ARAB AND NEAR EAST
PLANT PROTECTION NEWSLETTER

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EDITORIAL

Climate Change and Plant Protection

One of the most important features of climate change on the Arab Countries region in the coming few decades is higher temperatures and less rainfall. Such expected changes have an impact on agricultural production in general, including host-pest interactions and integrated pest management strategies. For examples, rise in temperature could increase the numbers of generations per year for some insect pests; resistance genes might lose their effectiveness under higher temperature regions; late season rains are becoming increasingly common, causing higher incidence of some diseases. The list could be long, and we need to ask ourselves what research activities should be implemented to identify solutions for such incoming problems.

It is essential that all agriculture research institutions in the Arab World intensify their effort to develop technologies to address biotic and a biotic constraints on important crops, especially in low rainfall regions with the main task of improving crop productivity and farmers' income in marginal environments. With climate change as a serious threat, efforts need to also focus on identifying means and ways for more efficient water use, less reliance on pesticides and herbicides, pay more attention to conservation agriculture and crop rotations and most importantly identify hot spots most vulnerable to climate change to permit policy makers to give priority to such locations.

In today's world, communities, and especially the farming communities, are facing serious challenges and one way to help is to predict incoming problems and allocate resources and efforts to find sustainable solutions.

Editorial Board

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

IRAN

Occurrence of *Ourmia melon virus* in the Guilan Province of Northern Iran. A survey was conducted in 2005 and 2006 in the major cucurbit-growing areas in Guilan Province (northern Iran). Leaf samples were collected from plants of melon (*Cucumis melo* L.) (n = 119) and squash (*Cucurbita* sp.) (n = 150) showing various virus-like symptoms (mosaic, yellowing, chlorotic spot, and irregular ring spot) on leaves. All samples collected from 16 different regions were screened for the presence of 10 cucurbit viruses by double-antibody sandwich (DAS)-ELISA using polyclonal antibodies provided by H. Lecoq (INRA, Avignon, France) and V. Lisa (CNR, Torino, Italy). *Ourmia melon virus* (OuMV, genus *Ourmiavirus*) was the most prevalent virus in melon and was detected in 59% of the samples. OuMV was also detected in 20 of 150 (13%) squash samples. OuMV was detected in 4 of the 16 areas surveyed (Rasht, Somehsara, Masal, and Rood-Bar). The identification of OuMV was confirmed through differential host range reaction. The number of multiple infections of OuMV with other common cucurbit viruses was relatively high (46%), most frequently with Zucchini yellow mosaic virus and Cucurbit aphid-borne yellows virus. Since the first report of OuMV from melon in Azerbaijan-E-Gharbi Province, western Iran, there has been no report of OuMV occurrence in any other region of Iran or any other country in the world. Our results show that OuMV is naturally spreading into other regions of Iran. [R. Gholamalizadeh, A. Vahdat, S.V. Hossein-Nia, A. Elahinia and K. Bananej (Iran). Plant Disease, 92(7): 1135, 2008].

PAKISTAN

Natural Occurrence of Phytoplasma Associated with Chickpea Phyllody Disease in Pakistan – a New Record. During spring 2005–06 chickpea plants (cvs Desi and Kabuli) were found to be affected by a previously undescribed disease in Pakistan. Symptoms consisted of proliferation of branches with smaller leaflets, giving a bushy appearance to the plants. Affected plants were scattered in the field and were more easily spotted at flowering and podding time. The flowers developed abnormal green structures (phyllody) instead of normal flowers. At the time of crop maturity when the healthy plants were drying the diseased plants in the field were conspicuously green. Tissue samples from plants with and without symptoms were examined using a transmission electron microscope to ascertain if the disease was associated with a phytoplasma. Typical pleomorphic bodies (phytoplasma) mostly spherical to oval of a size ranging from 200–600 nm were observed only in the sieve elements of affected samples. The bodies had opaque, low electron density cytoplasm that contained ribosome like granules, DNA-strand-like structures and lacked nuclear membranes, and were absent from healthy samples, from xylem cells, phloem parenchyma cells and companion cells of affected plants. PCR test and partial sequencing of PCR products confirmed that the phytoplasma had the greatest homology to 16SrII phytoplasmas. Phyllody symptoms similar to those observed in the field started to develop after 25–35 days in graft-inoculated plants while no disease symptoms were observed on control plants. Chickpea has been grown in Pakistan for many years without any reported incidence of phyllody. The presence of phytoplasma disease in chickpea presents a new threat to the chickpea in Pakistan. The disease was found previously in Ethiopia, India, Myanmar, Australia and Oman. This is the first report of chickpea phyllody disease in Pakistan. [K.P. Akhtar, T.M. Shah, B.M. Atta, M. Dickinson, F.F. Jamil, M.A. Haq, S. Hameed and M. J. Iqbal (Pakistan & UK). Plant Pathology, 57(4): 771, 2008].

First Report on the Association of a 16SrII Phytoplasma with Sesame Phyllody in Pakistan. Sesame phyllody disease has been recorded on sesame in Pakistan for a number of years, and is characterized by virescence, phyllody, yellowing, floral sterility and stem proliferation of infected plants, and causes significant losses in Pakistan. Earlier, in Oman, phytoplasmas of the 16SrII group have been reported as the causal agent of sesame phyllody. Tissue samples from infected and uninfected plants were examined using a light microscope using Dienes' stain. Regularly distributed dark blue areas were observed in the phloem cells of stem, leaf and stalk sections of infected sesame plants but were absent from phloem cells of healthy samples, confirming that a phytoplasma is associated with the disease in sesame. To identify the phytoplasma associated with the disease, PCR test and sequence of PCR products showed 99% sequence identity with sesame phyllody from Oman (Acc. No. EU072505). The disease was shown to be graft transmissible in a greenhouse experiment, phyllody symptoms similar to those observed in the field started to develop after 50–60 days in the graft-inoculated plants with no disease symptoms observed in control plants. This is the first molecular evidence for the association of a phytoplasma of the 16SrII group with phyllody disease in Pakistan and its sequence is essentially identical to that of the phytoplasma causing sesame phyllody in Oman. [K.P. Akhtar, M. Dickinson, G. Sarwar, F.F. Jamil and M.A. Haq (Pakistan & UK). Plant Pathology, 57(4): 771, 2008].

SOMALIA

First Report of Citrus Canker Caused by *Xanthomonas citri* in Somalia. *Xanthomonas citri* (synonym = *Xanthomonas axonopodis* pv. *citri*) has been reported in several countries in Africa but not Somalia. During 2006 and 2007, hyperplasia-type lesions, often surrounded by a water-soaked margin and yellow halo, typical of citrus canker caused by *X. citri* were found on 8- to 10-year-old

lime (*Citrus limetta*) and grapefruit (*Citrus* × paradisi Macfed.) trees in northern and southern Somalia, respectively. Ten leaf samples diagnosed presumptively as citrus canker by Xac ImmunoStrip test kits (Agdia, Elkhart, IN) were mailed to the USDA Foreign Disease-Weed Science Research Unit at Ft. Detrick, MD. To confirm the identification of *X. citri*, isolations were made from several lesions from each sample onto yeast-dextrose-$CaCO_3$ (YDC) agar. Yellow, xanthomonad-like mucoid, convex colonies were purified and stored on YDC slants. Phenotypic tests were done as described, and real-time PCR assays were done using primers XCit8F and XCit5R with probe XCitP2. For pathogenicity tests, cultures were grown overnight in liquid nutrient broth-yeast medium adjusted to contain 1×10^5 CFU/ml and inoculated into leaves of lime seedlings with the blunt end of a 2-ml syringe. After 21 to 30 days in a lighted dew chamber (Model I-60DLM; Percival Scientific, Inc. Perry, IA) at 30/23°C day/night, symptoms were recorded. Cultures of sample S-1 (northern Somalia) from lime were phenotypically atypical of *X. citri*, PCR negative, and nonpathogenic. However, cultures of samples 3 to 7 (southern Somalia) from grapefruit were typical of *X. citri* and PCR positive; cultures 3 and 4 were tested for pathogenicity and produced erumpent lesions on lime. Isolations onto YDC agar resulted in typical mucoid, convex, yellow, PCR-positive colonies. To our knowledge, this is the first report of *X. citri* on citrus plants in Somalia. Strains S3 and S4 have been deposited in ICPB at Ft. Detrick, MD as ICPB 11650 and 11651, respectively. [G.M. Balestra, A. Sechler, E. Schuenzel and N.W. Schaad (Italy & USA). Plant Disease, 92(6): 981, 2008].

SYRIA

First Report from Syria of *Citrus tristeza virus* in *Citrus* spp. During the spring of 2006, the main Syrian citrus-growing areas of Lattakia (Jableh, Aledyye, Eseelya, Siano, and Hresoon provinces) and Tartous (Almintar, Aljammase, Karto, Majdaloonelbahr, Yahmour, Amreet, Althawra, and Safita provinces) were surveyed to assess the presence of *Citrus tristeza virus* (CTV). Eight nurseries (approximately 130 plants per nursery), two budwood source fields (approximately 230 trees per field), and 19 groves (approximately 60 trees per grove) containing the main citrus varieties were visually inspected and sampled for serological assays. Infected samples were collected from two nurseries, two budwood source fields, and six groves. Stems and leaf petioles from nursery trees and flower explants from the groves were collected and analyzed for CTV by tissue blot immunoassay (TBIA) with the commercial kit from Plantprint (Valencia, Spain). Of 2,653 samples tested, 89 (4%) CTV-infected plants were detected. Five citrus varieties were found to be infected and Meyer lemon (*Citrus limon* 'Meyer') had the highest incidence 16%. Numerous sweet orange varieties (*Citrus sinensis* L.) were found to be highly infected in the field, but only the Washington navel sweet orange was found to be infected in the nurseries. No clear CTV symptoms were observed during the survey. Samples that were positive for CTV by TBIA were also positive by biological indexing on Mexican lime (*C. aurantifolia*) and immunocapture reverse transcription PCR. Coat protein gene sequences obtained from five selected clones of a Syrian CTV isolate (GenBank Accession No. EU626555) showed more than 99 and 98% nucleotide sequence identity to a Jordanian CTV isolate (GenBank Accession No. AY550252) and the VT isolate (GenBank Accession No. U56902), respectively. Almost all infected samples induced moderate vein clearing symptoms when grafted to Mexican lime. Symptoms of vein clearing, leaf cupping, stunting, and stem pitting on Mexican lime were induced by graft transmission of CTV from one Valencia sample from the Tartous area. The viral inoculum is widely and randomly distributed in commercial groves, especially in the southern Tartous area and in some nurseries. To our knowledge, this is the first report of CTV in Syria. However, CTV was reported from the neighboring citrus-growing countries of Lebanon, Turkey, and Jordan, in addition the severe seedling yellows strain is present in this area, which poses a potential threat to Syrian citriculture. [R. Abou Kubaa, K. Djelouah, A.M. D'Onghia, R. Addante and M. Jamal (Italy & Syria). Plant Disease, 92(10): 1468, 2008].

TUNISIA

Molecular, Biological and Serological Variability of *Zucchini yellow mosaic virus* in Tunisia. A study was conducted in Tunisia to better understand the population structure of *Zucchini yellow mosaic virus* (ZYMV), a severe virus affecting cucurbit crops worldwide, and to estimate whether the use of resistant cultivars may provide durable control. Analysis of the polymerase and coat protein partial sequences of 83 isolates collected in the three main cucurbit-growing areas in Tunisia showed that ZYMV isolates were grouped into two distinct clusters within ZYMV molecular group A. ZYMV molecular variability was shown to be significantly higher in the Cap Bon region than in the Bizerte area. An important biological variability was observed in a subset of 23 isolates regarding symptomatology in susceptible or resistant cucurbits. Some isolates overcame ZYMV tolerance or resistance in zucchini squash and melon, but not in cucumber. Three serotypes were differentiated using a set of 13 monoclonal antibodies (MAbs). Seven parameters characterizing the 23 isolates, including molecular, serological and biological properties, were used for a multiple component analysis (MCA). This analysis revealed that symptom intensity of a given isolate was similar in different susceptible cucurbit hosts, suggesting similar degrees of aggressiveness in different hosts. [S. Yakoubi, C. Desbiez, H. Fakhfakh, C. Wipf-Scheibel, F. Fabre, M. Pitrat, M. Marrakchi and H. Lecoq (Tunisia & France). Plant Pathology, 57(6): 1146–1154, 2008].

Occurrence of 'mal nero' Disease on Mandarin and Orange Trees in Tunisia. The Tunisian citrus industry covers 18 000 ha localized mainly along the coast of the Mediterranean Sea. The major phytosanitary problem is 'mal secco' of lemon trees, a dieback caused by *Phoma tracheiphila*. This fungal disease has been observed in

Tunisia since 1953. Different symptoms occur on the tree depending upon whether *P. tracheiphila* attacks via the roots or shoots. The disease is named 'mal nero' when infection begins at the basal part of trees (trunk, roots) with a rapid progression of symptoms and browning of the hardwood may occur. During surveys in Cap Bon region of Tunisia in 2007, decline of mandarin (cv. Cassar) and orange (cv. New Hall) grafted on sour orange rootstock was observed in some orchards characterized by a heavy soil. Symptoms included a general collapse of the tree with leaves remaining attached. A transversal section of the dead tree trunk showed necrotic coloration of the hardwood. The same symptoms have been described in Italy. Consistent fungal colonies, isolated from necrotic woody tissue producing pycnidia and pycnidiospores, were identified as *P. tracheiphila*. The identification of the pathogen was confirmed by PCR technique using the primer pair Pt-FOR2 + Pt-REV2 developed for detecting *P. tracheiphila* on infected lemon tissues. A pathogenicity test was conducted using susceptible 1-year-old sour orange plants grown in pasteurized potting medium. Mycelial plugs of two isolates each were inoculated separately into the basal stem of 10 sour orange plants. Ten non-inoculated plants were used as controls. Plants were grown in the greenhouse at 25ºC, where they all developed typical disease symptoms after 45 days. Non-inoculated controls did not develop disease symptoms. *Phoma tracheiphila* was re-isolated from all diseased plants. This is the first report of 'mal nero' disease occurring naturally on mandarin and orange trees and the first time this disease has been reported in Tunisia. The Tunisian citrus industry is mostly grown on sour orange rootstocks, and therefore, 'mal nero' represents a serious threat. [M.R. Hajlaoui, L. Kalai, M. Mnari-Hattab, A. Guermech and N. Ben Abdelaal (Tunisia). Plant Pathology, 57(4): 784, 2008].

TURKEY

First Report of White Mold Caused by *Sclerotinia sclerotiorum* on Sweet Basil in Turkey. In February of 2008, wilt and collapse of sweet basil (*Ocimum basilicum* L.) was observed on approximately 20% of the plants in a commercial greenhouse in Demre, Antalya, Turkey. Crown and stems of infected plants were necrotic; leaves turned brown and wilted. Profuse, white mycelia and occasionally black sclerotia were found inside and outside of affected stems. *Sclerotinia sclerotiorum* (Lib). de Bary, identified based on morphological characteristics was isolated from sclerotia and symptomatic stems on potato dextrose agar amended with tetracycline. To conduct pathogenicity tests, sclerotia produced on carrot discs were surface disinfested in 70% ethanol and dried on sterilized filter papers. Ten sclerotia were placed in 9-cm-diameter glass petri plates containing 15 ml of sterilized distilled water. Plates were wrapped with Parafilm and incubated at 4°C for 5 to 6 weeks in the dark. Plates were then incubated at 15°C in 12 h of dark and 12 h of light. Apothecia developed after 2 weeks. Ascospores were harvested from apothecia with distilled water by crushing and shaking the apothecia in centrifuge tubes. Thirty basil plants sprayed with ascospores (10^6 spores per ml) were maintained in a growth chamber at 22°C and 90% humidity. After 2 weeks, necrotic leaves and stems were observed on all inoculated plants. *S. sclerotiorum* was recovered from symptomatic tissues. No symptoms developed on the 30 basil plants sprayed with sterile distilled water. The pathogenicity test was repeated with similar results. *S. sclerotiorum* on basil has been reported in Canada, the United States and Italy. To our knowledge, this is the first report of *S. sclerotiorum* on basil in Turkey. [F.M. Tok (Turkey). Plant Disease, 92(10): 1471, 2008].

Outbreak of *Ralstonia solanacearum* Biovar 2 Causing Brown Rot on Potato in the Aegean Region of Turkey. *Ralstonia solanacearum* (Smith) Yabuuchi, Kosako, Yano, Hotta, and Nishiuchi, the cause of brown rot of potato (*Solanum tuberosum*), was detected for the first time in Turkey in 1995 in five potato fields in the Nevsehir Province of the central Anatolia Region and was eradicated under measures mandated by the government. Occurrence of the pathogen was not reported in other parts of the country. However, in 2006, brown rot symptoms were observed in potato (cv. Marabel) fields in the Balikesir Province of the Aegean Region. Symptoms and signs included wilting, browning of stem vascular tissues, and ooze exudation from the transversely cut stem. On tubers, brown discoloration of the vascular ring was observed. Creamy bacterial ooze emerged from the vascular ring a few minutes after cutting. In advanced stages, bacterial slime oozed from the tuber heel end (stolon) and "eyes" causing soil particles to adhere. Isolation of bacteria from diseased stem and tuber tissues on mSMSA medium consistently resulted in white, fluid colonies with red coloration in the center. On the basis of biochemical, immunofluorescence (IF), and real-time PCR tests, 10 representative isolates (one per affected field) were identified as *Ralstonia solanacearum*. They were further identified as biovar 2 according to metabolization of maltose, lactose, and D (+) cellobiose but not mannitol, sorbitol, and dulcitol. In the IF tests, fluorescent cells were observed at antibody dilutions from 200 to 12,800. The expected real-time PCR products were generated using biovar 2-specific primers. Pathogenicity tests were performed by injecting a bacterial suspension (10^6 CFU/ml) into the stem of 2-week-old tomato seedlings (cv. Alta F1). Inoculated plants (five plants per isolate) were incubated for up to 2 weeks at 25°C and 70 to 80% humidity. Wilting symptoms developed within 5 to 10 days. No symptoms were observed on controls inoculated with sterile water. The bacterium was reisolated and identified as *R. solanacearum* biovar 2 as described above. The incidence of the disease in the affected fields varied between 20 and 40%, and surveys showed that approximately 163 ha were infested. Phytosanitary measures that were taken included a prohibition of production of host plants in the infested areas, tracing and testing programs to identify the source of the bacterium, and measures to prevent any further spread of the bacterium to new areas. To our knowledge, this is the first report of *R. solanacearum* biovar 2 on potato in the Aegean Region of Turkey. [N. Ustun, M. Ozakman and A. Karahan (Turkey). Plant Disease, 92(6): 973, 2008].

Occurrence and Molecular Characterization of Turkish Isolates of *Turnip mosaic virus*. A total of 142 samples of plants showing symptoms of *Turnip mosaic virus* (TuMV) were collected from fields planted to Brassicaceae and non-Brassicaceae crops in the southwest Marmara region of Turkey, during the 2004−06 growing seasons. Using enzyme-linked immunosorbent assay (ELISA) TuMV was detected in the main brassica-crop fields of Turkey, with an overall incidence of 13.4%. TuMV was detected in samples from Brussels sprouts, cabbage, wild mustard, radish and wild radish, but not cauliflower or broccoli. The full-length sequences of the genomic RNAs of two biologically distinct isolates, TUR1 and TUR9, were determined. Recombination analyses showed that TUR1 was an intralineage recombinant, whereas TUR9 was a non-recombinant. Phylogenetic analyses of the Turkish isolates with those from the rest of the world showed that the TUR1 and TUR9 isolates belonged to world-*Brassica* and Asian-*Brassica*/*Raphanus* groups, respectively. This study showed that TuMV is widely distributed in the Asia Minor region of Turkey. [S. Korkmaz, Y. Tomitaka, S. Onder and K. Ohshima (Turkey & Japan). Plant Pathology, 57(6): 1155-1162, 2008].

First Report of *Tomato chlorosis virus* in Turkey. A tomato (*Lycopersicon esculentum*) plant showing severe interveinal leaf chlorosis with brown necrotic flecks was supplied by a commercial tomato greenhouse located in Fethiye, Mugla, southwestern Turkey. The symptoms were similar to those described for infection of tomato by *Tomato infectious chlorosis virus* (TICV) and *Tomato chlorosis virus* (ToCV). During a limited field survey, similar symptoms and the presence of whiteflies (*Bemisia tabaci* and *Trialeurodes vaporariorum*) as potential virus vectors were observed on tomato plants in various greenhouses in the same region, suggesting possible TCIV or ToCV infection. Leaf samples were taken from tomato plants with and without symptoms from four different greenhouses in the same area and total RNA was isolated from 100 mg leaf samples from eight tomato plants of both groups using a one step RNA isolation method (BioBasic). Samples were tested for the presence of TICV and ToCV by a previously reported method using nested RT-PCR for the detection of criniviruses. No amplification with TICV primers was observed in plants with or without symptoms but a 463 bp DNA fragment was amplified by nested PCRusing ToCV primers from all samples expressing symptoms but not from symptomless plants. These results suggested that the affected plants contained ToCV. To confirm these results, an amplicon from the nested PCR was sequenced (GenBank Accession No: EU069363). The sequence of the amplicon showed 99% nt identity with the Hsp70 h gene of ToCV isolates from Florida, USA (GenBank Accession No: AY903448), confirming the first diagnosis of ToCV in Turkey. [B. Çevik and G. Erkis (Turkey). Plant Pathology, 57(6): 1146–1154, 2008].

White Rust Outbreaks on Chrysanthemum Caused by *Puccinia horiana* in Turkey. Chrysanthemum white rust is a destructive disease of many chrysanthemum (*Dendranthema* × *grandiflorum*) and related species. The infection is caused by *Puccinia horiana* and the fungus is an EPPO A2 quarantine pest. Chrysanthemum cut flowers are only grown in Izmir province of Turkey. In 2006, the area under chrysanthemum production was about 5 ha. The major areas where it is grown commercially are Seferihisar, Narlıdere, Torbalı and Urla counties. During February and March, 2007, a devastating outbreak of white rust disease severely damaged the chrysanthemum crop in 12 different glasshouses, resulting in yield losses of 80%. Disease symptoms were observed on various parts of the plant, particularly in the leaves. The symptoms began as pale green to yellow spots up to 5 mm in diameter on the upper surface of infected leaves. Eventually the spots turned brown and became necrotic. Spore-forming pustules were observed on the lower surface of the leaves and were buff to pink colour. As these pustules matured, they became white in colour. Microscopic examination of the pustules revealed the presence of teliospores on pedicels up to 52 µm long; pale-yellow, oblong to oblong-clavate, slightly constricted, 30-52 × 11-18 µm, with thin walls, 1-2 µm thick, and thicker at the apex, 4-9 µm. Based on these morphological characteristics, the fungus was identified as *P. horiana*. Pathogenicity tests were conducted on 3-month-old chrysanthemum plants, by spraying unwounded leaves with a suspension of basidiospores (approximately 5×10^4 per ml). Control plants were sprayed with sterile water. Inoculated and control plants were enclosed in transparent plastic bags and incubated at 20±1°C for 4 days with a 16-h photoperiod. The bag was then removed. Two weeks after spraying leaf lesions developed on inoculated plants. No disease symptoms were observed on control plants. This is believed to be the first record and outbreak of white rust disease caused by *P. horiana* on chrysanthemum cultivars grown in Turkey. [M.E. Göre (Turkey). Plant Pathology, 57(4): 786, 2008].

YEMEN

Preliminary Survey of Broomrape (*Orobanche* sp.), Distribution and its Host Plants in Wadi- Hadhramout, Yemen. A survey of Broomrape (*Orobanche* sp.) distribution and its host plants was conducted during the growing season 2007-2008 in cultivated fields and non cultivated area in Wadi-Hadhramout, Yemen, in order to determine the distribution sites of Broomrape and its host plants. Broomrape is found parasites on six plant species of different families like tomato (*Lycopersicum esculentum* Mill), eggplant (*Solanum melongena* L.) from Solanaceae, sweet potato (*Ipomoea botatas* L.) from Convolvulaceae, and on three weed species: (*Zygophyllum simplex* L.) from Zygophyllaceae, Field marigold (*Pulicaria crispa* (Forsk.) Benth.) from Compositea and (*Aerva javanica* (Burm.F.) Juss.) from Amaranthaceae. The role of host plants might increase the incidence of Broomrape on major crops in Wadi Hadhramout. [Salim Mohamed Assggaf, Agricultural Research Station, Sieyun, Hadhramout, P.O. Box 9041, Yemen, Email: agr.res.seiyun@y.net.ye].

RESEARCH HIGHLIGHTS

EGYPT

Seasonal Abundance Patterns of Insects and Mites on Pear Trees during the Blooming and Fruiting Seasons at Ismailia Governorate, Egypt. The insect and mite pests attacking pear trees at Ismailia Governorate, Egypt, were surveyed throughout two successive years 2005–2006 in two pear orchards of Suez Canal University. The survey covered the existing insect and mite species causing damage, frequency of occurrence, period of occurrence and attacked plant parts during two successive blooming and fruiting seasons. Thirteen insect and mite pests belonging to twelve families from orders Homoptera, Thysanoptera, Diptera, Coleoptera, Isoptera and Parasitiformes were recorded. The most dominant and economically important pests were a mealybug, *Planococcus ficus*, a scale insect, *Aonidiella aurantii*, an aphid, *Aphis gossypii*, and a psyllid, *Cacopsylla pyricola*. A stem borer, *Scolytus aegyptiacus*, and a mite, *Cenopalpus pulcher*, were present in high density. The less economically important pests were a mite, *Tetranychus urticae*, a scale insect, *Chrysomophalus ficus*, a thrips, *Thrips tabaci*, a leaf hopper, *Empoasca lybica*, a wax scale, *Ceroplastes floridensis*, a fruit fly *Ceratitis capitata*, and the termite *Anacanthotermes ochraceus*. Mealybugs were the most important and major insect pests that attack pear trees in the first season (2005), whereas in the second season (2006) *Cacopsylla pyricola* was the major pest. Temperatures and relative humidity showed a significant effect on the population of such pests. [M.A.M. Osman and M.F. Mahmoud (Egypt). Tunisian Journal of Plant Protection, 3: 47-57, 2008].

Markers of Plant Resistance to Nematodes: Classical and Molecular Strategies. One of the most effective, economical and environmentally safe methods to reduce crop yield losses from diseases is to use pathogen-resistant cultivars. The challenges of classical approaches for rating host suitability for phytonematodes are presented and critical factors influencing phenotypic expression of the resistance are considered. An accurate identification of both plant genetic background and pathogens is necessary for an exact measurement of pathogen/host compatibility. Scientists with expertise in plant nematology should collaborate with plant breeders and molecular biologists to investigate new sources of resistance and their effectiveness, the nature of resistance traits and their inheritance, and the probability of DNA recombination during cycles of cultivar improvement. Specific molecular markers of plant resistance to nematodes should be determined for unique pathogen/host systems to rate resistance/susceptibility to the most economically important nematode families, which would save effort, time and money. Such markers may also be represented by enzymes with promise for use as genetically-based biochemical markers for screening breeding lines with potential for nematode resistance. More sensitive, rapid and accurate electrophoretic methods, such as those that are possible with miniaturized and automated equipment, should further facilitate identification of desirable markers. At present, more investigation is needed for effective transfer of cloned genes into susceptible plant species to integrate resistance to nematodes that have a broad host range. While tightly linked markers must be identified and used to monitor introgression, analysis of the chromosomal region concerned should be made to explore any unexpected linkage drag. The comparative value of molecular markers and consideration of the most up-to-date strategies of gene transfer for nematode resistance are also reported. [M.M. Abd-Elgawad and S. Molinar (Egypt). Nematologia mediterranea, 36: 3-11, 2008].

Biological Control of *Meloidogyne incognita* and *Rhizoctonia solani* in Eggplant. Eggplant (*Solanum melongena*) is an important vegetable crop that is infected by root-knot *(Meloidogyne incognita*) and root-rot (*Rhizoctonia solani*) pathogens in Egypt. *Bacillus subtilis*, *Pseudomonas fluorescens*, *Trichoderma harzianum* and *Trichoderma viride* were tested for managing these two pathogens *in vitro* and in the greenhouse in comparison with the nematicide oxamyl. The efficacy of the commercial product Micronema was assessed in the field. *In vitro*, culture filtrates of *B. subtilis*, *P. fluorescens*, *T. harzianum* and *T. viride* at 10% concentration caused nematode mortalities of 100, 99, 98 and 96%, respectively, after 72 hours exposure to the filtrates. Also, *T. harzianum* greatly reduced mycelial growth of *R. solani*, followed by *T. viride*, *B. subtilis* and *P. fluorescens.* In the greenhouse, the most effective culture filtrate, applied as a soil drench, was that of *B. subtilis* at 10%, which reduced the number of juveniles in soil, galls and egg masses of *M. incognita* on the roots of eggplant cv. Pusa Purple Long by 91.9, 82 and 82.6%, respectively. Also, cultures filtrates of *T. harzianum* reduced damping-off and root-rot incidence in eggplants, followed by those of *T. viride*, *P. fluorescens* and *B. subtilis*. All bioagent treatments improved plant growth and their effectiveness was similar to that of oxamyl at 0.01% soil weight. In the field, Micronema protected eggplants from attack of *M. incognita* and *R. solani*, thus increasing yield, and affected populations of soil mycoflora differently. [W.M.A. El-Nagdi and H. Abd-EI-Khair (Egypt). Nematologia mediterranea, 36: 85-92, 2008]

Long-term Activity of Bio-priming Seed Treatment for Biological Control of Faba Bean Root Rot Pathogens. The long-term activity of some antagonistic fungal and bacterial agents against the incidence of faba bean root rot incidence was evaluated when applied as a bio-priming seed treatment. The inhibitory effect of antagonistic fungi and bacteria against the linear growth of root rot pathogenic fungi was evaluated *in vitro.* The tested inhibitor factor in this study was the antagonistic agents applied as either growth culture discs or bio-primed faba bean seeds. The inhibitor effect of *Trichoderma viride*, *T. harzianum*, *Bacillus subtilis* and *Pseudomonas fluorescens* was significantly higher than *T. hamatum* and *B. cereus*, respectively. Similar results were also obtained when the antagonistic agents were applied as bio-primed seeds. Under greenhouse conditions, all the tested fresh and 2

months-stored, bio-primed faba bean seeds showed a highly significant effect causing complete reduction of root rot incidence at both pre- and post-emergence stages of plant growth compared with the control treatment. Stored seeds at 4 and 6 months showed a less protective effect against the incidence of disease. After 3 months of storage under field conditions, the antagonistic agents could protect seeds against infection by root rot pathogens at both pre- and post-emergence stages. However, after 6 months of storage, a lower protective effect was observed. No significance was observed between seeds primed only with adhesive agents and the untreated control. Promising applicable techniques could be suggested in light of the results obtained in the present study. The use of bio-primed seeds might be considered as a safe, cheap and easily applied biocontrol method against these soil-borne plant pathogens. [N.S. El-Mougy and M.M. Abdel-Kader (Egypt). Australasian Plant Pathology, 37: 464-471, 2008].

Prediction of *Synanthedon myopaeformis* Borkh. Moths Activity Based on Pheromone Trapping and Degree-day Accumulation of Temperature in Apple Orchards in Egypt. In Egypt, the clearing moth *S. myopaeformis* (Lepidoptera: Aegeriidae) is a serious pest on apple trees. The relation between weather factors (of temperature and relative humidity) and the population fluctuation was quantitatively calculated during six successive years (from 1997 to 2002 separately, and 1997-2002 together) in apple orchards at Qalubia governorate. Trials were conducted to determine the correlations between the main weather factors and moths activity as well as using the day-degree method for predicting the peak emergence period of adult moths, i.e. to asses predication formula through which population fluctuation could be expected. R-square values of each single weather factor indicated that daily maximum (×1) and minimum temperature (×2) significantly affected *S. myopaeformis* population fluctuation, showing 0.461-0.958 for (×1) and 0.607-0.904 for (×2) and were include in selection of suitable statistical models used. Statistical combined models [(×1×2), ($\times 1 \times 1^2$), ($\times 2 \times 2^2$), ($\times 1 \times 2^2$), ($\times 1^2 \times 2$), ($1^2 \times 2^2$) and ($\times 1 \times 2 \times 1^2 \times 2^2$)] were used in assessing the prediction formula. The effective weather factor was the daily maximum temperature (×1) rather than minimum temperature (×2). Prediction calculations were based on the liner regression formula [Y'=a+b1×1+b2×2 bj×j]. Results indicated that the degrees of correlation between the predicted and observed data varied between very close correlation in 2000, close correlation in 2001 and 2002, moderate correlation in 1997/2002 together and very poor correlation in 1999. Other factors such as the nutrition of trees, horticultural practices that may accelerate or delay the tree activity played an important role in predicting the population activity. According to graphs and statistical analysis ($\times^2$ test) which magnified the differences between the observed and predicted population it could population activity of *S. myopaeformis* in the following seasons. [A.W. Tadros, R.G. Abou El-Ela and M.M. Abd El-Azim (Egypt). Egyptian Journal of Agricultural Research, 85(4): 1239-1252, 2007].

Biological Studies of Predacious Mite, *Neoseiulus cucumeris* (Oudemans) When Feeding on Citrus Red Mite, *Panonychus citri* (McGregor). This week was carried out under laboratory conditions study the biological aspects of predacious mite, *Neoseiulus cucumeris* (Oudemans). This study was investigated under two constant temperature at 25 and 30°C and 65±5% RH to clarift its response when fed on movable stages of citrus red mite. *Panonychus citri* (McGregor). The incubation period averaged 3.8±0.06, 2.57±0.07, 3.2±0.09 and 2.37±0.1 days at 25°C and 30°C for female and male, respectively. The life periods lasted 10.2±0.11, 7.6±0.1, 9.1±0.07 and 6.7±0.2 days for female and male, respectively at the previous temperature. The food consumption of the predator mite *N. cucumeris* averaged 78.8±0.9, 49.06±0.6, 95.1±0.53 and 58.5±0.5 prey of *P. citri* during their life span for female and male, respectively. [N.M. Abd El-Wahed (Egypt). Egyptian Journal of Agricultural Research, 85(4): 1253-1258, 2007].

Innovation for the Control of the Potato Tuber Moth, *Phthorimae operculella* (Zeller) (Lepidoptera, Gelechiidae) on Potato Stores in Egypt. Spinosad, Potateco, Virotecto and the chemical insecticide Selecon were used to supperss population of the potato tuber moth (PTM) *Phthorimae operculella* (Zeller) on potato tubers in stores. Spinosad (0.125 WP) a new biochemical agent at a rate of 1.5 Kg/ton of potato tubers showed almost 100% reduction of PTM infestation and kept the tubers clean for four months. It gave the best result through all treatments, for both tuber infestations and gallery numbers, *Bacillus thuingiensis* subsp *kurstaki* (Protecto 10% WP) and Granulosis virus (Virotecto 4% WP) at a rate of 150 gm/ton each, and Profenfos (Selecron 72% EC) treatments at a concentration of 10 ppm could be used as a good tool for protecting potato tubers only for a short period (45 days). [A.E. Gomaa, H.M. El-Nenaey, S.A. Allam and R.A. Ibrahim (Egypt). Egyptian Journal of Agricultural Research, 85(5): 1719-1728, 2007].

Traditional and Innovative Methods for Controlling the Potato Tuber Moth, *Phthorimae operculella* (Zeller) on Stored Potatoes in Open Field. Spinosad compounds (Tracer 24% SC, Spinosad 0.125% WP), the bacterial pathogen *Bacillus thuringiensis* (Bt) in forms of protecto 10% and Dipel 2×, the Granulosis virus (GV) (Virotecto 4%) and the natural infected larvae of PTM with GV, Fars 5% E.C. an antimoulting compound (IGR), rice straw treated with Clidial 50% EC (an organophosphate insecticide) and the chemical insecticide Cypermethrin 10% E.C. (Pyrothroid) were evaluated to suppress potato tuber moth (PTM) *Phthorimae operculella* (Zeller) on stored potato tubers in open field. The best reduction through all treatments, for both tuber infestations and gallery numbers during the whole storing period was related to Tracer with both rates (7.5 and 5 ml/ton). Spinosad treatment came on the 2nd rank, Fars in the 3rd rank, followed by Dipel 2× and GV infected larvae in the 4th rank. Using rica straw treated Clidial gave a considerable reduction for tuber infestations and gallery numbers. Very close reduction was recorded between Virotecto and Protecto for tuber infestation and

gallery numbers. The Cypermethrin treatment proved ineffective at the final storing period. So, either Tracer 24% S.C at rate of 5ml/ton or Spinosad 0.125% WP at a rate of 1kg/ton could be a good tool for protecting potato tubers during the whole storing period. Also, the antimoulting agent Fars could be a good tool and in the same time much safer than the chemical ones. [A.E. Gomaa (Egypt). Egyptian Journal of Agricultural Research, 85(5): 1729-1742, 2007].

IRAN

Root Rot of Common Bean in Zanjan, Iran: Major Pathogens and Yield Loss Estimates. In 2007, prevalence of root rot pathogens and disease yield losses were studied under prevailing environmental conditions in common bean fields at Zanjan. Root rot disease incidence varied by sampling time and location of a field. In the majority of fields, *Fusarium solani* was the predominant fungus, being isolated from 2.8 to 96% of root samples over the sampling time, followed by *Rhizoctonia solani*, *Macrophomina phaseolina* and *F. oxysporum*. At pod maturity, the mean values for investigated factors were: disease incidence, 4.7–95%; disease severity, 0.1–2; disease index, 0.1–29%; number of seeds, 3.3–19; number of pods per plant, 8.3–62; and 100-seed weight, 19–53 g. Regression analysis demonstrated that disease incidence, disease severity and disease index were negatively correlated with both the number of pods or seeds per bean plant, whereas there was a positive correlation between the disease and 100-seed weight. If the indicative relations obtained between the disease and yield components are confirmed by further studies, then findings may contribute to the future estimation of bean yield losses to root rots and selection for resistant cultivars. [B. Naseri (Iran). Australasian Plant Pathology, 37(6): 546–551, 2008].

Biological Control of *Penicillium digitatum* on Oranges Using *Pseudomonas* spp. either Alone or in Combination with Hot Sodium Bicarbonate Dipping. Epiphytic fluorescent isolates of the genus Pseudomonas (277), cultured from the fruit and leaf surfaces of citrus, were screened for antagonistic activity against green mould caused by *Penicillium digitatum*. Three of the Pseudomonas isolates showed greater activity than others against the pathogen in preliminary screening tests and were selected for subsequent experiments. Pseudomonas isolates were evaluated alone and in combination with 24 and 45°C sodium bicarbonate (3%) treatments on artificially inoculated Thomson navel oranges. The Pseudomonas isolates were completely tolerant to sodium bicarbonate up to a concentration of 3%. In addition, their efficacy for controlling green mould was improved when combined with the 3% sodium bicarbonate. A further increase in biocontrol activity was obtained when the bacterial isolates were applied in combination with hot sodium bicarbonate. It was concluded that using the fluorescent *Pseudomonas* spp. isolates in combination with a treatment of hot sodium bicarbonate could provide a practical alternative or complement to fungicides for post-harvest control of green mould on oranges. [M. Zamani, A. Sharifi Tehrani, M. Ahmadzadeh, K. Behboodi and V. Hosseininaveh (Iran). Australasian Plant Pathology, 37(6): 605–608, 2008].

Effect of Water Potential on Sclerotial Germination and Mycelial Growth of *Macrophomina phaseolina*. The effect of the osmotic (Ψs) and matric (Ψm) potential on the sclerotial germination and mycelial growth of *Macrophomina phaseolina* was examined at room temperature. Sclerotial germination was determined in 0.1% water agar and mycelial growth on potato dextrose agar (PDA) and potato dextrose broth (PDB) amended with sodium chloride and polyethylene glycol (PEG 6000). Treatments consisted of 6 levels of osmotic and matric potentials (0, -0.3, -0.6, -0.9, -1.2, and -1.5 MPa) arranged in a factorial manner in a completely randomized design. Decreasing the matric and the osmotic potentials to -1.2 and -0.6 MPa, respectively, increased sclerotial germination and mycelial growth, but any further decrease caused both sclerotial germination and mycelial growth to decline again. It was concluded that the matric potential was more important as a factor than the osmotic potential in promoting the vegetative growth of *M. phaseolina.* [Azadeh Goudarzi, Zia Banihashemi and Manouchehr Maftoun (Iran). Phytopathologia Mediterranea, 47: 107-114, 2008].

IRAQ

Environmentally Safe Compounds for Controlling the Javanese Root-knot Nematode in Pots. The efficacy of Vermicompost, Drangonfire-CPP, Actigard, and DiTera against the root-knot nematode *Meloidogyne javanica* was determined in a greenhouse test. These compounds with low environmental impact were applied as pre- and post-plant treatments to cowpea plants growing in a mixture of Hawaii soil and sand in pots. Nematode populations/plant and root galling, after 8 weeks, were suppressed in all treatments, although none was as effective as fenamiphos. Plant growth was also enhanced as compared to the untreated control. Pre-plant applications of Vermicompost, Dragonfire, and DiTera were more effective than their post-plant applications. Under the controlled conditions of the experiment, these compounds showed promise as safer alternatives to traditional nematicides like fenamiphos. [S.N. Ami and B.S. Sipes (Iraq & USA). Nematologia mediterranea, 36: 57-60, 2008]

JORDAN

Resistance of Barley Landraces and Wild Barley Populations to Powdery Mildew in Jordan. Eleven barley (*Hordeum vulgare* L.) landraces and 12 wild barley (*H. spontaneum*) populations, collected from diverse eco-geographical regions of Jordan, were screened for resistance to powdery mildew. The average powdery mildew disease score (based on a 0 to 4 severity scale) was <1 in all tested barley landraces. Disease scores in wild barley populations ranged from 1.2 to 3.8. Most barley landraces of all tested lines were highly resistant to powdery mildew. The percentage of wild barley lines

exhibiting high resistance was 19%, while 45% of the lines were moderately resistant and 36% susceptible to powdery mildew. There was no significant correlation between weather variables (precipitation, temperature and altitude) and the disease scores of either the barley landraces or the wild barley populations. However, resistance in wild barley was more common in humid districts and at higher altitudes. Both barley landrace and wild barley accessions could serve as potential donors for powdery mildew resistance genes to be transferred to barley varieties improved by plant breeding. [Adel H. Abdel-Ghani, Nofal S. Al-Ameiri and Muwaffaq R. Karajeh (Jordan). Phytopathologia Mediterranea, 47: 92-97, 2008].

TUNISIA

Efficacy of the Lufenuron Bait Station Technique to Control Mediterranean Fruit Fly (Medfly) *Ceratitis capitata* in Citrus Orchards in Northern Tunisia. The effectiveness of the lufenuron bait stations as a component of an integrated pest management program (IPM) was tested in three citrus orchards in the North of Tunisia against the Mediterranean fruit fly (Medfly) *Ceratitis capitata* during the three years 2005, 2006 and 2007. The technique was based on the use of the insect growth regulator lufenuron transferred via a gel bait for adult flies to prevent the hatching of eggs laid in fruits and induce a subsequent population reduction. The evaluation of the effect of the treatments was based on the assessment of adult Medfly population reduction expressed by weekly recording of male captures in McPhail traps baited with the synthetic lure trimedlure and insecticide together with the evaluation of fruit damage. Results indicated that adult males Medfly captures showed reductions of 12.72% during 2005, 34.99% during 2006 and respectively 78.85%, 62.84% and 62.86% in fields 1, 2 and 3 during 2007 compared to standard chemical treatments. Fruit damage assessment showed generally significant differences between the two treatments in the reduction of the percentage of fruit punctures. [O. Bachrouch, J. Mediouni-Ben Jemâa, E. Alimi, S. Skillman, T. Kabadou and E. Kerber (Tunisia & Switzerland). Tunisian Journal of Plant Protection, 3: 35-45, 2008.]

Incorporation of *Cestrum parquii* (Solanaceae) Leaves in an Artificial Diet Affected Larval Longevity and Gut Structure of the Desert Locust *Schistocerca gregaria*. In laboratory, desert locust *Schistocerca gregaria* was fed with *Cestrum parquii* (Solanaceae) leaves which are appreciated by this insect despite their toxic properties. Light microscopy observations revealed that the foregut structure of the 5th stage is modified at cuticular intima level where no exuvial space could be seen up to 7 days of treatment. By the 9th day of treatment, this space started to appear but no new cuticle intimae were observed as in the case of the control. The height of the epithelial cells and the thickness of muscular layers are reduced significantly. At midgut level, *C. parquii* eliminated extracellular micro-organisms by intoxication. The food digestion by epithelial cells was precociously achieved. On day 5, a proliferation of intra-cellular microorganisms was observed and then decreased on day 7 to disappear on day 9 following plant toxin accumulation. In the controls, proliferation of intracellular microorganisms was not observed before day 9. [M. Ammar and S. N'cir (Tunisia). Tunisian Journal of Plant Protection, 3: 27-34, 2008].

Effects of Initial Populations of *Heterodera avenae* on Wheat and Barley Yield Components and on Final Nematode Populations under Tunisian Field Conditions. Field experiments have been conducted in Tunisia, during one season, to analyze the effect of the initial densities (Pi) of *Heterodera avenae* populations on the yield of wheat cv. Karim and barley cv. Rihane and on nematode population development. Increasing Pi of *H. avenae* significantly induced less spikes and less grain per spike, and depressed the weight of grains and grain yield of wheat and barley. Grain yields were reduced by 19 to 86% for barley and 26 to 96 for wheat. Final population densities (Pf) increased with Pi levels. These relationships were highly significant and modeled by linear regressions for the initial populations recorded. Final populations (Pf) were positively correlated with Pi on wheat and barley whereas the multiplication rate (Rf) was negatively correlated with Pi on both hosts. The multiplication rate decreased but was higher on barley than on wheat. [N. Namouchi-Kachouri, M.M. B'Chir and A. Hajji (Tunisia). Tunisian Journal of Plant Protection, 3: 19-26, 2008].

Assessment of Virulence Variability in *Septoria tritici* Isolates and Resistance of Selected Durum Wheat Cultivars. Twenty isolates of *Septoria tritici*, collected from various cereal growing regions in Tunisia, were evaluated for their virulence on ten selected durum wheat varieties. Inoculation was performed at seedling growth stage under controlled conditions. Disease rate development and pycnidial coverage on the second leaf were investigated. The results showed that virulence variability and resistance were highly significant. Isolates with identical virulence were selected from different geographical areas. Based on the differential varietal reaction to the different isolates; two old resistant cultivars were identified Agili and Jneh Kottifa that could be used to enhance the level of Septoria leaf blotch resistance in high yielding durum wheat varieties. [A. Sebei and M. Harrabi (Tunisia). Tunisian Journal of Plant Protection, 3: 11-17, 2008].

Agronomic Characterization of Tunisian Spontaneous Oat Accessions Resistant to Oat Crown Rust and Potential in Plant Breeding. Oat crown rust has been reported as the most widespread and damaging disease on oat. New sources of resistance to this fungus are necessary since the current sources become with time ineffective due to virulence changes of this pathogen. Six spontaneous accessions of oats, *Avena* spp. (AC1, AC3, AC5, AC4, AC6, and AC2) collected from different Tunisia's regions along with a cultivated population (Av.95) were evaluated for 10 agronomic traits and 4 slow-leaf rusting criteria using both univariate and multivariate analyses. Estimation of broad sense heritabilities of these traits ranged between

0.8214 (day to maturity) and 0.9998 (latency period). Three principal components explained 76% of the total variation and clustered these accessions at a similarity level estimated by Euclidian distances. Three groups were identified. The first is composed by AC5 and AC1 and the second by AC3, AC4, AC6, and AC2, whereas, Av.95 formed the third group. Agronomic traits of AC1 and AC5 were statistically similar to those of Av.95. The accessions, AC5 and AC1, presenting important agronomic traits and resistance to oat crown rust, could be valuable material potentially useful in future breeding programs. [I. Hammami, M.B. Allagui, M. Chakroun and M. El-Gazzeh (Tunisia). Tunisian Journal of Plant Protection, 3: 1-9, 2008].

Influence of Temperature on Hatching of Eggs of Tunisian Populations of *Heterodera avenae*. Six Tunisian populations of *Heterodera avenae,* originating from different bioclimatic regions, were submitted to different thermal treatments to assess the effect of the temperature on juvenile emergence. The six populations hatched over a range of temperatures between 5°C and 25°C with optima between 10°C and 20°C, but differed in the patterns of emergence of the juveniles from cysts. Simulation of seasonal temperature variations (from summer to autumn-winter and from winter to spring-summer) demonstrated diapause in at least two populations (Beja and Zaghouan) induced by high temperature treatment (5°C followed by 25°C) and broken by subsequent lowering of the temperature (25°C to 5°C). The behaviour of the six Tunisian populations of *Heterodera avenae* corresponded to that of the Mediterranean ecotype, with minor variations that probably result from regional adaptation to more or less severe climatic conditions. [N. Namouchi-Kachouri and M.M. B'Chir (Tunisia). Nematologia mediterranea, 36: 31-37, 2008].

Study on the Toxic Activity of *Cestrum parqui* on *Meloidogyne incognita*. As an alternative to chemical pesticides, different doses of saponic and dry extracts (SE and DE) of *Cestrum parqui* (Solanaceae) were tested, *in vitro* and in pots, on *Meloidogyne incognita. In vitro*, the SE inhibited eggs from hatching and caused mortality of more than 90% of the nematode second stage juveniles. Inhibition of hatching and mortality of juveniles were correlated with the dose and the period of exposure to the extract. In pots, the DE reduced the reproduction factor (Pf/Pi) and galling index of *M. incognita* on tomato roots. [W. Hlaoua, N. Horrigue Raouani and I. Chaieb (Tunisia). Nematologia mediterranea, 36: 39-44, 2008].

TURKEY

Seasonal Variation of Field Populations of *Heterodera filipjevi, Pratylenchus thornei* and *P. neglectus* on Winter Wheat in Turkey. The development of cereal cyst nematode *Heterodera filipjevi* and root lesion nematodes *Pratylenchus thornei* and *P. neglectus* was investigated under rainfed cereal conditions over three growing seasons (2002-2005) on the winter wheat cultivar Bezostaya. Juvenile emergence of *H. filipjevi* was recorded during the winter period from November to March. The hatching process was correlated with the lowest temperatures. Mature white females were found on roots at the beginning of May and mature cysts appeared later on. The total number of cysts and eggs in the soil had only one peak at the end of each growing season, suggesting that *H. filipjevi* was monocyclic. Multiplication rates were inversely correlated with initial nematode densities with ceiling levels of between 15 and 20 eggs per g of dry soil. Population densities of *P. thornei* and *P. neglectus* were low from November to March/April during the cold snow period, increased gradually to June/July and then rapidly decreased over the summer period. Numbers of nematodes were positively correlated with temperature and the multiplication rate was 0.42-3.8 for *P. thornei* and 0.91-2.26 for *P. neglectus*. [E. Sahin, J.M. Nicol, A. Yorgancilar, I.H. Elekcioglu, A. Tulek, A.F. Yildirim and N. Bolat (Turkey). Nematologia mediterranea, 36: 51-56, 2008].

❖SOME PLANT PROTECTION ACTIVITIES OF FAO AND OTHER ORGANIZATIONS

DESERT LOCUST SITUATION

General Situation during October 2008 Forecast until mid-December 2008

The Desert Locust situation remained calm during October. As the seasonal rains ended and vegetation dried out, locusts declined in the summer breeding areas of the Sahel in West Africa and Sudan, and along the Indo-Pakistan border. Small-scale breeding occurred in western Mauritania and in southern Yemen. During the forecast period, breeding will continue in these places, causing locust numbers to increase slightly. Small-scale is expected to start in northern Mauritania where scattered adults are present and in adjacent areas of Western Sahara where unusually heavy rains fell in September. Breeding is also likely to take place on the Red Sea coastal plains and perhaps in eastern Yemen where torrential rains and flooding occurred in October. Elsewhere, low numbers of adults will persist in northern Mali, Niger and southern Algeria. The two areas of unusual rainfall in northwest Africa and Yemen need to be surveyed regularly to monitor breeding activities in the coming months.

Western Region - Locust numbers increased in western Mauritania from local breeding during October and as adults arrived from summer breeding areas where vegetation had dried out. Solitarious adults were seen in northern areas that received heavy rains in September Small-scale breeding will continue during the forecast period in western Mauritania where small groups could form, and is expected to commence in the northwest and

north. Breeding is also expected to take place in Western Sahara where ecological conditions had improved. Isolated solitarious adults persisted in central and northeastern Chad. Surveys were still not possible in northeast Mali and northern Niger where scattered adults are probably present and are likely to concentrate in areas that remain green during the forecast period. No locusts were seen in southern Algeria or reported from other countries in the Region.

Central Region - Locust numbers declined in the summer breeding areas in the interior of Sudan during October and only scattered solitarious adults remained in a few places between the Nile and the Red Sea Hills. No locusts were reported in winter breeding areas on the Red Sea coast of Egypt, Sudan and Eritrea. Low numbers of locusts were present on the Red Sea and Gulf of Aden coast in Yemen, and smallscale breeding occurred near Aden. Unusually heavy rains fell for two days in eastern Yemen, causing severe flooding and loss of property and life. The rains extended into central Oman. Once the waters recede, ecological conditions are expected to remain favourable for breeding for several months. During the forecast period, locusts will increase along both sides of the Red Sea and sm811-scale breeding is likely to commence as conditions become suitable. Most of the breeding may be concentrated on the coastal plains in Yemen that have received rains for the past few months.

Eastern Region - The locust situation remained calm in the Region. Low numbers of solitarious adults persisted in the Cholistan Desert in Pakistan along the Indian border. No locusts were seen in Rajasthan, India. As the monsoon rains ended and vegetation is drying out, locust numbers will continue to decline. Isolated adults persisted on the coast in southeast Iran. During the forecast period, isolated adults are likely to persist in southeast Iran and appear in western Pakistan. No significant developments are likely.

❖ SHORT PLANT PROTECTION NOTES

- A lycopene and carotenoid rich mutant tomato line, introgressed into commercial cultivars, produces less strigolactone making tomato less susceptible to *Orobanche* report J.A. Lopez-Raez and associates at Wageningen University, RIKILT, Netherlands, and The Volcani Center, Israel. (J. Agric. Food Chem. 56: 6326-6332, 2008)

- *Botrytis mali*, a posttharvest pathogen of apple, is a unique species based on DNA sequence analysis report D.T.O'Gorman at Agriculture and Agri-Food Canada, Summerland, BC. *B. cinerea* is in a different clade. (Mycologia, 100: 227-235, 2008)

- Burning is not an effective production strategy to control Verticillium wilt or insect pests in alfalfa stands report S.N. Acharya and associates at Agriculture and Agri-Food Canada and University of Lethbridge, Canada. (Agron. J., 100: 742-747, 2008)

- Fungicide seed treatment improved seedling emergence in wheat and reduced severity of seedling blight caused by *Microdochium nivale* and *M. majus* report N.C. Glynn and associates at Harper Adams University College, UK. (Pest Manag. Sci. 64: 793-799, 2008)

- Hot water treatment temperatures for grape propagating material should exceed 51°C to reduce incidence of Petri disease pathogens (*Phaeoacremonium* spp. and *Phaeomoniella chlamydospora*) report D. Gramaje and associates at Universidad Politecnica de Valencia, Spain. (Ann. Appl. Biol. 153: 95-103, 2008).

- Nitrogen application can reduce need for fungicide application to control Cercospora leaf spot and Alternaria leaf blight of carrot report S.M. Westerveld and associates at the University of Guelph, Canada. (HortScience, 43: 1522-1527, 2008)

- Removal of shoots excised by pruning red pine reduces inoculum of *Diplodia pinea* and incidence of shoot blight in tree nurseries report I.A. Munck and G.R. Stanosz at the University of Wisconsin. (For. Pathol. 38: 196-202, 2008)

- *Rose spring dwarf-associated virus* is similar to *Barley yellow dwarf virus* in RNA structure and gene-expression report N.M. Salem and associates at University of California, Davis, and Iowa State University. (Virology, 375: 354-360, 2008)

- Saturated fatty acids (palmitic) had greater antifungal activity than unsaturated fatty acids (oleic) to four pathogens of tomato and cucumber and offer an approach to biocontrol report S. Liu and associates at Nankai University, Tianjin Normal University, and China Agricultural University, China. (Mycopathologia, 166: 93-102, 2008)

- The mechanism of the strong resistance of potato clone G8107 to *Potato leafroll virus* is resistance to virus movement within leaves or from leaves to petioles, to thereby prevent spread within plants, report R. M. Solomon-Blackburn and associates at the Scottish Crop Research Institute, Dundee, UK. (Ann. Appl. Biol., 152: 339-347, 2008)

- To measure peach tree resistance to *Meloidogyne mayaguensis*, it was better to count egg masses, eggs per plant, and eggs per gram of dry root, than to count root galls report A.P. Nyczepir and associates at USDA-ARS, Byron, Georgia; and Florida Division of Plant Industry and University of Florida, Gainesville. (HortScience, 43: 804-806, 2008)

❖ GENERAL NEWS

URGENT CALL FOR GLOBAL FIGHT AGAINST WHEAT KILLER

Major wheat producing countries agree on roadmap to battle virulent fungus

12 November 2008, Rome/New Delhi - Representatives of major wheat producing countries have called for urgent coordinated action to prevent and control the wheat stem rust disease strain Ug99, FAO said today. The fungus is capable of causing heavy damage to wheat crops and is a major threat to food security. In a declaration adopted by the International Conference on Wheat Stem Rust Ug99 - A Threat to Food Security in New Delhi (6-8 November 2008), countries pledged to strongly support prevention and control of the wheat stem rust as a matter of national policy and international cooperation. Affected countries and countries at risk should develop contingency plans to prevent rust epidemics that could result in devastating yield losses. Countries should share surveillance information and a global early warning system should be immediately established. Plant breeding research should be intensified and international cooperation enhanced to develop new Ug99 resistant varieties. Quality seeds of rust resistant wheat varieties should be multiplied nationally and distributed to needy farming communities. Over 130 participants from ministries of agriculture of 31 countries, senior policy makers, researchers, seed producers and plant production experts attended the meeting, jointly organized by the Indian Council of Agricultural Research, the Government of India, FAO and its Borlaug Global Rust Initiative partners.

Responding to the threat

"We will continue supporting countries in building national capacities for research, extension, plant protection and seed production and get the support of the international community for achieving our common goals in responding to the wheat rust global threat and improving livelihoods through enhanced food security," said Modibo Traore, FAO Assistant Director-General, Agriculture and Consumer Protection Department. A new virulent strain of the wheat stem rust disease, called Ug99 after its discovery in Uganda in 1999, has spread from East Africa to Yemen, Sudan and in late 2007 to Iran. Currently there is no evidence that the fungus has spread to any other country. A recent field survey, funded by Cornell University in the US, showed that Ug99 is not present in India, Pakistan, Egypt and China. It is estimated that as much as 80 percent of all wheat varieties planted in Asia and Africa are susceptible to the new strain. The spores of wheat rust are mostly carried by wind over long distances and across continents.

Supporting countries

FAO has recently launched its Wheat Rust Disease Global Programme that supports 29 countries in East and North Africa, the Near East and Central and South Asia, that are either affected or at risk of the disease and that account for 37 percent of global wheat production. FAO supports countries in emergency prevention, contingency planning, the release of improved varieties, seed multiplication and the training of farmers. The New Delhi meeting called upon the international community, donors and international organizations to increase assistance to national and global initiatives to combat the disease. Ug99 campaigns should involve the FAO Wheat Rust Disease Global Programme and the Borlaug Global Rust Initiative.

ROOT-KNOT NEMATODE RESISTANT BELL PEPPERS

The root-knot nematode (*Meloidogyne incognita*), a biotrophic parasite of many crops, including tomato, cotton and coffee, is responsible for global agricultural losses amounting to more than US$ 150 billion annually. The ominpresent worm is usually controlled by applying methyl bromide, an odorless, colorless gas that has severe negative effects in the environment. The pesticide has been banned for use in the United States. Scientists from the US Department of Agriculture's Agricultural Research Service (ARS) developed varieties of bell pepper resistant to the root-knot nematode. In a paper published by HortScience, a team of researchers led by Judy Thies tested the stability of the worm-resistant bell pepper varieties 'Charleston Belle' and 'Carolina Wonder'. Good news for pepper growers: the scientists found out that the two varieties are viable alternatives to methyl bromide for managing southern root-knot nematode in sub-tropical environments. It is important to establish whether the peppers' resistance to the nematode breaks down when they are grown in hot environments. Read the abstract of the article at: http: //hortsci.ashspublications.org/cgi/content/abstract/43/1/188

CONTROLLING CROP PESTS WITH STEALTH WORMS

Scientists from the Nigeria-based International Institute of Tropical Agriculture (IITA) and Ghent University in Belgium have identified certain entomopathogenic nematode (EPN) species that could effectively be deployed as biological control agents against crop pests in Sub-Saharan Africa. EPNs are microscopic roundworms similar in morphology to plant parasitic nematodes. The juvenile stage of these tiny worms travels with bacteria in its intestine that can rapidly kill their pest host, usually within 48 hours. They reproduce until the resources in the cadaver are depleted, then they migrate in search of new hosts. EPNs have been successfully used to control insect pests, especially in tropical regions. In Brazil, Venezuela, Egypt and in the tropical areas of Australia, they have been applied to manage banana weevil and diamond-back moths. However, information on indigenous EPNs in Africa is still limited. The IITA -Ghent University project addressed this by isolating local species, determining nematode/ bacterium associations for commercial production, and

training farmers on the effective use and proper application of EPNs. According to Françoise Kanga Messiga, coordinator of the project, "Within limits, EPNs are compatible with the use of chemical pesticides since their virulence is not affected. More importantly, using EPNs is safe for users and the environment as their associated bacteria poses no threat to vertebrates or plants". However, she cautions that EPNs may affect some beneficial insects such as pollinators. Read the full story at: http://www.iita.org/cms/details/news_details.aspx?articleid=1772&zoneid=81

ARS SEARCH FOR *CASUARINA* BIOLOGICAL CONTROL AGENTS

The United States southern coastal areas are being ravaged by Australian pine species, inhibiting the growth of native plants. The three Australian pines belong to *Casuarina* species namely; *C. equisetifolia* locally known as "coastal she-oak", *C. glauca* also named as "swamp she-oak," and *C. cunninghamiana*, the "river she-oak". A biological control strategy was conceived and the search started in the home of the pines, Australia. Investigators Matthew Purcell and Bradley Brown of the Agricultural Research Service Australian Biological Control Laboratory led the team who surveyed and conducted plant-DNA testing experiments. Potential biological control agents such as wasps, weevils, stem-borers and others were studied and 12 candidates were selected. The seed-feeding wasp *Bootanelleus orientalis*, which feeds specifically on Australian pine and the defoliator moth *Zauclophora pelodes* seem to be the best candidates. These insects will be further studied for use as biological control agents in the U.S. See details of the news at: http://www.ars.usda.gov/is/pr/2008/080902.htm

INSECT-RESISTANT TOBACCO PLANT HARBORING AN ELDERBERRY GENE

By inserting a gene coding for type-2 ribosome-inactivating protein (SNA-I') from elderberry (*Sambucus nigra*), scientists at the Ghent University in Belgium have developed transgenic tobacco lines resistant to several insect species including the beet armyworm and tobacco aphid. Ribosome-inactivating proteins (RIPs) are a group of plant proteins that are capable of catalytically inactivating eukaryotic ribosomes, which are necessary for protein synthesis. RIPs are widespread in the plant kingdom, with various degrees of toxicity. For instance, the RIP ricin from castor beans is highly toxic whereas RIPs from wheat and barley have no reported cytoxicity. Insecticidal activity of elderberry RIP is well documented and its enzymatic mechanism is well defined. However, the physiological steps by which ribosome inactivation leads to cell death are not well understood. Scientists postulate that RIPs induce cell suicide. Transgenic plants accumulating elevated levels of RIP in their leaves were found to be capable of resisting insect attack, specifically the tobacco aphid *M. nicotianae* and the beet armyworm *S. exigua*, in small-scale trials carried out under controlled conditions. In addition, significant increases in mortality were noted for insects fed on the transgenic lines as compared to wild type plants. Download the paper at: http://dx.doi.org/10.1007/s11248-008-9215-2

RUSSIAN WHEAT APHIDS ARE NO MATCH FOR NEW BARLEY

Troublesome Russian wheat aphids hoping to feed and live comfortably on barley plants are in for bad news. Scientists from the US Department of Agriculture's Agricultural Research Service (ARS) developed a new barley variety that is highly resistant to the insect pest. Russian wheat aphids, or *Diuraphis noxia*, are major pests of cereal crops. In the first 20 years after its introduction into the US, the pest has caused wheat and barley farmers billions of dollars in losses. Phil Bregitzer and his colleagues invested more than 10 years in developing the superior barley RWA-1758. The new variety offers barley growers in states such as Montana, Colorado, and Nebraska-where infestations of the insect can be severe-an effective, economical and environmentally sound way to quell the aphid. Bregitzer noted that cost-effective chemical controls are still not available for combating the insect. RWA-1758's yields are on par with those of popular barley varieties. Read the article at: http://www.ars.usda.gov/is/pr/2008/081208.htm

STUDY SUGGESTS CLIMATE CHANGE COULD BOOST CORN PESTS

Warmer growing seasons and milder winters, brought about by climate change, could boost populations of insects that feed on corn and other crops, according to a Purdue University study. Severe pest infestation may significantly decrease corn yield in the United States, the world's top corn producer and exporter. The study appears in the current issue of Environmental Research Letters. Noah Diffenbaugh and his colleagues compared conservative climate change models to the temperature survival thresholds of four common corn pests found in the U.S.: corn earworm, the European corn borer, northern corn rootworm and western corn rootworm. "Basically, we examined both the number of days warm enough for the pests to grow and the number of days cold enough to kill the pests, assuming the pests' documented climate tolerances remain the same," explained Purdue entomologist Christian Krupke, co-author of the paper. "This tells us what could happen in projected future climates." The scientists predict that increases in temperatures could result to a substantial range expansion of each of the pests surveyed, especially in the case of corn earworm (*Heliothis zea*), a migratory, usually insecticide-resistant and cold-intolerant pest. Read the full article at http://news.uns.purdue.edu/x/2008b/081216DiffenbaughCornpests.html

❖ EVENTS OF INTEREST

MEETINGS AND SYMPOSIA

2009

* **1-3 April**
International Conference - Advances in Plant Virology, Harrogate International Center, Harrogate, Yorks, UK. See: www.aab.org.uk/contentok.php?id=73&basket=wwsshowconfdets

* **22-23 April**
The First Scientific Congress for Biological Sciences. University of Mousel, Mousel. Iraq. Contact: Mr. Anmar Ahmad Altaie, Email: bioconf2009@yahoo.com

* **22-23 April**
Advances in Epidemiology and Control of Rusts, Science and Advice for Scottish Agriculture (SASA)**,** Edinburgh, UK. See: http://www.aab.org.uk/page.php?start=184&conf=78

* **31 May-4 June**
14th International Sclerotinia Workshop, Wilmington, North Carolina, USA. See: http://www.cals.ncsu.edu/sclerotinia_conference

*** 8-12 June**
10th World Congress on Parasitic Plants, Kusadasi, Turkey. See: www.ippsturkey.com

*** 28 June – 2 July**
Ascochyta 2009: Global Research Initiatives, Pullman, Washington, USA. See: http://capps.wsu.edu/ascochyta/

* **5-10 July**
XXIth International Symposium on Virus and Virus-Like Diseases of Temperate Fruit Crops and XIIth International Symposium on Small Fruit Virus Diseases, Germany. See: www.phytomedizin.org/index.php?id=193

*** 22-23 July**
Workshop: Breeding for Resistance to Whitefly-transmitted Viruses, Royal Plaza Hotel in the Walt Disney World Resort Orlando, Florida. See: http://conference.ifas.ufl.edu/whitefly

*** 29 September - 1 October**
APPS 2009 "Plant Health Management-An Integrated Approach", Civic Precinct, Newcastle, NSW, Australia. See: http://www.apps2009.org.au/

*** 19-23 October**
22nd Asian Pacific Weed Science Conference, Lahore, Pakistan. Contact: Prof. Dr. Gul Hassan, Email: secretarywssp@yahoo.com; See: http://wssp.org.pk/

*** 26-30 October**
10th Arab Congress of Plant Protection, Beirut, Lebanon. Contact: ACPP2009 Secretariat, Arab Society for Plant protection, P.O. Box 113-6057, Beirut, Lebanon; Fax: 00961-1-809173; Email: acpp2009@cnrs.edu.lb; See: www.asplantprotection.org

*** 27-29 October**
6th International Symposium of Mediterranean Group on Pesticide Research (MGPR), Cairo, Egypt. Contact: Mr. Mohsen M. Amin, Plant Protection Research Institute, Agricultural Research Center, P.O. Box 12618, Cairo, Egypt, Fax: +202-33372193, Email: pprimgpr@yahoo.com

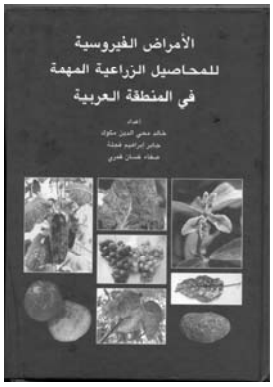
*** 10-13 November**
5th International Conference on Plant Pathology, with the theme "Plant pathology in the globalized era", Indian Agricultural Research Institute, New Delhi, India. Contact: Email: ipsdis@indiatimes.com

* **9-11 December**
National Soybean Rust Symposium, New Orleans, Louisiana, USA. See: http://www.apsnet.org/online/sbr/

❖ PUBLICATIONS

NEW BOOKS

• **Virus Diseases of Important Agricultural Crops in the Arab Region**. Edited by Khaled Makkouk, Gaber Fegla and Safaa Kumari. This book, written in Arabic, focuses on major virus disease which affect important agricultural crops in the Arab region; distribution in the Arabic region, natural host range, economic losses caused by them, and best methods of control. The Book is written by 33 authors with vast experience in virus diseases of crops in the Arab World.



It is the first in a series that focus on research progress achieved in the Arab countries over the last 3-4 decades, an initiative which is fully supported by the Arab Society for Plant Protection. The book covers general principles in virology and plant virus diseases (chapters 1-6), virus diseases of field crops (chapters 7-14), and virus diseases of fruit crops (chapters 15-18). This is a reference book, whose contents are mainly based on research published by Arab scientists. In one way, it can be considered as a recent data base for research findings on crop virus diseases in the Arab countries. It is a book of interest to general agriculturists and extension workers, as well as to those specialized in virus diseases of plants including graduate students. For more information about the book, please visit the ASPP website: http://www.asplantprotection.org/

• **Plant Nematode Control.** 2008. Ahmed A.M. Dawabah and F.A. Al-Yahya (translators). (Author: A.G. Whitehead). King Saud University Press. Riyadh, Saudi

Arabia. 875 pp. This book was chosen for translation due to our critical need to an Arabic-written book dealing with the control measures of plant parasitic nematodes. This book includes a brief on the biology of the most important plant parasitic nematodes, and the most effective control measures practiced worldwide. The English-written book has 384 pages, while the Arabic-written copy included a 875 pages. So, it was decided to be in two volumes according to the rules of the university press. The first volume includes 7 chapters (introduction and importance of nematodes, leaf and seed gall nematodes, stem and trunk nematodes, Ectoparasites of roots, semi-endoparasites of roots, migratory endoparasites of roots and tubers, sedentary endoparasites of roots and tubers: cyst nematodes). The second volume included two chapters (sedentary endoparasites of roots and tubers: root-knot nematodes, and conclusion), in addition to the references, appendices, indices and the list of terms. For more information please contact Dr Ahmed Dawabah, Email: dawabah@hotmail.com

- **Main Fungal Diseases of Cereals and Legumes in Tunisia** (*in English, Arabic and French*) 2008, of Bouzid Nasraoui. The Tunisian University Publishing Center has published recently a new book on the fungal diseases of cereals and legumes in Tunisia (with a CD guide for disease identification). The book author is Dr. Bouzid Nasraoui, Professor of Phytopathology (Phytomycology) at Higher (Graduate) School of Agriculture of Kef, Tunisia. This book is written in three languages: English, Arabic, and French. It includes an introductory chapter in which the author characterizes the world of fungi and its updated classification, a comprehensive analysis of the fungal disease development and the control methods commonly used against fungal diseases. In the remaining part of the book the author discusses in details the characterization and the description of the main fungal diseases that affect cereals (wheat, barley, and oats) and legumes (faba bean, chickpea, and pea) in Tunisia, treating every disease in four constant paragraphs: the causal agent, the symptoms, the fungal biology, and the chemical control.

Photos shot by the author in the Tunisian environment illustrate the microscopic observation of the fungus and the symptoms on the plant. The information provided in this book is supported by a CD expert system which guides the user through easy steps towards the identification of the specific disease on the basis of well described symptoms that the user can recognize on a diseased sample of cereals or legumes. This book may be considered as an enrichment of the Mediterranean agronomic library based on the climate resemblance in this region and also on the overcoming the lingual barrier by using three official languages. The author hopes that this book will be a practical tool of work for those involved in the cereal and legume area. This book will be of great use to instructors, researchers, and students, as well as extension specialists, field technicians, and to farmers. The book could be a self tutoring on how to identify the field crop fungal diseases and their fungal causal agents and to know about their modes of development as well as how to manage them (324 pages, 69 photos, price 12 TD ≈ 10$). For more information please contact Dr. Bouzid Nasraoui, Email: nasraoui.bouzid@iresa.agrinet.tn

- **Vegetable Diseases.** 2007. Edited by Steven Koike and Peter Gladders. This book focuses primarily on diseases that are caused by pathogens. Chapters dealing with the general principles of the causes, diagnosis and control of vegetable crop diseases are followed by crop-based chapters. Each disease entry includes a brief introduction to the disease, detailed description of disease symptoms, information on the pathogen and disease development, and suggestions on how to manage the problem. Top quality colour photos illustrate the book throughout. A Colour Handbook, 5 Tables, 444 Colour illustrations, 320 pages, 261x194 mm, Hardback, Price: 250 AU$. Please see: www.publish.csiro.au

- **Mushroom Pest and Disease Control**. 2007. Edited by John T. Fletcher and Richard H. Gaze. Pests and diseases are a major cause of crop losses and this book covers their recognition, biology and control. New pests and diseases are described together with changes in the management of pest and pathogen populations. The book is fully up-to-date on the important cultural changes that have occurred in recent years. New methods of crop production, the bulk handling of materials, changes in casing type, the more effective use of environmental controls, biological methods of control, the avoidance of environmental pollution, and the reduced use of pesticides, are all covered. Many of the cultural changes described influence the incidence of pests and diseases. A Colour Handbook, Colour illustrations, Colour photographs, 160 pages, 261 x 194 mm, Hardback, Price: 114 AU$. Please see: www.publish.csiro.au

- **Pests, Diseases and Disorders of Peas and Beans**. 2007. Edited by Anthony Biddle, Barry M. McKeown and Nigel D. Cattlin. Covering the most important pathogens, this handbook provides clear, concise descriptions of the symptoms and cycles of diseases, their distribution and economic importance and advice on their control. The text

is illustrated with some 300 superb colour photographs of affected crops to aid in the rapid identification of disease. The book also includes 'pest profiles' that identify, with the use of colour photographs, the pests that commonly prey on pea and bean crops. A Colour Handbook, 300 Colour illustrations, Index, 280 pages, 234 x 156 mm, Hardback, Price: 126 AU$. Please see: www.publish.csiro.au

- **Plant Nematodes of Agricultural Importance**. 2007. Edited by John Bridge and Jim Starr. This book aims to help people working commercially with crop plants to identify and improve their diagnosis of nematodes of agricultural importance. There is an introductory chapter on their biology and parasitism and the crops they are likely to attack. Crop chapters are divided into grain legumes, vegetables, flower crops, cereals, root and tuber crops, tree and plantation crops. Coverage includes their distribution, identification, symptoms and diagnosis, with management suggestions. A Colour Handbook, 212 Colour illustrations, 128 pages, 261x164 mm, Hardback, Price: 108 AU$. Please see: www.publish.csiro.au

- **Pests of Fruit Crops (2nd Edition).** 2007. Edited by David V. Alford. A completely revised edition of this highly regarded book gives a systematic account of fruit and hop pests – their recognition, biology and control. The pests are considered in their natural sequence of less advanced to more advanced forms, including a description of each, its life history, plants affected and damage caused. A Colour Handbook, Colour illustrations, Glossary, Index, 480 pages, 261x194 mm, Hardback, Price: 265 AU$. Please see: www.publish.csiro.au

- **A Colour Handbook of Diseases of Small Grain Cereal Crops.** 2008. Edited by Timothy Murray, David Parry and Nigel Cattlin. Covering 40-50 of the most important pathogens in Europe, North America, Japan and Australia, the handbook contains superb colour photographs accompanied by clear, concise descriptions of diseases with advice on their control. Colour illustrations, 142 pages, Paperback, Price: 64.96 AU$. Please see: www.publish.csiro.au

- **Diseases, Pests and Disorders of Potatoes.** 2008. Edited by Stuart Wale, Bud Platt and Nigel Cattlin. Covering the most important pathogens, this handbook provides clear, concise descriptions of the symptoms and cycles of diseases and disorders, and the pests that commonly prey on potato crops, their distribution and importance, and advice on their control. 250 Colour illustrations, 240 pages, 234 x 156 mm. A Colour Handbook Hardback, Price: 145 AU$. Please see: www.publish.csiro.au

- **Control of Pests and Weeds by Natural Enemies.** 2008. Edited by Roy Van Driesche, Mark Hoddle and Ted Center. This book offers a multifaceted yet integrated discussion on two major applications of biological control: permanent control of invasive insects and plants at the landscape level and temporary suppression of both native and exotic pests in farms, tree plantations, and greenhouses. Written by leading international experts in the field, the text discusses control of invasive species and the role of natural enemies in pest management. Paperback 484 pages. Price: 69.95 US$. Please see: www.wiley.com/promo/w9g9a

- **Ecology of Insects (2nd edition)** 2008. Edited by Martin R. Speight, Mark D. Hunter and Allan D. Watt. Insects account for a very large proportion of all terrestrial and freshwater species, pervading almost all ecosystems; functioning as carnivores, herbivores, and detritivores. Their ecology is of crucial importance to ecosystem function and they are economically important to human ity as pests of crops, vectors of disease, beneficial components of food webs, and vital components of pollination systems. The second edition of this successful text provides a balanced treatment of the theory and practice of pure and applied insect ecology. Fully revised and updated throughout, *Ecology of Insects* has expanded its coverage to include new and topical areas of insect ecology while presenting a thorough treatment of basic themes. Paperback 640 pages, Price: 89.95 US$. Please see: www.wiley.com/promo/w9g9a

- **Behavioral Ecology of Insect Parasitoids.** 2008. Edited by Eric Wajnberg, Carlos Bernstein and Jacques van Alphen. Written by a team of leading international specialists, this book examines the optimal behaviors that parasitoids exhibit in order to maximize long-term offspring production. It is an essential reference for research scientists and students studying these fascinating insects or for anyone involved in using parasitoids in biological control programs. Paperback 464 pages. Price: 80 US$. Please see: www.wiley.com/promo/w9g9a

- **Molecular Aspects of Plant Disease Resistance.** 2008. Edited by Jane Parker. In recent years, our understanding of the mechanisms involved in a plant's resistance to attack by disease has seen major advances. *Molecular Aspects of Plant Disease Resistance* includes contributions from many of the world's leading researchers in the area and covers such topics as the evolution of plant-virus interactions and plant resistance loci, the role of plant secondary metabolites, plant systemic resistance, oomycete genomics, intracellular immune receptors, transcriptional reprogramming, fungal biotrophy, chemical ecology of plant-insect interactions, bacterial Type ill effectors, and host perception of PAMPs. Hardcover 400 pages. Price: 209.99 US$. Please see: www.wiley.com/promo/w9g9a

❖ Selected Research Papers

Entomology and Acarology — الحشرات والعناكب

Acute abd biological effects of some synthetic organic compounds on pink bollworm. 2007. Enaiat, K. Mohamed, A.A. Amer, S.A. Raslan and Hind S. El-Tahawe (Egypt). Egyptian Journal of Agricultural Research, 85(5): 1743-1760.

Alternative means for controlling *Synanthedon myopaeformis* by mass trapping with sex pheromone, horticultural, mechanical and local chemical treatments. 2007. A.W. Tadors, R.G. Abou El-Ela and M.M. Abd El-Azim (Egypt). Egyptian Journal of Agricultural Research, 85(4): 1215-1226.

***Aphelinus desantisi* Hayat (Hymenoptera: Aphelinidae), a new record of parasitoids on aphids (Homoptera: Aphididae) in Egypt.** 2007. Shaaban Abd-Rabou and Monira M. El-Fatih (Egypt). Egyptian Journal of Agricultural Research, 85(4): 1279-1284.

Biological and biochemical activities of mesquite, *Prosopis juliflora* (S.W) D.C. seed extracts against, grain weevil, *Sitophilus granarius* L. (Curculionidae: coleopteran). 2007. Sawsan A. Shemais, Salwa M.S. Ahmed and T.A.A. El-Shikh (Egypt). Egyptian Journal of Agricultural Research, 85(5): 1703-1718.

Biological and prediction studies on the predaceous spider, *Steatoda triangulosa* (Walckenaer) fed on the newly hatched larvae of pink bollworm, *Pectinophora gossypiella* (Saund.). 2007. M.H. El-Erksousy and R.A.M. Amer (Egypt). Egyptian Journal of Agricultural Research, 85(5): 1599-1612.

Biological and prediction studies on the two acarine predators *Lasioseius sewai* Nasr & Abou Awad and *Blattisocius keegani* Fox Fed on the grain mite *Tyrophagus putrescentiae* (Acari: Acaridae). 2007. H.A. Taha, A.M. Metawlly, Wedad Atwa and Mariam El-Sanady (Egypt). Egyptian Journal of Agricultural Research, 85(5): 1659-1668.

Biological studies on *Neoseiulus arundonaxi* (Acari: Phytoseiidae) fed on *Tyrophagous putrescentiae* (Acari:Acaridae) under different constant temperatures. 2007. A.S. Sand, M.M. Abou-Setta and Hanaa El-Khateeb (Egypt). Egyptian Journal of Agricultural Research, 85(5): 1677-1688.

Biological studies on the true spider, *Thyene imperials* (Rossi) (Araneida: salticidae) when fed on different prey spices in Egypt. 2007. A.M. Afifi, M.F. Hassan, G.A. Ibrahim and M.M. El-Sebaay (Egypt). Egyptian Journal of Agricultural Research, 85(5): 1669-1676.

Common names of the most Egyptian thrips species. (Order: Thysanoptera). 2007. M.A. Badr and A.A. El-Gharbawy (Egypt). Egyptian Journal of Agricultural Research, 85(4): 1267-1278.

Effect of calcium and potassium elements and mixture on land snail Eobania vermiculata (Muller.). 2007. Maha F. Mahmoud, A.A. Asran and H.1. El-Deeb (Egypt). Egyptian Journal of Agricultural Research, 85(5): 1643-1652.

Effect of certain plant extract of Zanzalakht trees (Z. seed oil) on pink bollworm, *Pectinophora gossypiella* (Saunders) (Lepidoptera: Gelechiidae). 2007. F.F. Shalaby, A.F. Lutfallah and SH.S. Yacoub (Egypt). Egyptian Journal of Agricultural Research, 85(4): 1191-1204.

Effect of different bio-control agents on the bamboo PIT scale, Bambusaspis bambusa and the seychellarum mealybug, *Icerya seychellarum* under laboratory conditions. 2007. A.A.H. Mangoud, M.S. Abd El-Wahid and M.A. Abd El-Aziz (Egypt). Egyptian Journal of Agricultural Research, 85(5): 1629-1642.

Effect of different temperatures on the biology of the broad mite *Polyphagotarsonemus latus* (Banks) on Potato. 2008. L.K. Al-Ani and I. Al-Jboory (Iraq). Arab Journal of Plant Protection, 26(2): 95-101.

Effect of the temperature and host plants on life history of *Serangium parcesetosum* Sicard. when fed on *Bemisia tabaci* (Genn.). 2008. M. Ahmad and R. Abboud (Syria). Arab Journal of Plant Protection, 26(2): 135-142.

Evaluation of petroleum-ether extract of Zanzalakht trees (Z. seed oil) on pink bollworm, *Pectinophora gossypiella* (Saunders) (Lepidoptera: Gelechiidae). 2007. M.A.M. Ali, A.E. Hussien, S.A.A. Raslan and M.E.M.A. Hegab (Egypt). Egyptian Journal of Agricultural Research, 85(4): 1205-1214.

Food reference of *Tribolium confusum* (Duval) (Coleoptera: Tenebriondiae) under laboratory conditions. 2007. Hawaa M. El-Mabrouk and M.B. Wilson (Egypt). Egyptian Journal of Agricultural Research, 85(4): 1185-1190.

Further ecological studies on onion pests in Egypt. 2007. I.M. Sabra, M.A. El-Nagar and M.S.I. Shalaby (Egypt). Egyptian Journal of Agricultural Research, 85(4): 1259-1266.

Host plant, distribution and natural enemies the pomegranate whitefly, *Siphoninus phillyrae* (Haliday) (Homoptera: eyrodidae). 2007. Shaaban Abd-Rabou and Noha Ahmad (Egypt). Egyptian Journal of Agricultural Research, 85(5): 1695-1702.

Insecticidal activity of three phytochemecals against the Egyptian cotton leafword, Spodoptera littoralis (Biosd.) noctuidae:Lepidoptera. 2007. Elham F. Mahmoud, E.M. Mohamed and M.H. Gad. (Egypt). Egyptian Journal of Agricultural Research, 85(5): 1771-1784.

Joint toxic effect and synergism of pyrethroids as resistance management strategy in pink bollworm *Pectinophora gossypiella* (Saunders). 2007. Magdy M.K. Shekeban. (Egypt). Egyptian Journal of Agricultural Research, 85(5): 1565-1578.

Life history of *Thanatus albini* (Audouin) (Arachinidia: Araneida: Philodromidae) in Egypt. 2007. M.A. Mohafez and Gihan M.E. Sallam (Egypt). Egyptian Journal of Agricultural Research, 85(5): 1653-1658.

Physico chemicals properties and composition of Egyptian honey collected by *Apis mellifera lamarckii*. 2007. SH.M. El-Awady, H.A. Helal, M.M. Mazeed and M.A.I. Abdel Aziem. (Egypt). Egyptian Journal of Agricultural Research, 85(5): 1761-1770.

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