Host Resistance

R 1

SOURCES OF RESISTANCE TO CHICKPEA VASCULAR WILT. R. S. Malhotra, B. Bayaa, S. Kabbabeh and G. Khalaf, International Center for Agricultural Research in the Dry Areas (ICARDA), Aleppo P. O. Box 5466, Aleppo-Syria, E-Mail: B.Bayaa@cgiar.org

Vascular wilt, caused by *Fusarium oxysporum* f. sp. *ciceris* (Padwick) Matuo & Sato, is an important disease affecting chickpea in almost all chickpea-growing areas around the world, but is more important in the Indian subcontinent, Africa, and Latin America. Although healthy seeds, and crop rotations, help to control the disease, the best alternative is host-plant resistance. To screen chickpea for resistance to vascular wilt we have developed a wilt-sick plot at ICARDA and screened a large number of chickpea germplasm and elite lines. Out of of 1037 lines (605 improved lines from ICARDA; 28 and 349 germplasm lines from ICRISAT and ICARDA, respectively) screened during 1999 and 2003, a total of 110 (98 elite improved lines (Flip lines) developed at ICARDA, and 12 lines from ICRISAT), maintained their high level of resistance during the four years of testing. The resistant lines are from both desi and kabuli types. Most of these resistant lines have been shared with the national programs in chickpea-growing countries for further confirmation of their resistance under local conditions and for direct or indirect exploitation in breeding programs.

R 2

SOURCES OF RESISTANCE TO ASCOCHYTA BLIGHT AND CHOCOLATE SPOT IN A FABA BEAN CORE COLLECTION FROM NORTH AFRICAN COUNTRIES (ALGERIA, LIBYA, MOROCCO AND TUNISIA). Bassam Bayaa and M. Kabakebji, International Center for Agricultural Research in the Dry Areas, Aleppo P.O. Box 5466, Aleppo, Syria, E-mail: B.Bayaa@cgiar.org

Host plant resistance is the most efficient and environmentally friendly means to control foliar diseases affecting faba bean. A core collection of 129 faba bean lines collected from North African countries, Algeria, Libya, Morocco and Tunisia (obtained from ICARDA gene bank), were screened for resistance to Chocolate Spot (*Botrytis fabae* Sard.) and Ascochyta blight (*Ascochyta fabae* Speg.) during the period from 1999 to 2003. Evaluations were done using Syrian isolates of the causal organisms. The screening was carried out under artificial conditions in separate screen-houses at the ICARDA experimental station near Lattakia. Lines, which showed resistance in one year were re-screened for at least two more seasons under similar conditions. Thirty-two lines confirmed resistance to one, two or both diseases in at least two seasons. From the 32 lines selected, 21 were resistant to Chocolate Spot (ILB 918 from Algeria, ILB 135, -136, -138, -140,

-809, -1825, -2854, -3404, -4950, -4953, -5036 from Morocco, ILB 384, -398, -400, -403, -410, -919, -922, -1789 and -1874, from Tunisia); two (BPL 4180 from Morocco and ILB 384 from Tunisia) were resistant to Ascochyta Blight, and nine (ILB 386 and ILB 917 from Algeria, ILB 4338 from Libya, BPL 4103, 4164 and ILB 3394, -5034 and –5037 from Morocco, and ILB 926 from Tunisia) were resistant to both Ascochyta and Botrytis. It is hoped that these resistant sources will be useful for direct or indirect exploitation in a breeding program for improvement of faba bean as well as reducing dependency on chemicals and avoiding environmental pollution.

R 3

SEARCH FOR SOURCES OF RESISTANCE IN BARLEY AND WHEAT GENOTYPES AGAINST COMMON ROOT ROT DISEASE. Rana Naeb[1], Ahmed El- Ahmed[1], Amor Yahyaoui[2] and Miloudi Nachit[2]. (1) Department of Plant Protection, Faculty of Agriculture, Aleppo University, Aleppo, Syria; (2) International Center for Research in the Dry Areas (ICARDA), P.O. Box 5466, Aleppo, Syria.

A total of 156 genotypes of wheat and barley (40 genotypes from each of spring bread wheat, durum wheat, barley, and 36 of facultative bread wheat) were tested for their reaction against common root rot causal organisms *Bipolaris sorokiniana* (Sacc. in Sorok.) Shoem., *Fusarium culmorum* (W. G. Smith) Sacc. and a mixture of 30 pathogenic isolates of *Fusarium* spp., separately. The severity was determined on the sub-crown internode according to a 0-3 scale. Results showed significant differences between genotypes in their reaction to these pathogens tested. In general, *F. culmorum* and *B. sorokiniana* were more damaging than *Fusarium* spp., which were, in general, the least virulent. The facultative bread wheat group tested was the most resistant against each of the three causal organisms, compared to spring bread wheat, barley and durum wheat. This study confirmed the influence of common root rot disease on durum and bread wheat in northern Syria, and revealed a high susceptibility of durum wheat genotypes to *F. culmorum.* Also, it confirmed the importance of *B. sorokiniana* in the same region as a main pathogen on barley. Many varieties and lines of wheat and barley showed good resistance against the three pathogens tested.

R 4

TESTED OF SOME SPECIES OF TOMATO, EGG PLANT AND PEPPER TO INFECTION BY TWO SPECIES OF RKN *MELOIDOGYNE INCOGNITA* AND *M. JAVANICA*. Mohamed A. Mussa[1], M.E. Ehwaeti[1] and A. A. El-Maleh[2]. (1) Omar-Al-Mokhtar University, Faculty of Agriculture, Department of Plant Protection, P.O, Box 119, El-Beida, Libya; (2) Omar- Al-Mokhtar University, Faculty of Science, Department of Biology, P.O. Box 119, El-Beida, Libya.

Nine tomato cultivars, two eggplant and two pepper cultivars were tested for their reaction to two root knot nematodes species *M. incognita* and M. *javanica*. Results obtained indicated the tomato cultivar V.F.N.8 was immune to *M incognita* and highly resistant to *M. javanica,* and the other cultivars were susceptible to both species, with significant difference between the cultivars in the galling index. All eggplant cultivars were susceptible to the tested species. The pepper cultivar Pangal-1 was immune to both species and MC-12 was immune to *M. javanica* and highly resistant to *M. incognita.*

R 5

PRODUCTION OF INSECT RESISTANT POTATO BY AGROBACTERIUM MEDIATED TRANSFORMATION WITH CRY1AC GENE FROM *BACILLUS THURINGIENSIS*. A.J. Khan, A.M. Al-Saadi, A.M. Al-Subhi, and A.S. Al-Furqani, College of Agricultural and Marine Sciences, Sultan Qaboos University, P.O. Box 34, AlKhod 123, Sultanate of Oman, E-Mail: Saad2000@squ.edu.om

In Oman, potato cultivation has increased in recent years as consumer demand for potato products has risen. Tuber moth (*Phthorimaea operculella*) is a serious constraint to increase the potato production in Oman. The insecticidal proteins, (-endotoxins) are specifically lethal to Lepidopteran insects. An attempt is being made to transform a potato cultivar with *Bacillus thuringiensis* gene which codes for an insecticidal protein. In order to express endotoxin in transgenic potato, a cry1Ac coding sequences from *B. thuringiensis* has been constructed into Agrobacterium vector (pRD400) with double 35S AMV promoter suitable for dicot transformation using kanamycin resistance gene as marker. Transgenic callus of potato has been grown on modified MS medium containing 300 mg/L carbenicillin and 150 mg/L kanamycin. The integration of cry1Ac gene into potato genome has been verified by PCR amplification.

R 6

EFFECT OF TEN CERTIFICED AND LOCALLY DEVELOPED WHEAT VARIETIES ON THE BIOLOGY OF KHAPRA BEETLE *TROGODERMA GRANARIUM* EVERTS. Riyad A. Al-Iraqi[1] and Mohamad A. Mohamad[2] . (1) Department of Biology, College of Science, Mosul University, Iraq; (2) Department of Plant Protection, College of Agriculture and Forestry, Mosul University, Iraq.

Khapra beetle in Iraq is considered one of the most important pests which infest grains especially wheat and barely during storage causing a great loss in national income. The field survey in the stores showed that varieties differ in infestation rate by the beetle. Therefore, the present investigation aimed to study some biological activities of khapra beetle on ten locally developed wheat varieties and their relation to the susceptibility of these varieties to infestation by this beetle. The effect of grain type on the biology of the pest was also studied in addition to the varieties preference by the larvae for feeding and adults for egg laying.

R 7

A NEW SOURCE OF RESISTANCE FOR POWDERY MILDEW AND LEAF RUST IN BARLEY. Mouhamed Al – Hamdany, Jamal A. Sabar and Abdul–Kareem M. Taqi, Agricultural and Biological Researches Center, P.O. Box 765, Baghdad, Iraq, E-mail: itsd@uruklink.ent

A new and promising resistance source in barley against powdery mildew *Erysiphe graminis* f. sp. *hordei* and leaf rust *Puccinia hordei* was successfully selected under artificial epiphytotic conditions during many seasons. The resistance reaction of this source (H–7020) was close to immunity, as there were no symptoms produced on the plants neither at the seeding stage in the growth room nor at adult stage under field conditions. Recently, this source was used in crossing programs to study the inheritance nature of disease resistance and to develop barley lines with multiple disease resistance (powdery mildew, rust, covered smut and stripe diseases).

R 8

EVALUATION OF IRAQI FABA BEAN CULTIVARS FOR RESISTANCE TO ASCOCHYTA BLIGHT. M. El-Kamar, Faculty of Agriculture and Forestry, University of Mosul, Hamam El-Aleel, Mosul, Iraq.

A field study to evaluate the reaction of 17 Iraqi cultivars to *Ascochyta blight* was conducted at ICARDA main station during the 2001/2002 growing season, under artificial inoculation conditions. All cultivars were either susceptible or moderately susceptible to infection. Crosses of Iraqi germplasm with Ascochyta

resistant parents were made to develop new high yielding genotypes, resistant to *Ascochyta bligh*t and characterized by long pods and large seeds.

R 9

INDUCING RESISTANCE AND PROLONGING THE SHELF LIFE OF STRAWBERRIES BY FOLIAR APPLICATION OF CALCIUM SALTS.

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Pre-harvest spray with calcium sulfate (Ca So_4), calcium chloride (Ca Cl_2), calcium nitrate (Ca(No_3)2 and calcium silicate (Ca Sio_3) at 3, 5 and 10 g/L (except Ca SiO_3 was at 2 and 4 g/L) was applied on Strawberry cvs. Camarosa, Rosalinda, Shandler and Sequoia. The reduction in infection (%) by *B. cinerea* as well as the restriction of visual ratings of mold development (VRMD) due to calcium application occurred more clearly on cvs Camarosa and Shandler with greatest effect to Ca Cl_2 at the tested rates. Treatment with Ca Cl_2 and Ca SiO_3 to maintain quality fruit ripeness characteristics i.e., SSC (%), firmness (g/inch^2), vitamin C (VC), titratable acidity (TA) and colour density (CD), of both cultivars were achieved. Around two fold increase in flesh Ca content was obtained following a pre-harvest spray application of Ca Cl_2 at 5 g/L. However, similar increase in Ca content of Strawberries cell wall was obtained from pre-harvest application of Ca SiO_3 at 1, 2 and 4 g/L. Calcium chloride at 5 g/L prevented disintegration of fruit cell walls as indicated by preserving fruit cell structure of Strawberries (cv. Cameras).