

# **Fungal Diseases**

#### **F 1**

#### **GENETICALLY MODIFIED (GM) SOYA SEEDS CONTAMINATION ON THE ARMENIAN MARKET BY MOLDY FUNGI AND MYCOTOXINS.**

Omran Abbas Youssef<sup>1</sup>, Lia Livonevna Osipyan<sup>2</sup> and Karina Martinovna Grigoryan<sup>2</sup>. (1) Al-Qamishly, Himo Agriculture Research Center, GCASR, Syria, E-mail: omran\_y@hotmail.com; (2) Department of Botany, Faculty of Biology, YSU, Armenia.

Analysis of genetically modified soya seeds imported in the Republic of Armenia, indicated the presence of 11 species of fungal contaminants belonging to the genera *Aspergillus*, *Penicillium*, *Stemphylium* and *Fusarium*. The most specific diversity of contaminants has been exhibited in the samples from the USA and Canada (7 species) and from Spain (5 species). Mycotoxins were detected in 4 seed samples out of 12 studied with amounts exceeding the allowed concentration: aflatoxin B<sub>1</sub>- 15 µg/kg, zearalenon-2000 µg/kg. Similarly in 3 out 5 samples of soya flour imported from Spain, aflatoxin B<sub>1</sub> was detected at concentration of 20, 30 and 50 µg/kg, respectively and in one sample sterigmatosistin at 150 µg/kg

#### **F 2**

#### **FUNGI ASSOCIATED WITH ROT DISEASES OF INFLORESCENCE AND FRUIT OF DATE PALM IN RIYADH REGION, SAUDI ARABIA.**

Abdulaziz M. Al-Sharidi<sup>1</sup> and Ibrahim M. Al-Shahwan<sup>2</sup>. (1) Department of Extension and Agricultural Services, Ministry of Agriculture, Riyadh, Saudi Arabia; (2) Plant Protection Department, College of Agriculture, King Saud University, Riyadh, Saudi Arabia, E-mail: ishahwan@ksu.edu.sa

Diseased date palm inflorescence and fruit samples were collected during two consecutive growing seasons. *Mauginiella scattae* and *Thielaviopsis paradoxa* were isolated together from most diseased male and female inflorescence samples, while each fungus was isolated singly from other samples. It was noted that these inflorescence rots were abundant in the first season (1998) as a result of heavy rain falling during that season compared to the second season (1999 season). Only *Alternaria alternata* fungus was associated with date palm fruit rots during the two seasons (1997-1998). No fungal pathogen was isolated from the Maskanny cultivar fruit samples with speckled disease symptoms. This is the first report regarding the isolation of *T. paradoxa* and *A. alternata* from rotted inflorescences and fruits of date palm, in Riyadh Region, respectively.

### F 3

**MULTIVARIATE ANALYSES OF REGIONAL RISK OF CHOCOLATE SPOT DISEASE AND A BRIEF SUMMARY ON SOME OTHER DISEASES OF *Vicia faba* L. IN MOROCCO.** L. Mabsoute<sup>1</sup>, B. Sakr<sup>2</sup> and F. El Bouami<sup>3</sup>. (1) INRA Meknès, B.P. 578 Meknès 50000, Morocco, E-mail: mabsoutelahbib@caramail.com; (2) INRA Settât, Morocco; (3) Université My Ismaïl, Faculté des Sciences, Méknès 50000, Morocco.

Since 1988, several surveys were carried out to identify fungal diseases which affect faba bean production in Morocco. Results indicated that the severity level of chocolate spot was largely variable and the most common and destructive leaf disease of faba bean in the country. However, causes of these variations are unknown. Some hypotheses were advanced to explain variation in disease severity in relation to agro-ecological conditions, using multivariate analysis. This analysis is taking into account climatic conditions of several years and several variables, in the faba bean areas known to be highly affected with diseases.

### F 4

**FUNGI ASSOCIATED WITH KHAMEDJ DISEASE.** Abdellaziz Taxanna and L. Larous, Department of Biology, University of Sétif, 19000 Algeria, E-mail: a.taxanna@mail.com

The cultivation of date palm is facing many problems world-wide. Among the most important ones are fungal diseases, which cause serious damage to the plant and reduces its productivity. In Algeria, the khamedj disease comes in the second place after the Bayoud, due to the considerable losses it causes. The purpose of the present study was to isolate and identify fungi associated with Khamedj disease, using the appropriate methods. The identified pathogenic fungi are the following: *Mauginiella scaettae*, *Fusarium moniliforme*, *Fusarium solani*, *Memnoniella* sp., *Botrytis aclada*, *Trichothecium roseum* and *Acremonium strictum*.

### F 5

**GRAY MOLD OF STRAWBERRY *BOTRYTIS CINEREA* PERS.FR. AND ITS CONTROL.** Rasha Khalil<sup>1</sup>, Samir Kudsia<sup>2</sup> and Mohammed Abo Sha'r<sup>2</sup>. (1) General Commission for Scientific Agricultural Research, Syria, e-mail: elibcwan@scs-net.org; (2) Department of Plant Protection, Faculty of Agriculture, University of Aleppo, Aleppo, Syria.

Gray mold caused by the fungus *Botrytis cinerea* is one of the most important and dangerous fungal diseases on strawberry *Fragaria vesca* all over the world, whether it is grown in the open field or in greenhouses. This fungus significantly reduces crop yield up to 80-90% of flowers and fruits in the absence

of appropriate control, in addition to the losses due to the decay of infected fruits during storage. The development of gray mold under natural infection in greenhouses at Lattakia was studied. The integrated management options for the disease were evaluated. Results that will limit the spread of this disease which is a real threat to the strawberry crop along the Syrian Coast will be reported.

#### F 6

**RADIOMETRIC SPECTRAL REFLECTANCE AS A TOOL TO MONITOR ASCOCHYTA BLIGHT DEVELOPMENT IN CHICKPEA FIELDS.** Roula Shamsi<sup>1</sup>, Ahmed El-Ahmed<sup>1</sup>, Younis Idrees<sup>2</sup>, Rajinder Malhotra<sup>1</sup> and Siham Asaad<sup>1</sup>. (1) International Center for Agricultural Research in the Dry Areas (ICARDA), P.O. Box 5466, Aleppo, Syria; (2) General Organization of Remote Sensing (GORS), Damascus, Syria.

Chickpea is one of the most important cool season food legumes grown in West Asia and North Africa. The production of chickpea is seriously constrained by a devastating disease, Ascochyta blight, caused by *Ascochyta rabiei* (Pass) lab. Occasionally, severe epidemic occurs when the environmental conditions favor the spread of the disease, it causes heavy yield losses, or even crop failures. The present study was done to see whether radiometric spectral reflectance (RSR) could be used as a tool to monitor ascochyta blight development in chickpea. The material for the present study comprised five different artificially created inoculation levels. The RSR measurements were recorded during the incubation period (IP) before the development of the disease. Results revealed clear differences between the NIR (TM<sub>4</sub> channel 0.76-0.90  $\mu\text{m}$ ) as well as Normalized Difference Vegetative Index (NDVI) values for infected and non-infected plants. The NIR and NDVI values decreased at all inoculation concentrations ( $10^5$ ,  $10^4$ ,  $10^3$ ,  $10^2$  spores/ml and water as a check) starting from the first day after inoculation. There was a significant correlation between IP and TM<sub>4</sub> (0.89, 0.75, 0.88, 0.85 and 0.22) and NDVI values (0.99, 0.82, 0.75, 0.86 and 0.30), respectively. Whether a low or high inoculum levels were used to induce the disease, RSR was instrumental in detecting the disease. The present findings, therefore, may contribute to early detection of the disease and consequently lead to the development of more efficient control measures.

**F 7**

**A STUDY OF *PHOMA* SPP. PATHOGENIC ON FODDER FABACEAE: MORPHOLOGICAL CHARACTERISATION, ISOENZYMATIC AND MOLECULAR ANALYSIS AND HOST SPECIFICITY.** Nadra Boumediane, Institut National Agronomique, Departement de Botanique, El-harrach, Alger, Algeria.

Several fungal species of *Phoma* species cause important damage to fodder Fabaceae (alfalfa, pea, clover and vetch). Differentiation of these pathogens is very difficult and is matter of debate because of morphological similarity. Moreover, their host specificity is not yet well established. Attempts have been made to study inter- and intra-specific variability of *Phoma* strains by four characterisation methods: classical characterisation of conidia and chlamydospores, isozyme, RAPD analysis and host specificity. The results showed that the molecular characterisation with RAPD has a great potential to improve taxonomic knowledge of this fungi. At least one polyphagous *Phoma* species different from those described earlier on Fabaceae was detected. This fungus attacks Berseem and Vetch severely.

**F 8**

**REACTION OF THE DURUM RECOMBINANT INBREAD LINES (RIL) SW ALGER/GIDARA TO SEPTORIA LEAF BLOTCH (*SEPTORIA TRITICI*).** S. Asaad<sup>1</sup>, A. El-Ahmed<sup>2</sup> and M. Nachit<sup>1</sup>. (1) ICARDA, P.O. Box 5466, Aleppo, Syria, E-mail: S.Asaad@cgiar.org; (2) Faculty of Agriculture, Aleppo University, Aleppo, Syria.

*Septoria tritici* leaf blotch is considered a major disease problem of wheat worldwide, particularly in West Asia and North Africa countries. The objective of this study was to identify resistant lines in the Recombinant Inbred Line (RIL) cross SW Alger/ Gidara. During the 2000/01 season, 83 lines from the SW Alger/Grd cross were screened against *Septoria tritici* under controlled conditions. Ten-seeds/ entry was sown in two pots of 20- cm diameter (5 seeds/pot) containing a mixture of soil, sand and peat. Pots were placed in plastic house at 25±2 C<sup>0</sup> and watered regularly. At the 5-7-leave stage plants were artificially inoculated with a mixture of 5 different aggressive isolates of *Septoria tritici*, collected and isolated from infected durum wheat grown in Syria. Pots were then covered with polyethylene tent for 48 h. Inoculation was repeated twice with 7 days interval. The number of infected leaves/plant as well as density of pycnidia formation (PF) on the lesion, after three weeks of inoculation was used to evaluate the severity of infection. This was recorded by using a 0-3 rating scale, where 0= no PF, 1= scarce PF, 2= moderate PF, and 3 heavy PF. The plant reaction was accordingly considered as 0=HR, 0.1-0.5= R, 0.6-1.0=MR, 1.1-1.5= MS, 1.6-2.0=S and 2.1-

3.0= HS. Results revealed 10, 6 and 33 lines reacted as HR, R and MR, whereas 16, 14 and 4 lines reacted as MS, S and HS, respectively. Similarly, the number of infected leaves/plant was found 0, 0.5, 1.5, 2.2, 2.7, and 4.3, respectively. These results indicate the usefulness of SW Alger/Grd cross as a source of resistant gene (s) to *S. tritici*.

#### **F 9**

##### **MOST IMPORTANT DISEASES OF PEANUT ALONG THE COSTAL AREA OF SYRIA.** A. Khafate and S. Sary, A.C.O, Damascus, Syria.

Peanut (*Araechnis hypogaea*) is an important crop cultivated at present on over 365 ha in 2002 in Lattakia, Tartous, Hamah and Homs. Several diseases however were found to attack peanut and cause yield reduction of up to 60%. The major soil-borne diseases identified in this survey are stem rot (wilt mold) caused by *Selerotium rolfsii*, leaf spot (*Cercospora arachidicola*), rust (*Puccina arachidis*), other pathogenic fungi such as *Pythium* spp., *Verticillium* spp. and *Rhizopus* spp. were also detected.

#### **F 10**

##### **CONTROL OF PHYTOPHTHORA ROT AND CROWN ROOT ROT OF SWEET PEPPERS BY WATER-SOURCE AND IRRIGATION SCHEDULE PRACTICES.** Messaouda Benabdelkader and Abdelhadi Guéchi. Laboratory of Phytopathology and Microbiology, Faculty of Sciences, University Ferhat ABBAS, 19000, Setif, Algeria, E-mail: guechi.abdelhadi@caramail.com

A field study was carried out at Hamma-Bouzanem Constantine east of Algeria. The purpose of the experiment was to investigate the effect of the water source and irrigation schedule on controlling *Phytophthora infestans* root and crown rot of sweet peppers *Capsium annuum*. In naturally infested soil, the number of young infected plants decreased when the water source Hamma bit was used and irrigation every 14 days, reaching an incidence of 18 and 22.5%, respectively. When irrigation was applied every 7 days, incidence of young infected plants increased to 40.25 and 35.5%, with water source Hamma-river and irrigation schedule, respectively. The irrigation with river water polluted with pathogens for a long time (every 7 days) led to increased infection of stem bases. Control and reduction of disease severity was obtained by following an schedule every 14 days, and applying water from Hamma bit.

#### **F 11**

**PROLIFERATION AND CONTROL OF THE PEACOCK EYE DISEASE ON OLIVE LEAVES IN ALGERIA.** Abdelhadi Guéchi and Noureddine Rouag, Laboratory of Phytopathology and Microbiology Faculty of Sciences, University Ferhat ABBAS, 19000, Setif, Algeria, E-mail: guechi.abdelhadi@caramail.com

Olive peacock's eye disease caused by *Cycloconium oleaginum* Cast. is of major economic importance in some regions of Algeria. The infection rate varies from one site to another. It is very frequent in the province of Bejaia, Tizi-Ouzou, Sétif and Bouira and less frequent or rare in the provinces of Mascara, Oran and Relizane. Trials carried out under conditions of Sétif region with bordeaux mixture (1 per cent), copper oxychloride (0.3 per cent) and dithane (0.3 per cent) against *C. oleaginum* of olives. It was demonstrated that bordeaux mixture (1 per cent) gave the best control and better yield. In wet years, one spray in October 20<sup>th</sup> followed by one in December 29<sup>th</sup> gave the most efficient result while in dry years, only the first application was necessary.

#### **F 12**

**OCCURRENCE AND VIRULENCE OF WHEAT YELLOW RUST IN CENTRAL AND WESTERN ASIA.** Amor Yahyaoui and Munzer El-Naimi, ICARDA, P.O. Box 5466, Aleppo, Syria, E-mail: A.Yahyaoui@cgiar.org

Wheat yellow rust, caused by *Puccinia striiformis* west f.s.p. *tritici* is a major disease problem that affects wheat production in many countries in Central and Western Asia (CWA). Occurrence of yellow rust became more frequent in the last two decades and the disease caused great yield losses that reached up to 30% in Lebanon in 1994. High yield losses were also recorded in Turkey in 1991, Iran in 1993 and 1995, Yemen in 1988 and Azerbaijan in 1998. Wheat cultivars grown in CWA were resistant to the pathogen populations. Occurrence of new virulence types of *P. striiformis* f.s.p. *tritici*, and break down of resistance genes in many common cultivars were observed. Effective resistance genes were characterized and new sources of resistance were identified. Multi-location testing of yellow rust trap nurseries and germplasm pools has revealed the variability in yellow rust pathotypes and their distribution in CWA. The effectiveness/ineffectiveness of the resistance genes was determined at each testing site in CWA. Yellow rust physiologic races are annually analyzed in Syria. Studies of yellow rust population dynamics using DNA finger printing are being conducted in CWA. Knowledge of yellow rust population dynamics and its virulence types will enable researchers to better manage the resistance sources and the deployment of resistance genes.

### F 13

**ERYSIPHE CICHORACEARUM IS THE MAIN CAUSAL AGENT OF CUCURBIT POWDERY MILDEW IN EL-JABAL AL-AKHTAR REGION – LIBYA.** S.S. El-Ammari<sup>1</sup> and G. I. Fadiel<sup>2</sup>. (1) Department of Botany, Faculty of Science, University of Garyounis, Benghazi, Libya; (2) Department of Plant Protection, Faculty of Agriculture, Omar Al-Mokhtar University, El-Beida, Libya.

Based on conidial characters, (Presence or absence of fibrosin bodies and shape of germ tube) *Erysiphe\_cichoracearum* and *Sphaerotheca fuliginea* were identified as the caused agents of cucurbit powdery mildew in El-Jabal Al-Akhtar region. In four cultivated areas in the region, *S. fuliginea* was detected only in El-Arega area with 10% incidence on pumpkin and in El-Marg area with 20% incidence on indoor cucumbers, which representing is a very low incidence compared to *E. cichoracearum* which is considered the predominant powdery mildew causal agent on cucumber, squash, cantaloupe, pumpkin and snake cucumber in the region. Only watermelon was free of infection.

### F 14

**RICE FALSE SMUT DISEASE IN EGYPT.** M.M.M. Atia, Agric. Bot. and Plant Pathology Department, Faculty of Agriculture, Zagazig University, Zagazig, Egypt, E-Mail: usamaatia@yahoo.com

Rice is one of the most important cereal crop in Egypt and world-wide. Rice false smut (RFS) caused by *Ustilagoidea virens* (Cooke.) Tak, the imperfect stage of *Claviceps oryzae sativae* is an important disease wherever rice is cultivated. RFS is a new disease in Egypt, it was reported for the first time in the Nile Delta in 1997, and since then it appeared annually and its incidence was high during 2000 and 2001 growing seasons. The disease usually affects few grains (1-20) in each panicle. RFS was surveyed in the major rice producing area of Egypt, mainly in El-Dakahlia, El-Sharkia and El-Ismailia governorates during two successive growing seasons. The FS fungus was found to attack *Echinochoa crus-galli* a common rice weed, and *Imperata cylindrical*, a common weed of the irrigation cannal. The fungal pathogen was isolated and identified on rice flour yeast extract dextrose agar medium (RYDA) and on PDA medium. Losses caused by the RFS disease ranged from 1.01 to 10.91% according to disease incidence and no. of smutted balls. The disease also reduced the 1000-grain weight. Rice cvs. Giza 171 and Riho were the most infected, whereas cvs. Sakha 102 and 101 showed the lowest disease incidence. High disease incidence and no. of smutted balls was correlated with high N fertilization. Early transplanting (at the first of June), cultivation using transplanting method and cultivation in clay soil reduced the disease incidence. Spraying rice plants with Ridomil, Topsin and Cupper-oxychloride at 2.5 g/l at the beginning of booting stage significantly reduced the

disease severity. Further studies are needed to understand the viability of the fungus spores and sclerotia during winter, the variation between fungal isolates and its ability to produce mycotoxins and the effectiveness of using biocontrol agents.

#### **F 15**

**OCCURRENCE OF RICE KERNEL SMUT INCITED BY *TILLETIA BARCLAYANA* IN DAKAHLIA.** A.E.A Ismail, Plant Pathology Research Institute, Agricultural Research Center, Giza, Egypt.

Rice kernel smut incited by *Tilletia barclayana* was registered in some rice fields in El-beda village, Temi El-Amdid district, Dakahlia Governorate, Egypt, during the 1999 summer growing season on Giza 171 and Giza 178 rice cultivars. Rate of infection ranged from 2 to 7%, while the disease severity was high in Giza 171 and Giza 178 followed by Sakha 101, and Riho cultivar had the lowest rate of infection and disease severity. Total count of *T. barclayana* spores on one gram of rice seeds ranged from  $4 \times 10^5$  to  $15 \times 10^5$  spores/ gram seeds.

#### **F 16**

**CHARACTERIZATION AND MANAGEMENT OF MANGO SUDDEN DECLINE DISEASE IN OMAN.** A. Al-Adawi, M. Deadman, A. Al-Saadi, A. Al-Rawahi and Y. Al-Maqbali, College of Agricultural and Marine Sciences, Sultan Qaboos University, P.O. Box 34, AlKhod 123, Sultanate of Oman, E-Mail: Saad2000@squ.edu.om

During early 1999, a large number of mango trees started dying in the north of Muscat area in Oman. The disease was named sudden decline in recognition of the rapid death of the affected trees, especially grafted ones, and has become more prominent over the last three years threatening mango cultivation in Oman. The bark of the affected trunks and branches exude a gum that hardens with time. Other symptoms include vascular discoloration and wilting which often begins on one side of the tree and later covers the entire tree. The etiology of mango sudden decline disease in Oman was confirmed using Koch's postulates to be caused by *Diplodia theobromae* and *Ceratocystis fimbriata*. Results from this study clearly demonstrated for the first time in Oman that bark beetles (*Cryphalus scabrecollis*) transmit both pathogens to healthy mango trees. Moreover, removal of the bark directly underneath the bark beetle infestation hole, revealed discoloration caused by the growth of fungal mycelium. Using scanning electron microscope, beetles were found to carry spores of *C. fimbriata* on their bodies. Disease incidence and severity assessments revealed that nongrafted mango trees of Omani type were more susceptible to the disease than the grafted trees. Infection and disease development for the grafted group was found to be more in the rootstock, and normally no disease symptoms were observed in the scion. Bavistin, Carbendazim

and Topsin were most effective in suppressing mycelial growth of *D. theobromae* *in vitro* at 5 mg/kg.

#### **F 17**

**FUNGI ASSOCIATED WITH NEMATODES IN AGRICULTURAL SOIL IN SOME REGIONS OF LIBYA.** Salem M. R. Saud and Ezarug A. Edongali, Plant protection department, Faculty of Agriculture, El-Fateh University, P.O. Box 13274, Tripoli, Libya.

This study was conducted to evaluate the efficacy of fungi in association with nematodes in agricultural soil of Libya. Soil samples from different parts of coastal- western region including Zawia and some Tripolitanian areas, and southern and eastern-mid region (Mahroga and Augila) were collected and evaluated. Fungi were isolated from the soil using soil-sprinkling technique. The following fungi were isolated: *Gliocladium* sp., *Fusarium oxysporum*, *Fusarium solani*, *Oedocephalum* sp., *Trichoderma viride* and *Trichosporon* sp. The results indicated that the following fungi were found to inhibit root-knot nematode (*Meloidogyne incognita*) egg hatching: *Fusarium oxysporum*, *Fusarium solani* and *Trichoderma viride*. While *Oedocephalum* sp., *Gliocladium* sp. and *Trichoderma viride* were less effective. It was also found that these fungi colonized the egg sacs and the hatched second stage juveniles were weak. When 10000 eggs and second stage juveniles were added to tomato variety cv. ReoGrande (Susceptible to nematode) inoculated with isolates of *Fusarium oxysporum*, *Fusarium solani* and *Trichoderma viride* and local isolates of *Paecilomyces varotii*, the results indicated that a significant reduction in number of galls formed when *Fusarium solani* and *Trichoderma viride* were used, whereas, no significant results obtained when *Fusarium oxysporum* or *Paecilomyces varotii* were used. A spore suspension of these fungi added to soil with PDA (4 ml/2kg of soil) resulted in reduction of galls on ReoGrande tomato cultivar, and no galls were observed on tomato cultivar Falkato.

#### **F 18**

**TRANSGENIC TOBACCO CONTAINING THE MAIZE T-URF13 GENE AS A NOVEL HOST FOR THE MAIZE PATHOGEN *COCHLIOBOLUS HETEROSTROPHUS* RACE T.** Abdulkader A. El-Maleh, Omar Al-Mukhtar University, El-Beida, Libya.

Maize with Texas male-sterile cytoplasm (cms-T) is highly susceptible to the southern corn leaf blight disease caused by race T of the fungal pathogen *Cochliobolus heterostrophus* Race T produces a host-specific toxin, BmT-toxin, which binds to the T-*urf13* protein of cms-T maize mitochondria, creating pores in the inner mitochondrial membrane. The T-*urf14* protein is the product of a gene

unique to cms-T maize mitochondria, *T-urf13*. The aim of this research project was to investigate the interaction between transgenic tobacco plants containing the *T-urf13* gene and *C. heterostrophus* race T, and in particular to determine whether making tobacco sensitive to BmT-Toxin would cause it to become a novel host for this pathogen.

#### **F 19**

**SENSITIVITY OF SOME POTATO CULTIVARS TO LATE BLIGHT DISEASE, EFFECT OF NITROGEN FERTILIZATION AND ITS CHEMICAL CONTROL.** Mohamed M. Baraka<sup>1</sup>, Fauzi A. Bisheya<sup>2</sup>, S.M. Garew<sup>2</sup> and Azi-Deen N. Fahema<sup>3</sup>. (1) Faculty of Agriculture, Al-Fetah University, Tripoli, Libya; (2) Agriculture Research Center, Tripoli, Libya, E-mail: Bisheya@yahoo.com; (3) Agriculture Marketing Company, P.O. Box 2480, Tripoli, Libya.

Potato late blight is an important economic disease in libyan Jamahirya. Disease susceptibility of four highly productive potato cultivars: Oblex, Spunta, Concord, and Barka was studied in three locations in the western region of Great Jamahirya: Ben-Gasher, Jadedda, and Ain-Zara. Spunta and Concord were highly susceptible, Oblex was moderate, and Baraka, a late maturing variety, was resistant. Eight fertilizations rates of ammonium sulfate, from 50 kg until 350 kg/ha decreased late blight fungal infections and increased total and marketable production. Concord was highly susceptible in all fertilization rates compared to Lizeta and Ajax. Infection rate of Lizeta and Ajax was 30.47 and 34.63%, respectively. Lizeta had the lowest infection rate of 16.25 % at a fertilization rate of 150 kg/ha. This fertilization rate led to an increase of total production of 28.28, 29.48 and 22.32 ton/ha, and marketable production of 27.39, 27.30, and 19.84 ton/ha for Lizeta, Ajax, and Concord, respectively. Results of this study support the selection of less susceptible potato cultivar (Lizeta) to late blight. Fertilization rate of 150 kg/ha will increase total and marketable production and the use of specific fungicides will lower late blight infection. Galben was significantly better than the other fungicides, Previcur-N, Sandofan, and Ridomil MZ used, and all three fungicides were better than the control in lowering disease percentage for two seasons. This will help in designing a successful control program for the disease.

#### **F 20**

**SEED BORNE FUNGI OF SUNFLOWER AND THEIR PATHOGENICITY.** N.A. Ramadan and A.A.Mahmod, Biology Department, Science College, University of Mosul, Iraq.

Seed health testing on twenty two seed samples of ten cultivars of sunflowers (*Helianthus annuus* L. Dougl.) (Almo, Azur, Eurofloro, Flamme,

Hoggar, IPA, Oscar, Toridill, American cultivar and Local cultivar) for two years showed the occurrence of the following seed-borne fungi: *Alternaria alternata*, *Cladosporium* spp., *Fusarium* spp. *Macrophomina phaseolina* and *Rhizoctonia solani*. Isolation from plant debris mixed with sunflower seed samples yielded the presence of *Aspergillus flavus*, *Fusarium* spp. and *Rhizopus stolonifer*. Pathogenicity test of some isolated fungal isolates from seeds of cvs. Azur, Hoggar, IPA and Local cultivar showed that *R. solani* caused 57% seed decay in cv. Azur and 74% in cvs. Hoggar, IPA and Local, while *A. alternata* and *M. phaseolina* did not cause any increase in seed decay in all cultivars. The fungi *A. alternata* and *R. solani*, caused 20% increase in post-emergence damping-off in cv. IPA. The most resistant cultivar was Azur, whereas Hoggar was the most sensitive.

#### F 21

**HOST REACTION TO BLACK STEAM RUST IN WHEAT DURING LATE EPIPHYTIC FORM IN BAGHDAD AREA.** Mouhamed A. Al-Hamdany and Hassan A. Abas, Agriculture and Biological Researches Center, P.O. Box 765, Baghdad, Iraq, E-mail: itsd@uruklink.net

Host reaction of wheat cultivars to black stem rust incited by *Puccinia graminis* var *tritici* (Pers.) Erikss&E.Henn. was investigated during late epiphytic form in milky stage of late maturing wheat cultivars (1st week of May 2002) in Baghdad area where the early maturing cultivars successfully escaped infection. High susceptible reaction was observed on cultivars sally, Adnaniya, Saberbeg, Hamra, Tamoze3, IPA99, EL-IEZ, Babil and strain IR722. The cultivars AL-Qaied, AL-Noor, IPA95 and strain R24 showed susceptible to moderately susceptible reaction with 10-20% disease severity, affected by the early maturity of these cultivars. In spite of late maturity of Al-Hashimiya cultivar, resistant reaction was observed on the plants. The first symptom of black stem rust was developed on strain IR722. This strain however, is highly susceptible to both leaf and yellow rust and is always used as a spreader of inoculum in Tuwaitha Experimental station where this investigation was carried out.

#### F 22

**STUDY ON SEED ROT AND DAMPING OFF OF BEAN IN NINEWAH GOVERNORATE.** Nihal Younis Al-Murad<sup>1</sup> and Ali Kareem Al-Taae<sup>2</sup>. (1) Department of Biology, College of Science, University of Mosul, Iraq; (2) Department of Plant Protection, College of Agriculture and Forestry, University of Mosul, Iraq.

A survey carried out on bean fields in two areas in Ninewah Governorate showed that the incidence percentage of bean seedlings with post emergence

damping-off was between 40-49% in spring and 33-43% in autumn. The disease was found to be associated with the fungi *Macrophmina phaseolina* Tassi, *Fusarium solani* Mart and *Rhizoctonia solani* Kuhn. The isolated fungi were found highly pathogenic to the local variety leading to a high incidence of pre-emergence damping off. *R. solani* was highly pathogenic and caused 65% infection. Among the five bean varieties tested, Mosul 36 was the most resistant to the three fungi, with 33.5% infection, and the black bean variety was the most susceptible. The average damping off incidence was 79.5%. When the role of the different pathogens of seedling pre-emergence damping off was compared, it was evident that *R. solani* is the most important. When the reaction of different varieties to seedlings post emergence damping off was compared, Contender variety was the least susceptible and was not significantly different from black and red bean varieties. *M. phaseolina* was the most important pathogen causing seedling post-emergence damping off , with 34.4% incidence.

#### **F 23**

#### **LIGHT AND ELECTRON MICROSCOPIC STUDY OF THE LICHEN XANTHORIA PARIETINA INFECTING FRUIT TREES IN EGYPT. Ali M. Koriem, Efficient Productivity Institute, Zagazig University, Egypt.**

The lichen *Xanthoria parietina* is the most abundant lichen infecting fruit trees in Egypt. The anatomy of the lichen thallus showed a typical foliose lichen layers i.e. upper cortex, algal layer, medulla, lower cortex and rhizines. The rhizines were spreading over the cork tissues forming foot-like structure. No penetration was noticed except the loosely cork layer in the center point of contact. The fine structure including cellular and subcellular structures as well as the interaction between the symbionts were investigated by electronmicroscopy. Two layered cell wall, concentric bodies, one pore septum and intrahyphal-hypha were observed in the mycobiont hyphae. The ultrastructure of the phycobiont showed that *Trebouxia* cells had pyrenoids that contain electron dense globules (pyrenoglobuli). The interaction between the symbionts ranged between wall to wall contact to intramembranous haustorium. Intracellular haustoria were absent.