9.5.12

PROMISING SOURCES OF BARLEY YELLOW DWARF VIRUS TOLERANCE FOR BREAD WHEAT. A. Comeau[1], P. Burnett[2], R. McKenzie[3], S. Haber[3], and C.A. St-Pierre[4].
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In an attempt to pyramid genes for tolerance to barley yellow dwarf (BYD), a series of hybrids were made in 1985-86 in Ste-Foy, Quebec. Sources of BYD tolerance included wheat lines from Brasil, Mexico (CIMMYT), and China. Severe barley yellow dwarf virus isolates, of PAV and RPV serotype, were used in Ste-Foy to eliminate the sensitive lines in F2 and F3. Selection was pursued for 2 years (4 cycles) in Mexico under artificial and natural BYD infection, with MAV and other serotypes of BYD. Advanced lines from this program were returned to Quebec in 1991. Further screening and evaluation was carried on in Quebec (1991) and then also in Manitoba in 1992. Some lines displayed an exceptional level of tolerance, confirmed under drier than average conditions in 1991 and under moist, cool conditions in 1992. We believe the above germplasm will be very useful in breeding programs, as many selected lines also resist other diseases besides BYD.

9.5.13

USE OF CONDUCTIVITY MEASUREMENTS TO ASSESS IN VITRO CULTURED ELM, FOR DUTCH ELM DISEASE RESISTANCE. C. Piquin, N. Dorion[1], C. Bigot and P. Neumann[2]. 1- Lab. de physiologie végétale, Ecole Nationale Supérieure d'Horticulture, RP 914, 78009 Versailles, France. 2- Dep. de Sciences Biologiques, Univ. de Montréal, succ. A, CP 6128, H3C 3J7 Montréal, Canada.

Somaclonal variability, protoplast fusions and genetic engineering, which provide useful alternatives for the selection of Elms resistant to Dutch Elm Disease (DED), are yet under studies. Simple and reliable methods to evaluate early DED resistance of elm plants from *in vitro* culture are therefore needed in order to decrease further plant manipulations (propagation, acclimation, plantations). Since it was shown that a DED toxin (Cerato-ulmin) induced differential ion leakage from leaves of susceptible or resistant elms, we tested the effect of pathogen filtrates (*Ophiostoma ulmi*) on electrolyte release of in vitro micropropagated elm leaves. Young leaves (≠ 25 mg of d.w.) were stripped, vacuum infiltrated (20 min) in fungal filtrate or in control medium, rinsed in distilled water and assessed for conductivity measurements. Data were recorded during 6 hours. A susceptible clone: *U. carpinifolia* (OcBa) and a more tolerant one: *U. pumila X japonica* ('Sapporo gold 2') were tested. OcBa leaves released significantly more electrolytes when treated with fungal filtrate. Those of 'Sapporo gold 2' did not show any difference. Works are in progress to confirm with a highly susceptible genotype (*U. americana*) the validity and reliability of this test.

9.5.14

MULTIPLE RESISTANCE TO ASCOCHYTA FABAE AND TO BOTRYTIS FABAE IN ADVANCED LINES OF VICIA FABA. M.T. Carvalho, M.J. Gonçalves, National Plant Breeding Station, 7351 Elvas Codex and J. Palminha, Instituto Superior de Agronomia, Tapada da Ajuda, 1399 Lisboa Codex, Portugal.

Ascochyta fabae and Botrytis fabae are the most important pathogens of faba bean (Vicia faba) in the South of Portugal, where they can cause severe yield losses. In order to obtain new cultivars with good adaptability, high yielding and a fair degree of resistance to ascochyta blight and chocolate spot diseases, twelve faba bean genotypes were evaluated under field conditions. Eleven of these genotypes were advanced lines from ICARDA faba bean breeding program to Mediterranean basin countries and the remaining one was a commercial variety.
The field screening nursery technique adopted to select resistant lines comprised: a) susceptible faba bean plants grown at regular interval as a control; b) artificial inoculation of the nursery with different conidia suspensions ($3x10^5$ spores. ml^{-1} for A. fabae and $4-5x10^5$ spores. ml^{-1} for B. fabae) prepared from laboratory cultures grown in a faba bean dextrose agar medium; c) sprinkling irrigation and covering the inoculated plants with polyethylene sheets to provide adequate humidity; d) symptoms expression assessed after the plants achieved the pod stage, with a 1-9 scale (1-no lesions; 9-death of the great majority of plants).
Seven faba bean lines (Rebaya 40, B 8815, B 8822, B 88111, B 88158, B 88275, B 88248) were found to be resistant to A. fabae and to B. fabae.

9.5.15

55426

EVALUATION OF EMMER WHEAT (*TRITICUM DICOCCON*) FOR RESISTANCE TO *SEPTORIA TRITICI*. L.I. Gilchrist, B. Skovmand.
CIMMYT, Int., Wheat Program. Mexico, D.F. Mexico.

Head selections (2619) from 325 *Triticum dicoccon* Schrank accessions in the CIMMYT wheat collection were evaluated for their reaction to *Septoria tritici* in Toluca (Mexican Highlands), during 1992. The *S. tritici* isolate used was originally selected under controlled conditions by inoculating 10 durum cultivars with a virulent isolate. This isolate was then used to inoculate susceptible emmer wheats, and re-isolated. This isolate was increased in a yeast sucrose liquid medium. Field inoculations were done weekly for three weeks, starting at the tillering stage, with a 10^9 spore concentration using an ultra-low volume sprayer. Thirty four percent of the selections were highly susceptible to either stripe rust (*Puccinia striiformis*) or leaf rust (*P. recondita*) and were eliminated. Eleven percent of the selections were moderately to highly susceptible to *S. tritici*, 24% were extremely resistant to septoria but moderately to very resistant to both rusts. 31% were highly resistant to septoria and seemingly immune to both rusts. These emmer wheat accessions can be considered valuable for both bread and durum wheat improvement, and may well represent untapped sources of resistance.

9.5.16

RECURRENT SELECTION FOR RICE POLYGENIC RESISTANCE TO MAGNAPORTHE GRISEA IN IVORY COAST. M. Vales, CIRAD/CA-IDESSA, Bouake, Ivory Coast.

A recurrent breeding program has been initiated in Ivory Coast in 1989. The CNA-IRAT 5 rice population was obtained by cross hybridization of 28 upland cultivars, using a recessive male sterile gene. The virulent isolate of Magnaporthe grisea CI 69, was used to evaluate the resistance by inoculation in the greenhouse and in the field. Plants with complete resistance, probably race specific and monogenic, were discarded to allow to breed for partial resistance. Three different recurrent schemes are carried on. They differ by the resistance test and the selection method. The resistance test is made on leaves in the greenhouse, or on leaves and panicles in the field. The screening is made on individual plants or on S1 progeny issued from a single plant. After one selection cycle, the resistance level was increased by the three methods. Promising lines obtained are now evaluated for their agronomic qualities.

55427

9.5.17

FIELD TESTING FOR RESISTANCE TO SNOW ROT (CAUSED BY *Typhula incarnata*) IN THE UK. T.W. Hollins, M.J. Boddy. Plant Breeding International, Maris Lane, Trumpington, Cambridge CB2 2LQ, UK.

55427

Disease incidence varies between years and can be seen as death of isolated plants, scattered patches in a field or larger areas. *Typhula incarnata* is regarded as the causal agent in barley but *Fusarium nivale* is sometimes also found. Damage can occasionally be severe enough, principally in northern Britain, to cause farmers to resow the crop.
As the occurrence of the disease is unpredictable, being governed by the weather, host resistance could play an important role in disease control. An artificial field test is therefore being devised to enable resistant genotypes to be developed.
Micro-plots of winter barley varieties were established on an area artificially infested with sclerotia of *T. incarnata* in October and December. Snow cover was simulated from early January by covering plots with 100mm of fibreglass insulation held in place with polythene or with polythene alone. The covering was removed after various periods of time and resistance assessed by estimating damage and plant survival.
Preliminary evidence suggests that differences between varieties could be seen after four or six weeks covering. The variety Masto was significantly less affected than Halcyon, Magie, Pipkin and Torrent.