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molecular level by RAPD. Out of 50 RAPD primers, 38 primers were selected to generate polymorphic DNA fragment. Total 407 alleles were identified, 309 of which were polymorphic. The ratio of polymorphism was 75.9%, with 2-14 alleles per primer and averaged 8.1. Ratio of polymorphic bands in wild soybeans (94.35%) was higher than cultivars (87.47%) and landrace (83.54%). Shannon-Weaver indices changed from 0.5865 to 4.2133 and averaged 2.3380. The average Shannon-Weaver index in wild soybeans (2.2336) was higher than in cultivars (1.7331) and landrace (1.6198). Genetic similarity ranged from 0.44 to 0.92, with a mean of 0.75. Genetic similarity in wild soybeans (0.6498) was less than in landrace (0.7015) and in cultivars (0.7177). It was 0.6599 between cultivars and landrace, 0.6498 between cultivars and wild soybeans and 0.7015 between landrace and wild soybeans respectively. The UPGMA result showed that 40 materials can be divided into six groups. Cultivars and landraces were divided into 2 different genera respectively and wild soybeans were divided into 4 different genera. It indicated that wild soybeans had broad genetic background and great variety, which can provide excellent germplasms for soybean practical breeding. The number of specific alleles in wild soybeans was more than the total of them in cultivars and landrace. It also showed that cultivated and wild soybeans have significant differences from DNA level, so wild soybean should be a separate variety.

Keywords cultivars, wild RAPD, genetic diversity

X P031. Embrapa soybean breeding program in Rio Grande Do Sul, Brazil

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Brazil is nowadays the second world soybean producer with a production of 60 million tons of grains. The state of Rio Grande do Sul (RS), in the extreme south of Brazil, has a production of 9 million tons and is the third Brazilian producer, with no-tillage as its main strategy of soil management. The main crop rotation is maize which is planted every two to four years and it is planted after the winter crops, mainly oat and wheat. The average latitude for the production area is 28° South. The predominant soybean maturity groups are 6.0 and 7.0 and sometimes 8.0. Nowadays, due to soybean rust threat, early soybean cultivars are being used (group 5.0), even though they present higher risk loss due to water deficit. Embrapa (Brazilian Agricultural Research Corporation) Passo Fundo – RS unit has the objective of genetic improvement of soybean aiming to develop cultivars for soybean growing regions of the state. Selections have been made to search for new high yielding cultivars and resistant to important diseases, like: phytophthora root and stem rot (*Phytophthora sojae*), stem canker (*Diaporthe phaseolorum* var. *meridionalis*), brown stem rot (*Cadophora gregata*), soybean rust (*Phakopsora pachyrhizi*), root-knot nematode (*Meloidogyne javanica*), bacterial pustule (*Xanthomonas anoxopodis* pv. *glycines*) and frog-eye leaf spot (*Cercospora sojina*). During the last 32 years, Embrapa has released 27 conventional cultivars, and 7 transgenic glyphosate resistant, which occupied 5 to 70% of the area, depending on the year.

Keywords *Glycine max*, breeding, cultivars

P032. Genetic improvement of soybean by modern breeding strategies in region of the Eastern Croatia

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The genetic improvement of soybean cultivars considerably contributes to advances in production and food processing industry by developing

high-yielding and high-quality cultivars. In this study, agronomic performance of new developed soybean elite lines and standards were compared in order to evaluate the achieved genetic advance. The researches were conducted at the experimental field of the Agricultural Institute Osijek (Croatia) from 2005 to 2008 year. Experimental material consisted of 135 genotypes, as follows: 18, 52, 65 genotypes into maturity group 00, 0 and I, respectively. Tested elite lines were developed by different crossing within the Institute's soybean breeding program. Standards were Institute's released cultivars that have grown in commercial production in Croatia. Biometrical analysis indicated on realized genetic advance in grain yield, as well as, protein and oil content in seed of domestic soybean germplasm. Additionally, many tested elite lines had good stability in quantity and quality of grain, wide-general adaptability and high tolerance to major pathogens affecting soybean production in our country. Likewise, analysis of triacylglycerols (TAGs) showed that in oil of the best elite lines were LLL (19.5%), LLO (17.3%), LLP (13.8%) and LOP (12.5%), having the desired fatty acid profile. Achieved genetic advance in soybean considerably will contribute to further improving and increasing soybean production as well as production of safe product high functional value for consumers. Further genetic improvement of soybean will be based on the modern breeding strategies including combination of conventional breeding methods and recent chemical, biochemical, fitopathological and molecular analyses.

Keywords improvement, grain yield, grain quality, breeding strategies

P033. Mutagenic effectiveness and efficiency of gamma rays, EMS, and HA in soybean [*Glycine max* (L) Merr.]

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Two soybean cultivars viz. PK-472 and JS-335 were treated with 10, 20, and 30 kR gamma rays and 0.1, 0.2 and 0.3 percent ethylmethane sulphonate and hydroxylamine concentrations. The treated seeds were compared with dry and soaked control in M₁ generation. The higher doses and / or concentrations exhibited drastic reduction in germination, pollen fertility and survival percentage. However the magnitude of reduction was very less in M₃ as compared to M₂ and M₁ generation. The various chlorophyll mutations isolated during M₂ generation in present study include albina, xantha, viridis, xanthaviridis and chlorine in both cultivars. Maximum chlorophyll mutations were observed in cv. JS-335 as compared to cv. PK-472. The frequency based on M₁ family and M₂ plant basis observed in order of EMS > gamma rays > HA. A wide spectrum of mutations was recorded in different treatments. Ethylmethane sulphonate recorded maximum macro mutations as compared to hydroxylamine and gamma rays while cultivar PK-472 observed maximum macro mutations than cv. JS-335. Medium dose of ethylmethane sulphonate (0.2%) and lower dose of hydroxylamine (0.1%) was found more effective whereas in gamma rays no dose dependant effectiveness was observed. The mutagenic effectiveness was in order of EMS > HA > gamma rays while mutagenic efficiency based on lethality, seedling growth reduction and pollen sterility basis was observed in order of HA > EMS > gamma rays.

Keywords effectiveness, efficiency, gamma rays, EMS, HA

P034. Recco: national network for the evaluation of soybean cultivars in Argentina

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The National Agricultural Technology Institute (INTA) of Argentina, coordinates the National Network for the Evaluation of Soybean