ARAB AND NEAR EAST PLANT PROTECTION NEWSLETTER

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EDITORIAL

Politics Negative Impact on Pesticides Resistance Management in Iraq

Pesticides' use in Iraq was significantly increased in the last three years without proper pests monitoring and economic threshold assessement. The Iraqi farmers, drained by the on-going conflict, were inclined to buy cheap, broad spectrum insecticides due to their limited buying power. They use high dosages and repeated applications in order to achieve a desired,level of pest control, and who often follow the advice of poorly trained people whose main interest is to sell pesticides.

Cypermethrin and Alpha-Cypermethrin have become the dominant insecticides used by the farmers in Iraq. The dealers import over 500-1000 tons of low quality insecticides annually from different cheap sources (India, China, Egypt, Jordan, Lebanon, Turkey ...etc). These insecticides have been used to control plant and animal pests.

The misuse of these two pyrethroid insecticides and others damage the agro-ecosystem completely by killing the biological control agents, (predators and parasites) and establishing resistant strains of crop pests and also cross resistance to other chemically-related insecticides. The lack of quality control measures at the country of origin, high level of impurities, unappropriate solvents used (xylen mainly), besides the frequent application of these insecticides on daily consumed crops such as tomato, cucumber, pepper, potato and leafy vegetables created health problems in the area where these insecticides have been used and this was acknowledged by the Ministry of Agriculture without referring specifically to these insecticides.

The misleading label information which are designed by the wholesalers and retailers, the pesticide mixtures prepared by retailers, in addition to cheating practices such as transferring the contents of the cheap products to another container belonging to well-known companies or importing insecticides that are less concentrated than what is mentioned on the label, is frequently observed in the present Iraqi pesticides market. The farmers, consumers, and application workers are the victims of this chaos faced daily in Iraq. This mess started in April 2003 when Iraqi borders were opened to both legal and illegal products introduction. Before that date, the National Committee For Pesticides Registration and Approval (NCFPRA) had very strict regulations which controlled pesticides import.

What is mentioned above demonstrate the damaging influence of politics on the agro-ecosystem and natural balance of pests in Iraq. This problem is now facing the Iraqi people including scientists who are very much interested and willing in finding a solution to this dilemma, which will eventually bring benefits to both consumers and farmers.

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This page is an open forum for all members of the Arab Society for Plant Protection to express their views to further develop the plant protection profession and enhance its positive role in agricultural development in the Arab and Near East Region.

DISEASE AND PEST OUTBREAKS

EGYPT

First Report of Stemphylium Leaf Blight of Onion Caused by *Stemphylium vesicarium* in Egypt. In 2004, onion plants (*Allium cepa* cv. Giza 6) in several commercial fields in upper Egypt (Assiut), exhibited symptoms of blight on the leaves and seed-stalk. Initial symptoms on leaves consisted of tip necrosis followed by small white and/or large purple spots. A fungus was consistently isolated from diseased tissue and identified as *Stemphylium vesicarium*, based on morphological characteristics. Conidiophores were pale to medium brown with dark bands, smooth or minutely verruculose and conidia oblong to ovoid, densely verrucose with 1–5 transverse and several longitudinal septa, 13–21 × 25–40 μm. Ascomata forming in culture contained hyaline, biunicate, clavate asci with 8 ascospores that were light to medium brown, ellipsoidal, verrucose with 5–7 transverse and several longitudinal septa, usually in incomplete series, 9–17 × 17–46 μm. To confirm the pathogenicity of 15 isolates, inocula were prepared by growing isolates on potato dextrose agar at 27°C for 15 days, and inoculated plants reproduced the original symptoms.. The pathogen is widespread in Asia and Europe and has been recorded previously on onion plants in South Africa. It can cause severe damage especially to the onion seed crop with losses of up to 80–85% by affecting leaves and seed-stalk. This is the first report for Egypt. [M. H. A. Hassan, A.D.A. Allam, K.A.M. Abo-Elyousr and M.A.M. Hussein (Egypt). Plant Pathology, 56(4): 724-724, 2007].

IRAN

First Report of *Banana bunchy top virus* Infecting Banana in Iran. Banana bunchy top disease is one of the most serious diseases of bananas (*Musa* spp.) worldwide. The disease is caused by *Banana bunchy top virus* (BBTV), the type species of the *Babuvirus* genus; (family *Nanoviridae*). The genome of BBTV is comprised of at least six circular single-stranded DNA (ssDNA) components, each approximately 1 Kb in size. Symptoms of BBTV infection include plant stunting, foliar yellowing and most characteristically, dark green streaks on the pseudostem, petioles and leaves. From 2004 to 2006, a series of field surveys were conducted in the major banana-growing areas in Iran: Mazandaran province (Sari, Babol, Behshahr, and Ghaemshahr) in the north and Hormozgan province (Jask and Varz-Abad) in the south. A total of 164 banana plant samples with bunchy top, stunting and leaf samples with green streak symptoms were collected. Samples were tested for the presence of BBTV with a double-antibody sandwich enzyme-linked immunosorbent assay (DAS-ELISA) using positive control and polyclonal antibodies against BBTV, according to the supplier's instructions (Bio-Rad). Of the samples tested, 27 were positive for BBTV using DAS-ELISA. To confirm BBTV identification, polymerase chain reaction (PCR) was carried out using samples that previously tested positive by ELISA. Forward (F3) and reverse ([FPCR4) primers were used to amplify complete BBTV DNA-1. PCR analysis showed fragments of approximately 1 Kb in 19 samples. Furthermore, using primer pairs designed to differentiate BBTV strains, Iranian BBTV isolates were divided into two distinct strains. This is the first report of the occurrence of BBTV in Iran. [K. Bananej, T. Ghotbi and A. Vahdat (Iran). Plant Pathology, 56(4): 719, 2007].

Occurrence of Alfalfa Bacterial Stem Blight Disease in Kurdistan Province, Iran. During spring and summer of 2004 and 2005, a new disease of alfalfa was observed for the first time in some areas of the Kurdistan province in Iran. Symptoms were initially yellowed area on leaves, within which water-soaked, irregular spots developed. These spots eventually coalesced to produce large necrotic areas. Symptoms on petiole and stem include water-soaked lesions, which later turned brown. Gram negative and rod-shaped bacteria were isolated from infected tissues. From the results of LOPAT tests (levan production, oxidase reaction, potato soft rot, arginine dihydrolase and tobacco hypersensitivity) and other phenotypic, biochemical and physiological properties investigated, the causal bacterium have been identified as *Pseudomonas syringae* pv. *syringae*. Pathogenicity of selected strains was confirmed by injecting a bacterial suspension into leaf tissue from the underside of leaves. [B. Harighi (Iran). Journal of Phytopathology, 155(10): 593-595, 2007].

IRAQ

A New Record for Heavy Infestation by Dubass Bug on Date Palm Trees in Western Regions of Al-Anbar Province, Iraq. The date palm hopper (dubass bug), *Ommatisus lybicus* Debergevin is considered as a key pest on date palm trees mainly in the Mediterranean Euphraties regions and up north to the Dyala province. This pest is almost absent in Al–Anbar province. However, unexpected and discontinuous distribution of dubass infestation was observed in the Anbar province during 2007. Field survey indicated heavy infestation on date palm trees in many orchards on the left side of Euphraties River near Hit city in this province. The second generation of the pest was the most damaging in term of affected trees and accumulation of honey dew. Previous studies indicated that the distribution of this pest is influenced by climatic factors such as rain and dust storms which have harmful effect on flying stages. Present survey showed that the distribution was not uniform, suggesting that arrival and dissemination of the pest had happened in some way other than normal spread. Thus, an extensive investigation is still needed to explore the reasons for this unexpected localized out break.

[Abdul–Sattar A. Ali, College of Agriculture, Al–Anbar University, Iraq, Email: abdulsattararif@yahoo.com].

Outbreak of Medfly, *Ceratitis capitata* (Wiedemann) in Iraq. Field observations conducted at the end of 2006 and early 2007at Dyala, Salah-Aldeen and Baghdad provinces indicated the presence of unusual infestation with the medfly on citrus fruits. Examination of infested mandarin and grapefruit revealed the presence of live larvae of the fruit fly. It was found that these larvae and adults (males and females) were all *Ceratitis capitat*a and not other fruit fly species native to Iraq. The 1st outbreak was occurred in Dyala citrus groves in 1947. The reason for that outbreak was thought to be the imported citrus fruits infested with the pest, which can also be applied to the present and sudden outbreak of the pest. The follow up field observations indicated that citrus fruits infestation continued untill late February 2007. Infestation was then spread in early May 2007 on apricot fruits in groves at Baghdad, Waset and Salah-Aldeen. During early June infestation reached 267 larvae per 50 fruits. The adults caught in early June by using Russell IPM pheromone trap and local trap which contained DAP + yeast were 94 and 95 adults/ trap, respectively. In mid-June, the average numbers caught were 202 and 188 adults/ trap, and the numbers continued to increase. It is expected that infestation will move to other fruit crops, especially stone fruits, apples and pears. In addition, the insect will spread to a new locations, especially Karbala and Hilla. [H.F. Alrubeai and S.A. Khlaywi, Ministry of Science &Technology, Integrated Pest Control Research Center, P.O. Box 765 Baghdad, Iraq].

Preliminary Survey of Sorghum Insects and Efficacy of a Control Seed Treatment. Laboratory and field investigations were conducted to survey the relative abundance of the major insects species associated with sorghum plants in Abu-Ghraib. The study identified 20 species that belong to 6 orders, with several others being unidentified. Among the surveyed insects, three species were considered as major pests of sorghum. The shoot fly, *Atherigona soccata* Rondani,the pink corn borer, *Sesamia cretica* Led., in addition to the corn aphid, *Rhopalosiphum maidis* (Fitch). The shoot fly *A. soccata,* two species of seed bug (*Campyloma impicta* Wag. and *Nysius graminicola* Cos.) were considered to be new records on sorghum in Iraq. Other speicies were: *Crenotides pallidus* Rambur, *Oxycarenus hyalipennis, Acrosternum breviceps* Jalt, *Pentaria mesopotamica* Bl., *Perkinsiella insignis* Dist.. A group of predators and parasitoids were associated with these pests, namely *Coccinella septumpuctata* L.,C. *undicmpunctata* L., *Scymnus interrupture* Goze, *Orius albidipennis* (Reuter) and few species of egg -parasitoids, (Telenomus busseola Gahan and *Bracon hebeteaor* Say) were observed. Seed treatment with systematic insecticides (Cruiser and Gaucho) had no significant effect in terms of plant infestation level or yield for the two insects tested, the pink corn borer *S. cretica* and the shoot fly *A. soccata*. [Hameed H. Al-Karboli[1] and Adil Ismail Al-Nakhli[2]. (1) Plant Protection Department, College of Agriculture, Abu-Ghraib, Baghdad, Iraq; (2) Taaz Province, Yemen. The Iraqi Journal of Agriculture Sciences, 37(3): 141-146, 2007].

Identifying Fungal Pathogens Associated with Date Palm Seedlings Die-back and its Control. This survey aimed to study the spread of date palm seedlings die-back in 12 locations in central Iraq and identify the fungal pathogens associated with this disease syndrome, which was present in all the surveyed locations. The following fungi were isolated from the diseased seedlings: *Alternaria alternate, Chalaropsis radicicola, Cylindrocarpon album, C. destractuns, C. destructans* var. *crassum, Drechslera australiensis, Fusarium graminerum, Pythium aphanidermatum, Rhizoctonia solani* and *Scytilidium thermophilum* and their incidence varied between 5 and 48%. This is considered as the first report of *Cylindrocarpon* species infecting date palm seedlings in Iraq. The fungi *C. destractuns* and *Chalaropsis radicicola* were highly pathogenic to on date palm seedlings in the fields of Khan Beni Saad region og Diyali Governorate. The effect of the different control components used was variable in protecting the date palm seedlings from the pathogens *C. destructans* and *C. radicicola.* The fungicide Beltanol and the biological control fungus *Trichoderma harizanum* and the flour of the cabbage seed inredicing significantly the infection of date palm seedlings with the above two pathogens as compared with the untreated seedlings. Using a mixture of the fungicide Beltanol and the "lahana" seed flour reduced infection by 25%. (M. Sc. Thesis of Mr. Abed Zhara Jabbar Ali El-Mohamadawi under the supervision of Dr. Kamel Selman Jabr, Plant Protection Department, Faculty of Agriculture, University of Baghdad, Iraq, 2006)

OMAN

First Report of Rust Caused by *Tranzschelia discolor* on Peach in Oman. Peach (*Prunus persica* L.) is the primary fruit crop in parts of the northern mountainous regions of Oman. Local cultivars, propagated by seedling, are used to produce fruit for local markets and shade fodder crops planted underneath the peach canopy. In February of 2006, leaf samples showing rust signs and symptoms were collected from Balad Seet, 120 km southwest of Muscat. Angular, yellow spots were observed on leaf upper surfaces with orange sori on the undersides. The disease was observed to be affecting almost 100% of trees, with many leaves having more than 10 sori per leaf. Lesions producing urediniospores were also observed on twigs where spring growth had cracked. Urediniospores typical of *Tranzschelia discolor* (Fuckel) Tranzschel & M.A. Litv. were obovoid, echinulate, orange-brown, and measured on average 13 to 17×26 to 37 µm, with the cell wall 1.3 to 1.8 µm thick at the sides and as much as 5.8 µm thick at the apex. Golden capitate paraphyses were also present, measuring on average 35 to 57 µm long, head 13 to 16 µm in diameter, and tail 4.9 to 6.7 µm wide. Teliospores were not observed because of the time of year of collection. Pathogen identity was confirmed by analysis of a nuclear rDNA sequence

spanning from the 5.8S through the ITS-2 into the first 1,000 bp of the 28S gene. A voucher specimen was deposited in the U.S. National Fungus Collection (BPI 875341). The voucher's rDNA sequence deposited in GenBank (Accession No. DQ995341) shared 100% sequence similarity with *T. discolor* (Accession No. DQ354542). Although *T. discolor* has a worldwide distribution, it has not previously been reported from Oman. Improving the quality of peach production in Oman is an agricultural priority because it boosts the economy of small-scale farms in the mountainous regions. This work will facilitate the current research aimed at evaluating cultivar response to rust disease. [M. L. Deadman, Y. Al Maqbali, A. Al Subhi, R. Al Yahyai, and A. Al Sa'di (Oman) and M. C. Aime (USA). Plant Disease, 91: 638, 2007].

SAUDI ARABIA

Relationship between Desert Locust, *Schistocerca gregaria* (Forskal), Infestation, Environmental Factors and Control Measures in Gizan and Makkah Regions, Saudi Arabia. Desert Locust, *Schistocerca gregaria* (Forskal), is one of the most important insect pests in Saudi Arabia. Cultivated crops and the range lands are heavily affected by desert locust in some regions of Saudi Arabia. The objective of this study was to determine the extent of damage by the Desert Locust, *Schistocerca gregaria* (Forskal) to the range lands being used for grazing range animals in Gizan and Makkah regions of Saudi Arabia. However, it is very difficult to estimate accurately the total infested areas, which were sprayed with insecticides to control upsurges, outbreaks and plagues over the last five decades. Records of Desert Locust control are kept in the National Desert Locust Control and Research Center in Jeddah. Meteorological data was obtained from the Meteorology and Environmental Protection Administration (MEPA), Saudi Arabia. The data shows that the Desert Locust infestation was associated partially with the rainfall intensity in Gizan and Makkah regions. There was found a good relationship between Desert Locust infestation (Solitary phase), temperature and the relative humidity. The locust infestation was heavy during 1986-88, 1992-95 and 1997-98 and about 1.8 million ha were treated with insecticides. Out of the total breeding/infested area, 43% was treated in winter months (October-February) and the remaining 57% was treated in spring season (March-June). The infested area was sprayed with Marshall, Carbosulfan (20%), Malathion (96%), Clorpyrifos (48%), Fipronil (12.5%), Sumithion (100%) and Decis (12.5%). The study showed an excellent potential to determine the active locust infestation period in relation to the environmental factors for its effective control with insecticide sprays to minimize crop damage. The study highlighted the needs for further investigations in other locust infested areas with different environmental factors for planning future desert locust control programs. [Abdulaziz M. Al-Ajlan (Saudi Arabi), Pakistan Journal of Biological Sciences, 10(20): 3507-3515, 2007].

Two New Host Records of Cereal Cyst Nmatode in Saudi Arabia. Cereal cyst nematode (CCN), *Heterodera avenae* Woll. 1924, is the most important pest limiting the productivity of wheat and barley in Saudi Arabia. Until now, the nematode has not been recorded on any other host plants except wheat and barley in Saudi Arabia. However, during a routine work in wheat fields in Hail region, white females and cysts of *H. avenae* were found on the roots of the Italian rye grass, *Lolium multiflorum* Lam., (known in Saudi Arabia as multimo grass, and cultivated, under evaluation, as a fodder crop), and wild barley (or foxtail barley), *Hordeum murinum* L., a tufted annual grass appear widely in Saudi fields in winter. [A.A.M. Dawabah, A.S. Al-Hazmi and S. Al-Shawy (Saudi Arabia). Pakistan Journal of Nematology, 25(2):343, 2007]

Spreading of Cereal cyst nematode with Potato Seed Tubers in Saudi Arabia. Some of the *Heterodera avenae*-infested wheat fields are rotated with potato in Saudi Arabia. We have, found *H. avenae*, in few samples from newly-cultivated or non-infested wheat fields which, had been previously cultivated with potato seed tubers produced in *H. avenae*-infested fields. Accordingly, 20 soil samples (100 g each) were collected from the soil adhering to potato seed tubers stored in potato storage (3 °C) for two years. Hundred potato bags were randomly chosen in the storage, and the potato seed tubers were gently brushed to collect the adhering soil particles. Soil samples were then processed for nematode extraction and identification. Results showed that *H. avenae* eggs, juveniles and cysts were, indeed found in ten of the collected soil samples (absolute frequency= 50%), and the stunt nematode, *Tylenchorhynchus* spp. were found in 8 samples (absolute frequency= 40%). The mean nematode population density/100 g of the positive soil samples was, *Tylenchorhynchus* (90), *H. avenae* cysts (5 cysts). Our finding demonstrate that planting such contaminated potato seed tubers in our wheat fields would introduce and spread *H. avenae* to the wheat fields where, the susceptible wheat cv. "Yecora Rojo" is usually cultivated. [A.A.M. Dawabah and A.S. Al-Hazmi (Saudi Arabia) Pak. J. Nematol. 25(2): 339-340, 2007].

SYRIA

The First Report of *Polymyxa graminis* Led. in Northern Syria. Surveys of sugar beet, wheat, and barley fields were carried out from early March until mid-May 2007, to monitor soil-borne fungi capable of transmitting viral diseases. Plant and soil samples were collected from sugar beet, wheat, and barley fields, with Rhizomania history over the last few years. Wheat and barley samples were also collected from field borders. In addition, samples from plants with symptoms suggestive of viral infection were also collected. After washing, the roots were examined microscopically. A significant number of sugar beet samples were found highly infected with *Polymyxa betae* Keskin. In some samples, *Polymyxa graminis* was detected in wheat and barley for the first time in Syria. Soil samples from the fields where the presence of *P. graminis* or *P.*

betae was confirmed, were placed in 12 cm pots and seeded with wheat and barley or sugar beet in Idlib and Aleppo under greenhouse condition. Several weeks later the plants were removed, their roots washed and examined microscopically. The results showed the presence of both fungi in the surveyed soils. To studying the natural host range of *P. graminis* or *P. betae,* many weeds present in wheat, sugar beet, and barley crops were collected and identified. Their roots were examined microscopically. Some of them were found infected with either *P. graminis* or *P. betae*. The study is still in progress to detect and identify the prevalent soil–borne viruses. (A.M. Mouhanna, A.H. Kassem, F. Alkhateeb, O. Othman, A. Alshaikh and A. Alkhalf, Faculty of Agriculture, Aleppo University, Aleppo, Syria, Email: AhmadMouhanna@gmx.net).

Contamination of Peanut with *Aspergillus* spp. and Aflatoxins. During 2003 and 2004, 155 samples of Peanut seeds were collected directly from fields after harvest and from stores during storage , from different areas in Syria, and 170 fungal isolates belonging to 6 species of *Aspergillus* were isolated and classified. The results showed that analyzed samples were infected at different levels from 3 x 10^2 to 3.1 x 10^7 spores/g of seed. Around 38 % of *A. flavus* isolates showed different rates of toxicity on germination of Chickpea seeds under laboratory conditions and 26 % of those isolates produced Aflatoxin B1 with concentration range of 0.005-0.6 mg/100 ml. Aflatoxins B1 and B2 at different concentrations were found in 9.68 % of the tested samples. [Omran Youssef[1], Watfa Ibrahim[2] and Basema Barhoum[3]. (1) General Commission for Scientific Agricultural Research (GCSAR), Al-Qamishli Agricultural Research Centre, Email: om_youssef@yahoo.com; (2) GCSAR, Lattakia Agricultural Research Centre; (3) GCSAR, Al-Ghab Agricultural Research Centre, Syria].

TUNISIA

First Report of Verticillium Wilt of Melon Caused by *Verticillium dahliae* in Tunisia. Wilting melon plants (*Cucumis melo*) were observed in several greenhouses in Chott Mariem and Souassi regions, in the eastern part of central Tunisia, during the early spring of 2006. Diseased plants exhibited leaf chlorosis followed by typical V-shaped marginal and interveinal yellowing, necrosis and dropping of leaves. As affected plants approached physiological maturity, the above ground parts became desiccated and died. Internal, vascular discoloration in diseased plants extended from the base of the stem upward. Pure colonies of fungi were consistently and readily isolated from stem vascular tissue with symptoms when cultured on potato dextrose agar medium. A *Verticillium* species was the only fungus isolated and it grew from most plant pieces. Single spore isolates were obtained and identified as *Verticillium dahliae* on the basis of microsclerotium production. Pathogenicity tests were carried out using the root-dip inoculation. Five *Verticillium* isolates were tested on seedlings of the melon cultivar Ananas d'Amérique at the one-leaf stage. Wounded roots were submerged for 30 min in a conidial suspension (1×10^7 conidia per mL), while control plants were similarly submerged in sterile tap water. Seedlings were transplanted into pots containing a sterile 2:1 mixture of peat/perlite (v/v) and maintained in a growth chamber at 23 ± 2°C (12 h photoperiod). The tested isolates were found to cause wilting and interveinal yellowing and necrosis on melon plants 30 days after inoculation. *Verticillium dahliae* was successfully re-isolated from the stems of the inoculated plants. Occurrence of verticillium wilt of melon caused by *V. dahliae* has been reported from the Mediterranean region, Europe and USA, but this is the first report from Tunisia. [H. Jabnoun-Khiareddine, M. Daami-Remadi, F. Ayed and M. El Mahjoub (Tunisia). Plant Pathology, 56(4): 726-726, 2007].

First Report of Pea Black Stem due to *Phoma pinodella* in Tunisia. Symptoms of black stem on pea have been observed during a field survey of cropped pea conducted in the North-West of Tunisia in spring 2006. Microscopic observation of conidia allowed the identification of the causal agent which is *Phoma pinodella*. This disease has not been reported previously on pea in Tunisia. Synonymy and biology of the fungal plant pathogen are summarized [Bouzid Nasraoui, Faten Srarfi, Souad Aloui and Mohamed Kharrat (Tunisia). Tunisian Journal of Plant Protection, 1: 105-107, 2006].

First Report of *Pectobacterium carotovorum* subsp. *carotovorum* on Tomato Plants in Tunisia. During winters of 2005 and 2006, a severe outbreak of a stem rot disease occurred on tomato plants in greenhouses in Sidi Bouzid, Chott-Mariem and Mereth regions; disease incidence was estimated to respectively 20-25%, 30-35% and 90-100%. Isolations from rotted stems on King's medium B showed development of a bacterium characterized by white to cream colonies. Using some biochemical tests, all bacterial isolates were identified as *Pectobacterium carotovorum* subsp. *carotovorum.* Pathogenicity tests demonstrated the development of soft-rot symptoms on inoculated tomato plants. In Tunisia, this bacterium is well known as a potato soft rot pathogen, but this is the first report of an occurrence and an outbreak of a bacterial stem rot disease on tomato plants caused by *P. carotovorum* subsp. *carotovorum.* [K. Hibar, M. Daami-Remadi and M. El Mahjoub (Tunisia). Tunisian Journal of Plant Protection, 2: 1-5, 2007].

First Report of *Sclerotium rolfsii* Causing Atypical Soft Rot on Potato Tubers in Tunisia. During summer 2006, potato tubers showing a fan-like mycelial growth at their surface and severe soft rot symptoms were observed in a traditional potato storage at Essaida (North of Tunisia). Fungal isolation revealed the involvement of *Sclerotium rolfsii* in this decay. Pathogenicity of the isolates was confirmed by inoculating healthy potato tubers and plants (cv. Spunta). Inoculated tubers developed similar external symptoms within 24 h and an odorless soft rot within 5 days of incubation. Inoculated plants showed, 15 days post-inoculation, a yellowing of the basal leaves followed by a wilting and formation of a white cottony mycelium at the collar region. This disease is reported on potato for the first time in Tunisia. [M. Daami-Remadi, H. Jabnoun-

Khiareddine, F. Ayed, K. Hibar and M. El Mahjoub (Tunisia). Tunisian Journal of Plant Protection, 2: 59-62, 2007].

First Report on the Occurrence of *Grapevine leafroll-associated viruses 5* and *9* in Tunisian Grapevines. Grapevine leafroll disease is one of the most important diseases that occurs in cultivated grapevines in the world. So far, nine serologically distinct viruses of the family *Closteroviridae* have been isolated from diseased vines (3). A previous study (4) has shown that *Grapevine leafroll-associated viruses* (GLRaV) *-1*, *-2*, and *-3* are present in Tunisian grapevines and GLRaV-3 is the predominant virus associated with leafroll disease. A survey was conducted in table grapes to identify other viruses associated with this disease. Samples of dormant canes were collected and screened by indirect Biotin Steptavidin ELISA with specific antibodies to GLRaV-5 (Bio-Rad, Sanofi, France) according to the manufacturer's instructions. Serological analysis revealed that nearly 47% of the samples were infected with GLRaV-5. To confirm GLRaV-5 identification and identify other leafroll viruses, vines with severe leafroll symptoms were collected and total RNA extracts were obtained from six samples and tested at Waite Diagnostics (University of Adelaide, Australia) by reverse transcription (RT)-PCR using primers for GLRaV-5 (LR5-1F and LR5-1R) with a resulting amplicon size of 690 bp and primers for GLRaV-9 (LR9F 5 and LR9R) with a resulting amplicon size of 250 bp. RT-PCR results showed that 1 of 6 and 5 of 6 of the samples were infected with GLRaV-5 and GLRaV-9, respectively, and comparable results were obtained by ELISA. Amplicons were cloned and sequenced to confirm the identification of GLRaV-5 and GLRaV-9. The obtained sequences showed 99.1% nt identity and 94.8% amino acid similarity with an isolate of GLRaV-5 (GenBank Accession No. AF233934) and 97.6% nt identity and 94.8% amino acid similarity with an isolate of GLRaV-9 (GenBank Accession No. AY297819). The occurrence of GLRaV-9 has previously been reported in California and Australia (1). To our knowledge, this is the first report on the occurrence of GLRaV-5 and -9 in Tunisian grapevines. The widespread occurrence of GLRaV-5 and -9 is probably due either to the presence of their putative vectors, *Planococcus ficus* (Signoret) and *Planococcus citri* (Risso), or by propagation using infected local source material. Further studies are in progress to verify the implication of indigenous mealybugs in the spread of these viruses. [N. Mahfoudhi, N. Habili (Australia), S. A. Masri (Canada) and M.H. Dhouibi (Saudi Arabia). Plant Disease, 91:1359, 2007].

First Report of Tomato Yellow Leaf Curl Virus-Israel Species Infecting Tomato, Pepper and Bean in Tunisia. Tomato yellow leaf curl virus disease (TYLCVD) has been observed in Tunisia for more than 20 years. Until year 2004, only the Tomato yellow leaf curl Sardinia virus-Sicily (TYLCSV-[Sic]) was detected in tomato, pepper and bean crops. In the Sahel region, some tomato samples showing severe TYLCVD symptoms were collected from greenhouses in 2004 and 2005. Typing of these isolates revealed for the first time the presence of the TYLCV-Israel in Tunisia. This result was confirmed by using several sets of specific primers and by sequencing. This species has also been detected on pepper and bean collected from fields in the same region. The sequencing of a tomato and a bean isolate showed that they both share more than 97% of sequence identity with the TYLCV from Dominican Republic (AF024715). The TYLCV has been found in single and mixed infection with the TYLCSV-[Sic]. [S. GharsallahChouchane, F. Gorsane, M.K. Nakhla, D.P. Maxwell, M. Marrakchi (Tunisia) and H. Fakhfakh (USA). Journal of Phytopathology, 155(4), 236–240, 2007].

TURKEY

First Report of the Presence of *Plum pox virus* Rec Strain in Turkey. *Plum pox virus* (PPV) is a detrimental virus in stone fruit crops. Six strains of PPV are recognized, one of which, PPV-Rec, represents a group of isolates sharing a unique founding recombination event (2). This strain has been reported only from central and south-central Europe. Its distribution is of interest because PPV-Rec is reported to induce only weak and transient symptoms in GF305 peach seedlings, which may complicate its detection using this widely used indicator (2). During a field trip in May 2006, a Japanese plum *(Prunus salicina)* tree showing leaf symptoms reminiscent of PPV infection was identified in Isparta, Turkey. A leaf sample tested by a serological lateral flow PPV Pocket Diagnostic (Central Science Laboratory, Sand Hutton, UK) gave a weak positive reaction. The presence of PPV was confirmed by grafting onto GF305 peach and by PCR amplification and sequencing of a short P3M-P4b PCR product (1; positions 8446 to 8912 on PPV-BOR3; GenBank Accession No. AY028309) spanning the end of the *NIb* gene and the N-terminal hypervariable end of the coat protein gene. Comparison of the sequence obtained (GenBank Accession No. EF051630) with databases unambiguously identified the isolate as belonging to the Rec strain because it contained all the PPV-Rec specific mutations in the amplified region. In keeping with this identification, the symptoms observed in GF305 were very weak, consisting only of slight vein clearing on a few leaves. This is, to our knowledge, the first report of the presence of PPV-Rec in Turkey. [T. Candresse and L. Svanella-Dumas, P. Gentit (France), K. Caglayan and B. Cevik (Turkey). Plant Disease, 91:331, 2007].

First Report of *Ascochyta sonchi* in Turkey. Perennial sowthistle (*Sonchus arvensis*) is a native of Eurasia, including Turkey. The plant is found in wide range of habitats. In July 2004, a leaf spot disease of *S. arvensis* was observed on pastures in the province of Erzurum, Turkey. The symptoms began as small, circular, brown spots on leaves. The circular spots increased in size, developing into irregular lesions, in which pycnidia developed. Leaves showing symptoms were surface sterilized and portions transferred to potato dextrose agar (PDA) and incubated at 20°C. Pycnidia producing hyaline, ellipsoidal conidia (6–10 × 2–3·5 μm) were observed after 4 to 5 days. The fungus was consistently isolated on PDA from diseased leaves and

identified as *Ascochyta sonchi* based on morphological characteristics. To satisfy Koch's postulates, a conidial suspension (1×10^6 conidia per mL) of the fungus was sprayed onto leaves of *S. arvensis* plants (45 days old). Conidia were harvested from 10-day-old cultures grown on PDA. Both inoculated plants and control plants (inoculated with sterile water) were covered with plastic bags for 72 h in a glasshouse at 23 ± 2°C. After 8–10 days, the symptoms were similar to those previously observed. No symptoms developed on control plants. The pathogen was consistently reisolated from inoculated plants. *Ascochyta sonchi* has been recorded previously on *S. arvensis* in Russia and USA, but this is the first report of *A. sonchi* from Turkey on any host. [C. Eken and I. Çoruh (Turkey). Plant Pathology, 56 (4): 725, 2007].

First Report of *Turnip mosaic virus* on Brassicaceae Crops in Turkey. During winter and early spring of 2004–2006, crops of *Brassica oleracea*, *Raphanus sativus* and *R. raphanistrum*, showing mosaic, mottling, necrotic spots, malformation and chlorosis were collected from Canakkale, Balikesir and Bursa Provinces of the Turkey. Leaf samples were tested for the presence of *Turnip mosaic virus* (TuMV) by DAS-ELISA using a commercial polyclonal antibody (PAb) (Loewe). Sixteen out of 130 leaf samples from *B. oleracea* vars. *capitata* and *gemmifera*, *Raphanus sativus*, *R. raphanistrum* were found to be infected with TuMV, whereas no samples of *B. oleracea* var. *botrytis* were found to be infected. Leaf extracts of plants that reacted positively with the TuMV PAb were used for mechanical inoculation and produced chlorotic local lesions on *Chenopodium quinoa*, severe mosaic and stunting on *B. rapa*, and mosaic and wilting on *Nicotiana benthamiana*. These symptoms were similar to those described previously for TuMV. In addition, reverse transcription-polymerase chain reaction of total RNA extracted from the inoculated leaves using TuMV-specific primers resulted in the amplification of one fragment of the expected sizes. TuMV belongs to the genus *Potyvirus* and has a single-stranded, positive-sense RNA genome and infects a wide range of plant species, mostly from the brassicaceae. It is probably the most widespread and important virus infecting both crop and ornamental species of this family. TuMV has been reported to occur in the temperate and sub-tropical regions of Africa, Asia, the Americas, Oceania and Europe, including Greece, but this is the first report of the natural occurrence of TuMV on *B. oleracea*, *R. sativus* and *R. raphanistrum* in Turkey. [S. Korkmaz, S. Onder (Turkey), Y. Tomitaka and K. Ohshima (Japan). Plant Pathology, 56(4): 719-719, 2007].

RESEARCH HIGHLIGHTS

ALGERIA

Bioecology of Broad Bean Bruchid *Bruchus rufimanus* Boh. (Coleoptera : Bruchidae) in a Region of Kabylia in Algeria. In this study, the conditions of colonisation of the broad bean *Vicia faba* L. by the adults of the Coleoptera Bruchidae *Bruchus rufimanus* Boh. were analysed in the region of Kabylia in Algeria. *B. rufimanus* adults began to colonise the *V. faba* cultures in February after termination of a larval and a reproductive diapause. Males appeared in February and had terminated their reproductive diapause. Females began to colonise the broad bean culture in March; they terminated their reproductive diapause after consumption of nectar and pollen of the host-plant flowers. The adult density depended on the abundance of the trophic resources at the beginning of adult colonisation phase. The females oviposited on the green pods as soon as they appeared on the plants and laid on these pods as long as they did not became mature. The first and the secondary larval instars developed in maturing seeds in the green pods. The last larval instars and the pupae developed in dry seeds after harvesting and storage in granaries. A high inter-individual variability in the duration of the post-embryonic development was observed in this study. The adaptive signification of this developmental heterogeneity was analysed in this study. [F. Medjdoub-Bensaad, M.A. Khelil (Algeria) and J. Huignard (France). African Journal of Agricultural Research, 2(9): 412-417, 2007].

EGYPT

Efficacy of *Bacillus thuringiensis* Integrated with other Non-Chemical Materials to Control *Meloidogyne incognita* in Tomato. The effects of *Bacillus thuringiensis* (Bt, Dipel 2X, at 12 mg/kg soil), grape marc (GM), chicken litter (CL), both at 10 g/kg soil, and the neem-based product Achook® (AC), at 500 mg/kg soil, alone or as combinations of Bt with each of the other three products, on *Meloidogyne incognita* infecting tomato were assessed in a glass-house pot experiment. Controls consisted of non-inoculated pots, untreated pots inoculated with M. *incognita,* and pots treated with oxamyl at 10 mg a.i./kg soil. All treatments significantly improved plant growth and suppressed the nematode compared to untreated inoculated plants. Among the organic materials, CL and GM were the most effective with root gall reductions of 75.5% and 72.2%, respectively, similar to oxamyl (79.0%). The efficacy of *B. thuringiensis* against *M. incognita* was significantly increased by addition of the organic amendments to the soil. The best combination with which to reduce root galling (by 86.2%) and second-stage juveniles in the soil (by 80.5%) was Dipel 2X + CL, followed by Dipel 2X + GM and Dipel 2X + AC. These combined treatments also improved plant growth parameters. Therefore, *B. thuringiensis* (Dipel 2X) applied to soils in combination with organic amendment materials may be considered as a promising alternative to chemicals for controlling *M. incognita.* [M.A. Radwan (Egypt). Nematologia Mediterranea, 35: 69-73, 2007].

Efficacy of Selected Bio-control Agents on *Meloidogyne incognita* on Eggplant. The biocontrol effects of *Serratia marcescens* (1 x 10^9 bacterium cells/ml water), ground ascaris (*Ascaris lumbricoides*) cuticle (10 g/pot), two entomopathogenic nematode species (*Heterorhabditis bacteriophora* strain EGG and *Steinernema carpocap.* sae

strain All, each at 125 infective juveniles/cm^2), and garlic extract (600 g ground garlic cloves/1 water), used as soil treatments, were assessed on *Meloidogyne incognita* attacking eggplant (cv. Roomi Balady) in the glass-house. These treatments were compared with spray application of the nematicide oxamyl (15 ml solution/pot from a stock of 3 liters of 24% liquid oxamyl + 600 liters water). Fifty-three days after *M. incognita* inoculation, all of the bio-control agents increased various measures of plant growth. The root weights of plants treated with ascaris cuticle were almost doubled, but shoot weights were greatest in plants treated with oxamyl, followed by those of plants that received S. *marcescens,* S. *carpocapsae* and ascaris cuticle. Since much *Bacillus subtilis* was found in ascaris cuticle-treated pots (138 bacterial cells/g of treated soil) with respect to the control (28 bacterial cells/g), it is likely that ascaris cuticle could be used for culturing this bacterium, which apparently controlled *M. incognita.* The treatments delayed the development of *M. incognita* and second stage juveniles occurred only in control pots. Numbers of third and fourth stage juveniles, females and egg masses of the nematode, root galls and gall index were reduced by all treatments, with the greatest reduction (95-98%) given by ascaris cuticle. [M.M.M. Abd-Elgawad and M.M.M. Mohamed (Egypt). Nematologia Mediterranea, 34: 105-109, 2006].

Biological Control Study on the Mite Species, *Tetranychus urticae* Koch on Okra Plants in Ismailia Governorate, Egypt by the Predacious Mite, *Phytoseiulus persimilis* (Athias-Heuriot) (Acari: Tetranychidae: Phytoselidae). A preliminary study to control the two-spotted spider mite, Tetranychus urticae Koch by releasing the predatory mite, *Phytoseiulus persimilis* Athias-Henriot, at the rate of 10 or 5 individuals/bit using bean leaflets harboring the predator individuals was conducted on okra plants at Kasasin, Ismailia Governorate, Egypt during the two successive seasons 2003-2004. In 2003 season, the predator was released on April 12th. Few predators were recorded on the treated bits during different post-count probably due to the prevailing unfavorable environmental conditions where several hot spells coincided with the time of predator release which might have negatively affected the predator's activity. In 2004 season, the predator was early released on March 12th and satisfyed results were obtained. Releasing the predator using bean leaflets at the rate of 10 or 5 individuals/bit greatly reduced the *T. urticae* population, 4 weeks of the predator post-release. Mean reduction of the pest population over the experimental period was 97.8% (10 predators/bit) and 96.9% (5 predators/bit) when using bean leaflets carrying the predators, respectively. [M.M.H. Fawzy (Egypt). Egyptian Journal of Agricultural Research, 84(3): 743-750, 2006]

Evaluation of Certain Exotic Aphid Parasitoid Species against Cereal Aphids Under Laboratory, Field Cage and Open Wheat Field Conditions. Aphids attack cereal crops, particularly wheat, barley and corn in many countries worldwide. Aphid parasitoids' importation and colonization have a great potential as a classical and effective biological control method. Through an Egyptian/American collaborative project (1997-2002), four cereal aphid exotic parasitoid species were imported from different countries to provide additional mortality factors to the indigenous ones, against key cereal aphid species in Egyptian and American wheat fields. The exotic cereal aphid parasitoid species were collected from Syria, Morocco, and Iran, in localities near the reported areas of the origin of cereal species and from habitats of climatic patterns similar to those in Upper Egypt and Southern California, USA. *Aphidius matricariae* Haliday (Syria), *Diaeretiella rapae* M'Intosh (Morocco), *Aphidius rhopalosiphi* De Stefani (Hymenoptera: Aphidiidae) and *Aphelinus albipodus* Hayat & Fatima (Hymenoptera: Aphelinidae) (Iran) were the parasitoid species introduced and evaluated under laboratory, field cage and open wheat field conditions. The exotic parasitoid species showed different performances under several tested conditions. *A. matricariae* exceeded the other parasitoid species under similar conditions. [A.H. El-Heneidy (Egypt, Email: aheneidy@link.net), D.A.H. Gonzalez (USA, Email: danielzgonzalez@earthlink.net) and D. Adly (Egypt). Egyptian Journal for Biological Control of Pests, 16(2): 67-72, 2006].

Biological Control of the Two Spotted Spider Mite, *Tetranychus urticae* Koch Using the Phytoseiid Mite, *Neoseiutus cucmeris* (Oudeman) (Acari: Tetranychidae: Phytoseiidae) on Cucumber. The predatory mite, *Neoseiutus cucumeris* (Oud.) was released to control the two-spotted spider mite, *Tetranychus urticae* Koch in a cucumber field at Tookh district, Qualubia Governorate, Egypt. *N. cucumeris* was released at the rate of 5 individuals/bit in the treated area. The percent reduction of the mite pest reached 98.70% after two months of release with a level of infestation of the mite pest averaged 0.72 mite/leaf compared with 50.92 individuals of mite pest/leaf in the control area. These results indicated the possibility of establishment of this predator under the Egyptian conditions and can be used as a bio-control agent to control this mite pest on cucumber. The predatory mite was recently imported from Koppert Center, Holland for producing natural enemies. We aimed to produce a product free of pesticides and to adapt this predator species in Egypt. [G.A. Ibrahim, N.M. Abd El-Wahed and A.M. Halawa (Egypt). Egyptian Journal of Agricultural Research, 84(4): 1033-1038, 2006].

IRAQ

Resistance Mechanism to Pear Striped Bug (*Stephanitis pyri*) (Hemiptera: Tingidae) in Pears. The study showed that pear varieties "Zaafaraniyeh", "Othmani" and "Lecont" were susceptible at variable degrees to infestation with this insect pest, whereas the variety "Calryana" was resistant. The leaf morphological features such as number and length of hairs played a role in pest resistance. The increase in leaf area led to higher bug infestation per leaf. The increase in

chlorophyll content also increased pest infestation. Whereas, the increase in phenols content in the leaves (e, g. cv. Calryana) was associated with resistance to the bug. It was found that the water extract of "Calryana" leaves had insecticidal properties to the larvae and adults of *Stephanitis pyri*, but the extract from the other varieties did not have a similar effect. "Calryana" extract had also negative effects on the biology of the bug; it reduced the length of the larval stage, the number of emerging adults, the adults age, number of eggs produced per females and rate of egg hatching. [Ph.D. thesis of Mr. Abdel Jaber Khalil Ibrahim El-Abbady under the guidance of Dr. Nizar Mallah, Faculty of Agriculture and Forestry, Mosel, Iraq, 2007].

JORDAN

Weed Control in Cauliflower (*Brassica oleracea* var. *Botrytis* L.) with Herbicides. Field experiments were carried out to evaluate the effect of different herbicides on weeds and cauliflower (*Brassica oleracea* var. *Botrytis* cv. White Cloud) grown under Jordan Valley conditions during the 1996/1997 and 1997/1998 growing seasons. The most common weed species were *Chenopodium murale* L. (133 plants m^{-2}), *Malva sylvestris* L. (38 plants m^{-2}) and *Echinochloa colonum* (L.) Link (13 plants m^{-2}). On average, weed competition for the entire growing season reduced cauliflower shoot dry weight by 74.8% and head weight by 76.1% compared with the weed-free control. With the exception of linuron, all herbicide treatments increased crop shoot dry weight, head weight and number compared with the weed-infested plots. Oxyfluorfen applied pre-planting at 2.5 l ha^{-1} resulted in the highest cauliflower growth and head yield. Pre-planting application of chlorthal-dimethyl (10 kg ha^{-1}), pendimethalin (4.6 l ha^{-1}), nitrofen (1.4 l ha^{-1}) and trifluralin (1.5 l ha^{-1}), and post-planting treatment of oxyfluorfen (2 l ha^{-1}) were also effective and increased head yield of cauliflower compared with other herbicides. Oxyfluorfen (pre-planting) was the best in controlling weeds and reduced their shoot dry weight by 65.5% compared with the weed-infested control. Other herbicide treatments reduced weed biomass below the weed-infested control but were variable in their effects. Although diphenamid (7.5 kg ha^{-1}) and pronamide (2.5 kg ha^{-1}) reduced weed growth, this effect was not reflected as an increase in cauliflower shoot dry weight or head yield. Linuron (1.7 kg ha^{-1}) was damaging to cauliflower and reduced shoot growth and head yield. [J.R. Qasem (Jordan). Crop Protection**,** 26(7): 1013-1020, 2007].

MOROCCO

Bioinsecticidal Effect of Harmaline on *Plodia interpunctella* Development (Lepidoptera: Pyralidae). We have investigated the effects of harmaline, a plant secondary metabolic compound belonging to β-carboline alkaloids, on the 4th instar larvae of *Plodia interpunctella* (Lepidoptera). When incorporated into the diet, harmaline caused weight loss of larvae with a reduction in protein and glycogen contents and an inhibition of α-amylase activity. Using electron microscopy, we showed that harmaline provoked a severe cytotoxicity on the epithelial cells of the midgut resulting in marked vacuolization of the cytoplasm, appearance of numerous autophagic vesicles and lysosomic structures, fragmentation of rough endoplasmic reticulum cisternae, disruption of microvilli, rupture of the plasma membrane leading to shedding of the cytoplasm contents into the midgut lumen. The development of larvae to the pupal and adult stages was prevented and high mortality was recorded. [Kacem Rharrabe, Ahmed Bakrim, Naima Ghailani and Fouad Sayah (Morocco). Pesticide Biochemistry and Physiology, 89(2): 137-145, 2007].

OMAN

Diversity and Trapping Efficiency of Nemotophogous Fungi from Oman. A survey of the nematophagous mycobiota biodiversity of 82 soil and leaf-litter samples in the Sultanate of Oman yielded ten species of nematode trapping fungi belonging to three genera. The species are: *Arthrobotrys eudermata*, *A. thaumasia*, *A. musiformis*, *A. oligospora*, *A. oligospora* var. *oligospora*, *A. oudemansii*, *A. multiformis*, *A. javanica*, *Drechsecrella brochopaga* and *Gamsylella geophyropaga.* This is the first record of these species in Oman. *Arthobotrys multiformis* represents the second record of this species worldwide. A systematic study showed that *A. oudemansii*, *A. multiformis* and *A. javanica* were morphologically more variable than was so far known. In four days, *A. oligospora, A. thaumasia. D. brochopaga* and *A. eudermata* trapped all nematodes added to the Petri dishes (*Panagrellus redivivus,* 100 specimens per dish). No significant differences were found in the trapping efficiency among the species tested. [Abdulkader E. Elshafie, Ratiba Al-Mueini, Saif Al-Bahry, Abdulaziz Y. Akindi, Ibrahim Mahmoud and Salim H. Al-Rawahi (Sultanate of Oman). Phytopathologia Mediterranea, 45: 266-270, 2006].

PAKISTAN

Arbuscular Mycorrhizal Incidence and Infectivity of Crops in North West Frontier Province of Pakistan. Spores density and mycorrhizal colonization were studied in twenty-five rhizosphere samples of some selected soils and plant roots from fertile and marginal soils of North West Frontier Province of Pakistan. All tested plants are considered to be mycorrhizal plants. Highest number of mycorrhizal spores was found in Potatoes, Barley, rice and chickpea (>4000 spores kg•1 soil) in fertile soils. Fields of alfalfa, wheat, barley, oat and grasses gave the highest number of spores in marginal soil. The root infection levels varied in different crops from one site to another. Barley, Potatoes and oats showed the highest infection rates being 44, 40 and 33%, respectively in fertile well managed soil, whereas 52, 50 and 43% highest mycorrhizal infections rates were observed in barley, alfalfa and wheat, respectively in marginal soil. Generally, spores density in soil samples seemed to be dominated by the species of

Glomus fasciculatum. However, spores of *Glomus intraradices* and *Glomus mosseae* were also identified in the samples. Soils under investigation have pH value ranged from 5.6 to 8.5 with low concentration of available phosphorus and high contents of total phosphorus. Results suggest that (V) A mycorrhizal fungal spores and root colonization varied in different crops from one site to another under different agro-ecological conditions. [M. Sharif (Pakistan) and A.M. Moawad (Germany). World Journal of Agricultural Sciences, 2(2): 123-132, 2006].

PALESTINIAN NATIONAL AUTHORITY

Biological Control of Egyptian Broomrape *(Orobanche aegyptiaca)* Using *Fusarium* spp. The broomrape *(Orobanche* spp.) is an obligate holoparasitic weed that causes severe damage to many important vegetable crops. Many broomrape control strategies have been tested over the years. In this investigation, 125 *Fusarium* spp. isolates were recovered from diseased broomrape spikes collected from fields in agricultural areas near Hebron. The pathogenicity of isolates on broomrape was evaluated using an inoculum suspension containing mycelia and conidia. The most effective *Fusarium* isolates significantly increased the dead spikes of broomrape by 33.6-72.7% compared to the control; there was no obvious pathogenic effect on the tomato plants. *Fusarium* spp. isolates Fu 20, 25 and 119 were identified as *F. solani*, while Fu 30, 52, 59, 87 and 12-04 were *F. oxysporum.* In addition, the two previously known *Fusarium* strains, *F. oxysporum* strain EId (CNCM-I-1622) (Foxy) and *F. arthrosporioides* strain E4a (CNCM-I-1621) (Farth) were equally effective in controlling broomrape parasitizing tomato plants grown in pots, where the dead spikes of broom rape increased by 50.0 and 51.6%, respectively. [Ibrahim Ghannam, Radwan Barakat and Mohammad Al-Masri (Palestinian National Authority). Phytopathologia Mediterranea, 46: 177-184, 2007].

SAUDI ARABI

Influence of Malathion and Mancozeb on Mycorrhizal Colonization and Growth of *Zea mays* and *Vicia faba.* Mycorrhizal symbiosis of *Zea mays* and *Vicia faba* plants noticeably increased their growth parameters. Leaf pigments and element contents of N, P, Ca, K, Mg and Na, were also increased as compared with non-mycorrhizal plants. Infection of mycorrhizal plants and their sporulation were markedly influenced by the applied level of pesticides. Lower concentrations of both Malathion and Mancozeb were responsible for higher mycorrhizal colonization and sporulation, while higher concentrations were conducive to mycorrhizal activities. Malathion proved to be more deleterious to mycorrhizal colonization and sporulation compared with Mancozeb. Plant growth responded differently depending on pesticides concentration and mycorrhizal inoculations. At lower pesticides concentrations, mycorrhizal plants had high levels of growth parameters compared with pesticide free plants, while non-mycorrhizal plants show low levels. Higher concentrations of pesticides reduced growth of tested plants. The reduction in growth reached to 80% for some parameters. Moreover, the reduction of plant pigments b not exceeded 16%. Malathion affect the growth parameters of *Zea mays* and *Vicia faba,* either, mycorrhizal or non-mycorrhizal, compared with Mancozeb. The latter was most deleterious to elements contents at tested pesticides concentrations. [Saleh M Saleh Al-Garni (Saudi Arabia). World Journal of Agricultural Sciences, 2(3): 303-310, 2006].

SYRIA

Inheritance of Virulence in *Pyrenophora graminea.* *Pyrenophora graminea*, the causal agent of leaf stripe of barley, is an economically important disease with a worldwide distribution. To examine the inheritance of virulence in this fungus, a cross was made between two isolates that differed widely in their DNA and virulence. Of the 70 progeny tested, 36 exhibited high virulence and 34 exhibited low virulence on the barley cultivar Furat1. The data support a model in which a single, major gene controls virulence in P. graminea (1 : 1 ratio; X2 = 0.72, P = 36.3). This information will now allow for a map-based cloning approach to identify the gene. [M.I.E. Arabi and M. Jawhar (Syria), Australasian Plant Pathology, 36(4): 373–375, 2007].

A Biological and Ecological Study of the Almond Sawfly *Eurytoma amygdale* (Enderlin) (Hymenoptera: Eurytomidae) in Homs Governorate. This study was conducted in Maskana region, south east of Homs city, Syria, during 2005 and 2006 on three almond varieties ("Shami", "French" and "Spanish"). The study showed that pupation of larvae and emergence of almond sawfly adults from the infested almond fruits was almost at the same time for the three varieties. However, there was a difference in the pupation and adult emergence rate among the almond varieties; the highest rate was in the "Spanish" variety followed by the "French" variety and was lowest in the "Shami" variety. The pupation period was 15 days in the "Spanish" and "French" varieties and 21 days in the "Shami" variety. The thermal index for emergence from the overwintering stage was 94.6 ºC in the three varieties. Parasitism with the wasp *Microdontomerus* sp. (Hymenoptera: Torymidae) reached 40 % on the insect larvae of the fruits of "Shami" variety only. Infestation with a Lepidopteran insect which produced symptoms similar to those produced by the almond sawfly were observed. The larvae of this insect were found in 20% of the almond mummies still present on the trees of the "Shami" variety, and to a lesser extent on the mummies of the other two varieties. [B. El-Sheikh, D. Nammour and Z. Sheikh Khamis, Plant Protection Department, Faculty of Agriculture, El-Baath University, P.O. Box 33, Homs, Syria, E-mail: zck@scs-net.org].

A Participatory Farming System Approach for Sustainable Broomrape (*Orobanche* spp.) Management in the Near East and North Africa. Broomrapes (*Orobanche* spp.) are aggressive and damaging parasitic weeds which have a tremendous impact on agriculture in East Africa, the Mediterranean region and the Middle East. Despite the availability of technologies to control broomrapes in economically important crops, *Orobanche* infestation continues to increase, threatening the livelihoods of millions of farmers. Many of the technologies developed have not been effectively disseminated and there has been little or zero adoption by farmers—who continue to use ineffective management practices that exacerbate the problem. The adaptation and dissemination of appropriate management practices are major priorities in broomrape control. However, such work must take into consideration the specific socio-economic characteristics of individual farming systems. *Orobanche* is a community threat and effective management requires a community-based integrated management approach. Recognizing the central role of farmers in parasitic weed management, a technical cooperation project (TCP) involving FAO, ICARDA and seven countries in the Near East and North Africa (NENA) region was implemented to improve the dissemination of knowledge and skills by using a farmer field school approach: a form of education that uses experiential learning methods to build farmers' expertise. This paper reviews conventional *Orobanche* research and development approaches, and highlights weaknesses in the management of the parasitic weed using these approaches as opposed to participatory approaches. The benefits and challenges of participatory farming system approaches in relation to integrated broomrape management (IBM) are also discussed. Lessons learned from achieving community ownership of, and institutional support for, IBM could be applied to other sectors (e.g. public health) in which there is a need for institutional learning and reform. Recommendations are made that include regional collaboration within the framework of a proposed Near East and North Africa *Orobanche* Management Network (NENAOMAN). [Mathew M. Abang, Bassam Bayaa, Barakat Abu-Irmaileh and Amor Yahyaoui (Syria & Jordan). Crop Protection**,** 26(12): 1723-1732, 2007].

TUNISIA

Suppressive Effect of Five Compost Extracts against the Root-Knot Nematode *Meloidogyne incognita*. *In vitro* and *in vivo* tests were conducted to assess the suppressive effects of five different compost extracts, from various com posted animal manure mixtures [poultry-manure (FV), sheep manure (FO), cattle manure (FB) and horse manure (FE)], on the root-knot nematode *Meloidogyne incognita* and tomato growth. The incubation *in vitro* of egg masses of M. *incognita* in diluted (10%) extracts of composts showed a nematicidal activity of the extracts against M. *incognita.* Among the five extracts, C1 (50%FB + 25%FO + 25%FV) and C4 (40%FB + 40%FO + 20% the rest of vegetables) significantly reduced hatching of nematode eggs. The mortality of the eggs ranged from 9.3% in the control (distilled water) to 73.5% in Cl. *In vivo,* tomato plants grown in pot filled with sterilized perlite were inoculated with 750 eggs of *M. incognita* and irrigated every 10 days with the different compost extracts. C4 and C5 (25%FB + 25%FO + 25%FV + 23.5%FE + 1.5% natural phosphate) extracts significantly reduced the number of galls, gall index, percentage of infested roots, and reproduction rate (Pf/Pi) of the nematode. Also, irrigation of tomato with compost extracts improved tomato growth. [A. Kerkeni, N. Horrigue-Raouani and M. Ben Khedher (Tunisia). Nematologia Mediterranea, 35: 15-21, 2007].

Plasmid and Chromosomal Diversity of a Tunisian Collection of *Agrobacterium tumefaciens* Strains. Biochemical and molecular characteristics of *Agrobacterium tumefaciens* strains isolated in Tunisia from different host plants were analysed. A collection of 109 isolates was obtained from diseased plants in several nurseries and orchards located in different regions. The majority of strains was isolated from stone fruit trees and belong to the biovar 1. The analysis of opines produced in tumors revealed that the local strain plasmids were of nopaline type. The 16S rRNA gene sequencing showed the presence of different genomic species among the Tunisian collection; but analysis was not enough to undoubtedly assign any isolate to a single genomic species. The multi-loci analysis carried out by BOX-PCR showed that the local isolates were assigned to frequent genomic species G4 (related to the reference strain B6) and G1 (related to reference strain TTT111), but also to rare genomic species G6 and G7 related respectively to Zutra F/1 and RV3. [Ali Rhouma, Ali Boubaker (Tunisia), Xavier Nesme and Yves Dessaux (France). Tunisian Journal of Plant Protection, 1: 73-84, 2006].

First Report of A2 Mating Type of *Phytophthora infestans* in Tunisia Using Molecular Markers and Some Observations on its Metalaxyl Resistance. Isolates of *Phytophthora infestans* were collected from potato fields and tomato greenhouses located in different regions of Tunisia during the seasons of 2004 and 2005. A molecular approach was used in order to identify the mating types. *P. infestans* genomic DNA isolated from infected plants or from pure culture of mycelium of the pathogen was amplified with the specific primers W16-1/2 and subsequently digested with *Hae*III restriction enzyme. The results revealed the presence of the A2 mating type for the first time in Tunisia, which represented about 12.5 % of the analyzed populations. All of these A2 isolates were collected from the north east of Tunisia (Cap Bon region). Also, since it is observed that fungicide metalaxyl is loosing of its efficacy in some fields, *in vitro* tests for *P. infestans* resistance to this chemical were performed. Results revealed the presence of the metalaxyl resistant phenotype of *P. infestans* in Tunisia. Importance of the genetic studies to follow pathogenicity and population structure of *P. infestans* is noticed. [Wiem Jmour and Walid Hamada (Tunisia). Tunisian Journal of Plant Protection, 1: 85-91, 2006].

Establishment and Dispersal of the Parasitoids *Ageniaspis citricola* Logvinovskaya (Hymenoptera: Encyrtidae) and *Sernielacher petiolatus* Girault (Hymenoptera: Eulophidae), Introduced into Tunisia for the Biological Control of *Phyllocnistis citrella* (Lepidoptera: Gracillariidae). A programme for the biological control of the citrus leafminer *Phyllocnistis citrella* Stainton (Lepidoptera: Gracillariidae) was carried out in Tunisia between 1996 and 1998. Two exotic parasitoids, *Ageniaspis citricola* (Logvinovskaya) (Hymenoptera: Encyrtidae) and *Semielacher petiolatus* Girault (Hymenoptera: Eulophidae), were introduced from Australia, mass-reared in a greenhouse on *Citrus aurantium* L. seedlings infested with *P. citrella,* and released in different orchards located in the major citrus-growing area of Tunisia. In 1996, *A. citricola* was recovered in 39.13% of release sites, reaching a maximum percentage of parasitism of 28%. In 1997, the parasitoid was recovered in a third of all release points, with an average percentage of parasitism of 5%. However, the wasp was unable to survive the winter 1998, and has become extinct. The non-establishment of *A. citricola* may have been due to the more arid climatic conditions present during the rainless summer and most of the autumn in Tunisia. By contrast, the establishment, dispersal, and reduction in citrus leafminer population observed with S. *petiolatus* between 1997 and 1998 shows this species to be well-adapted to the Tunisian climate. The average percentage parasitism of *P. citrella* by S. *petiolatus* increased from 6.6% in 1997 to 15% in 1998. Moreover, S. *petiolatus* was established in 76% of release points in 1997 and in 82% in 1998. It spread as much as 30 km from some release points, with no apparent decline in parasitism levels with distance. *Semielacher petiolatus* is considered to be an effective biological control of the leafminer in Tunisia. Its biological control action would supplement the action of the native parasitoids *Pnigalio* sp. and *Cirrospilus pictus* Nees (Hymenoptera, Eulophidae). [Mohamed Braham, Brahim Chermiti, Rachid Souissi and Mourad Znaidi (Tunisia). International Journal of Pest Management, 52(4): 353-363, 2006].

❖ SOME PLANT PROTECTION ACTIVITIES OF FAO AND OTHER ORGANIZATIONS

DESERT LOCUST SITUATION

General Situation during November 2007 Forecast until mid-January 2008

The Desert Locust situation worsened in eastern Africa during November. Hatching and band formation occurred in eastern Ethiopia, swarms were seen in Somalia and a few swarms invaded northeastern Kenya for the first time since 1961 and laid eggs. Hatching and band formation will occur during December in the three countries. Therefore, it is critical that intensive survey and control operations are undertaken; otherwise, new swarms could start to form at the end of the year and move further south in Kenya. Small swarms also formed in Sudan and moved towards Egypt and to the Red Sea coast where breeding was underway and will continue during the forecast period, causing locust numbers to increase further. All efforts should be made to monitor this developing and potentially dangerous situation closely and carefully, and to undertake control as necessary. The locust situation remained calm in the Western and Eastern regions.

Western Region. The situation continued to remain calm during November. Locust numbers increased slightly from small-scale breeding that took place in central Mauritania**,** in northern Niger and probably in northeastern Chad**.** During the forecast period, small-scale breeding is expected to occur in northwest Mauritania and locusts will increase further. Low numbers of adults will persist in parts of northern Mali and Niger, and in northeastern Chad. No locusts were reported in northwest Africa and no significant developments are expected.

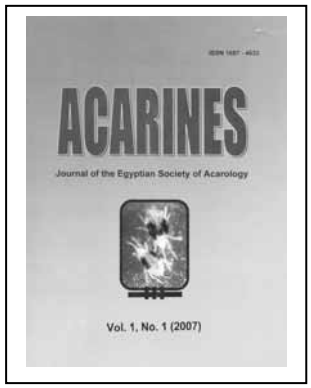
Central Region. Breeding occurred during November in eastern Ethiopia where hatching and numerous bands formed in the Ogaden. Several swarms continued to lay eggs there while a few others moved south to southern Somalia and northeastern Kenya. Ground and aerial control operations were carried out in Ethiopia and teams in Kenya are preparing for hopper band control in December. Numerous adult groups and several swarms formed in the summer breeding area in the interior of Sudan and moved north and eastwards as vegetation dried out. Consequently, an increasing number of adults were seen in the Western Desert in Egypt and some adults reached Cairo. In the winter breeding areas along the Red Sea coast, hopper bands and a swarm formed in northeastern Sudan and bands were present in the Tokar Delta. Smaller scale breeding was in progress on the coast in southeastern Egypt, northern Eritrea, in Yemen including the Gulf of Aden coast, and probably in Saudi Arabia. Control operations were carried out in Sudan and Egypt. A few swarms are expected to arrive on the Red Sea coast from the interior in December and lay eggs. If more rains fall along the Red Sea coast, breeding will continue during the forecast period and cause locust numbers to increase further.

Eastern Region. Locust numbers continued to decline in the summer breeding areas along both sides of the Indo-Pakistan border during November. Two small swarms unexpectedly formed from local breeding in northern Baluchistan, Pakistan and were controlled in early November.

❖ GENERAL PLANT PROTECTION NEWS FROM THE REGION

A NEW SCIENTIFIC JOURNAL ON ACAROLOGY

The first issue of the journal "ACARINES" was published in November, 2007 by the Egyptian Society of Acarology, established in 2005. The senior editors of the journal are Dr. Mohamed Zaher and Dr. Ali Rasmi. The first issue included nine articles, one by Dr. Zaher on the history of mites in Egypt, covering few millennia, and another by Dr. Rasmi on "Forensic Acarology", a science which is instrumental in identifying the site and date of murders through the identification of mite species associated with the dead body. For more information on the journal and the Society please contact: Egyptian Society of Acarology, c/o Agricultural Zoology Department, Faculty of Agriculture, Cairo University, Giza, Egypt; Tel/Fax: 35697849; Email: aas3rd@lycos.com



OBITUARY

Professor Dr. Bakir Abbas Oteifa was born in 1921 in Gharbiyeh Governorate, Egypt, and graduated from the Faculty of Agriculture, Cairo University in 1945. He served as an instructor in the Department of Agricultural Zoology in the same faculty until 1949, when he joined the University of Maryland, USA, to conduct graduate studies in nematology. Dr Oteifa earned his Ph. D. degree in 1953 and returned to Cairo University and served as an assitant professor in nematology, and was promoted to the rank of professor in 1968. In 1974, Dr. Oteifa established the Department of Agricultural Zoology and Nematology at Cairo University, which was the 1st of such department in Egyptian universities, and was appointed as the first head of this department. He served during 1974-1975 as the Associate Dean for Graduate Studies. In 1970, he built the Nematology Center, a well-equipped two story building which was named after him. Dr. Oteifa is considered as the pioneer of nematology science in Egypt and the Arab World, with nmany graduates who specialized in this science under his guidance. He published over a 100 scientific papers, and earned prestigious government awards in 1965 and in 1998. Dr. Oteifa served as the senior advisor to the Minister of Agriculture during the period 1990-2003. Professor Oteifa passed away on July 15, 2007, leaving behind a wealth of achievements. In addition to his professional achievements, he was very much appreciated by his colleagues for his warm and humble character which earned him respect and love of all those who worked with him. He established the "Nematology School" based on hard and creative work, which no doubt makes him as the "father" of this science in the Arab World. May God bless his soul.

❖ ARAB SOCIETY FOR PLANT PROTECTION NEWS

10TH ARAB CONGRESS OF PLANT PROTECTION, Algeria, 2009

The Executive Committee of the Arab Society for Plant Protection (ASPP) received an invitation from Dr Youssef Dawod, Director of Institut National Agronomique, El-Harrach, Algier, to hold the 10th Arab Congress of Plant Protection (10th ACPP) in Algier, Algeria. The ASPP Executive Committee accepted the invitation and the local Organizing Committee for the 10th ACPP will be established soon.

The Congress will be held during 2009 in Algier, Algeria. The exact date and more information on the forthcoming congress will be announced in the June 2008 issue of the Newsletter and on the ASPP website (www.asplantprotection.org). The first announcement for the congress is expected to be ready for distribution in early 2008.

AN ASPP MEMBER AND AN EX-ASPP PRESIDENT WINS THE UNEP CHAMPION AWARD

The Arab Society for Plant Protection (ASPP) is very pleased to announce that Dr Mohamed Besri, ASPP member, ex-member of the Society Executive Committee and ASPP ex-president and Professor of Plant Pathology at the "Institut Agronomique et Vétérinaire Hassan II", received on September 18, 2007 the "UNEP Champion award" from the United Nations Environment Program in a ceremony held at Montreal, Canada on the occasion the 20th anniversary of the Montreal protocol (1987-2007) in presence of representatives of the 191 countries signatory of the protocol and of many scientists and politicians from all over the world. UNEP awarded Dr. Besri this honor for his 20 years activities in the protection of the ozone layer. This UNEP Champion Award does not only honours Dr. Mohamed Besri, but also Morocco, the Arab world and the Arab society for Plant Protection.

Dr Mohamed Besri (right) receiving the UNEP Champion Award.

AN ASPP MEMBER HONORED BY IAPPS

Dr Mustapha El Bouhssini, ICARDA Senior Entomologist and ASPP member has won the International Plant Protection Award of Distinction from the International Association for the Plant Protection Sciences (IAPPS). The award was presented to him at the opening session of the International Plant Protection Congress, held in Glasgow, Scotland, 15-18 October, 2007. Dr El Bouhssini was honored for his contributions to the development of integrated pest management options for controlling insect pests of cereal and legume crops in Central and West Asia and North Africa.

Dr Mustapha El Bouhssini (right) receiving the International Plant Protection Award of Distinction from Dr Hans Herren, World Food Prize Laureate and President of the International Association for the Plant Protection Sciences.

❖ SHORT PLANT PROTECTION NOTES

- *Azospirillum brasilense*, a plant growth-promoting bacterium, was isolated from strawberry root surfaces and inner tissues of roots and stolons, could fix nitrogen, and produce siderophores and indoles, report R. O. Pedraza and associates at Universidad Nacional de Tucuman, and UNT-CONICET, Argentina. (Plant Soil, 295:169-178, 2007).
- Blue and gray mold decay of stored pome fruits were controlled by fumigation with hexanal (2-4 mg per liter), report P. L. Sholberg and P. Randall at Agriculture and Agri-Food Canada, British Columbia. (HortScience, 42:429-748, 2007).
- Carrot cavity spot caused by *Pythium* spp., including *P. violae*, starts as infection from soilborne inoculum and spreads from root to root from existing lesions (polycyclic) reports F. Suffert at INRA, LeRheu, France. (Can. J. Plant Pathol., 29:41-55, 2007).
- Four kinds of bacteriophages isolated from *Ralstonia solanacearum* are useful in detection, to study pathogenicity, and to control pathogens in cropping ecosystems, report T. Yamada and associates at Hiroshima University, Japan. (Microbiology, 153:2630-2639, 2007).
- *Iranian beet curly top virus* is the dominant curtovirus on four field crops, three vegetables, and 11 weeds in Iran, report J. Heydarnejad and associates at Shahid Bahonar University of Kerman, Iran. (J. Phytopathol., 155:321-325, 2007).
- Molecular markers associated with a major root-knot resistance gene in cotton aid in marker-assisted selection for resistance, report C. Niu and associates at New Mexico State University, USDA-ARS (New Orleans), Cotton Inc. (NC), and University of California (Riverside). (Crop Sci., 47:951-960, 2007)
- Of 141 European wheat cu1tivars tested as seedlings, 56 were highly resistant to *Puccinia striiformis*, and 18 had components of adult plant resistance, report M. S. Hovmoller at the University of Aarhus, Denmark. (Plant Breed., 126:225-233, 2007).
- Planting white clover cultivars resistant to the stem nematode increased dry matter yield, but additional stress of sheep grazing did not enhance the resistance effect, report T. A. Williams and associates at the Institute of Grassland and Environmental Research, UK. (Plant Breed., 126:343-346, 2007).
- Propargyl bromide (28 kg/ha) as a fumigant controlled the citrus nematode and *Fusarium oxysporum*, but weeds varied greatly in sensitivity, report I. A. Zasada and associates at USDA-ARS, Beltsville, and University of California, Davis. (HortScience, 42:1212-1216, 2007).
- Stem puncture inoculum was effective in identifying resistance of olive cultivars to *Verticillium dahliae*, report F. J. Lopez-Escudero and associates at Universidad de Cordoba, Spain. (HortScience, 42:190-423, 2007).

- Thirty-nine viruses, 5 viroids, and a few fungal pathogens, but no bacteria, phytoplasmas, or spiroplasmas are transmitted by pollen, report S. D. Card and associates at Biosecurity New Zealand and University of Auckland, NZ. (Australas. Plant Pathol., 36:455-461, 2007).
- Using RT-PCR, full length viroids of *Citrus exocortis viroid*, *Hop stunt viroid*, *Citrus viroid*-III, and *Citrus viroid*-IV could be detected, cloned, and sequenced from a collection of viroid-inoculated grapefruit plants, report M. Kunta and associates at Texas A&M University-Kingsville Citrus Center, TX. (HortScience, 42:600-604, 2007).
- Virazole in callus tissue culture media eliminated *Bean yellow mosaic virus* and *Cucumber mosaic virus* in corms of *Gladiolus psittacinus*, report B. R. Singh and associates at the National Botanical Research Institute, India. (Sci. Hortic., 114:54-58, 2007).

❖ GENERAL NEWS

NON-TOXIN STRAINS OF ASPERGILLUS TO FIGHT OFF TOXIC RELATIVES

A set of non-toxin producing (atoxigenic) strains of *Aspergillus flavus* was recently assembled by scientists at the International Institute of Tropical Agriculture (IITA) to radically reduce aflatoxin in maize using the biological control approach. The team, led by Dr Ranajit Bandyopadhyay, used the highly competitive atoxigenic strains of *Aspergillus* to eliminate their highly toxic relatives. "The atoxigenic strains were able to reduce aflatoxin contamination by up to 99.8% in field trials", says Ranajit. In addition, the most effective atoxigenic strain could out-compete toxigenic strains in grains by 99% after field release. The next step now is to test the efficacy of biocontrol after releasing multiple strains in large-scale field trials in several sites in Nigeria. Laboratory trials of the fungus *Muscador albus* have shown its potential as a biobased fumigant against *Phthorimaea operculella* (potato tuber moth), an important potato pest now managed by use of insecticides. L. Lacey (email: LLacey@yarl.ars.usda.gov).

RESEARCH ON GREY MOULD OFFERS POSSIBLE BREAKTHROUGH IN TOMATO CULTIVATION

Tomato growers are likely to soon be able to cultivate new tomato varieties without having to use pesticides against grey mould (*Botrytis cinerea*). This is the conclusion of the STW-sponsored thesis by Richard Finkers from Wageningen University, with which he hopes to earn his doctorate on 3 April 2007. Finkers designed highly efficient methods whereby tomato varieties can be resistant to grey mould. The leading company De Ruiter Seeds is already applying these methods in its breeding programme. Finkers started off with wild tomato accessions that were resistant to grey mould. When crossing the resistant wild tomato *Solanum habrochaites* LYC4 with the susceptible S. *lycopersicum cv. Moneymaker*, he identified two areas with resistant genes in the DNA. This, however, did not explain all the variations in resistance. With this in mind, Finkers next made a step-by-step scan of the entire genome of the wild tomato to identify locations that have an effect on resistance. Ten areas were found that accommodated resistance factors against grey mould. DNA-markers were then developed for each area to be able to track the presence of each resistance factor in breeding programmes.

With help of the DNA-markers, the identified areas can now be intentionally introgressed in the breeding programmes of De Ruiter Seeds, a Dutch company with a global reputation in the field. Using the DNA-markers, it expects to market new tomatoes that are resistant to grey mould in the near future. The new varieties will mean tomato growers will have to devote far less resources – or perhaps none at all – to combating *B. cinerea*.

An additional benefit of these new tomatoes is that they will be more suitable for closed glasshouse cultivation. This new type of glasshouse has a higher atmospheric humidity that actually increases the chance of grey mould activity. By providing tomato varieties resistant to grey mould, De Ruiter Seeds will fill a worldwide need that has long been around. The research was partly financed by STW (the Technology and Sciences Association) and De Ruiter Seeds. As the developed knowledge obtained from this research has been patented, and therefore both protected and made accessible.

Doctorate: 3 April 2007, Wageningen University, Plant Sciences Plant Breeding and Phytopathology. For more information contact: Richard Finkers, +31 (0)317 48 41 65, Email: richard.finkers@wur.nl

BT TOMATO WITH CRY6A FOUND RESISTANT TO ROOT-KNOT NEMATODES

Transgenic tomato plants expressing modified *Bacillus thuringiensis* (Bt) *cry6A* genes were found to have increased resistance to the root-knot nematode *Meloidogyne incognita.* This is the first time that a Bt Cry protein was demonstrated to confer plant resistance to an endoparasitic nematode, and that Cry proteins are reported to have the potential to control plant-parasitic nematodes in transgenic plants. Researchers at the University of California tested two *cry6A* genes – one was modified not to have codons (sets of three DNA bases that code for an amino acid) uncommon in plants, and the other altered to include only optimal codons for each amino acid based on studies in *Arabidopsis*. The researchers report that there was a fourfold decrease in progeny production of the nematode pest brought about by *cry6A* expression in the plants. They

other nematode-resistant traits. The paper, published by the Plant Biotechnology Journal, can be accessed at: http://www.blackwell-synergy.com/doi/abs/10.1111/j.1467-7652.2007.00257.x.

GENE FROM BOTTLEGOURD MAY HELP CONTROL WATERMELON VIRUS

Aside from its uses as food, bowls, bottles, and musical instruments, the bottlegourd may soon provide the gene for resistance to the zucchini yellow mosaic virus (ZYMV), a pest that infects cucurbits: melons, cucumbers, luffas, squash and pumpkins. ZMYV, as other viruses, is usually transmitted by insects, and is responsible for significantly reducing watermelon yield in North America. Agricultural Research Scientists Kai-Shu Ling and Amnon Levi screened over 200 bottlegourd accessions from different parts of the world. They found 36 ZYMV resistant cultivars, 33 of which are from India. They also found that ZYMV resistance can be transferred to different bottlegourd accessions, enabling the development of varieties with enhanced virus resistance. Resistance of popular watermelon cultivars to ZMYV can be bolstered by grafting the plants into bottlegourd rootstocks. Watermelon is a profitable fruit industry in the US worth $ 435 million in 2006. Read more at
<http://www.ars.usda.gov/News/docs.htm?docid=1261>

NEW CHAIRS OF ISPP SUBJECT MATTER COMMITTEES

Two new chairs have been announced. They are for the:-

ISPP Epidemiology Committee: Dr Odile Carisse at 430 Gouin Blvd /430, Boul. Gouin St-Jean-sur-Richelieu, Quebec/St-Jean-sur-Richelieu (Québec) J3B 3E6, Canada. Telephone: +1-450-515-2023 and facsimile: +1-450-346-7740. E-mail: carisseo@agr.gc.ca

ISPP Plant Virus Epidemiology Committee: Professor Alberto Fereres Castiel, Director del Instituto de Ciencias Agrarias (ICA), Consejo Superior de Investigaciones Cientificas-CSIC, C/Serrano 115 dpdo. 28006 Madrid, Spain. Telephone: +34-91-5627620. E-mail: afereres@ccma.csic.es

10TH INTERNATIONAL PLANT VIRUS EPIDEMIOLOGY SUMPOSIUM ICRISAT, India, 15-19 October 2007

The 10th International Plant Virus Epidemiology Symposium (10th IPVE) entitled *"Controlling Epidemics of Emerging and Established Plant Virus Diseases – The Way Forward"* was held recently at the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT), Patancheru, Hyderabad, India, October 15-19, 2007, where around 200 scientists from around the world participated. The meeting program included four days of paper presentations (15 sessions for Oral Presentations and two Poster Sessions) and a half day City tour around historical sites in Hyderabad. During the 10th IPVE Symposium, a new IPVE Committee was elected to serve for a three years term (2007-2010) and is composed of: Dr Alberto Fereres, Spain (Current Chairman), Dr Mike Thresh, UK (Founder Chairman 1978-1999), Dr Roger Jones, Australia (Australasian and Oceania Representative, Chairman 1999-2007), Dr P Lava Kumar, IITA, Nigeria (African Representative), Dr Safaa Kumari, ICARDA, Syria (West Asian Representative), Dr Ravi Khetarpal, India (East Asian Representative), Dr. Ian Barker, CIP, Peru (South America Representative), Dr Hervé Lecoq, France (European Representative), Dr Stewart M Gray, USA (North America Representative), Dr Thomas Kuhne, Germany (Symposium Organizer, 2002).

Participants of the 10th International Plant Virus Epidemiology Symposium (10th IPVE) at ICRISAT Campus, Patancheru, Hyderabad, India, October 15-19, 2007

FUNGAL INSECTICIDES WITH INCREASED EFFICACY

Biocontrol agents from insecticidal fungi can provide attractive alternatives to chemical insecticides. The uses of these agents, however, are hindered by their poor efficacy and costly preparation. Scientists from the Chinese Academy of Science and the University of Maryland have developed a potent agent that may open the way for effective biocontrol of a wide range of insects - scorpion neurotoxin expressing-insecticidal fungi. By introducing the gene coding for the neurotoxin AaIT from the fat-tailed scorpion, the scientists obtained *Metarhizium anisopliae* with 22-fold increased toxicity to tobacco hornworms and yellow fever mosquitoes. *M. anisopliae* is a fungus that causes disease in over 200 insect species by acting as a parasite. It is non-pathogenic to humans and other animals. New mass production technology makes pricing of *M. anisopliae* production competitive with chemical synthesis. The next step will be to develop host-specific strains, based on the hypervirulent AaIT strain, and incorporate measures to avoid environmental contamination. Subscribers to Nature Bioechnology can read the full paper at <http://www.nature.com/nbt/journal/vaop/ncurrent/pdf/nbt1357.pdf>. Non subscribers can read the abstract at <http://www.nature.com/nbt/journal/vaop/ncurrent/abs/nbt1357.html>

❖ EVENTS OF INTEREST

MEETINGS AND SYMPOSIA

2008

*** January 9-11**

AAB International Advances in Pesticide Application 2008, Robinson College, Cambridge, United Kingdom. Please See: http://www.aab.org.uk/contentok.php?id=184&basket=wwsshowconflist

*** February 25-28**

2nd International Conference on Health and Biodiversity, Galway, Ireland. Please see: http://www.cohabnet.org/cohab2008

*** March 27-29**

International Conference on Biotic Plant Interactions, Brisbane, Australia. Please see: www.uq.edu.au/plants/icbpi

*** April 3-6**

3rd International Late Blight Conference 2008, Beijing, China. Please see:

http://research.cip.cgiar.org/typo3/web/index.php?id=1053

*** April 7-10**

The 2nd Arab Conference for Applications of Biological Control in the Arab countries, Cairo, Egypt. Website: //www.esbcp.org/Conferences.htm

*** April 14-18**

6th International Seed Testing Association Seed Health Symposium, Kruger National Park, South Africa. Please see: www.up.ac.za/conferences/ielc

*** April 20-24**

12th International Symposium on Virus Diseases of Ornamental Plants, Van der Valk Hotel, Haarlem, The Netherlands. Please see: www.plant-virology.nl/ISVDOP12

*** June 19-22**

13th International Congress on Infectious Diseases (ICID), Kuala Lumpur, Malaysia. Please see: http://www.isid.org/13th_icid

*** July 13-18**

5th International Congress of Nematology, Brisbane, Queensland, Australia. Please see: www.5icn.org/

*** August 20-23**

4th International Symposium on Rhizoctonia, Berlin, Germany. Please see: http://rhizoctonia.org

*** August 23-24**

3rd International Phytophthora/Pythium Workshop in association with the 9th ICPP 2008, Torino, Italy. See: www.aphis.usda.gov/plant_health/identification/phytophthora

*** August 24-29**

9th International Congress of Plant Pathology (ICPP 2008), Torino, Italy. *Please Contact*: Congress Secretariat, Valentina Communication, PVia Cibrario 27, 10143 Torino, Italy, Phone: +39-011 4374250; Fax: +39-01 14374318
Email: info@icpp2008.org; Website: www.icpp2008.org

*** August 30 - September 2**

The X International Fusarium Workshop and the Fusarium Genomics Workshop, at the Hotel Carlos V in Alghero, Sardinia, Italy. Please see: http://www.ars.usda.gov/Main/docs.htm?docid=9850

*** September 22-26**

16th Ornamental Workshop on Diseases and Pests, Hendersonville, North Carolina, USA. Please see:

www.cals.ncsu.edu/plantpath/activities/societies/ornamental

*** October 13-15**

ENDURE International Conference "Diversifying Crop Protection", Congress Palace of La Grande Motte, near Montpellier, France. Please see: http://www.endure-network.eu

*** November 4-7**

2nd International Symposium on Biological Control of Bacterial Plant Diseases, Orlando, Florida, USA. Contact: JBJones@ufl.edu

❖ PUBLICATIONS

NEW BOOKS

- **Extension Brochure on Mediterranean Fruit Fly.** Dr. Ibrahim Al-Jboory, the member of the Executive Committee of the Arab Society for Plant Protection issued an extension brochure (44 pages) on the Mediterranean fruit fly as an initiative to disseminate awareness among the Iraqi farmers, researchers and decision makers .This insect was recorded as an invasive pest in October 2006. Two thousand copies were printed and almost more than half of it has been sent to the general authorities for Agricultural Extension and Plant Protection/Ministry of Agriculture. Some copies have been distributed by the author to the interested researchers and some copies are available in the ASPP office or by direct contact with the author (Email: ijboory@yahoo.com).

- **Molecular Plant Pathology.** 2007. Edited by Lakshman Desai. Plant pathology is an issue of direct relevance to crop yield and hence of major economic importance. Having a thorough and comprehensive knowledge of pathogens causing plant diseases, their symptoms, effects and treatment is an essential part of the curriculum for students in the field of plant science. The invaluable resource on plant pathology introduces the types of organisms causing plant diseases, ranging from higher plants to viroids. Techniques that may be of use in studying plant infections, such as colloidal gold cytochemistry, in situ hybridisation, etc., are detailed, and the defence mechanisms of infected plants, including trees, cytolocalisation of molecules involved in host resistance, have also been discussed. With an up-to-date account of the latest trends and developments in plant pathology, and a lucid style of writing, the book is a must for academicians, researchers and students in the field of agroscience, botany and plant science. 280 pages, Hardbound, Price 47.70 US$. Published by Paragon International Publishers, New Delhi, India.
http://www.akhilbooks.com/frmsingleProductDet.aspx?id=24987

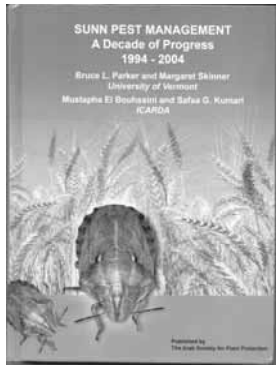
- **Botanicals as Ecofriendly Pesticides.** 2007. Edited by P.P. Mahulikar and K.M. Chavan. The book deals essentially with the aspects that are of immediate concern to new researchers in the field of botanicals and natural products. It presents the first comprehensive overview of the plant products since they were introduced in the pest management covering both theoretical and practical applications. This book covers the key aspects of the plant products including: Natural pest management agents from plants, extraction of plants products, characterization and formulation and bioassay of extracts against different pests. The book reports for the first time in the field of botanicals, a study on the stability of the prepared extracts towards their various biological activity against different microbial and stored grain pests through a large number of the prepared extracts and formulations in both water and organic media. The book is an indispensable and interdisciplinary text for researchers and scientists from Chemical Sciences, Life Sciences, Agricultural Sciences and related disciplines, working in this important and fascinating area of botanicals and natural products in Integrated Pest Management (IPM) concept. Published by New India Publishing Agency, New Delhi, India. Price 26 US$.
http://akhilbooks.com/frmsingleProductDet.aspx?id=20287

- **A Textbook of Plant Diseases and Their Control (in 2 Volumes).** 2007. Edited by Mukta Bhargava. This textbook in two volumes has been intended primarily for the students in undergraduate and postgraduate courses in plant diseases. It fulfil not only the need of the students to find literature on the diseases and other pathological conditions difficult to obtain and access, but also provide complete systematic treatment of the subject from their point of view. Arrangement of chapters and topics is such that it is easily followed by the students. The text matter is clear and simple, which is explained through various diagram. It is hoped that the publication is useful not only to the students but also to the academic professionals. Published by Dominant Publishers and Distributors, New Delhi, India. Price 82 US$.
http://akhilbooks.com/frmsingleProductDet.aspx?id=11360

- **Tomato Yellow Leaf Curl Virus Disease: Management, Molecular Biology, Breeding for Resistance**. 2007. Edited by Czosnek, Henryk. This book offers a multidisciplinary view on one of the major diseases of tomato crops, the tomato yellow leaf curl disease. It compiles the numerous aspects of the relation between the virus, the tomato host plant and the whitefly vector. Presents papers on classical epidemiology of the viral disease as well as up-to-date molecular research. This book covers the effort of researchers and companies to breed tomato plants resistant to the disease, to develop new diagnostic tools, and to use new and friendlier insecticides to overcome acquired resistance to insecticides. It will awaken the interest of breeders, phytopathologists, environmentalists, extension services, plant virologists, entomologists and molecular biologists. It deals both with the epidemiological aspects of the disease and with integrated pest management in the field. It discusses the efforts aimed at breeding tomato plants resistant to the virus (using classical breeding, marker-assisted breeding and genetic engineering). It summarizes the techniques used for diagnosis, eradication and certification and emphasizes the problems inherent to the control of the virus insect vector, the use of pesticides and the resistance acquired by the

insects, the appearance of new whitefly biotypes with previously unknown characteristics, and the complex relations between virus, vector and plant host. This book is written for researchers, plant breeders and growers.
http://www.springer.com/west/home/life+sci/plant+sciences?SGWID=4-10038-22-173660104-0

- **Sunn Pest Management: A Decade of Progress 1994-2004.** 2007. Edited by Bruce Parker, Margaret Skinner, Moustapha El-Bouhssini and Safaa Kumari. Sunn Pest is a serious pest of wheat that can induce losses which can reach 90-100% when insect populations are high. This pest is found from North Africa through West Asia and countries of the former Soviet Union, and East to Pakistan. This book, published by the Arab Society of Plant Protection (ASPP), represent of proceedings of the 2nd International Conference on Sunn Pest, held at the International Center for Agricultural Research in the Dry Areas (ICARDA), Aleppo, Syria, during July 2004. The book contains 54 papers on a range of subjects, all of which directly contribute to a clear understating of Sunn Pest integrated management. 430 pages, hard cover. Copies can be obtained from ICARDA, P.O. Box 5466, Aleppo, Syria. For more information on this book please see the ASPP website: http://www.asplantprotection.org/



- **Handbook of Small Grain Insects**. 2007. Edited by G. David Buntin, Keith S. Pike, Michael J. Weiss and James A. Webster. This handbook is a new and comprehensive text that examines the biology and management of arthropod pest and beneficial species of small grain crops. The handbook contains the latest information on the management of small grain pests with introductory chapters discussing management tactics specifically related to small grain production. It also brings together in one place an extensive amount of information on the biology and management of many minor pests of small grains that is often difficult to locate. It includes more than 135 color photographs and maps, illustrated keys of pest injury and insect identification, references, glossary, and an index. It is co-published by the Entomological Society of America and The American Phytopathological Society.
http://www.apsnet.org/apspress/email/7.19.07.htm

❖ Selected Research Papers — أوراق علمية مختارة

Entomology and Acarology — الحشرات والعناكب

Chemical control of *Pezothrips kellyanus* (Thysanoptera: Thripidae) in citrus plantations in Cyprus. 2007. V.A. Vassiliou (Cyprus). Crop Protection, 26(10): 1579-1584 .

Effect of black bean aphid, *Aphis fabae*, on transpiration, stomatal conductance and crude protein content of faba bean. 2007. Hail K. Shannag (Jordan). Annals of Applied Biology, 151(2): 183-188.

Effects of the soil texture and the burying depth of the larvae on some biological parameters of *Ceratitis capitata* (Diptera: Trypetidae). 2007. D. Ali Ahmed, N. Soltani, A. Kellouche and F. Mazouzi (Algeria). African Journal of Agricultural Research, 2(3): 105-111.

Histopathology and morphogenesis of the *Granulovirus* of the potato tuber moth *Phthorimaea operculella*. 2006. A. Laarif, A. Ben Ammar, M. Trabelso and M.H. Ben Hamouda (Tunisia). Tunisian Journal of Plant Protection, 1: 115-124.

Insecticidal effect of spinosad dust against four stored product insect species in different grain commodities. 2007. Amin Nikpay (Iran). International Journal of Pest Management, 53 (2): 121–125.

Diseases — أمراض

Bacterial — البكتيريا

A real-time PCR assay for detection of *Clavibacter michiganensis* subsp. *insidiosus* in lucerne. 2007. A. Marefat, K. Ophel-Keller and A. McKay (Iran & Australia). Australasian Plant Pathology, 36: 262-269.

Fungi — الفطور

AFLP analysis of the genetic variability and population structure of the wheat crown rot fungus *Fusarium pseudograminearum* in Tunisia. 2006. S. Gargouri, S. Hamza and M.R. Hajlaoui (Tunisia). Tunisian Journal of Plant Protection, 1: 93-104.

Slender wheatgrass is susceptible to smut caused by *Ustilago phrygica* from Turkey. 2007. D.K. Berner, H.J. Dubin and E.L. Smallwood (USA). Plant Disease, 91:906.

Viruses — الفيروسات

Characterisation of cineraria strain of *Tomato yellow ring virus* from Iran. 2007. R. Rasoulpour and K. Izadpanah (Iran). Australasian Plant Pathology, 36: 286-294.

Distribution of *Peach latent mosaic viroid* in Commercial Orchards of Peach in the North of Tunisia. 2007. I. Fekih Hassen, S. Massart, S. Roussel, J. Kummert, H. Fakhfakh, M. Marrakchi and M. H. Jijakli (Tunisia). Journal of Phytopathology, 155(7-8): 403-408.

Frequent occurrence of *Lettuce mosaic virus* in Cape Daisy (*Osteospermum* sp.) in Tunisia. 2007. O. Le Gall, L. Svanella-Dumas, H. Fakhfakh, M. Marrakchi and T. Candresse (France & Tunisia). Plant Disease, 91: 1514.

Molecular characterization of *Grapevine virus* A isolates from Jordan. 2007. Samar Misbeh, Abdullah Al-Musa, Ghandi Anfoka and Nida' Salem (Jordan & USA). Phytopathologia Mediterranea, 46: 195-200.

Molecular Characterization of Jordanian Isolates of *Cucurbit yellow stunting disorder virus* . 2007. M. Sweiss, G. Anfoka and Y. Abou-Jawdah (Jordan & Lebanon). Journal of Phytopathology, 155(9): 557-562.

Partial Molecular Characterization of Some *Grapevine fanleaf virus* Isolates from North-east of Iran. 2007. R. Pourrahim, S.H. Farzadfar, A. R. Golnaraghi and A. Ahoonmanesh (Iran). Journal of Phytopathology, 155(11-12): 754-757.

Sequence analysis of a Tunisian isolate of *Pepper mild mottle virus* (PMMoV) that overcomes L^1 and L^2 resistance genes of pepper in Tunisia. 2006. M. Mnari-Hattab, K. Ezzaier and N. Hamza (Tunisia). Tunisian Journal of Plant Protection, 1: 65-71.

Transmission properties of Iranian wheat stripe virus. 2007. J. Heydarnejad, K. Izadpanah, F.R. Hunter and M.J. Gooding (Iran & UK). Australasian Plant Pathology, 36: 354-357.

Nematodes النيماتودا

Comparison of the nematicidal potentials of dried leaves of five plant species against *Meloidogyne incognita* infecting tomato. 2007. M.A. Radwan, E.K. El-Maadawy and M.M. Abu-Elamayem (Egypt). Nematologia Mediterranea, 35: 81-84.

Host status of pentunia cultivars to root-knot nematodes. 2007. M.L. Mendes, D.W. Dickson, R. Schoelhorn, R. Centintas and J.A. Brito (USA & Turkey). Nematologia Mediterranea, 35: 91-94.

Weed Control مكافحة أعشاب

Efficacy evaluation of some dual purpose herbicides to control weeds in maize (*Zea mays* L.). 2007. M.A. Baghestani, E. Zand, S. Soufizadeh, A. Eskandari, R. PourAzar, M. Veysi and N. Nassirzadeh (Iran). Crop Protection, 26(7): 936-942.

Evaluation of integrated weed management practices for chilies in Pakistan. 2007. K.M. Khokhar, T. Mehmood and M. Shakeel (Pakistan). Crop Protection, 26(8): 1135-1139.

Evaluation of some newly registered herbicides for weed control in wheat (*Triticum aestivum* L.) in Iran. 2007. E. Zand, M.A. Baghestani, S. Soufizadeh, A. Eskandari, R. PourAzar, M. Veysi, K. Mousavi and A. Barjasteh (Iran). Crop Protection, 26(9): 1349-1358.

Evaluation of sulfosulfuron for broadleaved and grass weed control in wheat (*Triticum aestivum* L.) in Iran. 2007. M.A. Baghestani, E. Zand, S. Soufizadeh, M. Jamali and F. Maighany (Iran). Crop Protection, 26(9): 1385-1389.

Fenoxaprop resistance in sterile wild oat (*Avena sterilis*) in wheat fields in Turkey. 2007. A. Uludag, Y. Nemli, A. Tal and Baruch Rubin (Turkey & Israel). Crop Protection, 26(7): 930-935.

Field evaluation of the resistance of some faba bean (*Vicia faba* L.) genotypes to the parasitic weed *Orobanche foetida* Poiret. 2007. Z. Abbes, M. Kharrat, P. Delavault, P. Simier and W. Chaïbi (Tunisia). Crop Protection, 26(12): 1777-1784.

Growth parameters enhancing the competitive ability of corn (*Zea mays* L.) against weeds. 2007. G.R. Mohammadi (Iran). Weed Biology and Management, 7(4): 232-236.

Integrated weed management practices in garlic crop in Pakistan. 2007. T. Mehmood, K. Mahmood Khokhar and M. Shakeel (Pakistan). Crop Protection, 26(7): 1031-1035.

Response of winter wheat (*Triticum aestivum* L.) and weeds to tank mixtures of 2,4-D plus MCPA with clodinafop propargyl. 2007. M. A. Bahestani, E. Zand, S. Soufizadeh, M. Mirvakili and N. Jaafarzadeh (Iran). Weed Biology and Management, 7(4): 209-218.

The effect of sunflower leaf extracts on *Chenopodium album* in wheat fields in Pakistan. 2007. T. Anjum and R. Bajwa (Pakistan). Crop Protection, 26(9): 1390-1394.

Weed control and wheat (*Triticum aestivum* L.) yield under application of 2,4-D plus carfentrazone-ethyl and florasulam plus flumetsulam: Evaluation of the efficacy. 2007. M.A. Baghestani, E. Zand, S. Soufizadeh, N. Bagherani and R. Deihimfard (Iran). Crop Protection, 26(12):1759-1764.

Pesticides مبيدات

A review on the mechanisms involved in hyperglycemia induced by organophosphorus pesticides. 2007. R. Rahimi and M. Abdollahi (Iran). Pesticide Biochemistry and Physiology, 88(2): 115-121.

Differential influence of herbicide treatments on activity and kinetic parameters of C_4 photosynthetic enzymes from *Zea mays*. 2007. M. M. Nemat Alla, N.M. Hassan and Z.M. El-Bastawisy (Egypt). Pesticide Biochemistry and Physiology, 89(3): 198-205.

Fruit-growers' perceptions on the harmful effects of pesticides and their reflection on practices: The case of Kemalpasa, Turkey. 2007. S. Isin and I. Yildirim (Turkey). Crop Protection, 26(7): 917-922.

Improvement by *Satureja khuzestanica* Essential oil of malathion-induced red blood cells acetylcholinesterase inhibition and altered hepatic mitochondrial glycogen phosphorylase and phosphoenolpyruvate carboxykinase activities. 2007. S. Basiri, H. Esmaily, S. Vosough-Ghanbari, A. Mohammadirad, N. Yasa and M. Abdollahi (Iran). Pesticide Biochemistry and Physiology, 89(2): 124-129.

Induction of insulin resistance by malathion: Evidence for disrupted islets cells metabolism and mitochondrial dysfunction. 2007. S. Pournourmohammadi, S.N. Ostad, E. Azizi, M.H. Ghahremani, B. Farzami, B. Minaie, B. Larijani and M. Abdollahi (Iran). Pesticide Biochemistry and Physiology, 88(3): 346-352.

Investigation of acute toxicity of (2,4-dichlorophenoxy)acetic acid (2,4-D) herbicide on crayfish (*Astacus leptodactylus* Esch. 1823). 2007. A. Çağlan Karasu Benli, R. Sarıkaya, A. Sepici-Dincel, M. Selvi, D. Şahin and F. Erkoç (Turkey). Pesticide Biochemistry and Physiology, 88(3): 296-299.

Pathogenicity and RAPD analysis of *Phytophthora nicotianae* pathogenic to pepper in Tunisia. 2007. T. Darine, M.B. Allagui, M. Rouaissi and A. Boudabbous (Tunisia). Physiological and Molecular Plant Pathology, 70(4-6): 142-148.

Stimulation of insulin and glucagon synthesis in rat Langerhans islets by malathion in vitro: Evidence for mitochondrial interaction and involvement of subcellular non-cholinergic mechanisms. 2007. S. Vosough-Ghanbari, P. Sayyar, S. Pournourmohammadi, A. Aliahmadi, S.N. Ostad and M. Abdollahi **(**Iran). Pesticide Biochemistry and Physiology**,** 89(2): 130-136.

Thesis Research رسائل جامعية

Abbas M. Al-Khafaji. 2007. Susceptibility of some foreign Hybrids of maize to the corn stem borer, *Sesamia cretica* Led. (Lep.: Phalaenidae). M.Sc. Thesis. College of Agriculture, University of Baghdad, Iraq. 101 pp.

حنان محمود حبق. 2007. إمكانية استخدام الحشرات وبعض الطرائق الأخرى في الإدارة المتكاملة للهالوك المتفرع *Orobanche ramosa* L. على نباتات العائلة الباذنجانية. رسالة ماجستير، قسم وقاية النبات، كلية الزراعة، جامعة تشرين، سورية.