatus* and *Zaprionus indianus* (Diptera: Drosophilidae) identified in fig orchards in Algeria. *Oriental Insects* 59(2), 326-339. EPPO Reporting Service 2025 no. 6 – Pests.

###### Pictures

*Zaprionus indianus*. <https://gd.eppo.int/taxon/ZAPRIN/photos>

*Zaprionus tuberculatus*. <https://gd.eppo.int/taxon/ZAPRTU/photos>

##### Emergence of *Caenocoris neri* (Germar, 1847) on Fig Trees in the Oases of Southeastern Algeria

During insect sampling in the oasis ecosystem during the summer of 2019, individuals of the species *Caenocoris neri* (Germar, 1847) were recorded and identified for the first time. These insects were observed feeding on fig trees (*Ficus carica* L.) planted under date palms at the experimental site of the Institute of Arid Agriculture Development (ITDAS) in Ain Ben Noui. This finding represents the first record of *C. neri* in the Biskra oasis ecosystem, as well as the first documentation of this insect feeding on fig trees, which are now considered a new host plant. Before this record, there was no known association between *C. neri* and fig trees as a food source. This finding is a significant contribution to the understanding of insect-plant interactions in the region and enhances a broader understanding of agricultural entomology in Algeria. Although the presence of *C. neri* currently appears to have a limited impact, its feeding habits and the agricultural conditions of the area warrant continued monitoring and observation. This aims to anticipate potential future outbreaks and identify trends in the geographic distribution dynamics of phytophagous and predatory insects, influenced by climatic and human factors, as well as to study insect adaptation to new habitats and food sources. [Nacima Diab<sup>1</sup>, Tesnim Deghiche<sup>2</sup>, Khalila Bengouga<sup>1</sup>, and Vasily Vladimirovich Verkhoturov<sup>3</sup>, (Algeria)<sup>1</sup> Scientific and Technical Research Center on Arid Regions (CRSTRA), Po Box 1682 RP, Biskra, Algeria. <sup>2</sup>Mohamed Khider Biskra University, Po Box 145 RP. 07000 Biskra, Algeria. <sup>3</sup>Institute of Agroengineering and Food Systems of Kaliningrad State Technical University, Kaliningrad, Russian Federation. 2025]

### First Record of *Mogrus sahariensis* in Egypt.

*Mogrus sahariensis* Berland & Millot, 1941 (Araneae: Salticidae) was identified to be present in Egypt in the Al Mansoureyah region, Giza governorate, in the litter under mango trees (*Mangifera indica*), grape vines (*Vitis* spp.) and mandarin orange trees (*Citrus reticulata*) during the period October 2018 to September 2019. Seven specimens, four females and three juveniles, were collected and identified. Descriptions, habitat, and collection data were recorded. This is the first report of *Mogrus sahariensis* in Egypt. [ **El-Helbawy, N.M.S., G.M.E. Sallam, M.F. Hassan and M.S. Nawar (Egypt)**, Arab Journal of Plant Protection, 43(2): 276-278, 2025]. <https://doi.org/10.22268/AJPP-001308>



### First Record of *Citrus exocortis* viroid (CEVd) on Onions and Determining its Complete Sequence using Next Generation Sequencing (NGS) Technology in Iraq

This study was conducted at the Research Station of the College of Agriculture, Tikrit University, and aimed to isolate and diagnose a strain of *Citrus exocortis* viroid (CEVd) on onion plants, describe its pathological symptoms, determine the complete genomic sequence of the Iraqi isolates, and draw its phylogenetic tree using next generation sequencing (NGS) technology and bioinformatics programs. The observed symptoms of infection included twisting and wrinkling of the leaves, stiffening of the top of the leaf, sharp leaf bending, and reduced growth, in addition to causing a change in the natural tubular leaf structure and variation in size. 98,945,112 accurate reads were obtained representing the total RNA sequences in infected plant samples.

These reads were mapped to the complete viroid reference sequence, with 49,175 accurate reads and a length of 395 base pairs. This viroid strain which infects onion was the first record in Iraq and was given the name *Citrus exocortis* viroid isolate Aan-Saladin (CEVd Aan-saladin) and deposited in the gene library of the National Center for Biotechnology Information (NCBI) under the accession number OR589765.1, based on the complete genomic sequence. The phylogenetic analysis revealed close relation between the diagnosed isolate CEVd Aan-Saladin and the Najaf OR024670.1, Tikrit OR993891.1 and Baghdad OR343512.1 isolates, with significant divergence from the viroids outside the group. [ **Mohsen, A.S. and M.A. Al-Fahd (Iraq)**, Arab Journal of Plant Protection, 43(2): 164-170. 2025]. <https://doi.org/10.22268/AJPP-001306>

## First Record of *Fusarium solani* as a causal agent of Root Rot and Damping-Off Disease in *Acacia mangium* and its *in Vitro* Control in Karbala Province, Iraq

This study was conducted to determine the pathogens of root rot and damping-off of *Acacia mangium* in Karbala governorate, Iraq. The study included evaluating some biological and chemical methods against the pathogen. Four isolates, *Fusarium* sp (F1), *Fusarium* sp (F2), *Fusarium* sp. (F3), and *Rhizoctonia* sp (R1), were obtained. The F3 was the best isolate superiority compared to the other isolates in reducing the seed germination rate of red radish seeds on the water agar medium to inhibition rate 100%. While the seed germination, percentage in the control treatment amount 100%. The greenhouse experiment also demonstrated the same results. The F3 isolate significantly superior in decreasing the germination percentage compared to the control treatment. The morphological and molecular identification revealed that the highest pathogenicity isolate (F3) is the fungus *Fusarium solani*. The sequence was deposited in NCBI under the accession number PP319596. Moreover, the results indicated the effectiveness of the bioagent *Trichoderma koningiopsis* in controlling *F. solani*. It significantly outperformed the control treatment in controlling this pathogen an inhibition percentage of 96.29%. whereas the control treatment a mounted 0.00%. In addition to these findings, it was found that Beltanol fungicide demonstrated the highest inhibition efficacy (100%) against the isolated pathogens. [Noor A. Al-Ghazali<sup>1</sup>, Burair A.N. Gamaz, Ahmed B. Abu-Duka<sup>1</sup>, Lubna Abd Kamel<sup>1</sup> (Iraq), Plant Protection Department, Agriculture College, University of Kerbala, Karbala, Iraq. Basrah Journal of Agricultural Sciences, 10/4/2025].



Fig:1. In vitro Evaluating the pathogenicity of *Fusarium solani*, responsible for damping - off and root rot in *Acacia* plants, using red radish seeds on a water agar media



Fig. 2.The antagonistic efficiency of the bioagent *T. koningiopsis* against the pathogenic fungus *F. solani*

### First Detection of Jasmine Virus C infecting *Jasminum officinale* in Lebanon

Jasmine virus C (JaVC) is a member of the species *Carlavirus jasmini* (genus *Carlavirus*, family *Betaflexiviridae*) first identified in *Jasminum sambac* in Taiwan and later associated with yellow mosaic symptoms on *Jasminum officinale* in Italy. The virus poses a potential threat to ornamental plant health, especially due to the global trade of nursery materials. To investigate the possible presence of JaVC in Lebanon, a small-scale survey was conducted in the Bekaa Valley in 2022, where 33 *Jasminum officinale* samples were collected from various nurseries and private gardens. Some plants displayed aspecific viral symptoms such as chlorosis and leaf mosaic, while others were asymptomatic. All samples were tested for JaVC by RT-PCR using diagnostic primers reported in the Italian study. In addition, new primers targeting a 490 bp region of the coat protein gene (CP490F/CP490R) were designed to enhance detection. Three symptomatic plants were positive identified in a single nursery using both primers. Sequencing of the amplified fragments revealed over 99.8% similarity between the three isolates. The Lebanese sequence was submitted to GenBank under accession number OR544076. Comparative sequence analysis showed that the Lebanese isolate JAS-08 shares more than 98% nucleotide identity with the Italian JaVC isolate (GenBank accession No. OL828237). This study represents the first report of JaVC infecting *Jasminum officinale* in Lebanon, highlighting the need for virus surveillance programs in ornamental plant nurseries to prevent the dissemination of infected materials. [Raied Abou Kubaa<sup>1,2</sup>, Serafina Serena Amoia<sup>2</sup>, Luisa. Rubino<sup>2</sup>, Fouad Jreijiri<sup>3</sup>, Elia Choueiri<sup>3</sup>. <sup>1</sup>Department of Plant Pathology, University of California, Davis, CA 95616, U.S.A. <sup>2</sup>Institute for Sustainable Plant Protection, National Research Council, Bari, Italy. <sup>3</sup>Lebanese Agricultural Research Institute, Tal Amara, Zahle, Lebanon. 9<sup>th</sup> National Congress of the Italian Society for Virology, Turin, Italy. pp. 134, 2025.]

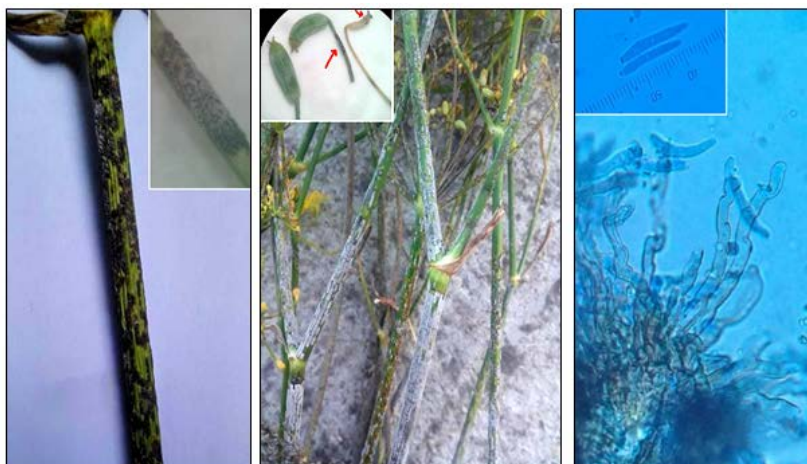
### First Record of Passalora Blight on Fennel (*Foeniculum sp*) in Syria

In May 2024, an unknown disease appeared on fennel crops cultivated in certain areas of Homs Governorate. Laboratory tests revealed that the disease was Passalora blight, caused by the fungus *Passalora punctum*. This fungus affects several crops from the Umbelliferae (also known as Apiaceae) family, including parsley and other related plants. The conidiophores (spore-bearing structures) are relatively long, sinuous, and often undivided in their upper parts. They emerge in very dense clusters from the stomata and cover the entire surface of the host plant's vegetative parts.

The conidia (asexual spores) are variable in shape and size (20–50 micrometres) with 0–3 septa and are relatively broad. The disease symptoms appear as severe blight affecting the entire vegetative system (stems, leaves, and flowers), with very dense sporulation on the plant's stem. On the stem, symptoms initially appear as small, brown spots surrounded by a yellow halo. These spots gradually enlarge, becoming elongated, sometimes exceeding 1.5 cm in length. The conidiophores emerging from the plant appear as spherical swellings, somewhat resembling rust pustules. When sporulation is abundant, the infected spots take on a greyish-white colour.

When the fungus infects the fruit stalk, it causes the fruit to bend and initiates decay from

the top. In cases of early infection, it leads to fruit death and desiccation. On the leaves, symptoms appear as dark, dense, spherical growths, clusters of conidiophores emerging from the stomata. [Hassan Khalil, Reem Yousef, Khaled ALmatar (Syria), Department of Plant Protection, Faculty of Agricultural Engineering, Homs University, Syria, 2025].



## Tunisia

### First report of *Dacus ciliatus* in Tunisia

#### EPPO Reporting Service 2025/142

During a trapping survey conducted between June 2020 and August 2020 in Takelsa (Nabeul Governorate, Northern Tunisia), the fruit fly *Dacus ciliatus* (Diptera: Tephritidae – EPPO A2 List) was found for the first time in Tunisia. Traps had been set in courgette (*Cucurbita pepo*) and cucumber (*Cucumis sativus*) fields. The identity of the pest was confirmed by morphological identification. In a separate survey conducted from 2020 to 2022 in four governorates in southern Tunisia, *D. ciliatus* was reported in fields of cucurbit crops, including snake cucumber (*Cucumis melo* var. *flexuosus*), the first record of *D. ciliatus* on this host, courgette and pumpkin (*Cucurbita pepo*), melon (*Cucumis melo*), wild gourd (*Citrullus colocynthis*), cucumber (*Cucumis sativus*) and watermelon (*Citrullus lanatus*) (Ben Othmen *et al.*, 2025). The situation of *Dacus ciliatus* in Tunisia can be described as: **Present**.

During the survey for the presence of *D. ciliatus*, *Dacus frontalis* (Diptera: Tephritidae, EU A1 Quarantine Pest as *Dacus* spp.) was also reported for the first time on new hosts, including snake cucumber (*Cucumis melo* var. *flexuosus*), wild gourd (*Citrullus colocynthis*), cucumber (*Cucumis sativus*), watermelon (*Citrullus lanatus*) and aubergine (*Solanum melongena*) (Ben Othmen *et al.*, 2025).

**Source:** Ben Othmen A, Ben Belgacem A, Bel-Kadhi MS, Nagaz K, Braham M (2025) The invasive cucurbit fruit flies (Diptera: Tephritidae), *Dacus frontalis* Becker and *Dacus ciliatus* Loew in southern Tunisia: preliminary data on distribution, hosts and infestation. *Euro-Mediterranean Journal for Environmental Integration*

**Challeb Y**, Cherif A, Grissa-Lebdi K (2023) Efficacy of food attractants and attract-and-kill system to control *Dacus ciliatus* (Loew) (Tephritidae: Diptera): a new recorded pest in northern Tunisia. *Journal of the Entomological Research Society* **25(2)**, 267–274]. <https://doi.org/10.51963/jers.2023.85>

**Pictures** *Dacus ciliatus*. <https://gd.eppo.int/taxon/DACUCI/photos>

## **Characterization of *Platynaspis luteorubra*, a Ladybird Associated with Aphid Colonies on Ornamental Trees in Tunis Region (Tunisia)**

*Platynaspis luteorubra* was identified in the Tunis region for the first time. This species was collected in July 2024 from a colony of aphids on *Cestrum nocturnum* and *Nerium oleander* in the National Agricultural Research Institute of Tunisia (INRAT) garden feeding on *Aphis spiraecola*, *Aphis gossypii* and *Aphis nerii*. An illustration and brief description are provided, including notes on its world distribution, biology, and host prey. Additionally, a fragment of mitochondrial DNA from the cytochrome c oxidase 1 (COI) gene was analyzed for species confirmation.

[**Boukhris-Bouhachem Sonia**, Institut National de la Recherche Agronomique de Tunisie (INRAT), Rue Hedi Karray, 1004 Menzah, Université de Carthage, Tunis, Tunisia; Laboratoire GLRV (INRGREF), 1004 Menzah, Université de Carthage, Tunis, Tunisia, **and Souissi Rebha**, INRAT, Rue Hedi Karray, 1004 Menzah, Université de Carthage, Tunis, Tunisia, Tunisian Journal of Plant Protection 20 (1): 17-27,2025]. <https://dx.doi.org/10.4314/tjpp.v20i1.2>

## **First Report of Apple Dimple Fruit Viroid (ADFVd) and Apple Scar Skin Viroid (ASSVd) in Apple Orchards of Tunisia**

Apple production in Tunisia is increasingly threatened by viral and viroid diseases that can severely impact fruit quality and yield. Among these, *Apple dimple fruit viroid* (ADFVd) and *Apple scar skin viroid* (ASSVd), members of the genus *Apescaviroid* (family *Pospiviroidae*), are known to cause fruit deformation, skin discoloration, and overall decline in market value. In the summer of 2024, a field survey was conducted in the Kasserine province to investigate the etiology of fruit symptoms observed in several apple cultivars, including 'Richared', 'Red Delicious', and 'Golden Delicious'. Fruits showed characteristic symptoms such as bright yellow rings, depressed green spots, and scarring. Molecular analyses were carried out using RT-PCR with genus-specific and viroid-specific primers, followed by direct sequencing. The presence of ADFVd and ASSVd was confirmed in multiple samples. Sequence comparison revealed a high degree of similarity with reference isolates from China and other countries. This study represents the first report of ADFVd and ASSVd infecting apple trees in Tunisia, expanding the known geographic distribution of these viroids and emphasizing the need for systematic phytosanitary monitoring. The implementation of viroid indexing and the use of virus-free propagation material will be essential for maintaining the health and productivity of apple orchards in the country.

[**Hamdi I., Soltani R., Najar A.** Journal of Plant Pathology,2025 ]. <https://doi.org/10.1007/s42161-025-01968-1>

## **First report of citrus bark cracking viroid-pistachio infecting wild *Pistacia atlantica* in Tunisia**

Citrus bark cracking viroid (CBCVd) (Cocadviroid, Pospiviroidae), was previously referred to as Citrus viroid IV in California. It is a significant pathogen affecting citrus plants, and in *Poncirus trifoliata* it is strictly associated with bark cracking. CBCVd has also been detected in Slovenia, where it was linked to severe symptoms in hop plants (*Humulus lupulus* L.) (EPPO 2023). A separate strain, named CBCVd-pis, was identified in pistachio trees in California (Al Rwahnih et al. 2018). In Tunisia, CBCVd has been reported in Citrus species (Najar and Duran-Vila 2004), but not in pistachio plants. To investigate this

further, a specific study was conducted in October 2021. During this study, pistachio samples were collected from wild *Pistacia atlantica* trees in northern Tunisia. Field surveys revealed various symptoms, including deformed and chlorotic leaves, as well as dwarfing. Leaf samples from *P. atlantica* plants were collected to test for the presence of viroids previously reported to infect pistachio. cDNA of CBCVd-pis was successfully detected from total nucleic acids (TNAs) using reverse transcription-polymerase chain reaction (RT-PCR) with a specific primer set (Det F/Det R), which amplify a 199 bp fragment (Al Rwahnih et al. 2018). Out of 66 plants analyzed, 75% tested positive for CBCVd-pis. Sequencing of eight CBCVd-pis isolates (PV006687-PV006694) revealed 100% nucleotide identity with the W11 strain (MF198463.1) from the USA and the GA/8 strain (OR419772.1) from Turkey. These findings emphasize the need for enhanced surveillance and biosecurity measures to prevent the spread of viroids in pistachio crops, particularly in trees grafted onto *P. atlantica* rootstocks. To the best of our knowledge, this is the first report of CBCVd-pis infecting *P. atlantica* in Tunisia. [Manel Elair<sup>1</sup> · Azza Chelli-Chaabouni<sup>2</sup> · Michele Digiaro<sup>3</sup> · Naima Mahfoudhi<sup>1</sup>] Journal of Plant Pathology, 107:1309, 2025] <https://doi.org/10.1007/s42161-025-01891-5>

## RESEARCH HIGHLIGHTS

### Algeria

#### Isolation, Characterization, and Agricultural Potentialities of Plant Growth Promoting Rhizobacteria Associated with Wild *Argania spinosa* L. Skeels from Algerian Sahara.

The plant growth-promoting rhizobacteria (PGPR) community plays an important role in the plant's cycle life. However, their screening in wild plants growing in hostile Saharan regions is limited. Therefore, this investigation is undertaken to characterize the PGPR associated with *Argania spinosa* L. Skeels growing in the Tindouf region located in the Algerian Sahara. Rhizospheric soil was used to obtain bacterial isolates. PGPR species were selected based on biochemical PGP traits and identified through morphological and 16S rRNA sequencing. A total of 38 isolates were obtained from the argan rhizosphere, seven of which have the ability to produce indole-3-acetic acid and ammonia; whereas five strains demonstrated the capacity to synthesize hydrogen cyanide. All the strains marked with PGP traits were identified based on 16S rRNA gene sequencing analysis with high bootstrap values ranging from 98.44 to 100%. The bio-inoculation assay revealed an appreciable capacity to promote the wheat growth characteristics with high variability between strains and wheat varieties. The Core and Colosseo varieties were the most responsive to the PGPR inoculation. The screening of the PGPR community associated with plants surviving in the Saharan environment holds promise for advancing our comprehension and developing solutions related to climate change challenges. This study opens new avenues for valorizing the beneficial effects of argan PGPR as a biofertilizer in wheat cultivation.

[Housseyn Medjahed<sup>1,2</sup> Abdelkader Saadi<sup>3</sup>, Houda Boureghda<sup>4</sup>, Abdelaziz Merouane<sup>5</sup>, Meriem Medjekane<sup>2</sup>, Abdellah Noui<sup>6</sup> (1)-Ecole Nationale Supérieure Agronomique (ENSA-ES1603), Algérie (2)-Institute of Life and Natural Sciences, Nour Bachir University Center of El-Bayadh, Algeria. (3)-Laboratoire de Phytopathologie et Biologie Moléculaire,

Département de Botanique, Ecole Nationale Supérieure Agronomique (ENSA-ES1603), Algérie (4)-Faculty of Life and Natural Sciences, Hassiba Benbouali University of Chlef, Algeria (5)-Higher School of Saharan Agriculture, Adrar 01000, Algeria (6 )-National School of Nanoscience and Nanotechnology, Sidi Abdellah, Algiers, *Algeria*. ACTA MICROBIOLOGICA BULGARICA Volume 41 / 2 (2025)]

## Egypt

### **Nematicidal Activity of Five Cruciferous Seed Extracts in Controlling the Root-Knot Nematode Infecting Cucumber Plants.**

A greenhouse experiment was conducted to evaluate the effectiveness of five plant aqueous extracts of watercress, radish, turnip, cauliflower, and cabbage, either as seed extract or germinated seed extract, compared with oxamyl nematicide to protect cucumber plants from infection with the root knot nematode *Meloidogyne incognita*. In general, all the tested aqueous plant extracts and the chemical nematicide led to a significant decrease in the number of nematode root galls, egg masses, and eggs per gram of root as well as the number of larvae per 250 g of soil compared to the untreated inoculated control. The aqueous extracts of the germinated cauliflower seed and watercress seed had the highest nematicidal effect against root gall formation, egg-masses, and the number of eggs per gram of root. The cauliflower seed extract had the maximum nematicidal effect against nematode juveniles in soil, whereas the radish seed extract has turned the least effective. The tested aqueous plant extracts significantly increased the shoot's fresh weight compared to the untreated inoculated control. Soil drenching with the germinated cruciferous seed extracts exhibited similar activity against *M. incognita* in terms of a significant increase in ascorbic acid, salicylic acid, and phenol content. [ **Saadoon, S.M., S.B. Gad, M.A. Osman and M.I. Sergany** (Egypt), Arab Journal of Plant Protection, 43(2): 241-246, 2025]. <https://doi.org/10.22268/AJPP-001317>

### **In vivo Production of *Palpita vitrealis* Nucleopolyhedrovirus.**

A Preliminary bioassay was conducted to determine the suitable larval instar of the olive leaf moth, *Palpita vitrealis* (Rossi) and the needed concentration of its homologous baculovirus *Palpita vitrealis* nucleopolyhedrovirus (PaviNPV) for in vivo production. The calculated lethal concentrations for killing 90% of the tested larvae ( $LC_{90}$ ) were  $8.3 \times 10^4$ ,  $15 \times 10^4$ ,  $9.1 \times 10^4$  and  $1.7 \times 10^4$  PIBs/ml for the tested 2<sup>nd</sup>, 3<sup>rd</sup>, 4<sup>th</sup> and 5<sup>th</sup> instars, respectively. In production tests, leaf-bud dipping bioassays were used for larvae infection. Virus yield of PaviNPV progeny polyhedral inclusion bodies (PIBs) was calculated in relation to the inoculum used for larval infection. The mortality rates of the tested PaviNPV concentrations ( $10^4$ - $10^7$  PIB's/ml) against the tested fourth and fifth larval instars showed ascending mortality-concentration dependence. The productivity rate (folds) of PaviNPV in the case of the fourth instar larvae were 137000, 35540, 1471, and 134.8 folds for the tested inoculum concentrations of  $10^4$ ,  $10^5$ ,  $10^6$  and  $10^7$  PIBs/ml, respectively. The addition of fluorescent brightener 28 (Tinopal UNPA-GX) enhanced the mortality rate and the obtained PaviNPV progeny by 188800, 43600, 1333.2 and 177.66 folds for the same inoculum concentrations, respectively. The study suggests using the fourth instar *Palpita vitrealis* larvae with a PaviNPV concentration of  $10^4$  PIB's/ml for in vivo production. [ **Elkady, Y.T., E.A. Agamy and S. El Salamouny** (Egypt), Arab Journal of Plant Protection, 43(2): 178-184, 2025]. <https://doi.org/10.22268/AJPP-001310>

### **Some Physiochemical and Antimicrobial Characteristics of Honeybee from Colonies Fed with Sugar Syrup and Inverted Sugar.**

The present study was performed to determine the impact of feeding honeybee colonies with sugar syrup and inverted sugar on pollen, physiochemical and antimicrobial properties. Raw honeys and bee-processed syrups (sucrose solution or inverted sugar syrup) samples were collected from bee colonies under field conditions in different regions of Egypt. Biological activities were compared between colonies which fed with sugar syrup and inverted sugar. The results obtained clearly showed that the chemical analysis of tested samples indicated that concentration of monosaccharide (fructose and glucose) was the highest in samples from natural honey. In contrast, disaccharide (sucrose) concentration was lowest compared to the samples collected from colonies fed with inverted sugar and sugar syrup. The antibacterial activity of natural honey from the Asyut region was highest against *Staphylococcus aureus* compared to honey obtained from bee colonies fed on sucrose solution and inverted sugar syrup. Only honey samples of colonies which feed with inverted sugar (Qualiubia region), sugar syrup (Arish region) at 100% concentration caused antimicrobial activity against *Staphylococcus aureus*. However, the effect against *Pseudomonas aeruginosa* was observed only with honey sample (100%) harvested from colonies fed with sugar syrup at Arish region. A wide range with highest value of H<sub>2</sub>O<sub>2</sub> (201.30 and 139.72 mg/kg) was observed in natural honey samples and honey obtained from colonies fed on inverted sugar from Arish region. The water contents of honey collected from colonies fed with sugar syrup in Qualiubia and Arish regions, or fed on inverted sugar in Arish reached the highest value. The results obtained also showed that the pollen grains content, H<sub>2</sub>O<sub>2</sub> and antimicrobial activity were reduced in the harvested honey samples of honeybee colonies fed with inverted sugar and sugar syrup in most regions. In contrast, these diets increased the water content and improved biological activity in colonies fed with inverted sugar, compared to that fed on sugar syrup. [Ghania, A.M.M., H.M. Mahfouz, T.E. Abd El-Wahab and A.E. Abd Alla (Egypt), Arab Journal of Plant Protection, 43(2): 194-201, 2025]. <https://doi.org/10.22268/AJPP-001307>

### **Efficiency of Cold Plasma and Microwave Power on Different Stages of *Callosobruchus maculatus*.**

This study investigated the effectiveness of cold plasma (CP) technology and microwave (MW) treatments on various stages of *Callosobruchus maculatus*. Beetle stages were exposed to three voltage levels of CP (150, 200 and 250V) for seven different exposure periods (1-20 minutes) and MW at two power levels (100 and 180W) for seven exposure periods (0.5-10 minutes). The results obtained showed that the effects of CP and MW on the beetle stages were independent of voltage, power level, and exposure time. For CP, mortality rates of *C. maculatus* stages were 51.2, 55.0, 56.9 and 50.5% after 5 minutes of exposure at 150V for adults, eggs, larvae, and pupae, respectively. Complete kill of all stages was achieved after 5 minutes of exposure at 250V. For MW, at 100W power level and 1 minute of exposure, mortality rates were 71.0, 67.7, 75.5 and 56.7% for the above-mentioned stages, respectively. Complete kill of all stages was achieved after 6 minutes of exposure at 180W. The larval stage was the most sensitive to both CP and MW, while the pupal stage was the most tolerant. Additionally, exposure to CP voltages enhanced cowpea seed germination, whereas microwave treatment decreased germination by 24%. CP voltages also reduced the cooking time of cowpea

seeds.[Zinhoum, R.A. and M.E.H. Nasr (Egypt), Arab Journal of Plant Protection, 43(2): 215-219, 2025]. <https://doi.org/10.22268/AJPP-001322>

### **Role of Parasitoids, Entomopathogens and Chemical Compounds in Managing *Liriomyza congesta* Populations in Faba bean Fields.**

Faba bean (*Vicia faba* L.) is an important source of dietary protein in Egypt, consumed as green vegetable, dried and canned seed. This highly nutritious crop is attacked by several insect pests, including the leafminer, *Liriomyza congesta* (Becker) (Diptera: Agromyzidae), which negatively affects the yield. The present investigation was conducted at the experimental farm of Sakha Agricultural Research Station, Kafr El Sheikh Governorate, Egypt during two growing seasons, 2021/2022 and 2022/2023, to monitor population dynamics of *L. congesta* and its larval and pupal parasitoids. In addition, the efficiency of an entomopathogen and some compounds against *L. congesta* larvae were investigated. The population density of *L. congesta* larvae was the highest in March, moderate in January and February, and lowest in December and April. Three hymenopterous parasitoids were recorded; *Diglyphus isaea* (Walker) (Eulophidae), which attacked *L. congesta* larvae with an average of 5.18 and 6.05% parasitism in the two seasons. *L. congesta* larvae exhibited the highest rates of parasitism on January 29<sup>th</sup> (12.40%) and on March 12<sup>th</sup> (17.31%) during the first season and on February 26<sup>th</sup> (17.20%) and March 12<sup>th</sup> (20.90%) during the second season. The pupal parasitoid, *Opius* sp. (Braconidae) was observed with an average of 16.76 and 18.41% parasitism, in the two seasons. The highest parasitism level of *Opius* sp. reached 21.78 and 34.95% on February 12<sup>th</sup> and March 19<sup>th</sup>, respectively, in the first season and 22.78 and 33.95% on February 26<sup>th</sup> and March 12<sup>th</sup>, respectively, during the second season, whereas the parasitoid *Chrysocharis* sp. (Eulophidae) was observed at an average of 15.96 and 16.99% in the two seasons, respectively. The conventional insecticide, abamectin, reduced the larval population of *L. congesta* by 89.85% and was superior to the entomopathogenic fungicides BioMeta (*Metarhizium anisopliae*) and Biossiana (*Beauveria bassiana*), as they produced 50.68 and 42.91% larval population reduction, respectively. The present research emphasized the effectiveness of parasitoids, entomopathogens and plant-derived materials against *L. congesta* as an important safe pest control agent, and their use help to reduce conventional chemical insecticide applications. [Abdel-Aliem, H.I., M.R. Abo Elela and A.B. Abou-Elkassem (Egypt) , Arab Journal of Plant Protection, 43(2): 207-214. 2025]. <https://doi.org/10.22268/AJPP-001309>

## **Iraq**

### **The Efficiency of Predatory Beetle *Cybocephalus rufifrons* Reitt (Coleoptera: Cybocephalidae) on Date Palm Scale *Parlatoria blanchardi* (Targioni-Tozzetti) (Hemiptera: Diaspididae).**

White or armored scale insect *Parlatoria blanchardi* Targ. (Homoptera: Diaspididae) is a destructive pest of date palm plantations in tropical and subtropical regions of the world including Iraq. This study evaluated the efficacy of a predatory beetle *Cybocephalus rufifrons* Reitt. (Coleoptera: Cybocephalidae) which is one of the major natural enemies found in the Iraq and it particularly predate on scale insects including *P. blanchardi*. Predatory efficacy of different life stages and different larval instars of *C. rufifrons* were evaluated by feeding them on the nymphs of *P. blanchardi*.

Results revealed that predatory efficiency of the beetle increased along with the age of its larval instars. This seems due to their larger size, preying agility and enhanced nutritional requirements. The consumption rates of the first, second and third stage larvae continued until the fourth stage, with daily consumption rates of 24.78, 35.28, 66.61 and 141.20 nymphs of scale insects (*P. blanchardi*). The average consumption of nymphs throughout the larval period was recorded as 1296.58 prey nymphs, with a daily average of 264.87 nymphs. A differential and significant consumption rates and daily consumption rates were recorded for the predatory instars and adult sexes. Adult female beetles devoured 128.50 nymphs per day, while male beetles consumed about 107.21 nymphs. The analysis also reveals significant differences between the larval and adult consumption rates in both sexes. Overall study results exhibited the predatory potential of *C. rufifrons* against the nymphs of date palm scale insect *P. blanchardi* and suggest the potential implication of this beetle in future integrated management of date palm scale insect pests, including *P. blanchardi*. [Mustafa Abbas Al-Jbouri\* and Feryal Bahjat Hermize<sup>2</sup> (Iraq), <sup>1</sup>Department of Plant Protection, College of Agriculture Engineering Science, University of Baghdad, Baghdad, Iraq; <sup>2</sup>Department of Entomology, College of Agriculture Engineering Science, University of Baghdad, Baghdad, Iraq. Sarhad Journal of Agriculture, Volume 41, Issue 2, Page 875, June 2025]. <https://dx.doi.org/10.17582/journal.sja/2025/41.2.875.880>

### **The Field Evaluation of *Chrysoperla carnea* and The Biocidal Oxymatrine for Controlling of *Tuta absoluta* in Open Tomato Fields in Wasit Governorate.**

The results showed the possibility of using the green lacewing in the control of this insect. The results showed that the field was free of infection for 5 weeks after the first release of the predator individuals, where the percentage of infection reached zero in the field and began to appear after the seventh week. While the injury was zero when two releases were fired until the eleventh week, it started to appear after that. The field was empty from injury until the end of the season after 17 weeks. The results also showed the effect of the release of the aphid lion and the number of its releases on the density of the population of the pest in the field, as it was morally high, especially after the seventh week of the launch of the aphids lion when the aphids lion was launched once and twice compared to when the aphids lion was launched three times. While the biopesticide Oxymatrine, it reduced the infection to 3% in the fruits after 8 days of the spraying of biopesticide from 20% one day before the spraying of biopesticide compared with controlled treatment when the infection reached 35% after 8 days of the spraying of biopesticide from 20% one day before the spraying of biopesticide and the effectiveness of the pesticide increased from 36% one day after the spraying of biopesticide to 91% after 8 days of the spraying of biopesticide, While the number of live individuals in the leaves decreased to zero after 8 days of spraying of biopesticide compared to the number of live individuals in the leaves in the comparison spraying of biopesticide, which increased to 30 live individuals. The effectiveness of the pesticide in killing live larvae in the leaves increased from 33% after one day of spraying biopesticide to 100% after 8 days of spraying biopesticide. [Amer J. A. Al-Gerrawy and Ahmed J. M. AL-Shammary (Iraq), Plant Protection Dept., College of Agriculture, University of Wasit, Integrated Pest Control Dept., Agricultural Research Centre, Authority of Scientific Research, Ministry of Higher Education & Scientific Research, Dijlah J. Agric. Sci., 2(2):93-102, 2025].

### **Use of Castor and Garlic Oils to Control the Red Flour Beetle, *Tribolium castanum*.**

This study investigated the repellency effect and killing efficiency of castor and garlic oils to control adults and larvae of the red flour beetle, *Tribolium castanum*. The results obtained showed a significant repellency effect of plant oils on the insect adults with a higher repelling effect of garlic oil, which reached 100%, 20 minutes after treatment with 30% concentration, as compared to 100% for castor oil, 30 minutes after treatment at the same concentration. The results obtained also indicated the superiority of garlic oil's effect on larval mortality (first, second, and last instars), which reached 86.6, 90.0 and 73.3%, 5 days after treatment with 30% concentration, for the different larval stages, respectively. Furthermore, the highest mortality rate of insect adults (76.7%) was also reached when garlic oil was used at a concentration of 30%, 5 days after treatment, followed by castor oil (66.7%) at the same concentration and period after treatment. [Al Hamadani, A.H.A., L.A. Atshan and M.K. Ibrahim (Iraq), Arab Journal of Plant Protection, 43(2): 202-206, 2025]. <https://doi.org/10.22268/AJPP-001316>

### **Demographic Parameters of *Chrysoperla carnea* on the Sublethal Concentration of Endosulfan: Two-Sex Life Table.**

This study aims to investigate the sublethal effects ( $LC_{30}$ ) of endosulfan on *Chrysoperla carnea* adults as an efficient natural enemy against the flour moth *Ephestia kuehniella* Zell (Lepidoptera: Pyralidae) under laboratory conditions: ( $25\pm 2^\circ\text{C}$  temperature, relative humidity of  $60\pm 5\%$  relative humidity, and 16:8 hours (light: dark) photoperiod), in a growth chamber. The results obtained showed a significant decrease in the  $LC_{30}$  concentration of Endosulfan during the biological life span of both sexes (male and female) of *C. carnea* compared to the control. The highest fecundity rate obtained for endosulfan treatment was 203.28 offspring/female compared to 316.31 offspring/female for the control treatment. The net reproduction rate ( $R_0$ ) of females treated with endosulfan was 140.18 offspring/individual/generation and was significantly lower than that of the control-treated females (253.04 offspring/individual/generation). The mean time of one generation (T) varied from 43.12 days in the control treatment to 38.70 days in the  $LC_{30}$  endosulfan treatment. Results obtained showed that the use of a sub-lethal concentration of endosulfan affects some biological parameters of the green lacewing predator *C. carnea*, which is useful information to consider when designing IPM programs for the flour moth. [Alsendi, A., S. Al-Zurfi, S.K. Hamad, A.A. Mohammed, A.A. Kareem and M. Shahid. (Iraq), Arab Journal of Plant Protection, 43(2): 171-177, 2025]. <https://doi.org/10.22268/AJPP-001312>

### **The Effect of the Host Species on the Parasitism of the Aphid Parasitoid *Aphidius matricariae*.**

Samples for this study were collected from some fields infested with the green peach aphid, *Myzus persicae* and the black aphid, *Aphis fabae* in the Shirqat region, Saladin Governorate, Iraq, during the period 10/1/2022-1/8/2023. The study aimed to test the effect of the insect host species on the efficiency of the aphid parasitoid *Aphidius matricariae* (Hymenoptera: Aphidiidae) rearing. Three aphid species hosts for the parasitoid were tested: the green peach aphid, *Myzus persicae*, the watermelon aphid, *Aphis gossypii*, and the black bean aphid, *Aphis fabae*. The study was carried

out under laboratory conditions, and the parasite was obtained from cultivated fields in the Shirqat region, Saladin Governorate, Iraq. The identification of aphids was based on the taxonomic keys provided by the Natural History Museum, University of Baghdad. The insect host preference and the vitality and efficiency of the parasite *A. matricariae* were assessed. Laboratory results showed that the highest rate of parasitism were on the green peach aphid, which gave the highest percentage of mummies (47.00%), and the highest rate of adult emergence, three weeks after the beginning of parasitism, was 53.33%, which qualifies the green peach aphid to be the selected host for mass rearing of the parasitoid and subsequent release in the farmers' fields. [Al Hadi, F.M. and M.S. Mansor (Iraq), Arab Journal of Plant Protection, 43(2): 235-240, 2025]. <https://doi.org/10.22268/AJPP-001303>

### **The Role of Calcium in Enhancing Bread Wheat, *Triticum aestivum* L. Tolerance to Salinity Stress and its Effect on Improving Growth Indicators and Seedling Growth.**

This study was conducted to assess the role of calcium in increasing wheat tolerance to salt stress. Wheat seeds were soaked in calcium chloride solution at concentrations of 0, 50 and 100 mg/L. Following this treatment, seeds were exposed to sodium chloride solution at concentrations of 0, 50 and 100 mg/L. The study examined several growth parameters, including seedling vigor, seed vigor, plumule length, radicle length, and the fresh and dry weight of plumules and radicles. Results obtained indicated a decline in seedling vigor, seed vigor, plumule length, radicle length, and the fresh and dry weights of plumule and radicle when wheat seeds were treated with sodium chloride at concentrations of 50 and 100 mg/L. Conversely, treating wheat seeds with calcium at concentrations of 50 and 100 mg/L led to a significant increase in plumule and radicle length. However, calcium treatment at these concentrations resulted in a significant decrease in seedling vigor index, as well as the fresh and dry weights of the radicle. Furthermore, the study showed variation in all studied characteristics except for the germination rate, primarily due to the interaction between sodium and calcium at the specified concentrations.[ Shkir, W.M., N.S. Ibrahim and A.A. Ghلام. (Iraq), Arab Journal of Plant Protection, 43(2): 247-256, 2025]. <https://doi.org/10.22268/AJPP-001321>

### **The Effect of Early Control of Weeds Associated with the Maize Crop Using Herbicides.**

A field experiment was conducted at Diyala Governorate, Iraq, during the 2022 fall season, in clay soil. This study aimed to determine the best pesticide and the most appropriate concentration to control weeds associated with the maize crop in the field. The results obtained showed that the herbicides Atrazine and Guardian were suitable control products. When the herbicide atrazine was used at a concentration of 4 L/ha, the number of grains/ear and total yield reached 532.83/ear and 9.90 ton/ha, respectively. Whereas at the concentration of 2 L/ha, the 1000-grain weight reached 260.41 g. The use of guradian herbicide significantly increased the ear length and reached 21.41cm. Best results were obtained when both herbicides were combined in one treatment. [El-Abassy, A.A.A.K. (Iraq), Arab Journal of Plant Protection, 43(2): 220-225, 2025]. <https://doi.org/10.22268/AJPP-001314>

## Molecular and Physiological Characterization of *Fusarium oxysporum ciceri* Isolates from Different Chickpea Areas in Kurdistan, Iraq.

Thirty-seven different *F. oxysporum ciceri* isolates were isolated from 55 chickpea fields at Sulaimani and Halabja governorates during 2021. Fourteen Foc isolates were pathogenic and displayed various morphological traits. The ideal temperature for Foc ranged 25-30°C. PDA was the best medium for the fungal growth. The isolates showed a variety of growth patterns, including appressed, flat/velvet, fluffy to partially fluffy, and cottony. However, Foc-28 displays nerve-type mycelium growth on PDA at 25°C. Microconidia (6.1-8.7x2.9-4.98 µm), macroconidia (10.0-20.1x2.7-5.2µm), chlamydospores (7.2-15.0 x 6.8-10.7 µm), and colony diameter on PDA all significantly differed among the isolates. Significant differences in the virulence of 14 Foc isolates were detected on 10 chickpea wilt differentials. The isolates were classified into two groups and ten physiological races accordingly. Each isolate's genomic DNA was amplified by the ITS primers to a maximum size of 400bp, producing a single band for each accession. The basic local alignment search tool (BLAST) analysis supported the morphological identification, whereby the closest match was 99 -100% in the NCBI GenBank database. The accession numbers for the sequences were registered at the NCBI GenBank under different codes. The phylogenetic tree proposed two major clades with stains distributed across the dendrogram irrespective of their geographic status [Emad Mahmood Al-Maarroof and Kazhal Hassan Rahim (Iraq), Biotechnology and crop science dept., College of Agricultural Engineering Sciences, University of Sulaimani, IKR, Iraq. Iraqi Journal of Agricultural Sciences -:56(2): 890-904, 2025].

## Iran

### *In vitro* Anti-acetylcholinesterase Evaluation and Molecular Docking Modelling of Some $\alpha$ -Aminophosphonate Derivatives.

The overuse of organophosphorus insecticides has resulted in the rise of pest resistance to these chemicals, thus making it necessary to develop new insecticides for global agriculture. In this investigation, we examined the anti-acetylcholinesterase (AChE) activity of certain  $\alpha$ -aminophosphonate derivatives via both *in vitro* experiments and molecular docking modelling. The tested compounds demonstrated notable efficacy against the *Drosophila melanogaster* AChE enzyme. The compound Diethyl (2,4-dichlorophenyl) (2,4-dichlorophenylamino) methylphosphonate (M2), which contained two Cl- substituents on each ring, exhibited a significant concentration-dependent inhibition of the enzyme with an LC<sub>50</sub> of 220 µg/ml. Additionally, at concentrations of 500 and 1000 µg/ml, Diethyl (2,4-dichlorophenyl) (2-hydroxyphenylamino) methylphosphonate (M4) reduced the enzyme activity by 45.7 and 84.6%, respectively. Moreover, the four molecules displayed *in silico* affinity towards *Dm*-AChE as observed in the experimental assay. Notably, M2 demonstrated the highest affinity towards the enzyme, with two oxygen atoms in the molecule forming hydrogen bonds with SER-238 and HIS-480. The estimated free binding energy and inhibition constant for M2 were determined to be -10.04 kcal/mol and  $K_i = 43.83$  nM, respectively. In addition, M4 exhibited an affinity of -9.36 kcal/mol and  $K_i = 137.7$  nM. Further studies on the formulation and efficacy of these  $\alpha$ -aminophosphonate derivatives are needed to serve as novel high-performance pesticides. [Abbod, M., N. Safaie, K. Gholivand and M. Mehrabadi (Iran), Arab Journal of Plant Protection, 43(2): 263-267, 2025]. <https://doi.org/10.22268/AJPP-001305>

## Lebanon

### Genetic Diversity and Mating Type Distribution of *Ascochyta rabiei* Populations Affecting Chickpea.

Chickpea *Ascochyta* blight, caused by *Ascochyta rabiei*, is the most important disease of chickpea in many countries. Understanding the genetic diversity of the pathogen is crucial for identifying resistance sources to virulent populations in national and international chickpea breeding programs. Moreover, knowledge of the existence of mating types can help to fine-tune *Ascochyta* blight management practices. Eight simple sequence repeats (SSR) markers were used to estimate the genetic diversity of 96 isolates collected from four countries (Uzbekistan, Syria, Lebanon, and Türkiye). A total of 29 bands were recorded, of which 26 were polymorphic. The study showed that the isolates were genetically diverse and isolates from Uzbekistan showed the highest diversity. Following phylogenetic analysis, the isolates were clustered into four groups and isolates from Uzbekistan were distributed in all groups. The two mating types were found in the four countries and no significant deviation from a 1:1 ratio for the Türkiye and Uzbekistan isolates. [Bassem Attar<sup>1</sup>, Seid Aahmed<sup>2</sup>, Makdas Kayim<sup>3</sup>, Alaa Hamwiah<sup>4</sup>, Elia Choueiri<sup>5</sup>, Heind Ghannam<sup>6</sup>, Abed Alkader Alabdullah<sup>7</sup>. <sup>1</sup>School of Natural and Environmental Sciences, Newcastle University, United Kingdom; <sup>2</sup>International Center for Agricultural Research in The Dry Areas (ICARDA), Rabat, Morocco; <sup>3</sup>Department of Plant Protection, Faculty of Agriculture, University of Çukurova, Adana, Türkiye; <sup>4</sup>ICARDA, Cairo, Egypt; <sup>5</sup>Department of Plant Protection, Lebanese Agricultural Research Institute, Tal Amara, Lebanon; <sup>6</sup>Department of Plant Food Legumes Research, Agricultural Research Center, Cairo, Egypt; <sup>7</sup>The John Innes Centre, Norwich Research Park, Norwich, United Kingdom. Arab Journal of Plant Protection, 43(2): 185-193, 2025]. <https://doi.org/10.22268/AJPP-001313>

## Libya

### A Study on the Biology of the Globular Mealybug, *Pollinia pollini* Costa on Olive Trees, *Olea europaea* L. and its Geographical Distribution in the Western Region of Libya.

This study was carried out during 2022 in an olive field at the Agricultural Research Centre Research Station, Tripoli, Libya, to investigate the biology and ecology of the globular mealybug *Pollinia pollini* (Costa) (Hemiptera: Asterolecanidae), an economic insect pest of olive trees in Libya. Samples were collected from 20 trees every two weeks. In addition, this study aimed to investigate the geographical distribution of the insect in olive growing areas in the western region of Libya, and monitor the population dynamics of *P. pollini* nymphs and adults during the year, and the number of generations/year. The study showed that the insect is widespread in the regions of Tripoli, Raqdalín, Zaltan, Zuwara, Sorman, Al-Zawiya, Al-Qarbouli, Souq, Al-Ahad, Tarhuna, Masalata, Al-Khoms, Gharyan and Al-Asabaa, while it was not recorded in the regions of Al-Qalaa, Dhaher Al-Jabal, Yafran, Al-Rayina, Al-Rojban and Jadu. The highest density of nymphs was recorded in September, with 960 nymphs/20 samples, whereas the lowest density was recorded in January, with 186 nymphs/20 samples. The highest density of the adult insect was recorded in February with 933 insects/20 samples, whereas the lowest density was in May with 164 adults/20 samples. The study showed that the insect has two generations in 2022, and it was most active in

the spring and summer. The results obtained showed that temperature and relative humidity had an effect on insect activity, and the correlation was positive for nymphs and negative for adults, reaching values of 0.544 and -0.762, respectively [Abukraa, H.E., S. El-Tayeb Sharlala, A.O. Al-Shammam, S.K. Al-Saghir and M.M. Al-Zantouti. (Libya), Arab Journal of Plant Protection, 43(2): 150-154, 2025]. <https://doi.org/10.22268/AJPP-001320>

## Syria

### **Study of the Biological Characteristics of *Bacillus amyloliquefaciens* subsp. *plantarum* 71 in NOVO TECH 888 and its Effect on *Fusarium* Wilt in Strawberry Plants *in vitro*.**

The biological characteristics of *Bacillus amyloliquefaciens* subsp. *plantarum* 71, obtained from the commercial product NOVO TECH 888 (Atomes, Canada), were studied. Morphological and biochemical identification revealed that the bacterium is rod-shaped, Gram-positive, motile, catalase-positive, urease-producing, spore-forming, and facultatively aerobic. It is capable of degrading starch, gelatin, and pectin, and is tolerant to salt concentrations ranging from 2-10% NaCl. The bacterium proliferates actively within a temperature range of 25°C to 50°C, with an optimal growth temperature of 35°C, indicating its thermophilic nature. It can grow across a broad pH range (pH 4, 7, and 10), demonstrating its adaptability to diverse environmental conditions. The bacterial cell concentration in 1 mL of the commercial product was determined to be  $5.32 \times 10^9$  CFU. The bacterium retained its viability in the commercial product for three years without any significant decrease in its activity. Additionally, it was confirmed that the bacterium was unaffected by copper in the form of copper sulfate pentahydrate ( $\text{Cu}_2\text{SO}_4 \cdot 5\text{H}_2\text{O}$ ) or copper hydroxide, nor by sulfur under controlled laboratory conditions. The efficacy of this bacterium in controlling the vascular wilt fungus *Fusarium oxysporum* f. sp. *fragariae*, isolated from strawberry plants, was also evaluated. The bacterium inhibited fungal mycelial growth on nutrient agar plates and induced morphological deformities in the fungal mycelium. These results indicate the promising potential of *B. amyloliquefaciens* as a biocontrol agent for *Fusarium* wilt disease in strawberries, making it a viable option for use in organic agriculture. [Reem Aboud AlKhilif (Syria), National Commission for Biotechnology, Middle East; Wa'el Almatni, Atomes S.A.L., Regional Office & Scientific Bureau of Atomes F.D., Dubai, United Arab Emirates; and Johnny Nehme, Atomes F.D. Inc., Quebec, Canada; Journal of Agricultural Science; Published by Canadian Centre of Science and Education, Vol. 17, No. 5: 1-15, 2025]. [DOI:10.5539/jas.v17n5p27](https://doi.org/10.5539/jas.v17n5p27)

### **The Spread of Dead-Arm Disease on Grapevine Caused by *Phomopsis viticola* in Southern Syria and its Correlation with the Prevailing Climatic Conditions.**

This study was conducted in the vineyards of southern Syria (Sweida Governorate), with the objective to estimate the spread of the dead-arm disease on the grapevine, its incidence and its relationship to the prevailing climatic conditions. 130 samples were collected during three seasons (2020, 2021 and 2022) from vines that showed visible symptoms of infection, in various grapevine growth stages, to be examined in the laboratory, and to isolate the pathogen. The results obtained showed the presence of the fungus *Phomopsis viticola*, which causes dead-arm disease on grapevine in 70%

of the examined samples. The disease prevalence in the vineyards was in the range of 2–30 %, depending on the different sites surveyed, whereas the disease incidence in the studied vineyards ranged between 10 and 70%. Disease severity ranged between 1 and 3 based on a 0–3 scale. There was a positive correlation between the altitude above sea level and rainfall on one hand, and disease incidence and severity on the other hand, especially at the beginning of the spring season during bud-growth and after flowering. A negative correlation was obtained between temperature and disease incidence and severity, as the disease was not observed in areas with an altitude of less than 1200 m. Accordingly, the disease incidence varied among the three seasons, as the highest incidence was recorded during the 2020 season, with an average rainfall exceeding 600 mm during the spring season, and an average temperature of 18.1 °C. To the best of our knowledge, this is the first record of dead-arm disease on the grapevine in Syria. [El-Halabi, S., W. Naffaa and B. Mozhir (Syria), Arab Journal of Plant Protection, 43(2): 155-163, 2025]. <https://doi.org/10.22268/AJPP-001319>

### **Effect of Adding Selenium to the Malt-Yeast-Agar Medium on the Mycelium Growth of the Mother Culture of *Agaricus bisporus*.**

This study was carried out at Set-markho facility, Latakia, Syria, for the production of agricultural mushroom (*Agaricus bisporus*) during the period 2022-2023, to study the effect of adding selenium to the growth medium on the mycelium growth of the mother culture ( $G_0$ ). The experiment included five treatments as follows: control, adding selenium at four concentrations of 1, 0.1, 0.01 and 0.001 mg/L to the malt-yeast-agar medium. Results obtained showed that all selenium treatments were superior to the control at the beginning of mycelium growth. In contrast, two selenium concentrations (0.001 and 0.01 mg/L) treatments were significantly superior to the control and the rest of selenium treatments, in terms of the average fungal colony diameter, which reached 75.2 and 62.2 mm, respectively. The time required to complete mycelium growth on the culture medium was 23 days for each treatment, and the average growth rate recorded was 3.27 and 2.7 mm/day, respectively. In addition, the average growth coefficient was 22.88 and 18.93 mm<sup>2</sup>/day, respectively. Accordingly, the agricultural mushroom *Agaricus bisporus* was classified as a slow-growing fungus. [Zidan, R., J. Motawaj, H. Mando and S. Ibrahim (Syria), Arab Journal of Plant Protection, 43(2): 257-262. 2025]. <https://doi.org/10.22268/AJPP-001311>

### **Efficiency of Compost Supplemented with Beneficial Microorganisms in the Biological Control of Tomato Crown and Root Rot in Protected Agriculture.**

The study aimed to evaluate the role of compost supplemented with beneficial microorganisms and biological agents in reducing infection with the pathogenic fungus *Fusarium oxysporum* f. sp. *radicis-lycopersici* (FORL), which causes Fusarium crown and root rot disease of tomatoes. Antibiotic agents were added individually and in combination to compost treatments. The results obtained showed that adding to the olive compost the isolate T-zh-9 of *Trichoderma viride* alone led to significant disease control compared to other treatments. The fresh shoot weight reached 33.2 g/ plant and the plant height 75.8 cm, in addition to a high level of peroxidase enzyme activity of 1.57 and 1.04 μmol/mg, 15 and 30 days after infection with the pathogenic fungus, respectively. Adding the isolate FZB27 of *Bacillus subtilis* alone

to the compost led to a reduction in the severity of infection with the pathogenic fungus FORL in plants treated with olive compost, reaching 13.9% compared to the control treatment (soil contaminated with pathogenic fungi, 58.3%). Adding the two antibiotic isolates together to olive compost achieved the best results in reducing the severity of infection with the pathogenic fungus FORL and increasing the level of peroxidase and polyphenol oxidase activity. [Abou Shaar, M., Q. El-Rhaya and N. Mahmoud (Syria), Arab Journal of Plant Protection, 43(2): 226-234, 2025]. <https://doi.org/10.22268/AJPP-001318>

## Saudia arabia

### Effect of Soil Types and Moisture Contents on The Pupation Behavior and Adult Emergence of Oriental Fruit Fly, *Bactrocera dorsalis* (Hendel) (Diptera: Tephritidae)

The oriental fruit fly, *Bactrocera dorsalis* is a major pest that poses a significant threat to various fruits and vegetables. Laboratory experiments were conducted to investigate the effect of soil type, depth, and moisture content on the emergence rate and survival of *B. dorsalis*. The results from the first trial indicated that the maximum number of pupae (47.32%) was recorded from loamy sand at a depth of 2 cm, while the minimum number of pupae (5.9%) was found at a depth of 5 cm. In sandy clay soil, the maximum number of pupae (46.66%) was recovered at a depth of 2 cm, while the minimum (1.33%) was at a depth of 6 cm. In gravel, the maximum number of pupae (40.66%) was recovered at a depth of 2 cm and the minimum pupae (2.00%) were recovered at a depth of 6 cm. In the second experiment, the maximum adult emergence (88.8%) was observed in dry soil with a 0% moisture level, while the minimum (68.88%) was noted at a 30% moisture level. The maximum life span (40 days) of the *B. dorsalis* was observed at 0% moisture level, while the minimum adult longevity (36.33 days) was noted at 30% moisture level. This study suggests that soil depth of at least 6 cm with moist conditions is effective for the management of *B. dorsalis* during the pupal stage. [Muhammad Bilal, Muhammad Mamoon-ur-Rashid, Shabana Wazir, Muhammad Naeem, Asif Ishaq, Rana Muhammad Kaleem Ulla and Abdulrahman Saad Aldawood (Saudi Arabia). Int J Trop Insect Sci 45, 699-709,2025]. <https://doi.org/10.1007/s42690-025-01461-3>

## Tunisia

### Geographical Distribution of *Fusarium* Species Involved in Fusarium Head Blight and Fusarium Crown Rot of Wheat in Tunisia and Their Mycotoxin Accumulation.

Fusarium crown rot (FCR) and Fusarium head blight (FHB) are among the most destructive diseases of wheat worldwide. A broad range of *Fusarium* species is associated with both diseases and can be isolated from stems and kernels of wheat plants. *Fusarium culmorum* and *F. graminearum* are the most frequent species involved, and both can produce the harmful mycotoxin deoxynivalenol (DON) that inhibits protein synthesis. This study aimed to assess the distribution of both *Fusarium* species and DON accumulation in crowns and kernels in geographic areas where wheat is cultivated in Tunisia. Sixty-four fields from four bioclimatic zones were sampled during two crop seasons (2020/2021, 2021/2022). Based on morphological traits, a subset of 250 representative *Fusarium* strains was identified by *elongation factor 1 $\alpha$*  gene sequencing. DON contamination in wheat samples was determined

by HPLC/DAD. Chemical analyses showed that DON contamination in crowns ranged from around 0.1 to 17 mg kg<sup>-1</sup>, while in kernels it was detected at a very low level (up to 2.4 mg kg<sup>-1</sup>). *F. culmorum* was the species frequently isolated from both crown and kernel samples. However, several *Fusarium* species, belonging to eight different phylogenetic species complexes, were isolated, showing a greater diversity in the crown than in the kernels. We report here for the first time the occurrence of *F. anthophilum*, *F. nygamai*, *F. algeriense*, *F. redolens* and *F. brachygibbosum* in Tunisian wheat. Moreover, this study provides important information on the toxicological risk related to DON contamination of wheat in Tunisia. [**Guermech S., Somma S., Masiello M., Haidukowski M., Sanzani S. M., Ippolito A., Moretti A., Samia Gargouri**, Plant Pathology, 74:1290–1301, 2025]. <https://doi.org/10.1111/ppa.14092>

## Yemen

### **Seasonal Fluctuation of Red Palm Weevil, *Rhynchophorus ferrugineus* in Wadi Hadramout, Yemen.**

The use of the pheromone traps to collect the red palm weevil showed the presence of all different stages of the insect throughout the year, suggesting that it has more than one generation per year. The peak of the insect's activity in the four districts was in mid-March, where the total insects caught was 2351 (males and females). The insect population then decreased with an increase in temperature until it reached its minimum in mid-July. The sex ratio (females: males) was 2:1. Infestation severity with the red palm weevil increased as we moved west. In addition, it was found that infestation with the date palm borer was associated with the weevil activity in Wadi Hadramout. [**Basahih, J.S., Y.R. Basyoud and M.A. El-Zubayri (Yemen)**, Arab Journal of Plant Protection, 43(2): 146-149. 2025]. <https://doi.org/10.22268/AJPP-001315>

### Ecological and Biological Studies of the Peach Fruit Fly *Bactrocera Zonata* (Diptera: Tephritidae) Province and Evaluation of Some Integrated Control Methods Against it in Karbala

The peach fruit fly, *Bactrocera zonata* is an important pest that infests different fruit trees in Iraq and causes significant economic losses. This research was conducted in Karbala Governorate during the 2023-2024 season. It aims to know the effect of some plant extracts, which include neem leaf extract, peppermint extract, geranium extract, and *Bacillus subtilis* bacteria, on the different insect roles, in addition to the effect of the chemical sterilizer colchicine on the dynamics of the insect population. The results of the laboratory study showed that there was a significant effect of the three plant extracts (geranium, neem, and peppermint) on the adult stage, as the highest insect repellent rate at a concentration of 70000 ppm reached 83.3% for the geranium leaf extract treatment. The lowest repellent rate was 60% for the neem leaf extract treatment. The results of the effect of the chemical sterilizer colchicine on the dynamics of the insect population showed that there was an effect on the survival rate of adults and the strength where the survival rate of adults reached 3 days at a concentration of 100 ppm, while the lowest survival rate reached 25 days at 2 ppm. The number of eggs produced reached zero eggs at concentrations 100, 50 and 20 ppm, while the average number of eggs produced reached 57.40 eggs/female at a concentration of 2 ppm. The results of the indications of the effect of the chemical sterilizer colchicine on the age specific life tables of the age groups also showed that the chemosterilant affected the net replacement rate, as the net replacement rate reached zero individuals/female at concentrations 100, 50 and 20 ppm, while the lowest net replacement rate reached 38.69 Individuals/female. The results also indicated that *B. subtilis* had an effect on the third larval stages under laboratory conditions, with the highest effect on the first larval stage reaching 59%. The bacteria also affected the number of eggs produced and the survival rate, as the survival rate of adults decreased from 55.40 days to 34.60 days. The average number of eggs produced decreased from 176 eggs/female in the control treatment to 114.60 eggs/female, while the hatching rate of eggs treated with *B. subtilis* decreased to 64% compared to 92% in the control treatment. The results of the seasonal presence of the insect also indicated that the insect infested many fruit trees in Iraq, starting from the loquat fruit and ending with the last fruit to ripen in the season, which is the Sour orange fruit. The highest insect infestation rate was found on the apricot fruits, with an infestation rate of 33.40%. The least preferred host for this insect was the palm tree, with an infestation rate of 8.36%. This was the first record of infestations on dates by *B. zonata* worldwide. The results of constructing and analysing the field time-specific life table for the 2023-2024 season showed that many different key factors were recorded that affect the different roles of the peach fruit fly. The results showed that the parasitic factor had a great impact on the different roles of the insect; the value of the key factor( KF) was 0.025 due to the effect of the parasitic mite *Proctolaelaps scolyti*. This is the first record of this parasitic mite on the peach fruit fly worldwide. The predator *Euborellia annulipes* also showed a clear effect on the larval stage. While the results indicated that there was an effect of each of the chemical sterilizer colchicine and the bacteria *B. subtilis*, in addition



to the integration of each of the chemical sterilizer with the bacteria and the neem leaf extract (soil treatment) on the number of larvae inside the fruits at a rate of (6.25, 9 and 5) larvae/fruit compared to the control treatment, which reached the number of larvae in its infected fruits of 12.75 larvae/fruit after 5 weeks of treatment. The fruit bagging treatment protected the fruit from infestation by the insect, 100% peach fruit fly. [Karrar Abd-Alzahra Mahdi Al Abbas (Iraq), University of Kufa, College of Agriculture, Department of Plant Protection, Supervisor: Prof. Dr. Akram Ali Mohammad (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 (PPNs) represent a critical challenge to global agriculture, responsible for annual yield losses valued at up to \$215 billion. As the global population grows and food demand increases, ensuring sustainable crop production and protecting plant health has never been more critical. Current management strategies for PPNs rely heavily on chemical nematicides. However, these compounds often exhibit high toxicity, negatively affect beneficial soil organisms, and are increasingly subject to strict regulatory limitations. As a result, there is a growing demand for safer, environmentally friendly alternatives that align with integrated pest management (IPM) practices.



This PhD research, titled (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*)), focuses on evaluating the biocontrol potential of four endophytic and nematode-antagonistic fungi (*Ijuhya vitellina*, *Niesslia gamsii*, *Polydomus karssenii*, and strain JKI72728) against three economically significant PPN species (*Heterodera filipjevi*, *Heterodera schachtii*, and *Pratylenchus thornei*) in wheat and sugar beet systems. Beyond their antagonistic effects on nematodes, the study also explores the endophytic colonization behavior of these fungi under both nematode stress and non-stressed conditions. The investigation included *in vitro* experiments to evaluate nematode egg parasitism, suppression of nematode reproduction, and fungal impact on nematode penetration. *In planta* experiments assessed how fungal inoculation influences plant morphological, morphometric, and agronomic traits under both nematode-infected and uninfected conditions. The findings revealed that the four fungal strains exhibited varying degrees of success in reducing PPN infection and enhancing plant performance. Most notably, this is the first report demonstrating that a dark septate endophyte, *Polydomus karssenii*, can delay and suppress the root penetration of a migratory endoparasitic nematode (*Pratylenchus thornei*) *in planta*. The overall results provide promising evidence for the use of these fungi as effective, sustainable biological control agents and highlight their potential integration and use in future integrated pest management strategies aimed at improving crop resilience and productivity, particularly in wheat and sugar beet cultivation. [Osameh Salahdin Atiya (Jordan-USA), University Niğde Ömer Halisdemir Üniversitesi, (Doctorate, 2025)].

## The Toxigenic Fungi Contaminating Wheat in Tunisia and the Development of Biological Control Tests

Durum wheat (*Triticum turgidum* L. var. *Durum* Desf.) is one of the most important cereal crops worldwide and plays a crucial role in Tunisian agricultural systems. However, this cereal faces major threats, notably fungal diseases caused by pathogens of the *Fusarium* genus. Among these, *Fusarium* head blight (FHB) and *Fusarium* crown rot (FCR) stand out for their considerable impact on crop yield, grain quality and stubble quality. These diseases not only cause production losses, but also the accumulation of mycotoxins, toxic secondary metabolites to human and animal health, thus compromising the marketability of crops. The geographical distribution of *Fusarium* species is influenced by climate, temperature, and humidity, affecting their prevalence, pathogenicity, and mycotoxin production. Climate change may alter these dynamics, highlighting the need for in-depth studies on their regional diversity and crop interactions. **The first** objective of this thesis was to study the geographical distribution of *Fusarium* species responsible for (FHB) and (FCR) of wheat in Tunisia, as well as their ability to produce mycotoxins. Focusing on the country's main cereal-growing areas, this research made it possible to map the presence of the various species and relate their toxigenic profile to local agro-ecological conditions (Chapter II). **Secondly**, the impact of infection by *Fusarium culmorum*, one of the main agents responsible for these diseases, was analyzed on nine commercial wheat varieties commonly grown in Tunisia.



Trials in inoculated and non-inoculated plots were used to measure various agronomic parameters, the incidence and severity of these diseases, mycotoxin accumulation in stems and grains, and fungal contamination of tissues. Analysis of the correlations between disease severity and these parameters provided a better understanding of the effects of this pathogen on crop production and quality, as well as crop residues (Chapter III). **Finally**, this study also aimed to valorize *Trichoderma* strains isolated from different Tunisian cereal-growing regions for their potential as biological control agents against *Fusarium culmorum* and as biostimulant on wheat plants. Sampling was carried out across several regions for identification and characterization. The antagonistic activity was evaluated *in vitro* through dual culture and volatile compound assays, while biostimulant effects were assessed on wheat growth parameters, including a seed coating trial to test their impact under both normal and pathogen-stress conditions. (Chapter IV). In conclusion, this thesis provides valuable insights into the dynamics of *Fusarium*-induced diseases affecting wheat crops in Tunisia.

It also explores innovative solutions, such as the use of biocontrol agents, to mitigate these diseases and promote more sustainable agricultural practices in response to the current environmental challenges. [**Salma Guermech (Tunis)**, Plant Protection Laboratory, National Institute of Agricultural Research of Tunisia, Carthage University, Faculty of Sciences of Tunis, University of Tunis El Manar, Tunisia, supervised by Pr. Samia Gargouri, Plant Protection Laboratory, National Institute of Agricultural Research of Tunisia, Carthage University and Pr. Antonio Ippolito, University of Bari Aldo Moro, Department of Soil, Plant and Food Sciences, Italy. Defence at the University of Bari Aldo Moro, Italy. (Doctorate, 2025)].

## Using Some Fungi and Plant Extracts to Control Leafhopper *Amrasca biguttula* (Pseudococcidae: Cicadellidae) on Some Eggplant Varieties

This study was conducted during the 2023/2024 agricultural season in the laboratories of the Department of Plant Protection and the Agricultural Research Station, College of Agriculture - University of Basrah, to evaluate the effectiveness of some biological control agents against the leafhopper *Amrasca biguttula*, in addition to testing the susceptibility of



some eggplant cultivars to infestation. The study included a laboratory part in which spore suspensions of the fungi *Beauveria bassiana* and *Trichoderma harzianum* were used, as well as their fungal filtrates, and plant extracts from neem leaves (*Azadirachta indica*) and castor leaves and seeds (*Ricinus communis*) using hexane solvent. The results showed no significant differences in kill percentages between the two fungi on adult insects, as the highest kill rate was 83.5% at the  $10^8$  concentration after 72 hours. Regarding the fungal filtrates, the filtrate of *B. bassiana* achieved the highest effectiveness with a kill rate of 64.7% at full concentration, while the rate decreased to 17.7% using 75% concentration after 24 hours. The plant extracts showed high and stable effectiveness against adults and nymphs, as the 1% and 0.5% concentrations of the extracts of neem leaves, castor leaves, and castor seeds achieved a consistent kill rate of 90% over the periods (24, 48, 72 hours).

A qualitative chemical analysis was also conducted to detect the active secondary compounds in the extracts. Neem leaves, castor leaves, and seeds were found to contain phenols, saponins, resins, and tannins, while alkaloids and coumarins were absent in castor seeds. All parts of the plants had a similar pH value of 5. In field experiments, neem leaf extract stood out among the single treatments with the highest effectiveness, reaching 96.6% on the first day, with an average effectiveness of 80.8%. *B. bassiana* recorded an average kill of 76.6%, while *T. harzianum* recorded 76.8%. Castor leaf extract was the least effective (66.8%). When using combinations of fungi and plant extracts, the mixture of *T. harzianum* with neem extract outperformed the others, recording the highest effectiveness with an average of 79.4%, followed by the combination of *B. bassiana* with neem extract (78.1%). In contrast, the chemical pesticide Sivanto recorded the highest effectiveness at 100% on day 21, while the control treatment (water only) recorded a low kill percentage of 3.64%. A field experiment was also conducted to evaluate the susceptibility of four eggplant cultivars (Barcelona, Nasr, Jawaher, Capto) to infestation by *Amrasca biguttula*. The results showed that the Barcelona cultivar was the most susceptible, recording the highest number of infestations by adults and nymphs, while the Capto cultivar was the most resistant. Regarding the biochemical traits associated with resistance, the results showed variation in the cultivars' content of chlorophyll, carotenoids, carbohydrates, proteins, and phenols. A positive correlation was observed between infestation and both chlorophyll and protein content, and a negative correlation between infestation and both carotenoid and phenolic content. These relationships indicate the role of the cultivars' secondary metabolic content in determining their susceptibility to infestation. The study demonstrates the importance of using fungi and plant extracts as effective and safe alternatives to chemical pesticides in controlling *A. biguttula*, with the potential to incorporate them into Integrated Pest Management (IPM) programs. Additionally, selecting resistant cultivars represents an important environmental approach to reducing infestation levels. [Fayroz Turkey Lafta(Iraq), Department of Plant Protection, College of Agriculture, Basra, Iraq. Supervised by Prof. Dr Aqeel Alyousuf and Hayat Mohammed Ridhe Mahdi (Master, 2025)].

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

## FAO and NEPPO Collaborate to Advance Phytosanitary Standards in the NENA Region

15/07/2025, Rabat



The Food and Agriculture Organization of the United Nations (FAO), through its Regional Office for the Near East and North Africa (FAO-RNE), actively participated in the Regional Training Workshop on International Standards for Phytosanitary Measures (ISPMs), held in Rabat, Morocco, on 14–15 July 2025. The workshop was organized by the Near East Plant Protection Organization (NEPPO), and in cooperation with the FAO-RNE and the FAO Subregional Office for North Africa (FAO-SNE).

The event brought together national plant protection officials, regional experts, and key stakeholders from across the Near East and North Africa (NENA) region. Its primary objective was to strengthen technical capacities for the implementation of international phytosanitary standards, which are critical tools for safeguarding plant health, facilitating safe trade, and ensuring food security.

Representing FAO, Dr. Thaer Yaseen, Regional Plant Protection Officer, delivered opening remarks. He emphasized the growing importance of plant health in the face of expanding global trade, climate change, and the increasing threat of transboundary pests and diseases. Dr. Yaseen highlighted ISPMs as essential instruments for protecting agricultural production, preserving biodiversity, and promoting fair and science-based international trade.

The workshop's comprehensive agenda included:

- » A review of the outcomes of the 19th session of the Commission on Phytosanitary Measures (CPM)
- » Discussions on draft ISPMs, including commodity-specific standards
- » Development of regional standards for certification systems for propagation materials of citrus, olives, and dates

- » Practical training on the Online Comment System (OCS), a digital platform that enables countries to submit structured technical feedback on draft standards, ensuring transparency and inclusive participation in global standard-setting processes.

“Capacity-building workshops like this one are essential for empowering national plant protection organizations to actively participate in shaping international standards that reflect our region’s unique circumstances and priorities, said Dr. Yaseen. “FAO remains committed to supporting member countries in strengthening phytosanitary systems, which are fundamental for achieving sustainable agricultural development and food security.”

This workshop also served as a preparatory step for the 2025 IPPC Regional Workshop, scheduled to take place in Salalah, Oman, from September 8 to 11, 2025. The upcoming event will further deepen technical discussions, promote regional collaboration, and align the contributions of member countries with international phytosanitary discussions. Through its active engagement, FAO reaffirms its commitment to technical excellence, regional cooperation, and the promotion of safe, sustainable agricultural trade across the Near East and North Africa.

<https://www.fao.org/neareast/news/details/fao-and-neppo-collaborate-to-advance-phytosanitary-standards-in-the-nena-region/en>

## NEPPO Delegation Visits FAO Morocco Office to Strengthen Regional Cooperation in Plant Protection

15/07/2025, Rabat

A high-level delegation from the Near East Plant Protection Organization (NEPPO) has conducted its first official visit to the Food and Agriculture Organization (FAO) Representation in Morocco, marking a key milestone in advancing regional collaboration on plant health and protection across the Near East and North Africa (NENA) region.

The NEPPO delegation was led by Dr. Mohamed Alkuriji, Chairman of NEPPO’s Executive Council, and Dr.



Mohamed El Habib Ben Jamaa, Executive Director of NEPPO. They were accompanied by Dr. Thaer Yaseen, Regional Plant Protection Officer at the FAO Regional Office for the Near East and North Africa (FAO-RNE), and Dr. Mohamed El Hadi Sidatt, Regional Plant Protection Officer at FAO’s Subregional Office for North Africa (FAO-SNE). The delegation was warmly received by Mr. Alexandre Huynh, FAO Representative in Morocco, who welcomed the visit as a valuable opportunity to reinforce regional solidarity and technical collaboration in plant protection.

The visit reflects the joint commitment of FAO and NEPPO to enhance regional coordination, foster technical cooperation, and promote sustainable plant protection

strategies to safeguard agricultural productivity and food security across the region.

Discussions during the meeting focused on NEPPO's mandate, ongoing programmes, and regional initiatives in collaboration with FAO aimed at safeguarding plant health, facilitating safe trade, and addressing emerging threats posed by plant pests and diseases. FAO and NEPPO explored avenues for technical cooperation, capacity building, and joint activities to support sustainable agriculture and food security in Morocco and across the broader region.

The visit underscored the shared vision of FAO and NEPPO in fostering regional cooperation and harmonized efforts in plant protection, contributing significantly to achieving the Sustainable Development Goals (SDGs). The visit took place on the sidelines of the regional training workshop on International Standards for Phytosanitary Measures, held in Rabat on 14-15 July 2025. The workshop was part of the cooperation program between NEPPO, the FAO RNE, and the FAO SNE. It brought together experts from across the region to exchange experiences, discuss the implementation of international standards, and strengthen national and regional phytosanitary measures.

It is worth noting that a successful prior collaboration has been established between the FAO Representation in Morocco, FAO-RNE, FAO-SNE, the IPPC, ONSSA, and NEPPO in organizing the IPPC Regional Workshop for the Near East and North Africa region, held in Rabat in August 2024. This workshop provided a valuable platform for capacity building, regional knowledge exchange, and discussions on international standards designed to safeguard plant health and facilitate safe trade. <https://www.fao.org/neareast/news/details/neppo-delegation-visits-fao-morocco-office-to-strengthen-regional-cooperation-in-plant-protection/en>

## Oman and FAO Sign Host Country Agreement to Establish Permanent Representation in Muscat

28/06/2025- Sultanate of Oman

**Rome** - The Sultanate of Oman and the Food and Agriculture Organization of the United Nations (FAO) have formalized a groundbreaking partnership with the signing of a Host Country Agreement to establish permanent FAO representation in Oman, marking a new chapter in regional food security cooperation. As part of the Food and Agriculture Organization of the United Nations (FAO)'s commitment to strengthening its strategic partnerships with



countries in the Gulf region, and in light of the growing cooperation with the Sultanate of Oman, H.E. Dr. Saud bin Hamoud Al Habsi, Minister of Agricultural, Fisheries and Water Resources (MAFWR), and H.E. Dr. Qu Dongyu, Director-General of the Food and Agriculture Organization (FAO), signed the Host Country Agreement to establish FAO Representation in the Sultanate of Oman. The signing took place at FAO headquarters in Rome, in the presence of senior officials from both sides.

This agreement comes in a landmark year as FAO celebrates its 80th anniversary, adding symbolic significance to the event and reaffirming the Sultanate of Oman's commitment to supporting global efforts to achieve food security and sustainable development. The partnership also strengthens Oman's emerging role as a regional hub for food security and sustainable agriculture initiatives across the Gulf region.

### **Strategic Partnership Deepens Cooperation**

The agreement marks a significant step forward in the cooperation between the Sultanate of Oman and FAO. It enhances Oman's presence in international forums related to food and climate, and facilitates broader technical and knowledge-based collaboration, as well as the implementation of joint programmes and projects in agriculture, fisheries, and natural resources.



The permanent FAO representation will enable enhanced coordination on climate-smart agriculture initiatives, sustainable fisheries management, and water resource optimization - areas critical to Oman's economic diversification goals under Vision 2040. The office will also facilitate knowledge transfer and capacity building programs tailored to the region's unique environmental challenges.

On this occasion, H.E. Dr. Saud bin Hamoud bin Ahmed Al Habsi, Minister of Agricultural, Fisheries and Water Resources, stated: "The signing of the Host Country Agreement to establish a FAO Representation in the Sultanate of Oman reinforces the vital role played by the Organization regionally and globally in shaping public policies related to agriculture, livestock, food security, food safety, rural development, and natural resource management. This agreement represents a key milestone in our cooperation with FAO and reflects the Sultanate's commitment to Oman Vision 2040, which prioritizes building a diversified and sustainable economy based on knowledge and innovation. Through this partnership, we aim to attract more projects and maximize the benefits of FAO's expertise, particularly in implementing national programmes and strategies and facilitating coordination across the sectors under the Ministry's mandate."

For his part, H.E. Dr. Thaer Yaseen, Head of the FAO Mission in the Sultanate of Oman, said: "The signing of this Host Country Agreement is a strategic step that strengthens FAO's ability to support member countries in building more efficient, inclusive, resilient, and sustainable agrifood systems. It aligns with FAO's Four Betters - Better Production, Better Nutrition, a Better Environment, and a Better Life - leaving no one behind. It also contributes to accelerating progress toward the Sustainable Development Goals.

We are confident that the establishment of a permanent FAO Representation in the Sultanate will deepen our partnership, expand technical cooperation, and enhance knowledge exchange at both national and regional levels."

### **Building on a Decade of Success**

The agreement builds upon more than a decade of successful collaboration. Since 2012, FAO

has been implementing projects across Oman's agricultural and fisheries sectors, focusing on sustainable development and climate resilience. The partnership has demonstrated exceptional momentum, with the project portfolio expanding by 83% between 2022 and 2024 through collaborations spanning government institutions, academic centers, and private sector partners. This remarkable growth reflects increasing mutual trust and an expanding scope of cooperation in sustainable agriculture, climate resilience, and rural development.

### **Regional Impact and Future Outlook**

This partnership positions Oman as a strategic partner in FAO's regional efforts to transform agrifood systems across the Gulf. The agreement reflects both organizations' commitment to innovation-driven solutions that address food security challenges while promoting environmental sustainability and rural development.

The permanent FAO representation will contribute to accelerating progress toward multiple Sustainable Development Goals, particularly those related to zero hunger, climate action, and sustainable use of terrestrial ecosystems. The office will also enhance coordination with other UN agencies operating in Oman, creating synergies for comprehensive development approaches.

The establishment of this representation underscores the Sultanate's growing influence in international development cooperation and its commitment to being a catalyst for positive change in the region's approach to food security and sustainable agriculture.

<https://www.fao.org/neareast/news/details/oman-and-fao-sign-host-country-agreement-to-establish-permanent-representation-in-muscat/en>

### **FAO Director-General and Jordanian Minister of Agriculture Discuss Deepening Partnership, Tackling Regional Challenges, and Advancing Agricultural Innovation**

4/6/2025, Amman-Jordan



Dr. QU Dongyu, Director-General of the Food and Agriculture Organization of the United Nations (FAO), met today with His Excellency Eng. Khaled Hneifat, Minister of Agriculture in Jordan. The high-level meeting, held during the Director-General's visit, underscored

the growing partnership between FAO and Jordan and focused on collaborative strategies to address pressing agricultural issues, including water scarcity and climate change, alongside exploring avenues for regional cooperation and technological advancement.

**Director-General QU Dongyu commended the Hashemite Kingdom of Jordan**, under the visionary leadership of His **Majesty King Abdullah II**, for its significant strides in agricultural development and its proactive stance in confronting regional challenges. He expressed FAO's firm commitment to supporting Jordan in overcoming obstacles such as water scarcity and the impacts of climate change, and praised the nation's dedication to sustainable agricultural practices.

**Dr. QU stressed on FAO's Strategic Framework 2022-31** and its alignment with Jordan's national goals. He emphasized the transformative potential of Artificial Intelligence (AI) and other advanced technologies in modernizing the agricultural sector, enhancing productivity, and ensuring food security.

**H.E Minister Hneifat warmly welcomed Director-General QU** and lauded the expanding collaboration with FAO. He highlighted Jordan's ongoing efforts to enhance its agricultural resilience and productivity, acknowledging the critical support provided by FAO. The Minister specifically pointed to the importance of initiatives such as the establishment of demonstration farms, which serve as hubs for innovation and best-practice dissemination among



Jordanian farmers. The discussions also covered the pressing issue of rehabilitating the agriculture sector in Syria, with both parties exploring ways Jordan, with FAO's support, could contribute to these efforts, thereby bolstering regional food security. They agreed on the importance of a coordinated approach to support farmers and rebuild resilient agrifood systems.

Furthermore, Director-General QU Dongyu and Minister Hneifat reviewed the progress of joint projects and identified key areas for future collaboration. These include scaling up the use of AI and digital technology in agriculture, strengthening water management systems, and empowering local communities to adapt to climate change. They reaffirmed their shared vision for a dynamic and sustainable agricultural sector in Jordan.

The meeting concluded with a renewed commitment to strengthen the fruitful partnership, with Director-General QU Dongyu reiterating FAO's readiness to provide continued technical expertise and support to Jordan. Both parties agreed to enhance joint efforts to achieve common goals in food security, sustainable agriculture, and rural development, reflecting the strong ties and shared vision between FAO and the Kingdom.

<https://www.fao.org/jordan/news/detail/fao-director-general-and-jordanian-minister-of-agriculture-discuss-deepening-partnership--tackling-regional-challenges--and-advancing-agricultural-innovation/en>

12/05/2025- Bari, Italy



### **Director-General QU Dongyu Marks International Day of Plant Health at NENA Conference**

Cooperation at all levels, together with effective funding, is critical in the fight against [transboundary pests and diseases](#) (TPPDs), which each year destroy up to 40 percent of the world’s crops, Food and Agriculture Organization of the United Nations (FAO) Director-General QU Dongyu noted today as he marked the [International Day of Plant Health](#).

Qu was invited to address government ministers from the Near East and North Africa (the NENA region) gathered for a conference in the southern Italian city of Bari. The May 12-13 conference, which aims to rally support for the NENA Plant Health Strategy, was hosted by the International Centre for Advanced Mediterranean Agronomic Studies (CIHEAM), a Mediterranean intergovernmental organization established in 1962. CIHEAM, together with FAO and the Near East Plant Protection Organization (NEPPO), have developed a comprehensive Regional Strategy to address all concerns related to the TPPDs, focusing on strengthening coordination among member countries, improving pest management approaches, and capacity-building. Plant protection is not only about safeguarding crops, “it is fundamental to preserving biodiversity, which is fundamental for food diversity and ensuring the right to food for all,” the FAO Director-General said, adding that “the right to food is a basic human right.”

The high-level attendance at the conference sent a clear message that plant health is critical for food security and nutrition, sustainable development, and resilience across the NENA region, and globally.

Migratory pests such as locusts and armyworms pose a significant threat to food security, trade, and livelihoods. It is estimated that up to 40 percent of global crop production is lost to plant pests and diseases each year, causing economic damage of more than USD 220 billion annually.

Such losses are particularly severe in the Near East and North Africa region, which is already vulnerable to the impacts of conflict and the climate crisis.

[Algeria, Libya, Tunisia and other areas of Northwest Africa, for instance, are currently experiencing an invasion of desert locusts](#) originating from the Sahel. A single swarm can cover several hundred square kilometres, with a single square kilometre of swarm containing up to 80 million adults. These pests can consume the same amount of food in one day as 35,000 people.

Since TPPDs know no borders, move fast and overpower national capacities, “no country can address these challenges alone,” Qu said. This is why “regional, and global, solidarity and cooperation are essential, partnerships are fundamental, and funding is critical,” he said.

### **FAO’s work on TPPDs**

FAO promotes sustainable and ecological approaches to prevent and control the potential impact of TPPDs through continuous monitoring, early warning, and the promotion of innovative and environmentally friendly preventive control strategies.

Healthy plants are a cornerstone of FAO’s [One Health](#) approach, which recognizes that the health of people, animals, plants, and the environment are deeply interconnected.

They are also central to FAO’s [Four Betters](#) (Better Production, Better Nutrition, a Better Environment, and a Better Life- leaving no one behind), an organizing principle for the Organization’s work and the foundation of its [Strategic Framework 2022-31](#).

More on this topic [Transboundary Pests and Diseases One Health](#)

<https://www.fao.org/newsroom/detail/cooperation-at-all-levels-and-funding--critical--for-plant-health-and-food-security--fao-says/en>

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

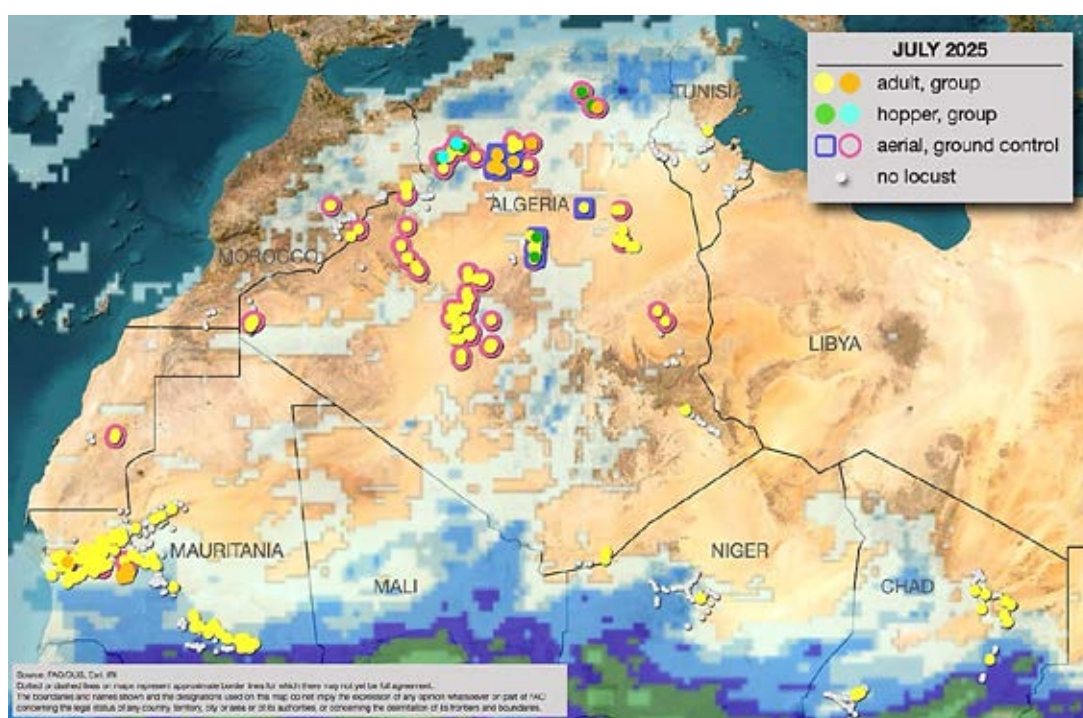


### Desert Locust Situation

## 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 isolated and scattered adults were reported, while Tunisia had very few isolated adults remaining. 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.

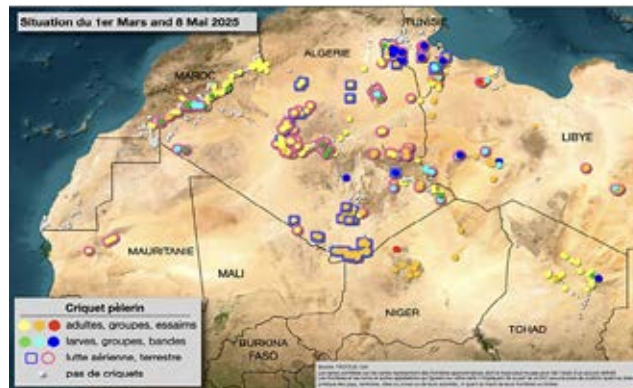


### 2. Regional Workshop Strengthens Locust Preparedness in the Western Region

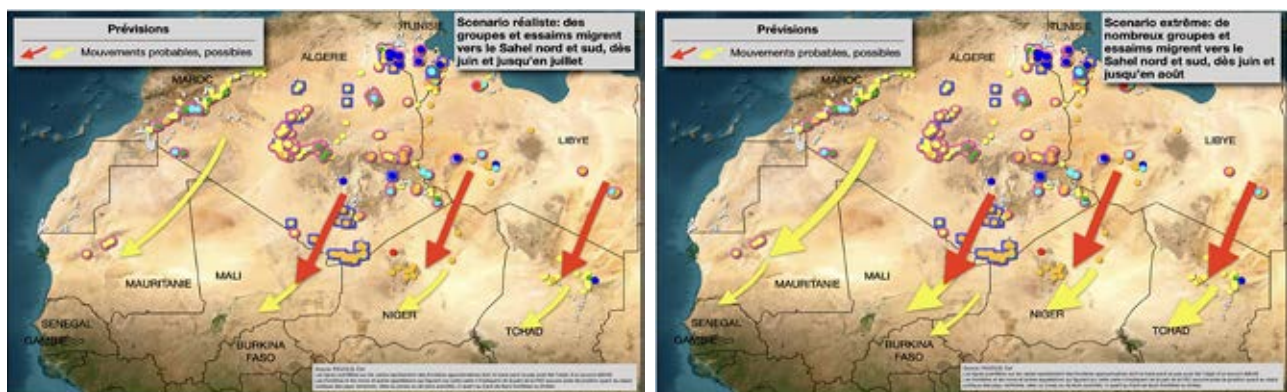
In response to the rising desert locust threat, the Commission for Controlling the Desert Locust in the Western Region (CLCPRO), organized a regional workshop in Tunis, Tunisia, from 21 to 23 May 2025. The workshop brought together representatives from the 11 CLCPRO Member Countries, senior FAO officials, 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.

#### **PR-41-M-Türkiye (CLIMARES) Case Study: Advancing Climate-Resilient Wheat in WANA Through Collective Germplasm Selection**

Under the Umbrella of the **TREATY SBP initiative**, the International Soil-Borne Pathogens (SBPs) Workshop (17–20 June, 2025) represented an unprecedented political and scientific breakthrough for West Asian and North African wheat security. Organized under the TREATY project (CLIMARES: *Improving Food Security in West Asia and North Africa by Identifying and Promoting Climate-Resilient Wheat Varieties Resistant to Soil-Borne Pathogens*), the workshop took place across three pivotal Turkish agricultural hubs—Ankara, Eskişehir, and Konya. This landmark gathering was the first time ever that brought together nearly 60 experts from across CWANA (Central and West Asia and North Africa) and policy-makers from CWANA’s national programs, national agricultural institutions (TAGEM), CGIAR centers (CIMMYT, ICARDA), genebanks, industry stakeholders, plant pathologists, nematologists,

agronomists, cereal quality specialists, industry players, and academics, that united in a single, high-level platform. It sent a clear message: only coordinated, politically backed action can safeguard regional food systems against escalating threats driven by climate change.

This workshop was not only a forum for knowledge exchange but also a hands-on learning opportunity that empowered participants with practical skills. One of the workshop's core strengths was a targeted training course that focused on how to effectively select bread-wheat lines within breeding programs for resistance to SBPs. This included an in-depth exploration of *Fusarium* crown rot (FCR), cereal cyst nematodes (CCN), and root lesion nematodes (RLN), the most persistent and yield-limiting soil-borne threats to wheat production in the region. In Eskişehir, genebank accessions were directly linked to field trials, highlighting the vital role of genetic repositories in breeding pipelines. Parallel TREATY SBP activities were simultaneously conducted in Morocco, Syria, Iran, Algeria, Lebanon, and Tunisia, demonstrating the project's deep political buy-in and its capacity to harmonize protocols across borders. Participants engaged in field visits, laboratory demonstrations, and data interpretation sessions that deepened their understanding of pathogen behavior under different climatic and edaphic conditions.

Participants have carried out joint germplasm evaluation and selection programs both at Eskişehir (Transitional Zone Agricultural Research Institute, TZARI) and Konya (Bahri Dagdas International Agricultural Research Institute, BDIARI). A rigorous selection process was completed: 1,500 bread and durum wheat germplasm lines were screened, culminating in the rigorous selection and evaluation of 312 elite lines (dedicated to the TREATY project) with superior resilience and agronomic traits. Agronomic scores for overall germplasm performance, including both yield and resistance to diseases, were carried out using a 1-5 scale where 1, 2 are poor, 3 is good, 4 is very good, and 5 is excellent. There were outstanding genotypes at both locations. The selected germplasm reflects broad adaptation and resistance to critical pathogens (FCR, CCN, and RLN) evaluated under drought conditions, with BDIARI being the main drought centre in Türkiye. These highly performing genotypes will be shared with all participating national programs to be tested in their respective agroecologies for adaptation and registration, duplicated in the genebanks, released, and adopted by the farmers. Similar joint germplasm evaluation and selection will be carried out in the selected platforms in the coming years.

A key takeaway from the workshop was the pivotal role of multi-disease and multi-environment trials in identifying resilient wheat lines. Data presented and discussed during the sessions highlighted that several advanced lines consistently performed at the top under varying environmental conditions and disease pressures. This reinforced the importance of integrating disease screening with broader agronomic evaluations to fast-track the development and deployment of climate-resilient varieties.

Beyond its scientific contributions, the TREATY SBP workshop catalyzed a new level of political and institutional alignment. Through roundtable discussions and strategic planning, the event solidified shared protocols, data frameworks, and a common roadmap to confront region-wide wheat vulnerabilities. It served as a politically symbolic gathering—a message of unity and purpose from the WANA region in the face of climate change, rising disease pressure, and food insecurity. With strong commitments to collaborative breeding, resource sharing, and joint evaluation platforms, the TREATY SBP project continues to be a central model of regional resilience and scientific diplomacy, a model of how collective action can reshape the future of agriculture under the dual threat of disease and climate change.



**Picture 1.** Official Gathering photo of TREATY International Soil Borne Pathogens workshop participants with the director of the Transitional Zone Agricultural Research Institute (TZARI) <https://arastirma.tarimorman.gov.tr/gktaem/Sayfalar/EN/Anasayfa.aspx> in Eskisehir, Türkiye.



**Picture 2.** The participants of the TREATY International Soil Borne Pathogens Workshop observing the extent of root diseases and selecting elite bread-wheat lines during the field visit at the TZARI in Eskisehir, Türkiye.



**Picture 3.** Official Gathering photo of the TREATY International Soil Borne Pathogens workshop participants with the deputy director general of the General Directorate of Agricultural Research and Policies (TAGEM) at the [Bahri Dagdas International Agricultural Research Institute](#) (BDIARI), Konya, Türkiye.



**Picture 4.** Dr. Amer Dababat explained to the participants of the International SBP Workshop the extent of the root diseases infesting bread-wheat lines during field visits.



**Picture 5.** Dr. Degu, Wuletaw Tadesse, explained to the participants of the International SBP Workshop which criteria breeders used to select the best wheat germplasm during field visits.



**Picture 6.** The participants of the TREATY International Soil Borne Pathogens Workshop observing the extent of root diseases selected elite bread-wheat lines during field visits at the [Bahri Dagdas International Agricultural Research Institute](#), Konya, Türkiye.



**Picture 7.** The TREATY International Soil Borne Pathogens workshop participants during the ceremonial closure of the workshop in Konya, Türkiye.

## The 14th Arab Congress of Plant Protection, Algiers, November 3-7, 2025



The Arab Society for Plant Protection, in collaboration with the Local Organizing Committee of the 14th Arab Congress of Plant Protection (ACPP 2025), is honored to invite all professionals in the field of plant protection in the Arab region and abroad. This includes academics, researchers, students from various universities, and individuals working in research centres.

We encourage you to attend the 14th ACPP 2025, which will be held in Algiers from November 3 to 7, 2025. This year's congress theme is «Plant Health for Sustainable Food Security». You are kindly invited to visit the congress website for more information <https://acpp-aspp.com>.

Registration is made by filling out the online registration form or by downloading the form, filling it out and sending it to the congress secretariat: [info@acpp-aspp.com](mailto:info@acpp-aspp.com).

### Important Dates:

**Deadline for registration 30 :September2025**

You can also follow all the news related to the conference (Hotel reservation, request for partial support to attend the conference) through the congress website.

For any inquiries, please contact the congress secretariat via [info@acpp-aspp.com](mailto:info@acpp-aspp.com)

**WhatsApp: 00213 78 41 43 115**

### Registration fees

Participation type	Participants from Algeria (Algerian Dinars)	Participants from outside Algeria (Algerian dinars)
Regular (with or without abstract)	equivalent to 100 US Dollars	equivalent to 200 US Dollars
Graduate students	equivalent to 50 US Dollars	equivalent to 100 US Dollars
Accompanying persons	equivalent to 50 US Dollars	equivalent to 100 US Dollars

The current exchange rate is 1 US Dollar = 135 Algerian Dinars.

More information about special programs for accompanying persons and the agricultural tourist trip will be announced later in the third announcement of the congress in August.

## 14<sup>th</sup> Arab Congress of Plant Protection 3-7 November 2025, Algeria: Invited Speakers

Monday, 3 November 2025	
Keynote address in the opening session	
The role of plant protection in achieving food security in the Arab region.	Dr. Thaer Yaseen, FAO/RNE, Cairo, Egypt. Email: <a href="mailto:thaer.yaseen@fao.org">thaer.yaseen@fao.org</a>
Symposium one: Use of artificial intelligence and other innovations in optimizing pest management	
1. Use of decision-making tools to enhance implementation of integrated pest management.	Dr. Vittorio Rossi, Department of Sustainable Crop Production, University Cattolica del Sacro Cuore, Italy. Email: <a href="mailto:Vittorio.rossi@unicatt.it">Vittorio.rossi@unicatt.it</a>
2. Advances in using high-throughput sequencing (HTS) technology to detect plant pathogens and its adoption in implementing agricultural quarantine regulations.	Dr. Maher Al-Rwahnih, University of California at Davis, USA. Email: <a href="mailto:malrwahnih@ucdavis.edu">malrwahnih@ucdavis.edu</a>
3. A novel approach to combat plant pathogens: genome editing of rice for enhancing resistance to <i>Xanthomonas oryzae</i> .	Dr. Boris Szurek, IRD, FRANCE. Email: <a href="mailto:boris.szurek@ird.fr">boris.szurek@ird.fr</a>
4. Use of remote sensing for crop diseases surveillance.	Dr. Gerald Blasch, CIMMYT, Mexico. Email: <a href="mailto:g.blasch@cgiar.org">g.blasch@cgiar.org</a>
5. Use of biotechnology in plant protection.	Dr. Lakhdar Khelifi, National Higher School of Agriculture, Algiers, Algeria. Email: <a href="mailto:lakhdar.khelifi@edu.ensa.dz">lakhdar.khelifi@edu.ensa.dz</a>
Tuesday, 4 November 2025	
Symposium Two: Innovations to improve pest management and enhance plant health under Climate change conditions	
1. Plant breeding to improve host resistance to pests under climate change conditions.	Dr Diego Rubiales, Institute for Sustainable Agriculture, Spanish National Research Council, Cordoba, Spain. Email: <a href="mailto:diego.rubiales@ias.csic.es">diego.rubiales@ias.csic.es</a>
2. Effects of climate change on plant health: Are beneficial microbes and their metabolites a possible solution?	Dr. Francesco Vinale, University of Naples Federico II, Italy. Email: <a href="mailto:frvinal@unina.it">frvinal@unina.it</a>
3. How can we maintain crops productivity under climate change and soil salinization?	Dr. Stanely Lutts, Catholic University of Louvain (UCL-Louvain-la-Neuve), Belgium. Email: <a href="mailto:stanley.lutts@uclouvain.be">stanley.lutts@uclouvain.be</a>
4. Endophytic fungi: a hidden treasure towards plant pathogens management in a changing environment.	Dr. Ahmed M. Abdel-Azeem, Suez Canal University, Ismailia, Egypt. Email: <a href="mailto:Ahmed_abdelazeem@science.suez.edu.eg">Ahmed_abdelazeem@science.suez.edu.eg</a>
5. The use of allelochemicals in enhancing soil and plant health.	Dr. Narwal Shamsher, India. Email: <a href="mailto:Allelopathy2017@gmail.com">Allelopathy2017@gmail.com</a> , <a href="mailto:Narwals2017@gmail.com">Narwals2017@gmail.com</a>
Thursday, 6 November 2025	
Symposium Three: Invasive and newly emerging pests in the Arab region and means to reduce their negative effect on food security	
1. Addressing emerging plant pests is crucial for safeguarding fruit tree crops in the Arab countries.	Dr. Khaled Djelouah, CIHEAM- Mediterranean Agronomic Institute of Bari, Italy. Email: <a href="mailto:djelouah@iamb.it">djelouah@iamb.it</a>
2. Importance of risk assessment of introduction and establishment of emerging pests in the Mediterranean basin.	Dr. Juan A. Navas-Cortes, High Council for Scientific Research, Cordoba, Spain. Email: <a href="mailto:J.navas@CSIC.es">J.navas@CSIC.es</a>
3. Management of North Africa-Middle East (NAFME) cryptic whitefly haplotypes to mitigate begomovirus spread in the Arab region.	Dr. Muhammad Shahid, College of Agricultural and Marine Sciences, Sultan Qaboos University, Oman. Email: <a href="mailto:mshahid@squ.edu.om">mshahid@squ.edu.om</a>
4. Date palm invasive and newly emerging pests in the Arab countries and measures to reduce their negative impacts on date production.	Dr. Ibrahim Jboory, Faculty of Agriculture, University of Baghdad, Iraq. Email: <a href="mailto:ijboory@gmail.com">ijboory@gmail.com</a>
Friday, 7 November 2025	
Symposium Four: Plant health and agricultural quarantine in the Arab region and means of improving monitoring of quarantine pests.	
1. The role of CGIAR Germplasm Health Units in enhancing the germplasm phytosanitary safety and mitigation of transboundary pest spread.	Dr. Lava Kumar, IITA, Ibadan, Nigeria. Email: <a href="mailto:L.Kumar@cgiar.org">L.Kumar@cgiar.org</a>
2. The importance of phytosanitary measures in mitigating the spread of transboundary plant pests in the NENA region.	Dr. Thaer Yaseen, FAO/RNE, Cairo, Egypt. Email: <a href="mailto:thaer.yaseen@fao.org">thaer.yaseen@fao.org</a>
3. Challenges and opportunities for improving quarantine pest surveillance: Is there a way to predict and avoid rare events?	Dr. Claude Bragard, Catholic University of Louvain, Belgium. Email: <a href="mailto:claud.bragard@uclouvain.be">claud.bragard@uclouvain.be</a>
4. Working together for clean plants: The national clean plant network example for an Arab regional network to support agricultural quarantine and develop plant disease control programs.	Dr. Maher Al-Rwahnih, University of California at Davis, USA. Email: <a href="mailto:malrwahnih@ucdavis.edu">malrwahnih@ucdavis.edu</a>

## Participation of Dr Asma NAJAR to the Regional Consultation Meeting EUPHRESKO III. Bari-Italy, 11 July 2025

On the sidelines of the MPU (Mediterranean Phytopathological Union) Congress organized in Italy between 6<sup>th</sup> and 11<sup>th</sup> July 2025, Dr A. NAJAR who is the focal point of EUPHRESKO III in Tunisia, has presented the results of the EUPHRESKO survey on the Tunisian Priorities of Plant Health Research. Data analysis showed that:

- » **Main priorities for insects:** *Rhynchophorus ferrugineus* 50%, *Dactylopius opuntiae* 20%, *Dactylopius coccus*, *Ceratitis capitata* 15% and **for pathogens:** *Xylella fastidiosa* 36%, *Citrus tristeza virus* 22% followed by *Erwinia amylovora*, and *Black spot*
- » **Plant health research topics are:** Pest/Disease Management and alternatives to pesticides, Impact of Climate change on the plant pathogens, Surveillance, early detection, risk prevention and management of invasive/emerging pests, diseases, Diagnostics and Epidemiology, Crop improvement and Establishing stricter phytosanitary regulations and certification for seed exchanges.
- » **Capacity Building needs are:** Training, financial resources, facilities, and equipment are among the most critically needed components for effective capacity building. Communication and collaboration with social science specialists are essential for transferring research results to farmers

## MPU 2025 International Congress Concludes Successfully in Bari, Italy

### Bari, Italy - July 10, 2025

The 17th International Congress of the Mediterranean Phytopathological Union (MPU 2025) successfully concluded its sessions in Bari, Italy, held from July 6 to 10, 2025, under the theme **“New Phytopathology Frontiers of Research and Education for Plant Health and Food Safety.”**

The Congress brought together more than 200 participants from over 30 countries, including experts from Europe, North Africa, the USA, the Near East, and beyond, reflecting the growing global importance of plant health and food safety. For five days, the scientific program featured more than 100 presentations and sessions, covering a wide range of timely topics such as:

- » The genetic diversity, diagnostics, and management of *Xylella fastidiosa* in the Euro-Mediterranean region
- » Plant viruses and phytoplasma diseases under climate change
- » Innovations in diagnostics, including artificial intelligence and high-throughput sequencing (HTS)
- » Biological control strategies and integrated pest management (IPM)
- » Policy developments and coordinated action under the EU and international frameworks

The MPU congress scientific program included an oral presentation session organized by ASPP and entitled “Major diseases that affect economic crops in the Arab and Mediterranean countries”

The closing ceremony included awards for the best poster presentations and the announcement of the winner of the Euphresco III Plant Health Video Contest.

MPU 2025 reaffirmed its role as a vital platform for advancing phytopathological science and cooperation across the Mediterranean and globally.

**Management of Major Viral and Fungal Diseases Affecting Temperate Food Legume Crops in the Arab and Mediterranean Countries**

The production, productivity and quality of temperate food legumes (faba bean, Kabuli chickpea, lentil, and field pea) are affected by several viral and fungal diseases in the Arab and Mediterranean countries. Surveys conducted over the past three decades have shown that the most important diseases affecting food legumes are wilt/root rot disease complex caused by *Fusarium* spp., *Rhizoctonia* and *Pythium* spp., and foliar diseases. In a few countries, parasitic nematodes (*Heterodera* and *Pratylenchus* spp.), and *Ascochyta* blights (*Didymella* spp.) are the major diseases of chickpea, faba bean and lentil, whereas faba bean suffers from chocolate spot (*Botrytis fabae*) and rust (*Uromyces viciae-fabae*). Viruses are emerging production constraints of food legumes where Faba bean necrotic yellows virus (FBNYV), Chickpea chlorotic stunt virus (CpCSV), Beet western yellows virus (BWYV), Bean yellow mosaic virus (BYMV), and Pea seed-borne mosaic virus (PSbMV) are the major ones. These viruses are affecting food legumes individually or as mixed infections. The importance of food legume viruses is mainly associated with an increase in aphid activity due to changes in climate and cropping systems in the regions.

A positive linear correlation has been observed between virus prevalence and aphids that can transmit these viruses. The main aphid species in legume fields were *Acyrtosiphon pisum* (Harris), *Aphis craccivora* Koch. and *Aphis fabae* Scopoli. In addition, several wild species (annual or perennial) were found infected with these viruses and may play an important role in the spread of these viruses. In recent years, virus epidemics have been reported in some Arab countries (such as Egypt, Tunisia, Syria, and Jordan), sometimes causing considerable yield reduction. Significant progress has been made in managing fungal diseases by integrating two or more management options, such as development resistant varieties, production of healthy seeds, adjusting planting dates, seed treatments, selective use of fungicide sprays, and cultural practices that reduce the impact on food legume productivity and quality.

Over the past two decades, faba bean genotypes resistant to FBNYV and BLRV, chickpea genotypes resistant to CpCSV and BWYV, and lentil genotypes resistant to FBNYV, BLRV and PSbMV have been successfully identified. In addition, a relatively quick and simple plastic house technique was developed to identify resistant genotypes on the basis of relative virus movement and multiplication using Tissue blot immunoassay (TBIA). However, management options remain limited for emerging viruses, the emergence of virulent pathogens mainly for *Ascochyta* blight on chickpea, and complex soil-borne diseases caused by several parasitic pathogens and nematodes. Further efforts are still needed to develop varieties with multiple disease resistance, integrate new management options supported by digital innovations, establish regional networks for food legume disease research for development, capacity development, and utilize modern tools, such as diagnostic tools, AI-based early warning and detection systems. Furthermore, more farmer-led participatory research for development is needed to effectively address the key plant health challenges arising from climate and farming systems changes facing food legume production systems in the Arab and Mediterranean countries, which is leading to cereal monocropping. **[SAFAA G. KUMARI<sup>1</sup> and SEID-AHMED KEMAL<sup>2</sup> <sup>1</sup>International Center for Agricultural Research in the Dry Areas (ICARDA), Terbol Station, Beqa'a Valley, Zahle, Lebanon. <sup>2</sup>ICARDA, Rabat, Morocco.** **17th International Congress of the Mediterranean Phytopathological Union (MPU) Congress, 6<sup>th</sup>-11<sup>th</sup> July 2025, CIHEAM-BARI, Italy.**

## Recent Advances on Emerging Vascular Pathogens of Grapevines in Eastern and Southern Mediterranean Countries.

Eastern and southern Mediterranean countries are illustrious for the cultivation of grapevine, since the old antiquity. Emerging vascular pathogens of grapevines, including viral and phytoplasma diseases, significantly reduced grape yield and quality, in addition to shortening the productive life of grapevine canes, which prompted to conduct field surveys in grapevine growing areas over the past few decades in Lebanon, Syria, Palestine, Jordan, Tunisia, Morocco, Algeria, and Egypt. Bright yellow leaves, yellow mosaic, veinal mottling, and the malformed shoots, were the most common symptoms caused by GFLV in the vineyards. ToRSV and ArMV were rarely reported producing symptoms that resemble those described for fanleaf.

Leaf reddening/yellowing with leafroll symptoms was consistently observed in different areas, mainly affected by GLRaV-1, GLRaV-2 and GLRaV-3, whereas other relevant viruses such as GLRaV-4 strain 6, GLRaV-5 and GLRaV-7 were less frequent. Rugose wood, corky bark and GVA were the most observed among the infrequent cases. In addition to the presence of GVB and GRSPaV, few cases of GPGV, GVL and GVD were also reported. Later, typical grapevine yellows (GY) symptoms were observed in Lebanon, Jordan and Syria caused by '*Candidatus Phytoplasma solani*' associated with grapevine bois noir, '*Candidatus Phytoplasma omanense*', '*Ca. P. aurantifolia*, *Ca. P. asteris* and clover proliferation group (16SrVI). Finally, the heavy widespread of mealybug infestations and the outbreak of GY epidemic could be a real risk in the Arab vineyard agroecosystems. The use of certified seedlings and monitoring strategies are essential to prevent the spread of epidemic viruses and phytoplasmas. [Elia Choueiri<sup>1</sup>, Fouad Jreijiri<sup>1</sup>, Toufic Elbeaino<sup>2</sup>, Raied Abou Kubaa<sup>3</sup>, Pascal Salar<sup>4</sup>, Xavier Foissac<sup>4</sup>. <sup>1</sup>Department of Plant Protection, Lebanese Agricultural Research Institute, Tal Amara, P.O. Box 287, Zahlé, Lebanon. <sup>2</sup>CIHEAM Bari, Istituto Agronomico Mediterraneo di Bari, Italy. <sup>3</sup>Department of Plant Pathology, University of California, Davis, USA. <sup>4</sup>University of Bordeaux, INRAE, Fruit Biology and Pathology, Villenave d'Ornon, France. **17<sup>th</sup> International Congress of the Mediterranean Phytopathological Union, CIHEAM Bari, Italy, pp. 211, 2025**].

## '*Candidatus Phytoplasma phoenicium*', a Causal Agent of Stone Fruits Diseases and a Target For Surveillance.

A disease affecting almond trees, characterized by symptoms such as small yellowish leaves, shoot proliferation, and dieback, was first observed in Lebanon during the 1990s. It was reported by Choueiri *et al.*, (2001) as being associated with phytoplasmas belonging to the pigeon pea witches'-broom (PPWB) group (16SrIX). Later, Abou-Jawdah *et al.* (2002) carried out a survey in Lebanon showing the association of Almond Witches'-broom disease (AlmWB) with a phytoplasma from a newly subgroup 16SrIX-B, later classified as '*Candidatus Phytoplasma phoenicium*' and detected in both Lebanon and Iran. From 2010 to 2015, a scientific cooperation project between Lebanese and Italian institutions was funded with the aim to investigate the host range of the pathogen, the geographic distribution of the disease, and the identification of potential insect vectors.

These studies revealed that the epidemiological cycle of AlmWB involves *Asymmetrasca decedens* (Hemiptera: Cicadellidae), possibly responsible for almond-to-almond transmission of '*Ca. P. phoenicium*'. In addition, two species of *Tachycixius*, *T. viperinus* and *T. cf. cypricus* (Hemiptera: Cixiidae), were identified as potential vectors responsible for transmitting the phytoplasma from weed hosts to almond trees. Further studies, including

draft genome sequencing, demonstrated that '*Ca. P. phoenicium*' (i) infects almond, peach, nectarine, and apricot in both Lebanon and Iran; (ii) the genome encodes membrane proteins and effector-like proteins that may play a role in host-pathogen interactions and pathogenicity. In 2017, the European and Mediterranean Plant Protection Organization (EPPO) published a pest risk analysis of '*Ca. P. phoenicium*', and the EUPHRESKO network supported the project "DIPCAPP" (Development of reliable protocols for the detection and identification of '*Ca. P. phoenicium*'). [Fabio Quaglino<sup>1</sup>, Youssef Abou Jawdah<sup>2</sup>, Alberto Alma<sup>3</sup>, Piero Attilio Bianco<sup>1</sup>, Paola Casati<sup>1</sup>, Elia Choueiri<sup>4</sup>, Michael Kube<sup>5</sup>, Marina Molino Lova<sup>6</sup>, Rosemarie Tedeschi<sup>3</sup>. <sup>1</sup>Department of Agricultural and Environmental Sciences - Production, Landscape, Agroenergy, Università degli Studi di Milano, 20133 Milan, Italy. <sup>2</sup>Department of Agricultural Sciences, Faculty of Agricultural and Food Sciences, American University of Beirut, 11-0236 Riad El-Solh 1107-2020, Beirut, Lebanon. <sup>3</sup>Department of Agricultural, Forest and Food Sciences, Università degli Studi di Torino, 10095 Grugliasco (TO), Italy. <sup>4</sup>Department of Plant Protection, Lebanese Agricultural Research Institute, Tal Amara, P.O. Box 287, Zahlé, Lebanon. <sup>5</sup>Department of Integrative Infection Biology Crops-Livestock, University of Hohenheim, 70599 Stuttgart, Germany. <sup>6</sup>AVSI Foundation, Jounieh, Ghadir, Lebanon.

**17<sup>th</sup> International Congress of the Mediterranean Phytopathological Union, CIHEAM Bari, Italy, pp. 40, 2025.]**

### **Prevalence of Emerging Vascular Diseases of Stone Fruit Trees in Arab Countries and Progress in Control Strategies**

Stone fruit trees are a major industry in the Arab region characterized by climatic conditions favorable for fruit species providing economic, social and environmental services. Emerging vascular diseases had great influence on the quality and yield of these crops. Over 10 viruses have been reported in the Arab countries to affect stone fruits with a wide range of symptoms that consisted of mosaic, line patterns, mottling, yellow spots, distortion of the leaves, leaf shot-hole, fruit abnormalities, etc.

The more common viruses and viroids detected in most Arab countries to infect stone fruits were PNRSV, PDV, ApMV, ACLSV, PPV, PLMVd and HSVd, whereas other viruses such as ApLV, APLPV, PBNPaV were less widespread. Phytoplasma-like symptoms such as leaf yellowing/reddening and rolling, and witches'-broom were observed, where '*Candidatus Phytoplasma solani*' infected plum, cherry and peach and '*Ca. P. omanense*' on plum in Jordan. In peach and plum orchards, the disease incidence ranged from 25% to 55% and from 15% to 55%, respectively, with a disease incidence of around 60% in sweet cherry. In addition, disease symptoms resembled those caused by phytoplasmas confirmed the presence of aster yellows phytoplasma (16SrI) affecting peach trees.

In Egypt, European stone fruit yellows (ESFY) producing leaf curling, yellowing and fruit malformation caused serious economical losses on apricots and peaches. In Lebanon, almond witches' broom associated with '*Ca. P. Phoenicium*' destroyed more than 100,000 of almond and peach trees. Proliferation of slender shoots at several points on the main trunk of affected trees, or from the roots appeared on almond trees. Witches' broom and proliferation, perpendicular development of many auxiliary buds on the branches, leaf size reduction and yellowing (pale green), phyllody, stunted growth with affected fruit quality and yield reduction reaching 70%-100% and general decline of affected trees were also encountered.

Intensified symptoms appeared after excessive pruning of infected trees. Infected almond

trees generally die 3 to 4 years after the appearance of the first symptoms. Recently, *Xylella fastidiosa* has been reported on almonds with symptoms such as leaf scorch in Lebanon. However, monitoring efforts for *X. fastidiosa* in Palestine, Jordan and Morocco on stone fruit trees have been conducted, confirming that these important horticultural crops are still free of *X. fastidiosa*. Control strategies have been initiated through several practices such as prohibiting imports of plant material from high-risk countries, production of pathogen-free propagation materials, avoiding grafting scions from infected trees and strengthening human capacity in pathogen diagnosis. Large-scale surveys are of utmost importance to detect newly established outbreaks, particularly for diseases that can be transmitted by insect vectors.

Unfortunately, in most Arab countries, information on natural vectors of emerging vector-borne diseases is still limited or incomplete. Intensive training of technical staff and surveys to investigate the identity and distribution of the insect vectors and their natural hosts all over these countries is essential. Field surveys and continuous monitoring to assess the sanitary status of stone fruit crops and implement appropriate measures to limit the spread of these emerging vascular diseases is badly needed. [Elia Choueiri, Department of Plant Protection, Lebanese Agricultural Research Institute, Tal Amara, P.O. Box 287, Zahlé, Lebanon. **17<sup>th</sup> International Congress of the Mediterranean Phytopathological Union, CIHEAM Bari, Italy, pp. 68. 2025**].

#### **Evaluation of biostimulants and beneficial bacteria for Controlling Pistachio decline**

In recent years, the experimental pistachio orchards at INRAT's Agricultural Experimentation Unit in Mornag have faced phytosanitary problems, leading to tree decline and reduced productivity. Isolation, Microscopic and molecular identification showed that the damage is mostly due to *Alternaria alternata* and *Neofusicoccum mediterraneum*.

To address these challenges sustainably, biostimulants were tested as a potential solution to improve tree resilience and enhance yield and quality. An *in vivo* trial was conducted on a 33-year-old orchard of Pistachio trees cv. Mateur grafted onto *Pistacia vera* and *Pistacia atlantica* rootstocks, to evaluate the combined effect of two biostimulant products, PLANTA and EPSOMIT, under three treatments: rainfed control (T0), irrigated (T1), and PLANTA-EPSOMIT combined treatment (T2) with regular phytosanitary monitoring. A pre-treatment with Methyl-thiophanate was applied to all the orchards.

Observations conducted after treatments during field inspections showed no new cases of plant dieback and a significant reduction in necrotic leaves previously caused by *Alternaria*. Absence of infected fruits on bunches of trees treated with Planta-Epsomit compared to the control T0 was also recorded. Additionally, PLANTA and EPSOMIT effectiveness against *Neofusicoccum mediterraneum* was assessed *in vitro*, compared to (B1, B2, and B3). The results revealed that both PLANTA and B3 exhibited the highest antifungal activity, significantly reducing the fungal mycelium growth by 65% and 50% respectively.

This highlights B3 as a promising biological control agent, suggesting that beneficial bacteria and biostimulants could play a key role in mitigating pistachio decline while reducing reliance on chemical treatments. [W. Rouissi<sup>1</sup>, I. Ouerghi<sup>1,2</sup>, I. Hemissi<sup>1</sup> and A. Chelli Chaabouni<sup>1</sup>] <sup>1</sup>National Institute of Agronomic Research of Tunisia, University of Carthage, Tunis, Tunisia. <sup>2</sup> Faculty of science, Manar university, Tunis, Tunisia. **17<sup>th</sup> International Congress of the Mediterranean Phytopathological Union (MPU) Congress, 6<sup>th</sup>-11<sup>th</sup> July 2025, CIHEAM-BARI, Italy.**

## Wheat Fusarium Crown Rot Occurrence and Disease Strategy Management in Algeria

Crown rot (CR) caused mainly by *Fusarium* spp. is a worldwide disease on wheat. CR may affect yield quantity and quality by mycotoxin accumulation in wheat kernels. Surveys conducted in Algeria revealed the occurrence of CR in all cereal-growing regions of the north of the country, with *F. culmorum* as the dominant associated species. In the context of an integrated control management, the behavior of 17 durum and bread wheat varieties cultivated in Algeria were evaluated over two years (2022-2023 and 2023-2024) at two stages of wheat growth: the seedling stage (greenhouse) and the maturity stage under field conditions. Results obtained showed that the bread wheat varieties were more resistant than durum at both stages, with variability of the disease indices recorded. At the seedling stage, disease indices recorded was ranged from 1.05 to 2.80.

The bread wheat variety Rmada was found to be the most resistant, while the durum wheat varieties Boussalem and Manssourah were considered the most susceptible. At the maturity stage, the disease indices were ranged from 0.71 to 1.74, with Rmada recording the lowest index. On the other hand, the durum wheat varieties GTA and Semito were found to be the most susceptible. A strong positive correlation ( $r=0.71$ ,  $P\leq 0.05$ ) was observed between the behavior of the varieties at both stages of the two years. In conclusion, the variety Rmada, thanks to its behavior at both growth stages, represented a promising source for the control of crown rot and should be recommended in wheat breeding programs.

**[Houda Bouregdda, Khadija Hacheffa, Khadija Djemaoui** Ecole Nationale Supérieure Agronomique (ENSA), Département de Botanique, Laboratoire de Phytopathologie et Biologie Moléculaire, Hassan Badi street, El Harrach, Algiers, Algeria.**17th International Congress of the Mediterranean Phytopathological Union July 6 – July 10, 2025]**

## Viroid and virus infections in Tunisian pistachio orchards

Pistachio (*Pistacia vera* L.) is an economically important crop in Tunisia; however, its productivity is significantly threatened by viral and viroid infections. In spring 2022, field surveys were conducted in the main pistachio-growing areas of Morneg, Sidi Bouzid, and Gafsa to investigate the presence of pistachio ampelovirus A (PAVA), hop stunt viroid (HSVd), and Citrus bark cracking viroid-pistachio (CBCVd-pis). Symptoms of chlorosis and leaf deformation were frequently observed, while stunting and bushy growth appeared less commonly. A total of 144 leaf samples, collected from various cultivars and pollinator trees, were analyzed using RT-PCR. Of the analyzed samples, 116 (80.5%) tested positive for at least one of the targeted pathogens. Mixed infections of HSVd and CBCVd-pis were detected in 41% of samples, while PAVA was present in 15.9%.

The highest infection rate was recorded in Sidi Bouzid (84.7%), followed by Morneg (84.2%) and Gafsa (70.7%). CBCVd-pis was the most prevalent pathogen, with incidence rates of 73.1% in Sidi Bouzid, 60.9% in Gafsa, and 57.8% in Morneg. In Morneg, female cultivars exhibited a higher infection rate (88%) compared to pollinator trees (77%), with frequent co-infections by both viroids. Among pollinator plants, 50% were infected with HSVd and 63.6% with CBCVd-pis. The higher incidence of HSVd and CBCVd-pis compared to PAVA may reflect efficient transmission through pruning tools and potential pollen-mediated dissemination. Further research is needed to understand their epidemiology, incidence, and symptom severity.

Tunisia is currently implementing a certification program to produce virus- and viroid-free pistachio propagation material. **[M. Elair<sup>1</sup>, C E. Kouraichi<sup>2</sup>, M. Digiario<sup>3</sup> and N. Mahfoudhi<sup>1</sup>]**

<sup>1</sup> Plant Protection Lab: National Institute of Agricultural Research of Tunisia (INRAT),

University of Carthage, , Tunis, Tunisia,<sup>2</sup> Higher Institute of Agronomic Sciences of Chott Mariem, University of Sousse, B.P 47, 4042 Chott Mériem Sousse, Tunisia, <sup>3</sup> Mediterranean Agronomic Institute of Bari, Ceglie 9, 70100, Valenzano, Bari, Italy. **17th International Congress of the Mediterranean Phytopathological Union (MPU) Congress, 6<sup>th</sup>-10<sup>th</sup> July 2025, CIHEAM-BARI Italy.**

## ASPP Member NEWS

### **Genome Characterization of Prunus Maculavirus 1 (PrMcV-1), a Novel Member of the Genus *Maculavirus* identified in *prunus* spp.**

A novel virus with a (+)ssRNA genome was identified in a symptomless peach tree by high-throughput sequencing. The complete RACE-verified genome of the virus, tentatively named “Prunus maculavirus 1” (PrMcV-1; GenBank accession number PV231830), is 6,664 nucleotides (nt) long, excluding the poly(A) tail, and contains two open reading frames (ORFs). ORF1 (nt 64-5895) encodes a large replication-associated polyprotein, which contains conserved domains associated with methyltransferase (Mtr), papain-like protease (Pro), helicase (Hel), and RNA-dependent RNA polymerase (RdRp). ORF2 (nt 5571-6478) partially overlaps ORF1 and encodes the capsid protein (CP). Phylogenetic analysis based on both ORFs placed PrMcV-1 in a distinct clade within the genus *Maculavirus* of the family *Tymoviridae*. Experimental evidence showed that PrMcV-1 is graft-transmissible. This study expands the known host range of maculaviruses to include *Prunus* species.

[**Raied Abou Kubaa, Ashrafou Ouro-Djobo, Kristian A. Stevens, Olufemi J. Alabi and Maher Al Rwahnih.** Department of Plant Pathology, University of California, Davis, CA, USA; Department of Plant Pathology and Microbiology, Texas A&M AgriLife Research and Extension Center, Weslaco, TX, USA; Department of Plant Protection, School of Agriculture, The University of Jordan, Amman, Jordan. Arch Virol 170, 168,2025]. <https://doi.org/10.1007/s00705-025-06346-x>

### **Rapid and Accurate Detection of the Most Common Bee Pathogens; *Nosema ceranae*, *Aspergillus flavus*, *Paenibacillus larvae* and Black Queen Cell Virus.**

Honey bees are essential pollinators for the ecosystem and food crops. However, their health and survival face threats from both biotic and abiotic stresses. Fungi, microsporidia, and bacteria might significantly contribute to colony losses. Therefore, rapid and sensitive diagnostic tools are crucial for effective disease management. In this study, molecular assays were developed to quickly and efficiently detect the main honey bee pathogens: *Nosema ceranae*, *Aspergillus flavus*, *Paenibacillus larvae*, and Black queen cell virus. In this context, new primer pairs were designed for use in quantitative Real-time PCR (qPCR) reactions. Various protocols for extracting total nucleic acids from bee tissues were tested, indicating a CTAB-based protocol as the most efficient and cost-effective. Furthermore, excluding the head of the bee from the extraction, better results were obtained in terms of quantity and purity of extracted nucleic acids. These assays showed high specificity and sensitivity, detecting up to 250 fg of *N. ceranae*, 25 fg of *P. larvae*, and 2.5 pg of *A. flavus* DNA, and 5 pg of BQCV cDNA, without interference from bee DNA. These qPCR assays allowed pathogen detection within 3 h and at early stages of infection, supporting timely and efficient management interventions. [**Simona Marianna Sanzani 1, Raied Abou Kubaa 2,3, Badr-Eddine Jabri 4, Sabri Ala Eddine Zaidat 1,4, Rocco Addante 1, Naouel Admane 4 and Khaled Djelouah,** Insects, 16, 810, 2025]. <https://doi.org/10.3390/insects16080810>

## Survey of 'Candidatus Liberibacter solanacearum' and Its Potential Psyllid Vectors in Northwestern Italy

Psyllids (Hemiptera: Psylloidea) are the main vectors of various phloem-limited plant pathogens, including 'Candidatus Liberibacter' species. 'Candidatus Liberibacter solanacearum' (CLso) has been associated with various plant disorders and economic losses in plants from the Solanaceae and Apiaceae families. Recently, it has been reported in Europe, primarily linked to carrots and celery. This situation presents a significant threat, prompting the need for a survey to assess the presence of the bacterium and its potential vectors. Plant and psyllid samples were collected from potato (*Solanum tuberosum*), carrot (*Daucus carota*) and other wild weed species in commercial fields and urban areas over two consecutive years (2022 and 2023). DNA was extracted from the samples, followed by conventional PCR and the sequencing of positive samples. The psyllid species *Bactericera nigricornis* was the dominant species in potato fields, while *Bactericera trigonica* was the most abundant in carrot fields, followed by *Heterotrioza chenopodii*, ranking as the second most abundant species in both cases. CLso-positive samples were found in *D. carota*, *B. trigonica*, *H. chenopodii*, *B. nigricornis*, and *Trioza urticae*. The sequencing results suggest the detected haplotypes are D and U. These findings raise concerns about the potential spread of CLso and the associated risk of significant economic losses. [Ahmed Y. S. Oraby, Valentina Candian and Rosemarie Tedeschi, Department of Agricultural, Forestry and Food Sciences (DISAFA), University of Turin, Largo P. Braccini 2, Grugliasco, 10095 Turin, Italy. *Insects*, 16, 499, 2025]. <https://doi.org/10.3390/insects16050499>

## Methyl Salicylate as A Dose-dependent Fumigant against Common Stored Product Pests: A Comparative Laboratory Study

Stored product pests pose a significant threat to global food security, leading to substantial economic losses in agricultural commodities. Traditionally controlled with synthetic pesticides, these pests have developed resistance, raising environmental and health concerns, driving the search for alternative strategies. In this study, we assessed the effect of methyl salicylate (MeSa), a naturally occurring compound with several promising properties for pest control, against three stored product pest species: *Sitophilus oryzae*, *Tribolium castaneum* and *Trogoderma granarium*. Laboratory bioassays were conducted to assess mortality rates by fumigation across doses ranging from 2 to 10 mg in 120 mL containers where adults were placed. The results demonstrated dose-dependent variations in mortality among the species. After 48h from the treatment MeSA demonstrated strong insecticidal activity against *Tro. granarium*, achieving over 80 % mortality across all tested doses, while *Tri. castaneum* showed a dose-dependent response, reaching approximately 70 % mortality at 10 mg. In contrast, *S. oryzae* exhibited limited susceptibility, with mortality peaking at around 37 % at the highest dose of 10 mg. This variation in susceptibility among species underscores the importance of species-specific evaluations. Overall, the findings of this study highlight the potential of MeSA as a sustainable alternative to synthetic insecticides, particularly to *Tro. granarium*. This study encourages further investigation of the mechanisms of action and field efficacy of MeSA to evaluate its possible application in pest management strategies. [Salvatore Guarino <sup>a</sup>, Mokhtar Abdulsattar Arif <sup>b</sup> (Iraq), Giuliano Cerasa <sup>c</sup>, Antonioni Acacio Campos Moliterno <sup>c</sup>, Ezio Peri <sup>c</sup>, <sup>a</sup>Institute of Biosciences and BioResources (IBBR), National Research Council of Italy, Via Ugo La Malfa 153, 90146, Palermo, Italy, <sup>b</sup>Ministry of Agriculture, Abu-Ghraib, 10081, Baghdad, Iraq. <sup>c</sup>Department of Agriculture, Food and Forest Sciences, University of Palermo, Viale delle Scienze, Building 5, 90128, Palermo, Italy.

## **Survival of Plant Pathogens during Composting of Bio-waste: a Case Study for Oomycetes and Fungi**

European countries have implemented national strategies to reduce the use of peat in horticulture due to its environmental impact. Studies demonstrated the possibility of reducing peat consumption by using compost as a substitute without affecting the growth and development of potted horticulture plants. However, any substitute must be produced considering quality standards and requirements that are adopted for peat. Among others, the risk of contamination of compost with plant pathogens is particularly high. Furthermore, the assessment of the survival of specific plant pathogens during the composting process requires proper detection methods. This study evaluated the survival/presence of the oomycete *Phytophthora cinnamomi*, as a model plant pathogen, in woody chips of artificially inoculated *Castanea sativa* saplings used as a bulking agent in composting processes. Detection techniques for assessment included isolation in pure culture, quantitative PCR (qPCR) and High Throughput Sequencing (HTS). The pathogen was easily detected in woody chips at the beginning of the composting process with baiting and molecular barcoding. By the end of the maturation phase, no *P. cinnamomi* was detectable by any diagnostic method including baiting, confirming the efficacy of a proper composting process in eradicating the pathogen. HTS approach was also able to detect throughout the process the DNA of plant pathogenic fungal genera naturally present in the green residues and bulk agents. These findings are crucial for developing diagnostic pipelines to be included in protocols for compost biosafety certification. Finally, the present study demonstrated the possibility of processing recycled horticulture biowaste to obtain high-quality and safe compost without the need for complex and expensive composting plants. [Leonardo Guidoni, Mounira Inas Drais, Silvia Turco, Angelo Mazzaglia, Andrea Vannini, Carmen Morales-Rodríguez. Science of the Total Environment, Volume 986, 15 July, Article 179767, 2025]. <https://doi.org/10.1016/j.scitotenv.2025.179767>

## **Chemical Composition and Antifungal Activity of Essential Oils from *Lavandula dentata* L., *Cymbopogon citratus* DC. Stapf., and *Salvia officinalis* L. against *Rhizoctonia solani* in Potato Tubers**

*Rhizoctonia solani* is an emerging necrotic and aggressive pathogenic basidiomycete able to attack a wide range of crops, including potato; therefore, the development of eco-friendly compounds could be a good substitution for chemical pesticides. This study evaluates the antifungal activity of essential oils (EOs) extracted from leaves of lavender (*Lavandula dentata*), lemongrass (*Cymbopogon citratus*), and sage (*Salvia officinalis*) against *Rhizoctonia solani*. The chemical composition of EOs was determined by GC-FID (gas chromatography–flame ionisation detection) and GC-MS (gas chromatography–mass spectrometry). Geraniol (42.78%) and neral (32.82%) were the main components of lemongrass oil; lavender oil was rich in 1,8-cineole (40.26%) and camphor (23.82%), while the major components of sage oil were camphor (25.59%),  $\alpha$ -thujone (22.21%), and 1,8-cineol (16.97%). The *in vitro* growth of *R. solani* was completely inhibited by lemongrass essential oil at 3000 and 4000 ppm; however, sage essential oil represented less inhibitory activity, even at the highest concentration (71% at 4000 ppm). Furthermore, scanning electron microscopy of the mycelium of *R. solani* subjected to EOs treatment, especially with lemongrass and lavender, exhibited deleterious morphological and ultrastructural alterations when compared to the control. An *in vivo* study showed that the application of lavender oil significantly reduced disease severity on potato tubers, and it completely

inhibited mycelium development. Therefore, EOs from lavender and lemongrass hold promise as natural antifungal alternatives for sustainable crop protection to protect potato tubers against *R. solani*. [Jemai N., Ben Mahmoud K., Jedidi E. Gargouri S.Hachana A., Jemmali A., Boulila A.]. *Potato Res.* 2025]. <https://doi.org/10.1007/s11540-025-09869-7>

### Sanitary Status of Onion (*Allium cepa*) in Tunisia

Similar to other vegetatively propagated crops, onion (*Allium cepa* L.) is highly vulnerable to viral infections that can accumulate over successive cycles, leading to yield and quality losses. In Tunisia, despite the crop's economic importance, little information is available about the diversity of viruses affecting onion. Until recently, only *Onion yellow dwarf virus* (OYDV) had been officially reported (Nahdi et al., 2023), although field observations often show virus-like symptoms. To investigate this gap, a survey was conducted in spring 2023 to assess the presence of other viruses in symptomatic onion plants. A total of 111 leaf samples were collected from five major onion-producing regions (Sousse, Mahdia, Gabes, Kebili, and Cap Bon). Samples were tested using DAS-ELISA for *Leek yellow stripe virus* (LYSV), *Garlic common latent virus* (GarCLV), and three allexiviruses (*Garlic Virus A* (GarV-A), *Garlic Virus -B* (GarV-B), *Garlic Virus -C* (GarV-C)). Results showed that 75 out of 111 samples (67.56%) were infected with at least one virus. GarCLV was most prevalent (72.05%), followed by GarV-C (27%), GarV-A (21.61%), LYSV (4.5%), and GarV-B (9%). Mixed infections were more common than single infections. These findings reveal a broader viral diversity in Tunisian onions than previously documented. Further investigations using high-throughput sequencing, vector identification, and epidemiological studies are necessary to better understand the onion virome and support the development of integrated, sustainable disease management strategies. [S. Nahdi<sup>1 2</sup>, W. Abidi<sup>1</sup>, B. M'rabet Samaali<sup>3</sup>, M. Braham<sup>3</sup>, S. Matic<sup>4 5</sup>] Ecole Supérieure d'Agriculture du Kef, Tunisia, Université de Jendouba, Tunisia. <sup>2</sup> Laboratoire de Protection des Végétaux (LPV), INRAT, Université de Carthage, Tunisia. <sup>3</sup> Laboratoire des Analyses Virologiques, Direction Générale de la Santé Végétale et du Contrôle des Intrants Agricoles, <sup>4</sup> Institute for Sustainable Plant Protection, National Research Council of Italy (IPSP-CNR), Italy. <sup>5</sup> Department of Agricultural, Food and Forest Sciences (SAAF), University of Palermo, Italy, 2025].

### Phenolic Profile and Biopesticidal Potential of *Moringa oleifera* Extracts: Antioxidant and Insecticidal Activities Against Stored Pests

This study investigated the phenolic composition of *Moringa oleifera* organ extracts via RP-HPLC. In addition, their antioxidant and insecticidal potential was assessed. Polyphenols, flavonoids and condensed tannin levels depend on the different plant parts. Phenolic composition was distinguished by the presence of quercetin-3-O-galactoside as the major compound with high insecticidal activity due to their phenolic composition. So, repellent properties against two stored pest species, *Tribolium castaneum* and *Sitophilus oryzae*, without food substrate were assessed. In addition, contact toxicity toward *T. castaneum* with wheat flour substrate was investigated. The repulsive dose of *Moringa* extracts from different morphological organs was more marked for leaves compared to stems, seeds and flowers with the lowest repulsive dose (RD 2 50 = 0.069 µl/cm) for *T. castaneum*. Moreover, *M. oleifera* MeOH extracts from different morphological organs exhibited a contact toxicity potential against *T. castaneum* with and without wheat flour substrate. MeOH extracts of *M. oleifera* from leaves caused the highest mortality percentages (83.33%) after 48 h of exposure for both concentrations of 0.9 and 1.9 µl/cm<sup>2</sup> towards *T. castaneum* on wheat flour substrate. To reduce pesticides, Drumstick could offer an effective protection to

*T. castaneum* and *S. oryzae* [Bachrouch, O., Sriti, J., Zarroug, Y., Nefzi, H., Mssada, K., Maamouri, N., Laajili, M., Selmi, S., Abderraba, M. International Journal of Environmental Health Research, 1-12.2025] <https://doi.org/10.1080/09603123.2025.2486596>

### **GC-MS Profiling, Insecticidal Performances and Acetylcholinesterase Inhibition of Tunisian *Thymus capitatus* (L.) Essential Oil for Sustainable Stored Grain Pest Management**

*Sitophilus oryzae* L., commonly known as the rice weevil, is a challenging pest of stored products, causing serious economic losses. The management of this pest in stored products is based on the use of synthetic insecticides. Nevertheless, the excessive use of chemicals has induced several side effects. Essential oils (EOs) have become a sustainable alternative for stored product pest management due to their entomotoxic performances. Accordingly, this study aimed to investigate the fumigant toxicity of *Thymus capitatus* L. EOs and its active component carvacrol against *S. oryzae* adults in cereal grain substrate during 10 days of storage under semi-industrial setup. Besides, Thyme EOs chemical composition and its acetylcholinesterase inhibition on *S. oryzae* adults were screened. GC-MS analysis revealed that Tunisian Thyme EOs were a carvacrol chemotype representing 78.35% of the total oil. Results showed that EO and carvacrol possessed fumigant activities towards *S. oryzae* adults with LC<sub>50</sub> values of 991.962 and 274.195 µl/L air over 10 days of storage, respectively. Meanwhile, carvacrol exhibited a strong acetylcholinesterase activity with a value of 96.26 after 72 hours of exposure. Results highlighted the fumigant performances of *T. capitatus* EOs and carvacrol, especially carvacrol, as a promising candidate for sustainable grain pest management. [Gayess L., Bachrouch O., Besbes N., Hamdi S. H., Sriti J., Bourgou S., Jallouli S., Msaada K., Abderraba M. Mater. Environ. Sci., 16(4), 602-613, 2025]

### **Enhancing the properties and oxidative stability of margarine through Moringa oil enrichment**

Reports on moringa oil being a great food source. Because of the high nutritional content and possible health benefits associated with its chemical makeup, moringa oil is categorised as a nutraceutical food. This study aimed to valorise *Moringa oleifera* oil and evaluate the effect of its incorporation at different concentrations on the properties and oxidative stability of margarine during a one-month refrigerated storage. *Moringa oleifera* seeds were extracted in a cold press, which have undergone preparation operations and degreased by passing through a continuous-feed screw press (horizontal press) of the Xeoleo screw press. The Moringa oil was incorporated into margarine at the following two levels: 5% (MO5%) and 15% (MO15%). The best way to preserve the high biochemical quality of MO, with good concentrations of fatty acids and triglycerides, particularly oleic acid, was to extract the oil by cold pressing. MO extracted for this investigation has high levels of β-sitosterol (49.85%) and α-tocopherol (243.02 mg/kg). The results showed that this oil presented respective peroxide value, acidity and iodine index of about 2.47 meq O<sub>2</sub> /Kg, 0.84 mg KOH/g and 64.53 g/100g, with good contents of polyphenols (0.163 mg/kg) and carotenoids (3.26 mg/kg). Additionally, the efficacy of including MO in high-fat diets was validated by preventing margarine's oxidative stability while it was refrigerated in comparison to the control. The strong antioxidant activity of the recently created margarine qualifies it as a functional product. Nonetheless, significant water content was the outcome of the 15% moringa oil dosage. Moringa oil is extremely resistant to autoxidation and can be used as an antioxidant for the long-term stabilisation of commercial edible oils [Sriti, J., Zarroug, Y., Bachrouch, O., Boulares, M., Najjar, J., Sfayhi, D., Haj Yehya, N., Fendri, M., Kharrat, K. LA RIVISTA ITALIANA DELLE SOSTANZE GRASSE - VOL 102 - GENNAIO/MARZO 2025. 25-32.2025]

## Researcher Spotlight

### Dr. Dalia Adly

Professor, Department of Biological Control, Plant Protection Research Institute (PPRI), ARC, Egypt

Dr. Dalia Adly is a professor of biological control at the Agricultural Research Center (ARC) in Egypt. Throughout her career, she has focused on applied research in insect and mite pest management, with a particular emphasis on enhancing biological control strategies using parasitoids, predators, and entomopathogenic agents. Her academic work includes a B.Sc. in Agricultural Sciences from Cairo University in 1997, an M.Sc. in 2003 focused on *Aphidius matricariae* as a parasitoid of cereal aphids, and a Ph.D. in 2008 on the parasitoid *Aphelinus albipodus*, both of which contributed to the field of aphid biocontrol under Egyptian agro-ecological conditions.



Dr. Adly has published over 30 scientific papers in international and local peer-reviewed journals. Her research has focused on pest control in greenhouses and open fields, examining the efficiency and effectiveness of natural enemies in pest control, and developing integrated pest management programs. Adly has taken part in several national and international collaborative projects. She was a team member in the Egyptian-American Integrated Pest Management (IPM) project on wheat, supported by USAID and the University of California (1997–2001). She contributed to the project “Risk Assessment of the Side-effects of Agricultural Pesticides on Non-Target Organisms in Egyptian Agro-Ecosystems” (2013–2017) and later worked on “Environment-Friendly Electromagnetic-Based Solutions for the Cotton Leaf Worm in Egypt” (2019–2021). She also served as Principal Investigator for a project titled “Integrated Crop Management of Medicinal and Aromatic Plants” from 2019 to 2022. Currently, she is involved in the project “Using Eco-Friendly and Innovative Methods for Crop Yield Enhancement and Efficient Use of Water”, which began in 2022.

Alongside her research, Dr. Adly is actively involved in academic supervision. She has supervised a Ph.D. thesis on *Spodoptera frugiperda* (fall armyworm) behavioral and environmental studies, and two M.Sc. theses, including one on pest management in medicinal and aromatic plants, another on the biological control of cucumber pests under protected agriculture conditions. Her engagement extends beyond research, having delivered numerous lectures and workshops on integrated pest management (IPM) in greenhouses and the applied use of biological control agents. Dr. Adly is a board member of the Egyptian Society of Biological Control of Pests, editor of the Egyptian Journal of Biological Pest Control and contributes to peer-review and editorial processes in regional journals.

## Researcher Spotlight

### Dr. Sara Mohammed Al-Ansari

Fruit flies are among the most important economic insect pests, and they have become a growing threat to international trade. There are over 5,000 known species of fruit flies distributed worldwide, and they pose a serious concern for producers. The classification of fruit flies belonging to the *Tephritidae* family is considered the essential entry point for designing integrated pest management (IPM) programs for their control. **Dr. Sara Mohammed Al-Ansari**, a researcher in economic entomology at the Ministry of Agriculture, Fisheries and Water Resources in the Sultanate of Oman, is one of the dedicated and knowledgeable experts who have made significant contributions to the classification of fruit flies. Given the limited number of specialists in this field, I found it important to highlight her work, as she can be a valuable resource for those seeking expertise in this area.



Dr. Sara is a dedicated entomology researcher at the Ministry of Agriculture, Fisheries, Wealth, and Water Resources of the Sultanate of Oman. She has built a strong academic and research foundation in agricultural sciences, having earned her Bachelor of Science in Crop Science from Sultan Qaboos University in 2015. She continued her studies at the same institution, obtaining a Master's degree in Plant Protection in 2018 and a Ph.D. in Crop Science in 2023.

Her doctoral research focused on the study of fruit flies in Oman, on the **characterization of fruit fly species, their host plants, and associated parasitoids**. She has also contributed significantly to understanding the **population dynamics of fruit flies** across different agroecological zones in the country in 2023 and 2024. This work forms part of an ongoing initiative to implement **Integrated Pest Management (IPM)** programs in selected pilot areas in Oman.

Dr. Al Ansari plays an active role in scientific communication and capacity building. She has delivered technical lectures in workshops focused on fruit fly biology and control and date palm pests, targeting agricultural extension officers and plant protection specialists under the Ministry's training programs.

Among her academic accomplishments is the publication of a highly recognized scientific article titled:

**“Fruit Flies: Fauna, Bio-ecology, Economic Importance and Management with an Overview of the Current State of Knowledge in the Sultanate of Oman and the Arabian Peninsula”**, published in the **JAMS Journal**. This article was awarded by Sultan Qaboos University as a **Distinguished Scientific Paper published in JAMS**, highlighting her contribution to entomological research in the region.

Dr. Al Ansari has also actively participated in several prestigious conferences. In December 2022, she presented her research at the **First International Conference on Plant Protection (ICPP)** at Sultan Qaboos University, where she received the **Best Oral Presentation Award**. More recently, in April 2024, she participated in a poster presentation at the 5th International Fruit Fly Symposium organised by the fruit flies **TEAM** in Mauritius.

### First Call for the NCPD International Prize

The National Centre for Palms and Dates, Kingdom of Saudi Arabia, is pleased to invite you to participate in the prestigious **NATIONAL CENTRE FOR PALMS & DATES INTERNATIONAL PRIZE**, a global Prize dedicated to advancing sustainability in the date palm sector through groundbreaking original and impactful research, innovative solutions and technologies, and the development of new products.

This international prize was launched with a vision to achieve excellence and promote the date palm sector worldwide by recognizing the efforts of Government Entities, Private Companies, Research Centres, Universities, Scientists, International, Regional and Local Organization etc., who apply their expertise to develop impressive solutions under the below-mentioned three NCPD International Prize categories. By participating, you will join a distinguished group of contributors whose work has made a lasting impact in the sector.

- » Best Scientific Research Prize winner(s) total Prize worth 400,000 Saudi Riyals (Individuals)
- » Date Palm Innovative Technology Excellence Prize winner(s) total Prize worth 500,000 Saudi Riyals (Individuals/Entities)
- » New Product Development Prize winner(s) total Prize worth 500,000 Saudi Riyals (Individuals/Entities)

We encourage you to submit your application for consideration. Together, we can promote innovation and drive progress in the date palm sector globally.

**SUBMISSION DEADLINE: 10 September 2025**

Apply online at the link: <https://prize.ncpd.gov.sa/en/>

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For queries, please contact [ncpd\\_prize@ncpd.gov.sa](mailto:ncpd_prize@ncpd.gov.sa)

### Congratulations

**The Arab Society for Plant Protection congratulates Dr. Abdulaziz Mohamed Al-Sahlawi on his appointment as CEO of the National Centre for Palms and Dates in the Kingdom of Saudi Arabia. We wish him continued progress in developing the palm and date sector, which has achieved significant accomplishments in the fields of production, processing, marketing, pest management, and modern innovations in the sustainable development of this blessed tree.**



## Workshop to Launch the Project for Evaluating the National Plan to Combat the Red Palm Weevil



Under the patronage of His Excellency the Minister of Agriculture, the Jordan Date Association (JODA) held a workshop yesterday, Tuesday, at the Research Center of the Agricultural Engineers Syndicate in Al-Karama / the Jordan Valley, to launch the project for evaluating the National Plan to Combat the Red Palm Weevil. The project is being implemented by the association in cooperation with the Ministry of Agriculture and with the support of the United Nations Development Programme (UNDP).

The workshop was attended by Engineer Yaseen Al-Adwan, Director of Agriculture for the Central Jordan Valley, representing His Excellency the Minister; Engineer Waleed Shaheen, Chair of the National Steering Committee of the Small Grants Programme – UNDP; Engineer Anas Al-Khasawneh, National Coordinator of the Small Grants Programme; Engineer Anwar Haddad, President of the Jordan Date Association; in addition to personnel from the Ministry's Plant Protection Directorate, directors of agriculture from palm-producing regions in the Kingdom, and irrigation water managers from the Jordan Valley Authority. The workshop also saw the participation of a number of local and international experts in palm pests, as well as a large number of palm farmers from across the Kingdom. A presentation was delivered on the palm sector in Jordan and the current plan to combat the Red Palm Weevil. This was followed by the official announcement of the launch of the project, which aims to raise awareness about the significance and economic impact of the weevil, verify the procedures and tools of the adopted control plan, and explore the possibility of adjusting the plan's course if necessary.



The workshop also saw the participation of a number of local and international experts in palm pests, as well as a large number of palm farmers from across the Kingdom. A presentation was delivered on the palm sector in Jordan and the current plan to combat the Red Palm Weevil. This was followed by the official announcement of the launch of the project, which aims to raise awareness about the significance and economic impact of the weevil, verify the procedures and tools of the adopted control plan, and explore the possibility of adjusting the plan's course if necessary.

The project also includes several important secondary objectives, such as building a database on the palm sector in the Kingdom, identifying areas with concentrated weevil infestations, and assessing the severity of the outbreak.

The representative of the Minister, the President of the Date Association, and the attendees all expressed their appreciation for the efforts made by the field specialists in managing this issue, and extended their thanks to the United Nations Development Programme for its support.

## Maxlure Light Traps for Monitoring and Controlling the Spotted Wing Fly SWD (*Drosophila suzukii*)

Russell IPM has developed a program for monitoring fruit flies, particularly small ones such as the vinegar fly (*Drosophila melanogaster*) and the spotted-wing drosophila, SWD, (*Drosophila suzukii*). This trap combines food kairomones and light attractants at specific wavelength. Experiments have proven this technology to be more effective than traditional traps, and the percentage of trapped females is higher than in traditional traps.

Given the serious threat posed by the spotted-wing drosophila to red fruits (especially cherries, strawberries, raspberries, blueberries, grapes, and others), this trap has proven effective in stopping the spread of this fly from its wintering areas to farms, especially during the fruit ripening period, which is the critical stage for infestation. It is worth noting that this fly lays its eggs only in ripe and healthy fruits, unlike the vinegar fly, which lays its eggs in damaged fruits that have begun to show signs of fermentation. Monitoring this fly and protecting red fruits from its damage by using a trap is a guarantee to avoid huge losses resulting from fruit spoilage or the refusal of infested fruits by traders and jam factories. It is worth noting that the cultivation and export of red fruits has expanded in recent years in Jordan, Egypt, Lebanon, Palestine, and Morocco, and is heading towards exporting them to Europe, where these fruits are subject to strict monitoring in terms of the presence of fly infestations or high levels of pesticide residues.



Trap and food lure Maxlure / Male of *Drosophila suzukii* (SWD) / Eggs of SWD inside the skin of a cherry fruit

## BEST APPLIED RESEARCH AWARD AT THE PLANT PROTECTION RESEARCH INSTITUTE, EGYPT

Dr. Adel Abdel Azim, Head of the Agricultural Research Centre, and Dr. Ahmed Abdel Megid, Director of the Plant Protection Research Institute, honoured a group of outstanding researchers at the institute. The ceremony, held at the institute's main office in Dokki, Giza, included the distribution of certificates of appreciation and financial awards for the winners of the "Best Applied Research" competition for the years 2022, 2023, and 2024.



This competition plays a key role in encouraging researchers to conduct applied research that addresses farmers' real needs and keeps pace with global advances in plant protection. The winning studies provided practical solutions and stood out for their innovation,

originality, and applicability in the field, benefiting Egyptian farmers and contributing to the national economy.

The judging committee, made up of Professors Dr. Ahmed El-Heneidy, Dr. Ali El-Sherbiny, and Dr. Atwa Ahmed Atwa, used specific criteria to select the winners. These criteria were based on three main points:

1. **Research Quality:** This included the originality of the work, its scientific value, relevance to the field, and publication in reputable journals with high impact factors.
2. **Researcher's Performance:** Evaluation was based on the number of published papers, how often those works were cited, the researcher's H-index (which measures research impact), areas of publication, and collaboration with other institutions.
3. **Institutional Impact:** The committee also examined how the research and researchers contributed to enhancing the institution's reputation, increasing funding opportunities, and strengthening the institute's scientific identity.

#### **Winners for 2022:**

- **First Place:** Prof. Reham Abo-Shnaf

**Title: Reham Abo-Shnaf, Sally F.M. Allam, Menna L. El-Sobky, Ahmed F. Abdul-Shafic, Aml G. El-Tony. (2022).** Biodiversity of mites in mango orchards (*Mangifera indica* L.) and evaluation of some mineral and essential oils against *Cisaberoptus kenyae* Keifer (Acari: Eriophyidae) management. *Acarologia* 62(1): 130-142.

- **Second Place:** Dr. Aida Abdel Aziz Abdel Wahed

**Title:** Hesham R. El-See, Nehal Eid, **Aida A. Abd El-Wahed**, Mostafa E. Rateb, Hanan S. Afifi, Ahmed F. Algethami, Chao Zhao, Yahya Al Naggari, Sultan M. Alsharif, Haroon Elrasheid Tahir, Baojun Xu, Kai Wang and Shaden A. M. Khalifa. (2022). Honey Bee Products: Preclinical and Clinical Studies of Their Anti-inflammatory and Immunomodulatory Properties. *Front. Nutr.* 8:761267.

- **Third Place:** Prof. Wedad Khafagi

**Title:** Esmat Hegazy, **Wedad Khafagi** and Essam Agamy. (2022). Arthropod fauna of *Thymelaea hirsuta* in the Egyptian western desert, with a special reference to *Olpium kochi*. *Egyptian Journal of Biological Pest Control.* 32:41.

#### **Winners for 2023:**

- **First Place:** Dr. Hend Omar Mohamed

**Title: Hend O. Mohamed, A. H. ElHeneidy and Hassan F. Dahi. (2023).** Impact of egg mass layers and scale thicknesses of fall armyworm, *Spodoptera frugiperda* (Lepidoptera: Noctuidae) on the parasitic performance of *Trichogrammatoidea bactrae* (Hymenoptera: Trichogrammatidae). *Egyptian Journal of Biological Pest Control,* 33:89.

- **Second Place:** Prof. Dalia Adly

**Title: Dalia Adly, Halima Mahmoud Ibrahima and Abd El-Hamed Mohamed Salleh. (2023).** Synergistic effects of *Aphidius colemani* (Hymenoptera: Aphidiidae) and *Coccinella undecimpunctata* (Coleoptera: Coccinellidae) releases for the biological control of *Diuraphis noxia* in wheat fields. *Biocontrol Science and Technology,* 33:12, 1105-1120.

- **Third Place:** Prof. Soha Abdallah Mobarak

**Title:** Heba Y. Ahmed, Randa A. Kandil and **Soha A. Mobarak. (2023).** How does Acetylcysteine

Compound Affect the Shell of Land Snails?. International Journal of Agriculture & Biology, 29 (2) 127-132.

#### Winners for 2024:

- **First Place:** Prof. Dalia Adly

**Title:** **Dalia Adly** and Ahmad Said Sanad. (2024). Comparative evaluation of biological control programs and chemical pesticides for managing insect and mite pests in cucumber greenhouses: a sustainable approach for enhanced pest control and yield. Egyptian Journal of Biological Pest Control, 34: 42.

- **Second Place:** Prof. Wedad Khafagi

**Title:** Esmat Hegazi and **Wedad Khafagi**. (2024). Host-instar selection, interspecific competition, and reproductive capacity of extant and novel parasitoids (Hymenoptera: Braconidae) on Egyptian cotton leafworm. Egyptian Journal of Biological Pest Control. 34:10.

- **Third Place:** Dr. Suzan Mohamed Saad Badr

**Title:** **Suzan M. S. Badr** and Aziza A. M. Darwish. (2024). Anatomical and cytological studies on the cotton leafworm *Spodoptera littoralis* (Boisd.) larva infected with some bio-insecticides. Journal of Umm Al-Qura University for Applied Sciences, 10:245-256.

#### Active Participation in the Geneva International Conference on Banning Hazardous Pesticides, Iraq

The Ministry of Agriculture has confirmed its active participation in the international conference held at the International Conference Centre (CICG) in Geneva, Switzerland, dedicated to discussing the ban of hazardous pesticides and their impacts on public health and the environment. This participation was made under the direction of the Minister of Agriculture, Dr. Abbas Jabur Al-Maliki, with the ministry represented by Mr. Tamkeen Al-Hadraawi, Deputy Director General of Plant Protection, and Dr. Mustafa Al-Taie, Director of the Agricultural Services Department and the Ministry's representative to the Stockholm and Rotterdam Conventions. The conference included specialized discussions on banning several highly hazardous chemical pesticides such as **Chlorpyrifos**, **Iprodione**, and **Paraquat**, due to their documented negative impacts on both the environment and human health. The Ministry reaffirmed its commitment to continued cooperation with international and national bodies to ensure the safety of the agricultural and environmental sectors, in alignment with scientific standards and international agreements.



## The Iraqi Ministry of Agriculture Announces Launch of Aerial Campaign to Combat Palm Tree Pests in Six Provinces

Baghdad, 1/6/2025 INA, Amina Alsalami

The Ministry of Agriculture announced on Sunday the launch of an aerial campaign to combat palm pests in six provinces, while also noting the distribution of pesticides for ground-based pest control across all provinces.



Deputy Minister of Agriculture, Mahdi Saher Al-Jubouri, told the Iraqi News Agency (INA): “The Plant Protection Directorate is conducting an aerial pest control campaign targeting Dubas insects and other agricultural pests on palm

trees in the provinces of Wasit, Diyala, Baghdad, Babylon, Karbala, and Najaf Al-Ashraf.” He explained that “the campaign targets date palm groves suffering from high infestations of the Dubas insect, the aerial spraying will be conducted in those provinces, in addition to the distribution of pesticides for ground-based control throughout all Iraqi provinces.”

Al-Jubouri urged orchard owners to “visit agricultural units or provincial agriculture directorates to receive pesticides for combating Dubas insects and palm pests, free of charge.” He emphasized that “palm tree care represents a significant economic priority for farmers and for Iraq in general, especially since the country is considered among the leading exporters of dates worldwide.” He stressed the “importance of pest control, along with continuous care of palm trees through regular irrigation, the use of drip irrigation technologies, and the cultivation of high-quality palm varieties with appropriate spacing.”

## PUBLIC FIGURE IN THE FIELD OF ENVIRONMENT AND SUSTAINABILITY

### Imad Saad: From Engineering to Impact: 25 Years of Environmental and Social Leadership

In an era marked by escalating environmental crises and mounting challenges to sustainable development, the name Eng. Imad Saad stands out as one of the Arab world’s inspiring leaders who has seamlessly combined scientific expertise, human commitment, and long-term community impact. For more than a quarter-century, Imad Saad has dedicated his professional life to transforming the concepts of sustainability and corporate social responsibility (CSR) from theory into practice, from policy documents into institutional behavior, and from elite environmental discourse into a public awareness movement across the UAE and the Arab region.



### Pioneering Environmental Impact

Imad Saad’s professional record is exceptional. Between 2008 and 2024, he led over 29 environmental consultancy projects covering sustainability management, climate

change, CSR, environmental communication, and youth and community empowerment. His career demonstrates how environmental values can be operationalized within public and private institutions by integrating frameworks such as the Global Reporting Initiative (GRI) for sustainability reporting, ISO 26000 for social responsibility, the EFQM model for institutional excellence, and SROI and ESG for measuring social and environmental impact. He is not merely a technical expert or academic consultant, but a field practitioner who has enabled over 5,000 professionals across various sectors to embrace sustainability not just as a policy requirement, but as an institutional and ethical value.

### **Beyond Files: Humanizing Environmental Media**

Imad Saad's influence transcended the technical field to become a powerful Arab voice in scientific environmental communication. He founded numerous pioneering media initiatives, including:

- *Al-Morshed Al-Zira'i* (The Agricultural Guide), the UAE's first agricultural extension magazine (1998–2010, issued by Abu Dhabi Municipality)
- *Environmental Affairs Magazine*, the first environmental magazine in the UAE (1998–2002, issued by the Friends of the Environment Society)
- *The Little Environmentalist*, the first environmental awareness program for children in the UAE and the Arab region (2001–2011)
- *The Blessed Tree*, the first scientific journal dedicated to date palm research in the UAE (2009–2025, issued by the Khalifa International Award for Date Palm and Agricultural Innovation).

Most importantly, he established the Abu Dhabi Environment Network, now one of the region's leading Arabic-language digital platforms dedicated to localizing knowledge on environment, sustainability, CSR, and climate change. This platform is a CSR-driven initiative owned by NAYA Consulting, founded by Saad in 2012. Thanks to these pioneering projects, environmental knowledge is now more accessible in Arabic, helping shift the climate issue from the hands of experts into the realm of public opinion and civic responsibility.

### **Environment as Justice, Not Privilege**

At the heart of Imad Saad's philosophy lies a deep belief: the environment is not a luxury, but a matter of human dignity and planetary justice. He has carried this principle into international arenas, participating as an official UAE delegate in major global summits, including:

- COP26 (Glasgow), COP27 (Sharm El-Sheikh), COP28 (Dubai) and World Summit on Sustainable Development (Johannesburg, 2002)

In these forums, he has not merely echoed official statements but consistently advocated for a clear vision: climate justice must begin with local empowerment, respect for cultural diversity, and the transformation of knowledge into responsible public engagement.

### **Impact Measured in Communities, Not Just Policies**

The impact of Imad Saad is best understood through tangible figures:

- Over 200,000 students have benefited from his environmental awareness programs between 1999 and 2015
- More than 100 institutional partnerships were built across 9 Arab countries to amplify social and environmental outcomes

- Served as a jury member in dozens of environmental and CSR awards across the UAE and the Gulf
- Helped institutionalize ESG and environmental governance practices at the highest levels

Yet his most significant impact transcends institutions—his work is woven into the cultural fabric of communities through education, media, and the empowerment of vulnerable groups such as youth, people with disabilities, and volunteers.

### **Awards Don't Define the Legacy—They Reflect It**

Imad Saad has received over 12 regional and international awards—most of which sought him out, not the other way around. Among them:

- Order of Abu Dhabi, by decree of H.H. Sheikh Mohamed bin Zayed Al Nahyan, President of the UAE (2007)
- Abu Dhabi Award for Excellence in Community Service (2007)
- Arab Environmental Advocate Award, by the Arab Towns Organization (2010)
- Named among the Top 100 Most Influential Arabs in CSR for four consecutive years (2019–2023)
- Recognized among the Top 100 Arab Leaders in Sustainability (2023–2024)

But what truly distinguishes Imad Saad is that he never saw awards as goals, but as milestones on a journey of meaningful, lasting impact.

### **Impact Across the UAE and the Arab World**

The environmental and social legacy of Imad Saad in the UAE and the Arab world can be seen in:

- Raising environmental awareness at both institutional and grassroots levels
- Integrating sustainability into local policies and private sector practices
- Enriching the Arabic environmental discourse with a balanced scientific and human language
- Bridging the gaps between media and climate, and between research and field action
- Contributing to the formation of an Arab generation that considers climate responsibility a core aspect of citizenship

## **SPOTLIGHT ON INTERNATIONAL SCIENTIFIC ARTICLE AND INTERVIEW**

### **The Sweet Taste Inhibitor Lactisole Affects Aphid Feeding Behavior and Performance.**

Aphids and numerous other phloem-feeding insects primarily rely on sucrose in the phloem to locate their feeding sites. However, it is still unclear whether this sweet perception process could serve as a target for aphid control. In this study, we investigated the impact of the sweet taste inhibitor sodium salt of 2-(4-methoxyphenoxy)-propionic acid (lactisole), a widely used food additive that binds to sugar receptors, on the feeding behavior and performance of aphids. Our findings indicate that both the green peach aphid *Myzus persicae* (Sulzer) (Hemiptera: Aphididae) and the English grain aphid *Sitobion avenae* (Fabricius) (Hemiptera: Aphididae) avoided settling on an artificial diet containing

lactisole or on host plants treated with lactisole. In addition, these aphid species showed reduced weights when feeding on the artificial diet containing lactisole or on seedlings root drenched by lactisole. Furthermore, data from the electrical penetration graph revealed that *S. avenae* exhibited a greater number of phloem probes but significantly shorter mean and total phloem ingestion durations when feeding on wheat plants root-drenched by lactisole. It is worth noting, however, that root drenched by lactisole had a significant inhibitory effect on plant growth. These findings suggest that the sweet taste inhibitor lactisole may reduce aphid feeding preference and growth, offering a new avenue for aphid control strategies.]**He-He Cao<sup>1</sup>, , Ning Ban<sup>1</sup>, Zhi-Fu Liu<sup>1</sup>, Zhe Li<sup>1</sup>, Jia-Fei Tian<sup>1</sup>, Zhaozhi Lu<sup>1</sup>, , Jian-Wen Qiao<sup>2,\*</sup>, Tong-Xian Liu<sup>3</sup>**, Journal of Economic Entomology, 118(2), 2025, 568–575.] <https://doi.org/10.1093/jee/toaf027>

## RNAi Technology Emerges as Game-Changer in Fight Against Soybean Cyst Nematode

By **Christina Xie**, Editor-in-chief at AgroPages, [christina@agropages.com](mailto:christina@agropages.com)

The soybean cyst nematode (SCN) *Heterodera glycines* crisis represents one of agriculture's most persistent and costly challenges, causing \$1.5 billion in annual losses across U.S. soybean production. What makes this microscopic enemy particularly troublesome is its expanding territorial reach and its growing resistance to conventional control methods.

Against this backdrop of mounting agricultural pressure, innovative biotechnology companies are pioneering novel approaches that could fundamentally change how we combat this destructive pest. Innatrix, a North Carolina-based agricultural biotechnology firm, has developed InnaNema™, a groundbreaking solution that harnesses RNA interference (RNAi) technology to target the nematode's essential genes directly.



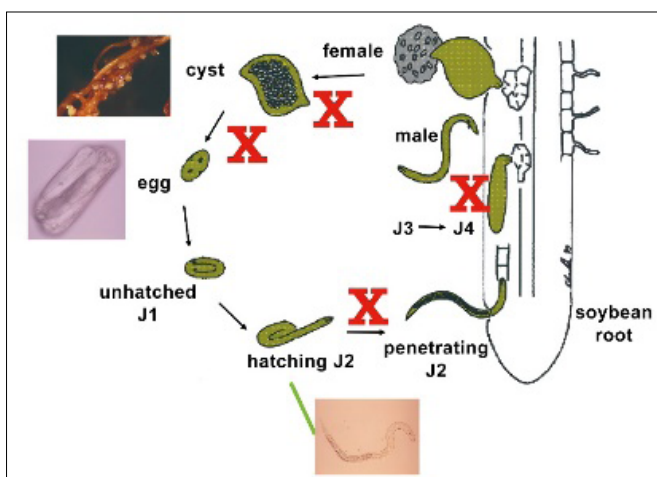
In this exclusive interview, we sat down with **Jiarui Li, CEO of Innatrix**, to explore how this cutting-edge approach works, from laboratory validation to field trials. As the agricultural industry grapples with increasing pest resistance and mounting pressure for sustainable solutions, Li's insights offer a glimpse into the future of precision agriculture. The conversation reveals not just the technical innovations behind RNAi-based pest control, but also the practical considerations of bringing revolutionary biotechnology from the laboratory to commercial deployment in America's soybean fields.

**InnaNema™, developed by Innatrix, is a RNAi-based solution for the Soybean Cyst Nematode crisis. Could you describe how you've validated its efficacy across different stages and environmental conditions?**

InnaNema™ works by silencing essential nematode genes through RNA interference (RNAi), disrupting critical stages of their development. Our greenhouse trials have consistently shown that treated plants had significantly fewer developing nematodes compared to untreated controls. This reduction leads to fewer offspring and a lower nematode population over time. Next, we have planned to conduct field trials across various soil types and environmental conditions to validate robustness.

**InnaNema™ works by silencing essential genes in soybean cyst nematodes. Could you walk us through how your team identifies and validates these genetic targets?**

In the lab, we conducted a high-throughput screen of nematode genes using dsRNA to silence them and observed their impact on nematode viability and reproduction. Genes that, when silenced, impaired nematode development or reproduction were prioritized. We then validated these targets through greenhouse and field trials, applying dsRNA to plants and confirming suppression of these genes correlated with reduced nematode counts.

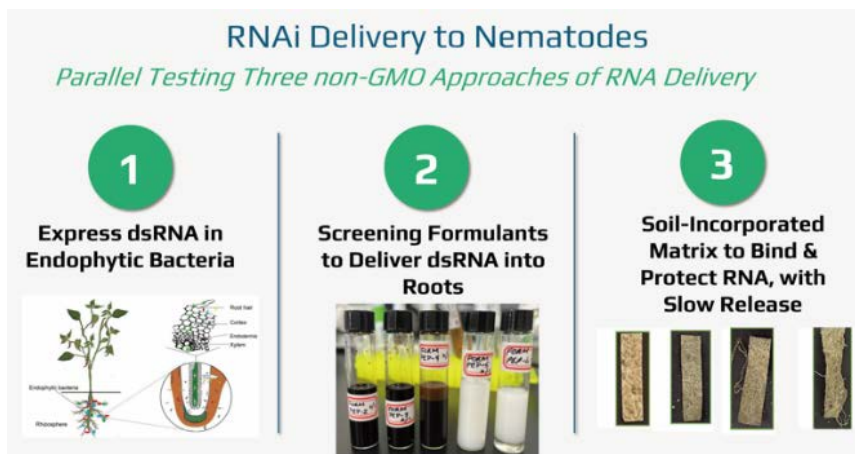


RNAi strategy to shut down nematode essential genes

Credit: Iowa State University (adapted from [http://www.plantpath.iastate.edu/html/soybeancyst/life\\_cycle.htm](http://www.plantpath.iastate.edu/html/soybeancyst/life_cycle.htm))

**You mentioned three non-GMO RNA delivery strategies: endophytic bacteria, formulants, and soil matrices. Which of these approaches do you believe holds the most promise for commercial seed treatment applications, and why?**

The treatments that hold the most promise are those that can be applied as seed treatments. Farmers already treat soybean seeds for other purposes, so adding a nematode control ingredient to existing seed treatments would be convenient and economical for farmers. We are developing ways of formulating RNA, or producing the RNA in endophytic bacteria, under conditions that will be compatible with applying the RNA as a seed treatment.

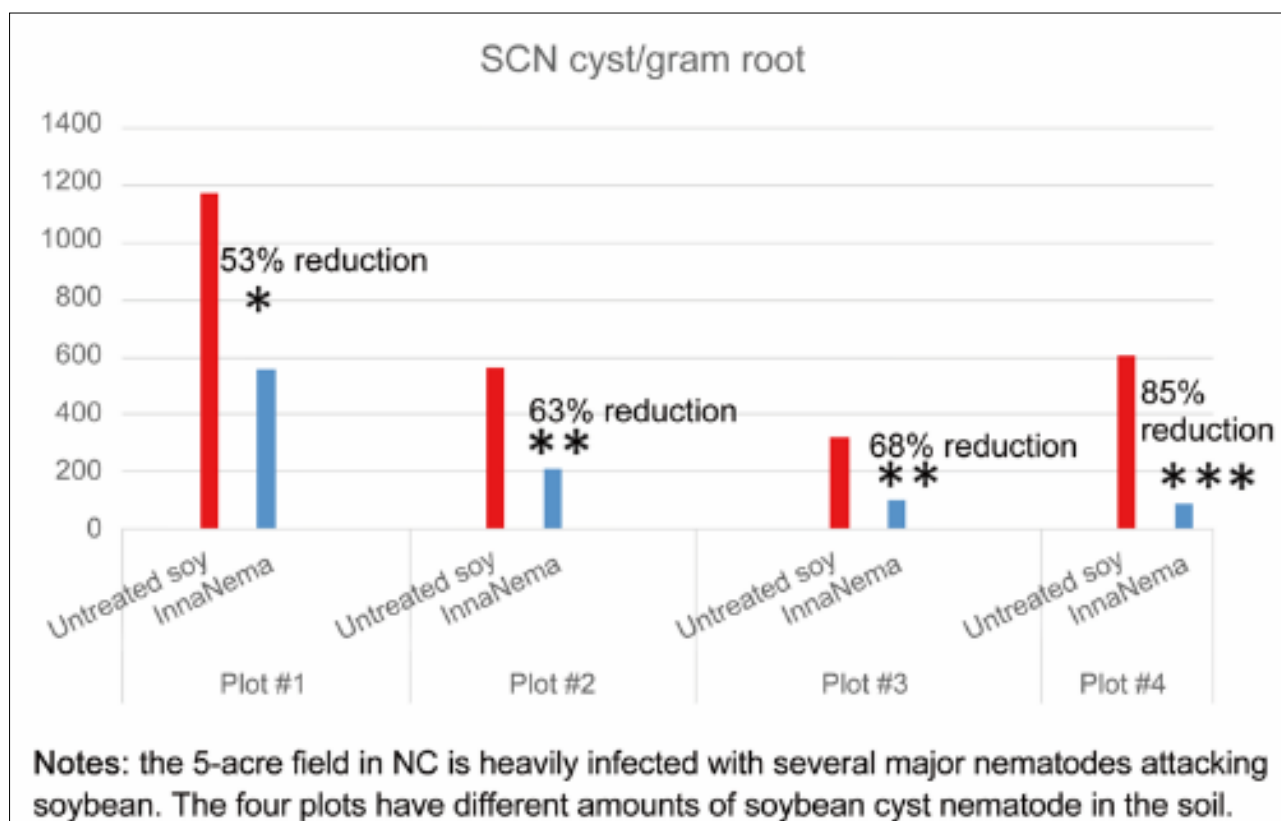


**Could you share more details about the field trials of InnaNema™ in heavily nematode-infested fields? What were the most encouraging findings in terms of efficacy and root health?**

In heavily nematode-infested fields, we applied various dsRNA formulations at planting. At harvest, we quantified nematode cysts and assessed root health. The most promising formulations significantly reduced nematode populations and preserved root integrity. These results underscore the effectiveness of dsRNA in real-world settings.

**InnaNema™ can be applied both in-furrow and as a seed treatment. What are the comparative advantages and challenges of each method, especially under diverse soil conditions?**

In-furrow application is ideal for early-stage testing of formulation efficacy due to ease of application and rapid results. However, seed treatment is preferred for commercial deployment due to its convenience and compatibility with current farming practices. The challenge lies in ensuring uniform dsRNA uptake across variable field conditions.



**RNAi Transgenic Soybeans Control Soybean Cyst Nematode Roots**

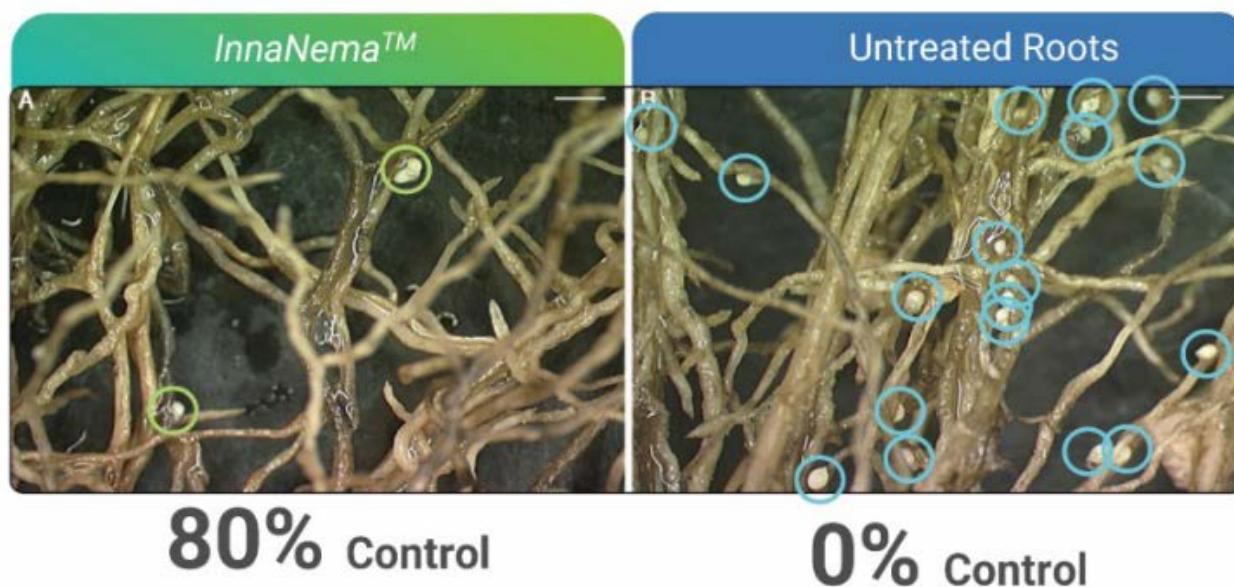
**Could you introduce the commercialization plan for InnaNema™?**

Developing a strong data set is critical for demonstrating to customers (and investors) that we have a commercially feasible product in development. As such, we are focusing on additional testing activities in 2025.

In parallel, we will be conducting the regulatory studies and activities on the latest formulation required to prepare the dossier for submission to the U.S. EPA for registration approval. In that time, we will be working closely with several preferred channel partners on efficacy testing and will sign agreements with one or more of them so that we are ready to launch the product shortly after the U.S. EPA approval.

We have identified a preferred manufacturing partner for pilot and full-scale production. Once the dossier is submitted to the U.S. EPA, we will work with the manufacturing partner to scale up our production process by the time of product launch.

Selling will occur through our channel partners. After the U.S. EPA registration, we expect to sell each product through our channel partners. We are open to various deal structures, including a license or similar models with our channel partners.



**How do you position InnaNema™ against traditional seed treatments and nematicides in terms of efficacy, cost, and environmental footprint?**

Traditional nematicides often show limited and inconsistent efficacy and can pose risks to non-target organisms. InnaNema™, by contrast, employs RNAi – a highly specific mode of action targeting SCN genes – minimizing off-target effects. Additionally, RNA is a natural, biodegradable molecule, making InnaNema™ a more environmentally friendly option that can complement other integrated pest management strategies.

**Looking ahead 5-10 years, what is your vision for the role of RNAi in integrated pest and pathogen management, especially in row crops like soybeans?**

RNAi provides a novel method for controlling nematodes. This is critical to farmers because nematodes are developing resistance to existing control methods. RNAi can be combined with other products with different modes of action so that nematodes can continue to be controlled, and will be less likely to develop resistance. RNAi has the additional advantage that it is highly specific for the pest, and will not affect other living things, meaning that it will contribute to the movement towards sustainable agriculture.

**A permission was granted by Christina Xie, Editor-in-Chief at AgroPages to publish the interview in ANEPPB**

### 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

National Center for Prevention & Control of Plants & Animal Diseases, in the Kingdom of Saudi Arabia, is a Governmental centre specialized in protecting the plant and animal wealth from pests and diseases to ensure the safety of animal and plant production. The center aims to enhance food security and support the sustainable agricultural development in all regions of the Kingdom.

#### National Objectives, Polices & Strategies for a Sustainable Plant Health

WEQAA Centre works on applying and implementing the approved policies for controlling plant pests and animal diseases through taking preventive and therapeutic actions to ensure the health and sustainability of plants and animals, and enhance the private sector participation in this field. The Centre also makes great efforts to achieve the strategic objectives, including:

- » Promoting plant health to protect the plant wealth and control risks of pests and diseases.
- » Upgrading the efficiency of early warning and emergency response.
- » Establishing an integrated construction to control animal diseases and their vectors in accordance with the One Health Approach.

The Centre includes five Main Sectors playing the essential role in maintaining environmental sustainability. One of these Sectors is the Plant Health Sector, which works on:

- » Protecting the plant wealth to enhance food security.

- » Promote biodiversity and agricultural sustainability.
- » Develop the plant's prevention actions against pests.
- » Meet the Kingdom's commitments for the International Conventions concerning the organization of the plant health actions through strategies, plans, programs, initiatives and rules to:
- » Raise the performance efficiency of Integrated Plant Pest Management.
- » Implement the plant health actions, measurements, and agricultural quarantine regulations.
- » Monitor the plant pests.
- » Organize and follow up on plant health income trading.
- » Rehabilitate the plant health services providers in order to practice their businesses.

### **Biocontrol.. Method for protecting the environment.**

WEQAA Centre has launched the integrated plant pest control actions in order to:

- » Protect the plant wealth.
- » Enhance agricultural sustainability.
- » Promote health and biodiversity.
- » Contribute to achieving the national strategic targets of biotechnology and agriculture improvement.

The biocontrol contributes to controlling plant pests and animal disease risks. It supports the implementation of strategic programs and applies the Integrated Plant Pests Management programs. It helps reduce reliance on chemical pesticides.

For this purpose, the Biocontrol & Bumblebee Production Centre was launched in mid-2023 in Al Qassim Province. It aims to:

- » Function of the biocontrol.
- » Produce the Beneficial organisms.
- » Develop the relevant techniques to raise the efficiency of Plant Pests Management.
- » Consolidate the partners' confidence in the biocontrol role to be enabled as an alternative to chemical pesticides.



## Biocontrol & Bumblebee Production Centre

The main functions entrusted to Biocontrol & Bumblebee Production Centre are to develop the methods which:

- » Support the biocontrol and bumblebee production.
- » Determine the integrated plant pest management programs and plans.
- » Limit the domestic beneficial organisms and classify them according to their types (predators, parasites, Microorganisms).
- » Provide technical support to register the beneficial organisms.
- » Present the scientific opinions to analyse the risks.
- » Monitor and follow up on the beneficial organisms.
- » Participate in issuing permissions for laboratories, biocontrol, and bumblebee production centres.
- » Support the relevant Sides for monitoring actions.
- » Coordinate with relevant Sides for issuing the importation and exportation permissions.
- » Provide technical support for following up with the service providers who work on producing beneficial organisms and bumblebees.
- » Establish a database to register the organisms.
- » Provide technical support consistently for all the official and unofficial Sides, companies, institutions, agricultural societies and individuals about the subjects related to biocontrol and bumblebees.
- » Keep following up on any recent developments.



## Impact, Achievement and Specialization represented by the Plant Health Sector

The Plant Health Sector aims to reduce reliance on using chemical pesticides for controlling economic pests. Great efforts are made to raise the efficiency to protect the plant wealth through consolidating a system to follow up and monitor the plant pests and diseases. Undoubtedly, these efforts have shown a clear impact and a big achievement in keeping agricultural sustainability and controlling losses resulting from plant pests. The experts and specialists in the Sector work on:

- » Developing methods in order to face the risks which threaten agricultural production.
- » Applying the plant health actions stated in the international conventions.
- » Reducing waste in agricultural production to be improved in accordance with the international standards, which support food security and ensure the sustainability of plant health.



### **Red Palm Weevil Control by National & Institutional Efforts**

The red palm weevil is one of the dangerous insects which threaten date palms in the Kingdom of Saudi Arabia. The first emergence of this insect was registered in 1987. Since that time, it has posed a real danger to the national agricultural wealth. In view of the fact that the palms have a social, economic and nutritional value in the Kingdom so that, the Ministry of Environment, Water & Agriculture has taken the initiative to adopt the method of integrated management to prevent and control this pest. Actually, these efforts have shown tangible results in reducing the infection rate from 7% in 1993 to 1% currently.

Within the framework of enhancing the scientific efforts to take advantage of the international experiences, the Ministry of Environment, Water & Agriculture has established technical partnerships with Food & Agriculture Organization of the United Nations (FAO). The Ministry makes all the effort to develop a national strategy based on the best international practices to be fully prepared for facing the increased challenges against the plant pests.

In 2015, the Red Palm Weevil Developed Program was launched, engaging the relevant governmental sides. Accordingly, a Permanent Committee, which includes members from all the relevant Sides, has been formed. It has several Coordinating Committees all over the regions of the Kingdom. These Committees work on supervising the implementation of the field control actions. Also, a decree has been issued for both big and small farmers to bear the costs of plant pest control under a well-established mechanism.

In 2022, a decree was issued to transfer the competencies and tasks related to the plant pests' prevention and control from the Ministry of Environment, Water & Agriculture to WEQAA Centre, to become the Executive and Technical Side specialized in administering the field prevention and control efforts. In fact, this decree has marked an important regulative step that has enhanced the institutional performance effectiveness and has contributed to improving the field and technical works.

In furtherance of these efforts, WEQAA Centre works to achieve the national transformation program targets through a quality initiative titled "Red Palm Weevil Prevention & Control". This initiative has successfully raised the efficiency of prevention and control in all regions of the Kingdom. A series of specialized operative projects had been implemented that achieved 67 of indicators. At the end of 2024, it was concluded after achieving its objectives completely.

In order to improve the field performance and develop the executive tools, WEQAA Centre is currently leading overall developmental efforts that include: establishing a national comprehensive executive plan to prepare various executive plans for each region

in accordance with the level of infection to ensure the optimal distribution of resources. The Procedural Guide of Integrated Red Palm Weevil Management. It is an integrated technical guide including serial operative protocols with illustrative pictures. It contains all the stages of control, from detection to treatment. The awareness and training programs have witnessed significant development and advancement to provide a highly valued education for agronomists, technicians, and farmers. Besides, periodic mechanisms have been activated for monitoring and evaluation to ensure the quality of implementation and continuity of improvement.

At the technical level, the program depends on the overall periodic inspection according to the targeted farmers' groups. An alternative to the indiscriminate use of preventive spraying, therapeutic methods have been developed to use the 'Aluminium Phosphide'. This type of pesticide has shown the highest efficiency in eradicating all insect life cycles without leaving any harmful residues. Accurate protocols have been prepared for occupational safety that include: using an insulating uniform, restricting the use of pesticide trading, applying the technique of intralesional injection and scraping in accordance with the nature of infestation and the level of its size.

With this integration between the legislative, technical and institutional sides, and by virtue of the close cooperation between the National and International Sides, the Kingdom of Saudi Arabia continues in making its efforts to protect the date palms against the plant pests and establish an integrated model to be followed regionally and internationally in the field of pests' management in order to enhance the plant security.

### **Plant Health. An International Effective Presence to share the achievements and experiments**

WEQAA Centre works on enhancing its role in preserving plant health through participating in the international agricultural annual events. One of those events is the International Day of Plant Health. In this event, several activities, awareness exhibitions, and technical workshops are held to highlight the Kingdom of Saudi Arabia's efforts in the field of protecting the plant wealth to ensure the sustainability of food security. These events actually have the main role to:

- » Raise societal awareness.
- » Devote to the culture of preventive action.
- » Support environmental sustainability.
- » Motivate economic growth at the international and local levels.

### **Representation in the International and Regional Organizations**

The Kingdom of Saudi Arabia strives to:

- » Provide a lot of information related to the plant pests.
- » Provide means of effective communication with the international and regional sphere, trading partners, and international groups that have knowledge about plant health in the Near East.
- » Facilitate the cooperation between experts.
- » Motivate the action via a high-speed communication network.
- » Build the technical and institutional capacities in the field of plant health prevention.

WEQAA Centre is a representative of the Kingdom in several organisations and international and regional conventions, as follows:

- » Near East Plant Protection Organization (NEPPO).
- » International Plant Protection Convention (IPPS).
- » Agreement on the Application of Sanitary and Phytosanitary Measures (SPS) of the World Trade Organization (WTO).
- » The Commission for Controlling the Desert Locust in the Central Region (CRC).

WEQAA Centre, through the representation in those Global Sides, contributes to:

- » Determining the vision.
- » Establishing the strategic objectives in coordination with the organization's members.
- » Supervising the implementation of polices.
- » Providing the necessary instructions to implement the activities that comply with the objectives of Organization, Convention or Authority.
- » Enhancing the plant health to protect the plant wealth by controlling the risks of plant pests and diseases.
- » Ensuring sustainability of the food production that supports the Ministry of Environment, Water & Agriculture's system directions. Facilitating the trade movement for the plant consignments between the countries.
- » Getting acquainted with the control programs related to the plant pests that are applicable between the Member Countries.
- » Following up and reviewing the updates of international plant health standards.
- » Presenting suggestions for modifications and objections.
- » Cooperating with the International and Regional Organizations in the fields of making conventions and correspondences.
- » Holding bilateral meetings with the Member Countries by convention during the official meetings of the Commission on Phytosanitary Measures (CPM).
- » Discussing the trading obstacles for the plant consignments between the two countries, if any, in order to consolidate the cooperation with the International Organizations in the field of making conventions and bilateral meetings concerning the most prominent obstacles of the exportation and importation requirements with the Member Countries to be coordinated with the relevant centre in this regard.



## Desert Locust Control

The Plant Health Sector plays a key role in applying all the technical fields in order to monitor, detect and control the desert locust. The State of the Climate and environmental conditions are monitored in the breeding seasons through the remote sensing channels. Furthermore, the survey studies are prepared and organized in accordance with the field detection programs. All the information related to the environment and desert locust is collected to be analyzed in order to determine the level of need for the field research or for the operation of control. This operation is carried out by a large number of qualified and specialized persons. The most important pillars for controlling the desert locust are the best use of developed tools of a Geographic Information System (GIS), like RAMSES. Also, the field channels function to collect data electronically. It is a group of (eLocust3) that has been lately updated with application called (eLocust3K)<sup>1</sup>.

WEQAA Centre, represented by the Plant Health Sector, is devoted to cooperation with the Food and Agriculture Organisation (FAO) to exchange experiences and information through the Desert Locust Information Services (DLIS). This service is designed for all Countries to keep informed about the desert locust status in accordance with the level of early warning via electronic platforms, like Locust Watch<sup>2</sup> or FAO Locust Hup<sup>3</sup>. The purpose is to enhance cooperation and coordination between the Organizations, Authorities and relevant countries in the field of preventative monitoring and control.

In partnership with the Commission for Controlling the Desert Locust in the Central Region (CRC), WEQAA Center provides the logistic, material and technical support, that is necessary to achieve the best practices in controlling the desert locust in the Member Countries, and to create specialized and shared projects and training programs which contribute to developing the technicians' skills and experiences. These activities are held constantly to discuss all the challenges related to developing and rehabilitating the National Centres. These activities contribute to early controlling the pests and preventing their increase, which can probably cause a breakout. In this case, it is hard to control the breakout of pests during the seasons in the north-east Africa and the Horn of Africa countries. Additionally, the permanent communication with the Commission for Controlling the Desert Locust in the Western Region (CLCPRO) aims to provide advanced solutions in the field of recent techniques that support monitoring through remote sensing and in the field of biological pesticides to be friendly to the environment and to be an alternative to chemical ones.

### WEQAA Center Actions for monitoring the Plant Pests

Experts and specialists are devoting all their research and studies to :

- » Enhance the plant health.
- » Protect the plant wealth.
- » Control the risk of pests and raise the early warning efficiency and emergency response.

So, a national integrated plan has been established to monitor the plant pests in the Kingdom of Saudi Arabia, which has been expanded from 2025 to 2027. This plan aims to develop an effective monitoring system to detect plant pests and ensure a fast response in accordance with the International Standards of Plant Health and national legislations and systems.

1. It is an innovative tool for crop pest control designed to improve early warnings by enabling rapid detection of desert locust outbreaks and the green vegetation that is likely to become sites of locust infestations

2. Locust Watch is FAO's one-stop shop for all information related to the desert locust. The portal offers timely forecasts and early warnings to prevent and address the spread of desert locust, along with a wealth of resources and archives dating back to 1975.

3. It is the authoritative repository for desert locust data managed by FAO. The data is updated frequently with the latest observations from the field

The plan focuses on monitoring (61) targeted pests, implementing (30) programs to monitor agricultural quarantine pests, and (22) programs for non-quarantine pests subject to regulation. Furthermore, preparing specific programs for pests that are economically significant, the detailed technical evidence of pests that affect promising crop production in the Kingdom, guidance on Fall armyworm (*Spodoptera frugiperda*) and guidance on coffee pests. These efforts are necessary to protect the strategic crops. These programs and evidence, which are applied in different agricultural natural regions in the Kingdom, have included wide field efforts to determine the sites of plant pest outbreaks, analyse their data, and react to the monitoring results flexibly and efficiently.



The plan has also contributed to preparing specialised diagnostic evidence, establishing qualified technical teams in the field of diagnosis and case reporting. For this purpose, a national platform has been created for electronic pest reporting. On the other hand, the continuous training courses play a crucial role in improving the efficiency of the inspectors and monitors.



These efforts are strongly required to face the challenges, such as climate change, increased trade movement, and pests affecting agricultural production and food security. From this perspective, the WEQAA Centre has played a key role in:

- » Coordinating the national response.
- » Determining mechanisms to monitor the size of the pest outbreak.
- » Linking the monitoring data.
- » Assessing risks.
- » Intensifying the awareness among farmers.
- » Enhancing the digital infrastructure of the data analysis system.

WEQAA Centre works actively on expanding its international and regional partnerships. It has a cooperation with:

- » International Plant Protection Convention (IPPS).
- » Food & Agriculture Organization of the United Nations (FAO).
- » Near East Plant Protection Organization (NEPPO)
- » European & Mediterranean Plant Protection Organization (EPPO).
- » Arab Organization for Agricultural Development (AOAD).
- » other international and local partnerships, Governments, Authorities and Centres in Countries like: (France, Taiwan, Vietnam, Philippines, Austria, Morocco, Tunisia, Australia and others). Actually, the purposes of these partnerships are to exchange experiences, to build capacities and to develop prevention and monitoring tools.

WEQAA Centre has experience in implementing the plant pests monitoring plan that has expanded from 2025 to 2027. These experiences demonstrate the importance of planning in the long run, the importance of establishing national specialised persons, and activating international cooperation to protect the plant wealth and enhance security in the Kingdom of Saudi Arabia.

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### National Campaign for the Integrated Management of Olive Trees in Jordan

The olive crop is considered one of the most important agricultural products in the Hashemite Kingdom of Jordan. It is cultivated over large areas, and the Ministry of Agriculture, along with supporting institutions, provides full support to farmers to enhance the production and quality of olives and their products, including olive oil and processed goods.



Every year, the Ministry of Agriculture organizes various national campaigns, implemented by the Plant Protection and Phytosanitary Directorate, to control pests

that appear at different times of the year such as the olive fruit fly, olive knot disease, olive leaf weevil, and scale insects. The Directorate of Olives also plays a role in expanding the cultivation of this blessed tree and increasing its planting area by offering support for its development.

To highlight the significance of this crop, we present useful information to share with interested parties in Arab countries for their benefit and to showcase Jordan's role in supplying local, Arab, and some European markets with this vital product, produced in compliance with all safety standards and organic agriculture principles.

#### Key Facts:

- » **Planted Area:** Olive trees constitute 72% of tree farms in the Kingdom, covering 600,000 dunums (1 dunum = 1,000 m<sup>2</sup>)

- » **Number of Trees:** 11 million olive trees
- » **Farming Types:** 60% rainfed, 40% irrigated
- » **Annual Production:** 165,000 tons (20% for table olives), with an average olive oil production of 25,700 tons annually
- » **Infrastructure:** 147 licensed olive presses with 332 production lines; total processing capacity is 504 tons/hour

**To produce a high-quality product, free from pesticide residues, the following actions are taken:**

- » Limiting the spread of the olive fruit fly across the Kingdom through:
  1. Pest monitoring and surveillance
  2. Using appropriate pest control methods (e.g., food and attractant traps, least residue pesticides)
- » Monitoring the crops during processing (including harvest timing, method, packaging, and transportation)
- » Post-harvest monitoring (storage methods and stacking at presses)
- » The Ministry implemented 19 field schools and field days in olive growing areas, focusing on agricultural and service programs and pest control, the most important of which is the olive fly, for which sticky and food traps are distributed along with their supplies.
- » Distributing information leaflets and showing videos about agricultural operations, oil, and other activities.

**Partners:**

- » Jordanian Ministry of Agriculture (Directorate of Plant Protection and Health, Agricultural Extension Sector, Directorate of Olives, National Agricultural Research Center, Directorate of Farmer Extension Programs), General Farmers' Union, General Syndicate of Olive Press Owners and Producers of Olive Oil in Jordan and Agricultural Engineers Syndicate

**Plan Components:**

- » Pest control axis, Extension/awareness axis, Supplies provision axis, Legislative/regulatory axis



## New Brochures

### Mediterranean Fruit Fly and other Fruit and Vegetable Fly Species: Problems and Proposed Solutions (Tephritidae–Drosophilidae)

Dr. Ibrahim Al-Jboory, member of the ASPP Executive Committee, has published a new 60-page brochure entitled "Mediterranean Fruit Fly and Other Fruit and Vegetable Fly Species: Problems and Proposed Solutions (Tephritidae–Drosophilidae)".

The brochure covers the most important fruit fly species in the region, including *Ceratitis capitata*, *Bactrocera zonata*, *B. oleae*, *B. dorsalis*, *Zeugodacus cucurbitae*, *Carpomya incompleta*, *Mayiopardalis pardalina*, and two *Drosophilidae* species: *Zaprionus indianus* and *Drosophila suzukii*. It focuses on their identification, economic importance, and management strategies. A special section is dedicated to fruit flies in the GCC countries, with particular emphasis on the Sultanate of Oman. <https://asplantprotection.org>



### Climate Change and its Role in the Emergence of Latent Pests on Palm Trees in Algeria and Southern Tunisia. The False Seed Bug is an Example.

In the second half of June 2025, a number of Algerian farmers issued a distress call about a population explosion of an insect they called "Weshwash". This pest attacks vegetables, grasses, greenhouses, and short fruit-bearing date palms whose fruits touch the ground, in some provinces of Algeria.

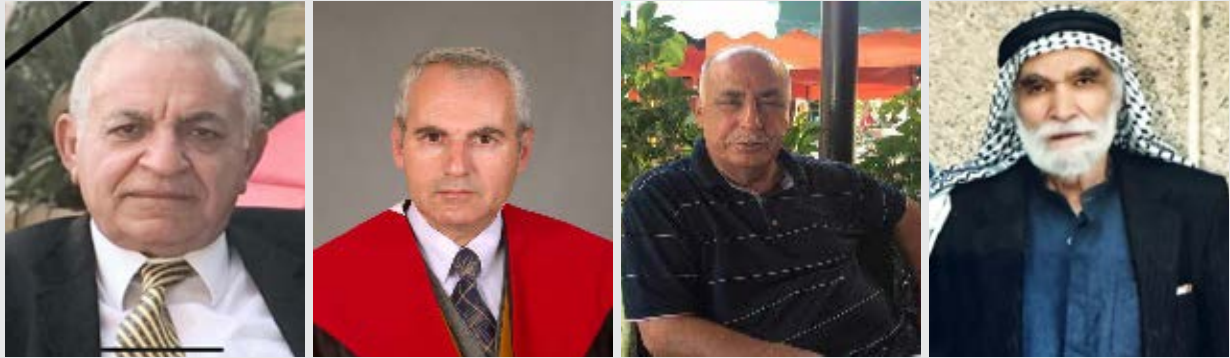
At the end of June, the insect was reported to have entered southern Tunisia, in Tozeur Governorate, where it appeared in three delegations: Hazoua (on the border with Algeria), Nefta, and Tozeur. It began spreading gradually, with its direct impact initially limited to grasses and short date palms (*Nashou*) whose fruits are close to or touching the ground, but later it even infested tall date palms.

It appears that the insect was influenced by the severe drought season in Algeria and southern Tunisia, reappearing and multiplying at a remarkable rate in both countries. This caused panic among farmers and residents of farms and nearby towns. Communication with specialists in Libya confirmed that the insect appeared in Aljefra on date palm fruits and weeds.

The potential bugs ***Nysius cymoides* (Spinola, 1837) (Hemiptera: Lygaeidae)**, which was recorded as a secondary pest in Algeria and Tunisia, resurge as a key pest on the short palms and other crops in the southern parts, warning the plant protection authorities in both countries to set up emergency control measures supporting the farmers to face this pest. A quick collaboration between two ASPP members, **Dr. Ibrahim Al-Jboory and Dr. Anis Zouba**, followed up on the insect situation and submitted a final report to the authorities, as well as published an extension brochure including all the details on the insect, distribution, description and management.



## Condolences, Plant Protection Scientists



The Arab Society Executive Committee and members extend their deepest condolences to the families, colleagues, and friends for the loss of **Dr. Ibrahim Shaaban Al-Saadawi, Dr. Tawfiq Al-Antari, Dr. Baqir Abd Khalaf Al-Jubouri and Dr. Mohammed Ammar Al-Rawi**, the distinguished scientists in the field of Plant Protection, whose dedication and lifelong contributions have left a lasting impact on agricultural science and the protection of our crops and environment.

Through their pioneering research, mentorship, and tireless efforts, they have advanced knowledge, inspired generations of scientists, and strengthened food security in our region and beyond. We honour their legacy and the invaluable role they played in building a more sustainable and resilient agricultural future. May their souls rest in peace, and may their memory continue to guide and inspire all of us in the pursuit of scientific excellence.

## The Pest Report

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- » Shaping the Future of Plant Protection with Biocontrol Agents and many more.

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## Selected Research Papers

- » **Imidacloprid Resistance Challenges in Brazilian Strains of *Drosophila suzukii* (Diptera: Drosophilidae).** Felipe Andrezza, Flávio Roberto Mello Garcia, Pedro Bento da Silva, Lucas Bretas Barbosa, Joel Marques de Oliveira, Gabriel Netto Araújo and Eugenio E. Oliveira, *Insects* **2025**, 16(5), 494, 2025. <https://doi.org/10.3390/insects16050494>
- » **Population composition and virulence of *Puccinia striiformis* f. sp. *tritici* in Kazakhstan.** Shynbolat Rsaliyev, Aralbek Rsaliyev, Rakhim Urazaliev, Saltanat Dubekova, Akerke Serikbaykyzy, *Plant Protect. Sci.*, 61(2):152-161, 2025. [DOI: 10.17221/16/2024-PPS](https://doi.org/10.17221/16/2024-PPS)
- » **Toxicity effect of *Ricinus communis* methanolic extracts against *Bactrocera cucurbitae* (Diptera: Tephritidae).** Sadia Manzoor, Rasheed Akbar, Afaq Hussain, Amjad Ali, Brekhna Faheem, Maid Zaman, Abid Farid, Ijaz Hussain, Imtiaz Ali Khan, Kahkashan Perveen, Najat A. Bukhari, Jianfan Sun, *Plant Protect. Sci.*, 61(1):77-88, 2025. [DOI: 10.17221/46/2024-PPS](https://doi.org/10.17221/46/2024-PPS)
- » **The Baluchistan Melon Fly, *Myiopardalis pardalina* Bigot: Biology, Ecology, and Management Strategies.** Junyan Liu, Yidie Xu, Mengbo Guo, Kaiyun Fu, Xinhua Ding, Sijia Yu, Xinyi Gu, Wenchao Guo, and Jianyu Deng, *Insects*, 16(5), 514, **2025**. <https://doi.org/10.3390/insects16050514>
- » **Strategies to Mitigate the Adverse Impacts of Viral Infections on Honey Bee (*Apis mellifera* L.) Colonies.** Ivana Tlak Gajger, Hossam F. Abou-Shaara, and Maja Ivana Smodiš Škerl, *Insects*, 16(5), 509, 2025]. <https://doi.org/10.3390/insects16050509>
- » ***Alternaria* and *Curvularia* leaf spot pathogens show high aggressivity on watermelon, and are emerging pathogens in cucurbit production.** Cristina Paredes-Machado, Verë Lindë Bogaj, Viktor Papp, Gábor Balázs, David Papp, *Phytopathologia Mediterranea*, Vol. 64 No. 1, 2025. DOI: <https://doi.org/10.36253/phyto-15955>
- » **Orange oil postharvest dips for control of grey mould (*Botrytis cinerea*) of plums and strawberries, and green mould (*Penicillium digitatum*) of citrus.** Ncumisa Njombolwana-Swartz, Julia Meitz-Hopkins, Sara Monteiro, Cheryl Lennox, *Phytopathologia Mediterranea*, Vol. 64 No. 1, 2025. DOI: <https://doi.org/10.36253/phyto-15613>
- » **First molecular characterization of pepper chat fruit viroid infecting pepper crops in Turkey.** Selin Ceren Balsak, *Springer Nature*, Volume 132, article number 96, 2025. <https://doi.org/10.1007/s41348-025-01091-4>
- » **Efficacy of pre- and post-infectional nematode-resistant crops in managing root-knot (*Meloidogyne* species) nematodes in potatoes under field conditions.** Nyasha Chiuta, Kgabo Pofu and Phatu Mashela, *J Plant Dis Prot*, Volume 132, article number 95, 2025. <https://doi.org/10.1007/s41348-025-01089-y>
- » **Toxicity of essential oils on *Callosobruchus maculatus* (Fabr., 1775) in grains of *Vigna unguiculata*.** Ozael David Valério da Silva, Paulo Roberto Ramalho Silva, Leticia Rodrigues da Silva, Rodrigo de Carvalho Brito, Kamilla de Andrade Dutra, Daniela Maria do Amaral Ferraz Navarro, Douglas Rafael e Silva Barbosa & Solange Maria de França, Volume 132, article number 87, 2025. <https://doi.org/10.1007/s41348-025-01079-0>
- » **Genome-Wide Analysis of Cytochrome P450s in *Ustilago* Species: Annotation and Evolutionary Relationships.** Dauda, W.P., I.J. Ifeanyi, P. Abraham, C.O. Adetunji, E. Glen, D. Morumda, I.O. Ogra, G.W. Peter, S.E. Abraham, C. Chukwu, N.J. Dasoem, M.I. Luka and M.P. Abraham, *Arab Journal of Plant Protection*, 43(2): 268-275, 2025. <https://doi.org/10.22268/AJPP-001304>

## Events of interest

<b>September 7-10, 2025</b>	Agbiol, VII. International Conference on Agricultural, Biological & Life Science, Edirne- Turkey. <a href="http://www.agbiol.org">www.agbiol.org</a>
<b>October 8-11,2025</b>	9th Meeting of the IOBC-WPRS WG "Integrated Control of Plant-Feeding Mites". Izmir, Türkiye. <a href="https://iobc-wprs.org/meeting/9th-meeting-iobc-wprs-wg-integrated-control-of-plant-feeding-mites/">https://iobc-wprs.org/meeting/9th-meeting-iobc-wprs-wg-integrated-control-of-plant-feeding-mites/</a>
<b>November 16-19, 2025</b>	III. International Biological and Life Sciences Congress (BIOLIC) Megasaray Westbeach Hotel, Antalya, Turkey. <a href="http://www.biolic.org">www.biolic.org</a>
<b>January 28-29, 2026</b>	International Conference on Plant Pathology and Plant-Microbe Biology in Istanbul, Türkiye. <a href="https://shorturl.at/fmqSY">https://shorturl.at/fmqSY</a>
<b>July 20-24,2026</b>	First circular - XVII International Congress of Acarology - Montpellier, France.

## Selected pest

Due to climate change and rising temperatures, many latent pests have emerged on agricultural crops, including the cotton mealybug *Phenacoccus solenopsis*, which is currently spreading on various crops in our Arab countries. It is worth noting that controlling this pest is difficult and requires several pesticide sprays because of the dense waxy, silky secretion covering its body. One of our colleagues Dr.Mohamed Zeadan Khalaf has sent us photos of this pest, which we are sharing with you for awareness purposes.



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

Elia Choueiri (Lebanon), Ahmed Y. S. Oraby ( Egypt ) , Mokhtar Abdulsattar Arif (Iraq), Mustafa Abbas Al-Jbouri (Iraq), Mounira Inas Drais (Algeria), Reem Aboud AlKhlif (Syria), Amer J. A. Al-Gerrawy (Iraq), Karrar Abd-Alzahra Mahdi Al Abbas(Iraq), Dalia Adly(Egypt), Nacima Diab(Algeria), Hassan Khalil(Syria), Fayroz Turkey Lafta(Iraq), Aqeel Alyousuf(Iraq), ahmed boraire (Iraq), Abdulrahman Saad Aldawood (Saudia Arabia), Imad Saad(Syria), Christina Xie(China), Emad Mahmood Al-MaarooF (Iraq), Osameh Salahdin Atiya (Jordan-USA), Sara Mohammed Al-Ansari (Sultanate of Oman), Abd Alrahman Mukahal(ICARDA-Lebanon),Anis Zouba(Tunisia) AlSarai Alalawi Mamoon (FAORNE), Heba Tokali (FAO-Egypt), Yosra Ahmed (FAORNE), Lidia AbdelShahid (FAORNE),Shoki Al-Dobi(FAO-Rome, Maged Elkahky(FAO-Rome), Diane Mostert(South Africa,Altus (South Africa).

## Appreciations

The Arab Society for Plant Protection and the Editor-in-Chief of the Arab and Near East Plant Protection Newsletter extend their sincere thanks and deep appreciation to Engineer Ayman Al-Ghamdi, Executive Director of the Weqaa Centre for providing us with information and content specific to the National Centre for the Prevention and Control of Plant Pests and Animal Diseases, with the aim of enlightening plant protection staff at the Centre and its various departments. We also value the efforts of our colleagues Mr. Ahmed Al-Salman, Dr. Mohammed Al-Khuraiji, and Engineer Abdulaziz Al-Shuraida for following up on the publication of the material. We wish for the Centre to continue assuming an active and leading role in protecting crops from agricultural pests and plant diseases, through the application of the latest scientific methods, the provision of technical and advisory support to farmers, and the implementation of environmentally friendly integrated pest management programs.

I want to extend my heartfelt appreciation to Diane, Altus, and Maged for their exceptional editorial on one of the most critical diseases impacting banana crops globally. Their commitment to shedding light on the urgency of this issue is commendable. By emphasizing the necessity of heightened staff awareness among ministries and agricultural personnel, they have provided a crucial call to action. Effective management of diseases like Tr4 hinges on informed collaboration and proactive engagement. Their work not only raises awareness but also inspires a collective effort to combat these formidable challenges. Thank you for your invaluable contribution to this vital discussion.

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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