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News and announcements from all on any aspect of plant protection in the Arab world are invited for the Newsletter. Contributions from the Executive Committee of the Arab Society of Plant Protection and from the four Subject Matter Committees, as well as from national societies in the Arab region dealing with any aspect of plant protection are kindly requested and highly appreciated.
Biorational Pest Control – a rapid growing sustainable control strategy

Biorational pest control involves application of a pesticide originated from natural source which is safe, residue free, rapidly biodegradable soft chemicals to grow crops with minimal use of pesticides. The main objective of biorational pest control is to optimize pest control in an economically and ecologically sound way. The term biorational derived from two words, biological and rational, referring to pesticides of natural origin that have limited or no adverse effects on the environment or beneficial organisms. Biorational pesticides are becoming popular due to environmental awareness and consumer concern. Biorational pesticides have different modes of action compared with conventional or traditional pesticides, with greater selectivity and considerably lower risks to humans, wildlife and the environment.

Biopesticides are effective in very small quantities and often decompose quickly, thereby resulting in lower exposures and largely avoiding the pollution problems caused by conventional pesticides. Moreover, biopesticides are selective to target pest and closely related organisms, in contrast to broad spectrum, conventional pesticides. With consistent performance, the future growth rate of biorational pesticides over the next ten years is expected to increase 10-15% annually in comparison to 2% for chemical pesticides. In 2008, total world Crop pesticide market was 25 billion US Dollar where share of Biological control was 3% (750 Million US$). However, world Crop Biocontrol Market is expected a growth of 2800 Million USD by 2015 (source: Global Industry Analysts Inc.) and $3.4billion by 2017.

Recently 122 biochemical pesticide active ingredients (a.i.) were registered with the Environmental Protection Agency (EPA), which include 18 floral attractants, 20 plant growth regulators, six insect growth regulators, 19 repellents, and 36 pheromones.

Developed countries pay great attention to the projected rapid pace of the development of biopesticides. In Canada, between 1972 and 2008, the Pest Management Regulatory Agency approved registration of 24 microbial active substances with 83 formulations. The majority of the registrations (55/83) occurred since 2000 and at the beginning of 2008 there were 10 new products.

As of October 2008, there were 327 biopesticides formulations that have been registered in China, accounting for 1.6% of total registered pesticide products. Use of biorational pesticides products will unlock a new market for developing countries fresh vegetable and fruit growers to comply with export legislation Eurepgap with residue free produces.

In the Arab World there is no substantial production of biorational products, however few trials have been started in the beginning of the year 2000 by scientists in Iraq to formulate and commercialize the Btk. which stopped later due to the UN sanctions. Trichoderma is being produced and marketed now by an Iraqi company. Production of Btk and also viral strains against cotton worm in Egypt has been manufactured locally.

By 2050, it is estimated that the world population will reach around 9 billion people. The Near East and Arab countries region will strongly feel the squeeze, as its share from the population increase and food shortage will be higher than the global average. To face the future demand we need abundant safe and nutritious food. To accomplish this goal requires an ability to meet the grand challenge of adaptation to climate change, while preserving the natural habitats. Plant science, including plant protection, is trying to cope with this challenge, and it is timely to ask what questions should the next generation of plant protection scientists address

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First Report of Tomato ringspot virus Infecting Pepper in Iran. Chili pepper (Capsicum frutescens) represents an important crop in Iran and is under cultivation in different regions in Northern Iran. In spring 2012, commercially grown tabasco (Capsicum frutescens) peppers in Varamin, Shahriar, and Karaj districts of Tehran province developed an undescribed disease. Symptoms observed were mosaic, leaf malformations, and stunting. Fruit symptoms included chlorosis and distortion. To verify the identity of the disease, six fields were surveyed and 72 symptomatic leaves were collected and screened by double antibody sandwich (DAS)-ELISA using specific antibodies to Tobacco ringspot virus (TRSV), Tomato ringspot virus (ToRSV), Pepper mild mottle virus (PMMV), Tomato mosaic virus (ToMV), Tobacco mosaic virus (TMV), and Arabis mosaic virus (ArMV). ToRSV was found in 23% of the samples collected. None of the samples had a positive reaction to other tested viruses. The ToRSV-positive peppers were used for mechanical transmission to Chenopodium quinoa, local lesion host, and after two cycles of single local lesion isolation, they were transferred to Cucumis sativus, Solanum esculentum, and Capsicum frutescens. Inoculations resulted in systemic mosaic and chlorotic local lesion on C. sativus; leaf distortion and mosaic on S. esculentum; and mosaic, mottle, and stunting on C. frutescens. All inoculated plants were positive for ToRSV with DAS-ELISA. To further verify ToRSV infection, reverse transcription (RT)-PCR was conducted. Two primers were designed on the basis of the highly conserved sequences of the putative viral polymerase gene available in the GenBank. RT-PCR of total RNA extract from infected peppers and inoculated plants with the designed primers RdR-R (5′-CGCCTTGTAATTGAGTAGCCC-3′) and RdR-F (5′-GAAGAGCTAGAGCCTCAACCGG-3′), consistently amplified the 411-bp product, while no amplification products were obtained from noninfected control (healthy plants). The fragment from tabasco pepper was cloned into pTZ57R/T Ins T/A clone PCR Cloning kit, Fermentas, St. Leon-Rot, Germany and sequenced in both directions of three clones. The resulting nucleotide sequence (GenBank Accession No. JQ972695) had the highest identity (94%) with the polymerase gene of a ToRSV isolate from blueberry cv. Patriot (Accession No. GQ141528) and had lower identity (91%) with that of a ToRSV isolate from blueberry cv. Bluecrop (Accession No. GQ141525). Tomato ringspot virus (ToRSV) is reported to infect Capsicum spp. in the United States. Our results confirm the natural infection of pepper plants in Tehran by ToRSV. To our knowledge, this is the first report of ToRSV infection of pepper in Iran. The finding of this disease in Tehran confirms further spread of the virus within northern regions of Iran and prompts the need for research to develop more effective management options to reduce the impact of ToRSV on pepper crops. Beside, primers designed on the basis of putative viral polymerase gene sequences may improve the detection of ToRSV isolates by RT-PCR in Iran. [Y. Sokhansanj, F. Rakhshandehroo and R. Pourrahim (Iran). Plant disease, 96(12): 1828, 2012].

First Report of Watermelon chlorotic stunt virus in Cucurbits in Lebanon. In August 2009 in the Marjayoun region in South Lebanon, severe yellowing symptoms on melon (Cucumis melo) and pronounced dwarving and mosaics on watermelon (Citrus lanatus) led to significant yield losses. Watermelon chlorotic stunt virus (WmCSV), genus Begomovirus, family Geminiviridae, was suspected. Symptomatic samples were collected close to the end of the growing season from several fields. The small scale CTAB protocol was followed for nucleic acid extraction. Samples were tested by PCR for WmCSV and Squash leaf curl virus (SLCV) using specific primers for SLCV and newly designed WmCSV specific primers: (WMAR1: 5′ TTTCCGACACGATGAGTGAT 3′; WMAF3: 5′ ACTGGACTTAGCGCTTTGTAT 3′; amplicon size 1,061 bp). Of 39 symptomatic samples, 90% were infected with WmCSV, 13/14 (93%) melon samples and 22/25 (88%) watermelon samples, while 64% were infected with SLCV, indicating a high incidence of mixed infections. In November 2009, no cucurbits were found in Marjayoun since farmers refrained from planting late crops after devastating losses in the previous year. Therefore, 92 samples were collected from other southern regions and 114 samples from northern regions. All squash samples had leaf curl symptoms, while 75 to 85% of cucumber and melon had yellowing symptoms. No WmCSV was detected in North Lebanon, even though 100% of squash samples and 79% of other cucurbit samples were positive for SLCV. However, in South Lebanon, WmCSV was detected 9/20 (45%) in melon, 12/32 (38%) in cucumber (Cucumis sativus), and 6/40 (15%) in squash; while the incidence of SLCV was high particularly on squash (39/40, 98%) and cucumber (30/32, 94%) followed by melon (7/20, 35%). The survey was repeated in 2010, and the previous year's results were confirmed: no WmCSV was detected in North Lebanon, while 39/40 (98%) melon samples tested in November were positive for SLCV. In southern Lebanon, WmCSV was not
detected in melon or watermelon samples collected in June; however, in November it was detected in 11/23 (48%) squash and 9/33 (27%) melon. WmCSV genome was amplified by rolling circle amplification (RCA) using the TempliPhi Amplification Kit (GE Healthcare). The RCA product was sequenced using mostly locally designed primers, and the sequences were submitted to GenBank: WmCSV DNA A: HM368371.1; WmCSV DNA B: HM368372. Phylogenetic analysis showed that WmCSV DNA A was most closely related to isolates from Israel (EF201809.1) and Jordan (EU561237.1), sharing 99% nt identities with both isolates; WmCSV DNA B was found to be most closely related to an isolate from Israel (EF201810.1), with 98% nt identity. WmCSV was first detected in Yemen but was detected quite recently in Israel and Jordan. Within a short period, Lebanon experienced the introduction of two new whitefly transmitted begomoviruses. WmCSV seems so far to be restricted only to South Lebanon, while SLCV is widespread. The synergistic interaction between a mixed infection by SLCV and WmCSV in melon resulted in significant symptom enhancement, plant shortening, and up to 54% yield reduction in summer. Hence, the development of resistant varieties coupled with the implementation of adapted integrated pest management strategies would be essential for successful production of cucurbit crops. [J. Samsatly, H. Sobh, M. Jawhari, C. Najjar, A. Haidar and Y. Abou-Jawdah (Lebanon). Plant disease, 96(11): 1703, 2012].

**SAUDI ARABIA**

First Report of Bacterial Spot Caused by *Xanthomonas campestris* pv. *vesicatoria* on Sweet Pepper (*Capsicum annuum* L.) in Saudi Arabia. In the summer of 2009 and 2010, 18 sweet pepper fruit with blister-like, raised, rough lesions were collected from four greenhouses (total of 0.1 ha) in the Al-Kharji region of Saudi Arabia. All samples were collected from commercial crops of the sweet pepper cv. California Wonder. Disease incidence was ≤5%. Isolations were made from all diseased fruits. A small piece (3 mm²) of symptomatic tissue from pepper fruit was placed in a sterile mortar and macerated in sterile distilled water with a pestle. A loopful of bacterial suspension from each sample was streaked onto Tween B agar medium. Plates were incubated at 28°C for 48 h. Single yellow, circular, butyrous, shiny colonies were picked from the plates and transferred to nutrient agar plates containing 5% D+ glucose agar (NGA). Gram-negative, rod-shaped bacteria were consistently isolated from the fruit and 10 of the isolates were identified as *Xanthomonas campestris* pv. *vesicatoria* on the basis of morphological, physiological, and biochemical tests. The isolates were oxidase positive and levan negative, arginine-dihydrolase positive, and did not macerate potato discs. The isolates were also non-fluorescent, grew at 37 and 4°C but not at 40°C, did not liquefy gelatine or starch, but did produce H₂S. The identity of the 10 bacterial strains was confirmed by PCR assay using primers RST65 and RST69. Four-week old pepper plants (cv. California Wonder) were inoculated by spraying five potted plants with each isolate using a bacterial suspension (10⁸ CFU/ml). Sterile distilled water was sprayed on an additional five plants as a negative control treatment. The bacterial isolates caused necrotic lesions, each with a yellow halo, on leaves of inoculated plants. Bacteria reisolated from the necrotic lesions using the technique previously described were identical to the original strains according to the morphological, cultural, and biochemical tests described above. Negative control plants inoculated with sterile distilled water did not show symptoms and no bacterial colonies were recovered from them. To our knowledge, this is the first report of bacterial spot on pepper fruits in Saudi Arabia. [Y. Ibrahim and M. Al-Saleh (Kingdom of Saudi Arabia). Plant disease, 96(11): 1690, 2012].

**TURKEY**

First Report of Fire Blight Disease on Blackberry in Turkey. During 2008 and 2009, a new disease on blackberry (*Rubus fruticosus* cv. Chester) causing leaf and shoot blight and cankers with brown discoloration of necrotic tissues on mature branches was observed in Isparta and Konya provinces of Turkey. Disease incidence was estimated to be 4% for the two years. Isolations were made from lesions on leaves and shoots on nutrient sucrose agar (NSA) medium. Bacteria consistently isolated from the diseased tissues were identified on the basis of biochemical, physiological, and molecular tests. Eleven representative bacterial strains were gram-negative, rod-shaped, mucoid, fermentative, yellow-orange on Miller and Scroth (MS) medium, positive for levan formation and acetoin production, no growth at 36°C, positive for gelatin hydrolysis, and negative for esculin hydrolysis, indole, urease, catalase, oxidase, arginine dehydrolase, reduction of nitrate, acid production from lactose, and inositol. Two reference strains of *Erwinia amylovora* (EaP28 and NCPPB 2791) obtained from the culture collection unit of Selcuk University were used as positive controls. All strains induced a hypersensitive response in tobacco (*Nicotiana tabacum* cv White Burley) 24 h after inoculation with a 10⁸ CFU/ml bacterial suspension in water. All strains were identified as *E. amylovora* using the species-specific primers set A/B, which amplified a 1-kb DNA fragment in PCR, and fatty acid methyl ester (FAME) profiles determined by Sherlock Microbial Identification System software (TSBA 6 v. 6.00; Microbial ID, Newark, DE) with similarity indices ranging from 07 to 99%. Pathogenicity was confirmed by injecting bacterial suspensions (10⁸ CFU/ml) in sterile distilled water into the shoot tips of 2-year-old *R. fruticosus* cv. Chester and the first blighting symptoms were observed on leaves.
within 3 days and also 10 days later after inoculation on shoots. Sterile distilled water was used as a negative control. No symptoms were observed on control plants. All tests were repeated three times. The bacterium was reisolated from inoculated plants and identified as *E. amylovora*. To our knowledge, this is the first report of *E. amylovora* on blackberry in Turkey. Phytosanitary measures are needed to prevent any further spread of the bacterium to new blackberry areas. [K. K. Bastas and F. Sahin. (Turkey). Plant disease, 96(12): 1818, 2012].

**First Report of Erwinia amylovora on Firethorn (Pyracantha coccinea) and Mountainash (Sorbus sp.) in Turkey.** Fire blight, caused by the bacterium *Erwinia amylovora*, is a serious disease of apples (*Malus* spp.) and pears (*Pyrus* spp.) but can also infect many ornamental species in the Rosaceae family. In the summers of 2009 and 2010, leaf and shoot blight and reddish colored cankers were observed on firethorn (*Pyracantha coccinea*) and brown discolored leaves and necrotic stem lesions on mountain ash (*Sorbus sp.*) both from the landscape areas of Konya province. Investigation of these symptoms showed that in an 85-ha area, disease incidence was estimated at 1.5% and 1% on firethorn and mountain ash, respectively. Bacteria were consistently isolated from both leaf and lesions onto nutrient sucrose agar medium. Nine representative bacterial colonies from firethorn isolations and six from mountain ash isolations purified as *E. amylovora*. Two reference strains of *Erwinia amylovora* (EaP28 and NCPPB 2791) obtained from the culture collection unit of Selcuk University were used as positive controls. All strains induced a hypersensitive response in tobacco (*Nicotiana tabacum* cv. White Burley). All strains were identified as *E. amylovora* on the basis of amplification of a 1 kb DNA fragment with a species-specific primer set, A/B by PCR, and fatty acid methyl ester profiles determined by Sherlock Microbial Identification System software (TSBA 6 v. 6.00; Microbial ID, Newark, DE) with similarity indices ranging from of 83 to 96%. Pathogenicity tests were performed by injecting 20 μl of a bacterial suspension (10⁸ CFU ml⁻¹) into the shoot tips of 3-year-old *C. horizontalis* seedlings. Leaf and shoot blighting symptoms were observed within 10 to 15 days, but no symptoms were observed on control plants treated with sterile water. The bacterium was reisolated from the lesions on leaves and shoots and identified as described above. To our knowledge, this is the first report of *E. amylovora* on cotoneaster in Turkey. Control measures are needed to prevent any further spread of the bacterium to new landscape areas. [K. K. Bastas and F. Sahin, Yeditepe (Turkey). Plant disease, 96(11): 1690, 2012].

**First Report of Fire Blight Disease Caused by Erwinia amylovora on Rockspray (Cotoneaster horizontalis) in Turkey.** In the late summer and early winter of 2008 and 2009, leaf and shoot blight and cankers with reddish and brownish necrotic tissue on mature branches of *Cotoneaster horizontalis* were investigated in landscape areas of Konya province in Turkey. Disease incidence was estimated at 2%. Bacteria were consistently isolated from the lesions on leaves and shoots on nutrient sucrose agar medium. Twelve representative bacterial strains were isolated and characterized as gram-negative, rod-shaped, mucoid, fermentative, yellow-orange on MS medium, positive for levan formation and acetoin production, no growth at 36°C, positive for gelatin hydrolysis, and negative for indole, urease, oxidase, arginine dehydrodase, reduction of nitrate, and acid production from lactose and inositol. Two reference strains of *Erwinia amylovora* (EaP28 and NCPPB 2791) obtained from the culture collection unit of Selcuk University were used as positive controls. All strains induced a hypersensitive response in tobacco (*Nicotiana tabacum* cv. White Burley). All strains were identified as *E. amylovora* on the basis of amplification of a 1 kb DNA fragment with a species-specific primer set, A/B by PCR, and fatty acid methyl ester profiles determined by Sherlock Microbial Identification System software (TSBA 6 v. 6.00; Microbial ID, Newark, DE) with similarity indices ranging from of 83 to 96%. Pathogenicity tests were performed by injecting 20 μl of a bacterial suspension (10⁸ CFU ml⁻¹) into the shoot tips of 3-year-old *C. horizontalis* seedlings. Leaf and shoot blighting symptoms were observed within 10 to 15 days, but no symptoms were observed on control plants treated with sterile water. The bacterium was reisolated from the lesions on leaves and shoots and identified as described above. To our knowledge, this is the first report of *E. amylovora* on cotoneaster in Turkey. Control measures are needed to prevent any further spread of the bacterium to new landscape areas. [K. K. Bastas and F. Sahin. (Turkey). Plant disease, 96(12): 1818, 2012].

**RESEARCH HIGHLIGHTS**

**EGYPT**

Susceptibility of different life stages of Indian meal moth *Plodia interpunctella* (Hübner) and almond moth *Ephestia cautella* (Walker) (*Lepidoptera: Pyralidae*) to modified atmospheres enriched with carbon dioxide. The susceptibility of the different life stages of the Indian meal moth *Plodia interpunctella* and almond moth *Ephestia cautella* to different modified atmospheres (MAs) containing various concentrations of carbon dioxide (CO₂) was studied as an alternative to methyl bromide fumigation at 27 °C and 60 ± 5% relative humidity (r.h.). The MAs tested were 40%, 60% and 80% CO₂ in

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Population Structure and Management of Podosphaera pannosa Associated with Peach Powdery Mildew in Oman. In 2004, severe powdery mildew infection on peach occurred in Al-Jabal Al-A'khdhar, Oman, and resulted in substantial yield losses to growers. This study was conducted to investigate occurrence, causal agents, genetic diversity and efficacy of azoxystrobin in management of this disease. Powdery mildew was observed on all farms and peach trees in Al-Jabal Al-A'khdhar. Disease symptoms were first observed on shoots in April, followed by appearance on fruits. Disease severity reached its peak between May and June. Morphological and molecular identification of 22 powdery mildew isolates indicated that all belong to Podosphaera pannosa. Podosphaera pannosa reproduced the same symptoms upon inoculation on peach leaves. Amplified fragment length polymorphisms analysis of 35 isolates of P. pannosa from five different villages using four primer pair combinations produced 688 polymorphic loci and 35 different genotypes. Populations of P. pannosa were found to have low levels of gene diversity (H = 0.1858), which suggests that P. pannosa has been recently introduced into Al-Jabal Al-A'khdhar. Analysis of molecular variance showed low levels of genetic differentiation among populations from the different villages, implying the introduction of P. pannosa into the different villages via common sources as well as frequent movement of pathogen inoculum among the different villages. Evaluating the efficacy of azoxystrobin showed that azoxystrobin is as efficacious as thiophanate-methyl in managing the disease, with sulphur being the least efficacious. The study is the first to report the presence of P. pannosa in Oman. Also reported are its genetic diversity and its management under commercial conditions. [Abdullah M. Al-Sadi, Ibthithal J. Al-Raisi, Masood Al-Azri, Hamoud Al-Hasami, Mohammed S. Al-Shukaili, Saif M. Al-Shuraiqi, Khater O. Al-Fahdi, Mike L. Deadman (Oman). Journal of Phytopathology, 160(11-12): 647-654, 2012].

Pakistant

Determination of Rust Resistance Gene Complex Lr34/Yr18 in Spring Wheat and its Effect on Components of Partial Resistance. The non-durable nature of hypersensitive (race-specific) resistance has stimulated scientists to search for other options such as race-non-specific resistance to provide long-lasting protection against plant diseases. Adult plant resistance gene complex Lr34/Yr18 confers a dual race-non-specific type of resistance to wheat against stripe rust (Puccinia striiformis f. sp. tritici) and leaf rust (P. triticina Eriks). This study was conducted to evaluate 59 spring bread wheat (Triticum aestivum L.) genotypes for the presence of the Lr34/Yr18-linked csLV34 allele using STS marker csLV34 and to determine the effect of this gene complex on the components of partial resistance in wheat to leaf/stripe rust. Lr34/Yr18-linked csLV34 allele was detected only in 12 genotypes, namely Eqbal 2000, NR-281, NR 354, NR 363, NR 364, NR 366, NR 367, NR 370, NR 376, 4ºEBWYT 509, 4ºEBWYT 510 and 4ºEBWYT 518.
Eleven genotypes showing the amplified \textit{Lr34/Yr18}-linked allele were further studied for the assessment of the effect of \textit{Lr34/Yr18} on components of partial resistance along with nine genotypes lacking this gene complex. Both stripe and leaf rusts were studied separately. The components of partial resistance including latency period (LP) and infection frequency (IF) were studied on primary leaf (seedling stage), fourth leaf and fully expanded young flag leaf (adult plant stage). Both the stripe and leaf rust fungi showed a prolonged LP and reduced IF on genotypes carrying \textit{Lr34/Yr18} gene complex. Generally, a longer LP was associated with a reduced IF at all growth stages. Although significant effect of \textit{Lr34/Yr18} gene complex on LP and IF was observed almost at all three growth stages, the effect was more pronounced at flag leaf. This suggested that \textit{Lr34/Yr18} gene complex is more effective at later stages of plant growth. [Maqsood Qamar, Dilnawaz Ahmed Gardezind and Muhammad Iqbal (Pakistan). Journal of Phytopathology, 160(11-12): 628-636, 2012].

Effects of combined thiamethoxam and diatomaceous earth on mortality and progeny production of four Pakistani populations of \textit{Rhynzopertha dominica} (Coleoptera: Bostrichidae) on wheat, rice and maize. Bioassays were conducted to evaluate the effects of combining thiamethoxam at 0.25, 0.5 and 0.75 mg/kg of active ingredient with the diatomaceous earth (DE) formulation, SilicoSec, at the rate of 100 mg/kg against four Pakistani populations of the lesser grain borer, \textit{Rhynzopertha dominica} (F.) (Coleoptera: Bostrichidae). The tests were carried out with adult beetles on wheat, maize, and rice. Mortality increased with increasing application rates and exposure intervals for each population. Individually, thiamethoxam alone was more effective at the high dose rate than DE alone, but after 14 days of exposure in most cases, there was greater mortality with DE than with the low dose of thiamethoxam. There was greater mortality in wheat than in rice or maize. Populations differed in susceptibility to treatments and production of progeny. [Waqas Wakil, Tahira Riasat and Jeffrey C. Lord (Pakistan and USA). Journal of Stored Products Research, 52: 28–35, 2013]

Viruses and Hop Stunt Viroid of Fig Trees in Syria. A virus survey was carried out in spring and summer 2010 in Syrian fig orchards and gardens in 9 cities and in a varietal collection at Idleb. A total of 90 fig samples were collected and tested by RT-PCR for the presence of Fig leaf mottle-associated virus 1 (FLMaV-1), Fig leaf mottle-associated virus 2 (FLMaV-2), Fig mild mottle associated virus (FMMaV), Fig mosaic virus (FMV), Fig latent virus 1 (FLV-1), Fig cryptic virus (FCV), Fig fleck-associated virus (FFkaV), and Hop stunt viroid (HSVd) using sets of specific primers. PCR results showed that about 84% of the trees were infected with at least one virus. FMV was the prevailing virus (56.7%), followed by FFkaV (36.7%), FLMaV-2 (31.1%), FMMaV (12.2%), FLV-1 (11.1%) and FLMaV-1 (4.4%), whereas FCV was not found. HSVd was detected in 13.3% of the samples. In a phylogenetic tree, the nucleotide sequences of most Syrian HSVd-fig isolates grouped with those reported in Lebanon from the same host and from mulberry, forming a distinct clade (M-group). This is the first report of FMMaV, FMV, FLV-1 and HSVd in fig trees.
Pathogenicity Spectra and Screening for Resistance in Barley against Tunisian Pyrenophora teres f. teres. This work aimed to determine patterns of pathogenicity in Pyrenophora teres f. teres and to identify potentially effective resistance sources that could be used as breeding material to control net blotch in Tunisia. Extensive pathogenic variability was detected in 85 isolates of P. teres causing net blotch of barley in Tunisia. Based on unweighted pair-group method with arithmetic averaging clustering and mean disease rating scores, three distinct virulence groups were identified. The isolates were classified into 23 pathotypes. Pathogenic variability within the groups was higher than that between the groups, a finding that can guide a rational choice of isolates for screening lines as part of a breeding program. Conversely, studying the relationship between geographic and pathotypic structure allowed us to detect a significant isolation by distance pattern, suggesting a regular and gradual dispersal of the pathogen over this spatial scale. Using specific resistance properties of individual barley genotypes as virulence markers, all the differential barley genotypes were shown to be distinct, and no single source of resistance was totally effective against all isolates. [A. Bouajila, N. Zoghlemi, M. Al Ahmed, M. Baum, A. Ghorbel and K. Nazari (Tunisia & ICARDA-Syria). Plant Disease, 96(10):1569-1575, 2012].

Insecticidal activity of Hypnum cupressiforme (Bryophyta) against Sitophilus granarius (Coleoptera: Curculionidae). The moss Hypnum cupressiforme Hedw. is cosmopolitan throughout the world and is one of the most common moss species in Turkey. In the autumn of 2011, moss samples were collected from Şadıman Hill located in Ilgaz Mountain National Park in Turkey. After drying the collected samples at room temperature, the green gametophytes and brownish rhizoid parts of the plant were separated from other contents and ground up before extraction procedure. The contact toxicities of 14 column fractions and 11 flash fractions of H. cupressiforme were evaluated against granary weevil (Sitophilus granarius) adults. The fractions C-10 (70.62%) obtained from column chromatography and F-11 (64.48%) obtained from flash chromatography showed the highest activity. As a result of dose dependent studies carried out on C-10 and F-11, LC₅₀ values were calculated as 44.8 μg/μl and 45.3 μg/μl, respectively. Two other fractions C-3 (29.9%) and F-2 (32.1%) were determined to have an active substance different from fractions C-10 and F-11. The LC₅₀ values of fractions C-3 and F-2 were determined as 81.3 μg/μl and 124.6 μg/μl, respectively. [Gökhan Abay, Ömer Cem Karaçoş, Ali Riza Tüfekçi, Serkan Koldaş and Ibrahim Demirts (Turkey). Journal of Stored Products Research, 51: 6-10, 2012].

A novel Bacillus thuringiensis strain and its pathogenicity against three important pest insects. A highly pathogenic Bacillus thuringiensis (Bt) strain was isolated from a soil sample in Turkey and characterized in terms of both its 16S-ITS rDNA region and cry gene content. This strain (SY49.1) harboured several cry genes producing crystalline inclusions known to have toxicity on lepidopteran, dipteran and coleopteran pests. The 16S-ITS sequence analysis of Bt SY49.1 showed 98% similarity to Bt serovar andaloussiensis BGSC 4AW1. The larvae of Ephesia kuehniella and Plodia interpunctella were treated with a spore-crystal mixture of this strain in the dose range of 50-1000 μg g⁻¹. Mortality rates were higher than 90% at the highest concentration for these pests. For Tribolium castaneum much higher concentrations were needed than with lepidopteran pests larvae. At the highest concentration tested of 10 mg g⁻¹, about 62% mortality was obtained. It was concluded that this native strain of Bt could be used as an effective biocontrol agent against various lepidopteran pests. [Semih Yılmaz, Abdurrahman Ayvaz, Mikail Akbulut, Ugur Azizoglu and Salih Karabörkli (Turkey). Journal of Stored Products Research, 51: 33-40, 2012].

The distribution of Russian Wheat Aphid, Diuraphis noxia (Kurdjumov) (Hemiptera: Aphididae) in Turkey. The Russian wheat aphid, Diuraphis noxia (Kurdjumov) (Hemiptera: Aphididae), is one of the most economically important and widely distributed pests of wheat in the world. In 1962, D. noxia caused crop losses between 25 and 60% in the central province of Konya, Turkey. In this study, the current status of the pest in wheat-producing areas of Turkey was investigated along a route from Izmir to Manisa, Usak, Kütahya, Eskişehir, Akşehir, Ankara, Konya, Aksaray, Nevşehir, Yozgat and Erzurum. D. noxia was detected in 58 of the 100 wheat fields surveyed in most fields and wheat was at the heading stage. The population density of the pest was low in 23 fields, medium in 22 fields and high in 13 fields. The percentage of infestation was low in 31 fields, medium in 12 fields, and high in three fields and very high in three fields. D. noxia was collected from bread or durum wheat plants (71%), barley plants (10%), volunteer oats (8%) (Avena fatua), volunteer wheat (6%), false barley (Hordeum murinum) (4%) and natural grasses (1%). According to results of the study, population density, damage and infestation rates of D. noxia were higher in high altitudes. [Ferit Turanlı, Astrid Jankielsohn, Alexey Morgounov and Mehmet Cakir (Turkey). African Journal of Agricultural Research, 7(39): 5396-5404, 2012].
Some Plant Protection Activities of FAO and Other Organizations

Desert Locust Situation

Situation level: Threat


Provided by the FAO Emergency Center for Desert Locust (ECLO).

The Desert Locust situation remained serious during November as small swarms formed in Mali, Niger, and Chad, and adult groups moved north to Libya, Tunisia and Algeria. An increasing number of adults were seen in Morocco and the Western Sahara. Locusts formed groups and small hopper bands in western Mauritania. More groups and small swarms are likely to form in the Sahel during December and move to Northwest Africa and northwest Mauritania. In the Central Region, groups and swarms formed in northern Sudan and moved to Egypt and the Red Sea coast where winter breeding will occur during the forecast period. One group crossed the sea to the Saudi Arabian coast. Aerial control operations commenced in Algeria, Niger and Sudan. Control operations were also undertaken in Mauritania, Libya, Chad and Egypt. All efforts are required to monitor the situation and undertake the necessary control operations.

Western Region. Second generation breeding continued to cause locust numbers to increase in the northern Sahel of Mali, Niger and Chad during November. As vegetation dried out, hoppers and adults formed groups and a few hopper bands and small swarms. Small adult groups moved north into southeastern and western Libya, southern Tunisia, and Algeria. In Mauritania, locust infestations increased in the west and northwest due to breeding and the arrival of adults from the summer breeding areas in the south, causing hopper and adult groups to form as well as a few hopper bands. Aerial control operations commenced in Niger and Algeria, supplementing ground efforts. Ground control was also carried out in Chad and Mauritania. During the forecast period, more groups and swarms will form in the northern Sahel and move into Northwest Africa where breeding could occur if temperatures remain warm. Breeding will continue in northwest Mauritania, causing locusts to increase further.

Central Region. Hopper and adult groups, bands and swarms continued to form during November in the summer breeding areas in the interior of Sudan. Although ground and aerial control operations were undertaken, groups of adults moved north to southern Egypt while other groups and small swarms migrated to the winter breeding areas in northeast Sudan and on the Red Sea coast in southeast Egypt. At least one group crossed the Red Sea to the northern coastal plains in Saudi Arabia. During the forecast period, small to moderate scale breeding will cause locust numbers to increase along both sides of the Red Sea as hatching commences in December.

Eastern Region. Isolated adults persisted in a few places of the summer breeding areas in Rajasthan, India near the border with Pakistan. No significant developments are likely.

For more up to date information about the Desert Locust situation and forecasts, visit the FAO’s Desert Locust website:

Source: The FAO Desert Locust Bulletin issued monthly in English and French by the Desert Locust Information Service, AGP Division (Rome, Italy; and Arabic version by the Commission for Controlling the Desert Locust in the Central Region (FAO Regional Office for Near East, Cairo, Egypt http://crc-empres.org).
The Annual Regional Workshop for the Review of Draft International Standards for Phytosanitary Measures was convened in Cairo, Egypt during the period 9-13 September, 2012. The workshop was organized by the FAO Regional Office for the Near East (RNE) with support of the International Plant Protection Convention (IPPC). The objective of the workshop was to review the new draft standards approved by the Standard's Committee this year 2012, provide comments on reviewed standards and agreed upon regional comments that should be considered before the adoption of the draft standards by the Commission for Phytosanitary Measures (CPM). The workshop aimed as well at promoting discussion and information exchange between countries in the region on the current phytosanitary system of each country, national plant protection issues and challenges faced countries. Furthermore, the workshop intended to prioritize and identify the challenges and support needed to face the challenges of the countries of the region.

The meeting was attended by 24 participants representing 14 countries in addition to the Near East Plant protection Organization (NEPPO) Executive Secretary.

The new draft standards discussed were:

1. Draft Appendix 1 to ISPM 12:2011 Electronic certification, information on standard xml schemas and exchange mechanisms (2006-003)
2. Draft ISPM on Determination of host status of fruits and vegetables to fruit fly (Tephritidae) infestation (2006-031)
3. Draft ISPM on Establishment of fruit fly quarantine areas within a pest free area in the event of an outbreak (for inclusion as Annex 1 of ISPM 26) (2009-007)
The Regional Symposium on the Management of Fruit Flies in Near East Countries was organized jointly by FAO, FAO-IAEA, NEPPO, IOBC North Africa Commission, the DG Plant Protection in Tunisia and the Tunisian Association of Plant Protection (ATPP), from 6 to 8 November 2012. The symposium provided a common forum for researchers, phytosanitary regulatory, plant protection experts, fruit producers and crop protection industry to share their knowledge on fruit flies’ biology, phytosanitary measures, monitoring, management and identify gaps in knowledge, capacity building needed; and measures should be taken to prevent the introduction of new species into the Near East region; and to come up with a IPM fruit flies strategies to respond to the outbreaks in the region. The symposium was also a good occasion to share and benefit from the knowledge and information on the integrated management (IPM) of fruit flies in the Mediterranean region and different parts of the world. Around 100 participants took part in the symposium, coming from 23 countries in the Middle East, North Africa, Europe, Africa, and Asia. A field trip was organized to observe citrus production as well as the production of natural enemies of the pest in the Technical Centre of Citrus in Cap Bon-Tunisia.

The FAO Regional Office for the Near East in cooperation with the General Directorate of Plant Protection (GDPP) in the Ministry of Agriculture and Irrigation in Yemen convened a national technical seminar on monitoring and management of Tomato Borer (Tuta absoluta) in Sanaá, Yemen, on December 11, 2012. Around 75 specialists from the GDPP and Plant Protection Directorate in the regions, Agricultural Research Authority, Extension Service, farmers and other stakeholders participated in the seminar. The purpose of the seminar was to raise the awareness among the stakeholders about the new invasive pests and to strengthen the capacity of the specialists in early detection, monitoring and management measures. A number of traps with the pheromones were distributed to the farmers and technicians from different tomato growing areas for monitoring purpose.

**Short plant protection notes**

- Based on research and observation, exotic pathogens are said to be a safe and useful tool for weed control, especially in natural areas rich in valued non-target species. - J. Barton, Jane.Barton@ihug.co.nz
- Climate change is already being blamed for increasing multiple pest outbreaks in Manihot esculenta (cassava) across South-east Asia, according to a recent report. See: http://tinyurl.com/9p6t4rh
- Trial results for using entomopathogens in soil-less media in greenhouse and nursery production found that using peat moss, recycled plant material, or hardwood bark produced optimum impacts. - A.L. Nielsen, Nielsen@aesop.rutgers.edu
- Field appraisals and individual interviews conducted in western KENYA revealed that farmers viewed Striga hermonthica (witchweed) as a major constraint to cropping, but also rejected control methods as too risky with no guaranty of direct crop yield increase. - K. Itoh, KItoh@people.kobe-u.ac.jp
- The world’s main pesticide manufacturing/marketing firms “continue to invest in biopesticides,” according to a report in the 30 September 2012 issue of Crop Protection Monthly at www.crop-protection-monthly.co.uk
- A conceptual framework, based on a pesticide impact assessment plus a multi-question farm inquiry, was used as a dual approach to aid growers in achieving more sustainable crop protection. - H. Wustenberghs, Hilde.Wustenberghs@ilvo.vlaanderen.be
Scientists from Wageningen University in the Netherlands, together with its partners, have identified the genes for whitely resistance in a wild relative of cultivated tomato known as the Galápagos tomato. Whitely causes major damage to the plant and its fruit, and is an important vector of plant virus dissemination.

Scientists tested different seeds of crossable varieties of tomato from various gene banks and measured their resistance to whitely. The 30 varieties underwent whitely infestation and were observed for the number of eggs laid to them over five days. The said process revealed one crossable variety fully resistant to the whitely – a wild tomato from the Galápagos Islands. The scientists then identified two resistance genes in the wild tomato using DNA research.

With this discovery, a plant breeding company hopes to introduce these genes into cultivated tomatoes and bring a resistant tomato to market within two years.

See the original article at http://www.wur.nl/UK/newsagenda/news/gal%C3%A1p agostomato12092012.htm.

Trichomes in wild tomatoes were found to produce acyl compounds that could be used in fending-off insect attack. This finding was discovered by a team of scientists in Michigan State University led by Anthony Schilmiller and Robert Last. Genes that are involved in the acyl production were discovered and identified. The location of the trichomes and its accompanying secreted acyl compound becomes the first line of defense in insect attack.

Cultivated tomatoes no longer contain these trichomes, hence resistance to insects is lowered. The discovery which was published in the online edition of the Proceedings of the National Academy of Sciences describes the first gene that partipates in the production of the protective sugars in cultivated tomatoes. The gene is only active in one specific cell of one trichome type. This discovery and immediate transfer of the gene to cultivated tomatoes as well as other solaneous crops such as potatoes, peppers, eggplants and petunias would provide another strategy in fighting insects.

Full Article can be downloaded at http://news.msu.edu/story/new-gene-could-lead-to-better-bug-resistant-plants/
that all contribute to higher net profits to growers. -> NCIPM, LBS Bldg., IARI Campus, New Delhi 110 012, INDIA. www.ncipm.org.in. (IPMnet NEWS, November 2012).

4. The Bulletin of Insectology publishes "original articles, mainly on morphology, biology, behavior, and physiology of insects and other arthropods; control of insects, mites and other arthropod pests with particular reference to biocontrol and integrated pest management." Abstracts are freely accessible. www.bulletinofinsectology.org. (IPMnet NEWS, November 2012)

5. Crop protection-related U.S. Agricultural Research Service articles appearing in recent issues of Agricultural Research, at www.ars.usda.gov/is/pr/, in either html or pdf form, include:
- "Hormone Therapy for Fruit Flies Means Better Pest Control," 04 September 2012;
- "Researchers Use ‘Banker Plants’ to Help Battle Whitefly Pests," 10 September 2012;
- "Trapping Weevils and Saving Monarchs," 01 October 2012;
- "ARS Scientists Devising New Ways to Protect Avocados," 03 October 2012;

### CROP PROTECTION VIDEOS

Several U.S. land grant universities offer a selection of videos related to crop protection. The Integrated Pest and Crop Management program at the Univ. of Wisconsin lists six recent videos such as "Spider Mites in Soybean," and "Alfalfa Weevil Scouting in Alfalfa Fields," that can be freely accessed at www.ipcm.wisc.edu. Extension specialists at Purdue Univ. have also produced a number of videos including "Aspergillus Ear Rot, Identification and Scouting Tips," and another discussing options for growers in controlling the weed Chenopodium album (lambsquarters). These and other videos can be freely accessed at www.youtube.com/watch?v=YP9rLFtrtCM(IPM Net, November 2012).

### (ISPP) NEW JOB VACANCY, PLANT PATHOLOGIST (AFLATOXIN BIOCONTROL)

**Background:** The International Institute of Tropical Agriculture (IITA) invites applications for the position of a Plant Pathologist (Aflatoxin Biocontrol). Please visit http://www.iita.org/ for more information on IITA.

**Position/Responsibilities:** The primary responsibilities of the Plant Pathologist (Aflatoxin Biocontrol) is to: work with other team members for developing, testing and commercializing aflatoxin biocontrol products in maize and groundnuts for improving health and income of people in Southern Africa. The successful candidate will become a member of a team that is developing an Africa-wide aflatoxin biocontrol program (for more details see: www.aflasafe.com).

**Educational Qualifications:** The candidate must have a PhD degree in plant pathology or related field.

**Duty Station:** IITA-Zambia, Lusaka.

**General Information:** Initial appointment is for three years. IITA offers a competitive remuneration package paid in US dollars.

**Applications:** Applications including covering letter, curriculum vitae, names and addresses of three referees should be addressed to the Human Resources Manager. Please complete our online application form using this link: http://www.iita.org/irs-online-application

**Closing Date:** 3rd January 2013

### WORST FUNGUS AMONG US

The world’s Top 10 Fungal Pathogens, as nominated by fungal pathologists and compiled by R. Dean, et al, are, in order: (1) Magnaporthe oryzae; (2) Botrytis cinerea; (3) Puccinia spp.; (4) Fusarium graminearum; (5) Fusarium oxysporum; (6) Blumeria graminis; (7) Mycosphaerella graminicola; (8) Colletotrichum spp.; (9) Ustilago maydis; (10) Melampsora spp., with honorable mentions for fungi just missing out on the Top 10, including Phakopsora pachyrhizi and Rhizoctonia solani. The list was published in Molecular Plant Pathology, 13(4), 414-430, May 2012, at http://tinyurl.com/9s5rsz2. The listing includes a short resume of each ranked fungus as well as its importance (IPM Net, November 2012).

### PREVENTING AND MANAGING PESTICIDE RESISTANCE

The latest addition to the International Code of Conduct on the Distribution and Use of Pesticides promulgated by the FAO, is Guidelines on Prevention and Management of Pesticide Resistance, published in September 2012. Resistance (technical) is defined as "a genetic change in an organism in response to selection by pesticides, which may impair control in the field." Practically resistance may also be seen as "a heritable change in the sensitivity of a pest population that is reflected in the repeated failure (more than one instance) of a product to achieve the expected level of control." Several forms of resistance (metabolic, multiple, penetration) are defined and discussed. As expected from an FAO document, the resistance element referred to addresses the realm of agriculture and focuses on the problem associated with pesticides. The 57-page publication, freely available at http://tinyurl.com/9frwaxo, outlines resistance problems and their causes, and identifies the objectives and challenges associated with managing pesticide resistance (IPM Net, November 2012).
Arab Society for Plant Protection News

The Arab Society of Plant Protection (ASPP) became an affiliate member of IAPPS as of November 1, 2012. This membership will open avenues of interaction with similar societies at the international scene, which will prove beneficial to all plant protection scientists in the Arab countries.

The Arab Journal of Plant Protection will become available only online starting 2013.

Publications

New Books

Pests of Date Palm and Dates in Qatar and Control Methods

Author: Emad Hussain Al-Turaihi
Supervision: Yousef Khaled Al-Kulaifi
Price: Free
A new book on pests of date palm and dates in Qatar has been published by the Directorate General for Agricultural Research and Development, Ministry of Environment. The content of the book comprises seven chapters; the first one is a general introduction on the history of date palm in the Islamic and Arab countries. It also mentioned the most popular varieties which are currently cultivated in the world, in addition to that the area of plantation and the international production of dates. The second chapter mentioned the impact of environmental factors on the plantation of date palm and production of dates such as temperature, irrigation system, humidity, rainfalls, sunlight, salinity of water and soil. The third chapter mentioned the importance of date palm tree in Qatar. It also mentioned the area of plantation, local varieties, production of dates, number of palm trees and the traditional practices. The fourth chapter is a crucial chapter of the book which described in details the most important harmful insects and diseases of date palm and dates in Qatar such as red palm weevil, fruit stalk borer, long-horned stem borer, mealy bugs, scales, Dubas, Cicada, greater and lesser date moths. Besides that, it described the fungal and physiological diseases such as inflorescence rot, black scorch, Grapholia leaf spot, Diplodia disease, leaf spot, fruit rot, Albinism, fruit shrivel, checking phenomena, V-cuts and head bending. The fifth chapter described in brief the pests which are not yet recorded in Qatar. These pests are Bayoud,
brittle leaf, Al Wajam, lethal yellowing, Khapra beetle, and large palm moth. The sixth chapter gave general idea about the impact of agricultural practices on the infestation/development of insects/diseases of date palm such as using manure, fertilizers, inter-cropping, space of plantation, pruning, plowing, pollination...etc. The seventh chapter is the last one in the book which stated the integrated management of date palm pests by using tissue culture technique, plant extracts, pheromone traps, light traps, organic culture, mechanical control, microwaves, acoustic devices, biological agents, resistant varieties, plant quarantine and finally synthetic chemical pesticides. (The book contains 240 A4 pages with 158 color illustrations).

**Plant Resistance to Parasitic Nematodes**

Editors: J.L. Starr, R. Cook and J. Bridge
Translated By: Prof. Ahmed A. Dawabah
Price: 86 SR

A new book has been published recently by the General Directorate for Academic Publishing and Press, King Saud University, Riyadh, Saudi Arabia. The book is an Arabic translation by Professor Ahmed Abdel-Samie Dawabah for the book entitled "Plant Resistance to Parasitic Nematodes", which has been edited by: J.L. Starr, R. Cook, and J. Bridge, and published in 2002 by CABI Publishing. The book comprises 12 chapters plus a subject index and a terminology section. The first chapter is an introductory to the history, current use and future potential of plant resistance to parasitic nematodes. The second chapter explains the concepts and consequences of resistance. Chapters from 3 to 11 included brief information about the biology of the most important plant parasitic nematodes worldwide, in addition to the explanation of the definition, evaluation, and inheritance of plant resistance to parasitic nematodes in the economic crops. Besides, these chapters shed the light on how to incorporate resistance to nematodes in the economic crops either by the traditional breeding methods or by molecular techniques. Finally, chapter 12 discussed the marker assisted selection for soybean cyst nematodes. The book contains 378 A4 pages of the luxury paper with two color plates.
Isolation and identification of *Colletotrichum coccodes*, the causal pathogen of black dot disease on potato in Syria. 2012. Matar, M.


Reaction of some tomato imported hybrids and local genotypes to infection with *Tomato mosaic virus* and its molecular detection. 2012. Ismaeil, F., A.A. Haj Kasem and S. Al-Chaabi.


**Events of interest**

**2013**

* 20-23 January
  Southern African Society of Plant Pathology conference 2013 at ATKV Buffelspoort, near Hartebeespoordam, South Africa. Contact: SASPP Secretary Adel McLeod at e-mail: adelern@sun.ac.za

* 28 January-1 February
  12th International Plant Virus Epidemiology (IPVE) Symposium in Arusha, Tanzania. See: www.iita.org/IPVE.

* 18-22 February
  International Herbicide Resistance conference, Perth, Australia. Contact address: S. Powles, AHRI, School of Plant Biol., Univ. of Western Australia, 35 Stirling Hwy., Crawley, Perth 6009, WA, Australia. Email: Stephen.Powles@uwa.edu.au

* 21-25 April
  17th International Reinhardbrunn Symposium on Modern Fungicides and Antifungal Compounds in Friedrichroda, Germany. See: http://www.reinhardbrunn-symposium.de

* 22-26 April
  ISAA 2013 - 10th International Symposium on Adjuvants for Agrochemicals in Iguacu Falls, Brazil. See: http://events.isaa-online.org/.

* 26 April-3 May
  II International Symposium on Discovery and Development of Innovative Strategies for Postharvest Disease Management in Kusadasi, Izmir, Turkey. See: http://www.pdm2013.org

* 28 July–2 August
  International Organisation of Citrus Virologists Conference 2013 in Kruger National Park, South Africa. Contact: Gerhard Pietersen at e-mail; gerhard.pietersen@up.ac.za

* 25-30 August
  10th International Congress of Plant Pathology (ICPP2013), Beijing, China. Email: president@cspp.org.cn, http://www.icppbj2013.org/

* 03-06 September
  2nd International Symposium on Plum Pox Virus (continuation of Middle European Meetings on Plum Pox Virus) in Olomouc, Czech Republic. See: http://isppv2013.upol.cz

* 22-27 September 2013
  9th European Vertebrate Pest Management Conference. Turku, Finland. For more information please see: www.evpmc.org, or contact Otso Huitu Email: otso.huitu@melta.fi

* 24-27 November

**2014**

* 13-18 July
  Eight International Symposium on Chemical and Non-Chemical Soil and Substrate Disinfection. Torino, Italy. www.sd2014.org

* 27 July-1 August
  XIVth International Congress of Mycology, the XIVth International Congress of Bacteriology and Applied Microbiology and the XVIth International Congress of Virology in Montreal, Canada. See: http://www.montrealiums2014.org/; Contact: iums2014@nrc-cnrc.gc.ca

* 03-08 August
  10th International Mycological Congress (IMC10). Bangkok, Thailand. Contact: Leka Manoch; e-mail: agrlkm@ku.ac.th

* 09-13 August
  APS Annual Meeting in Minneapolis, Minnesota, USA. See: http://www.apsnet.org

* 17–24 August

**2015**

* 24–27 August
  XVIII IPPC (International Plant Protection Congress) in Berlin, Germany. See: http://www.ippc2015.de
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