Registration of J87-233 Soybean Germplasm with Resistance to Soybean Cyst Nematode Races 1, 2, 3, and 5

J87-233 soybean [Glycine max (L.) Merr.] line (Reg. No. GP-152, PI 562611) was developed by the USDA-ARS and released in 1992 because it has a high level of resistance to soybean cyst nematode (SCN), Heterodera glycines Ichinohe, Races 1, 2, 3, and 5, and has moderate resistance (4) to Race 14. J87-233 is also resistant to root-knot nematode, Meloidogyne incognita (Kofoid & White) Chitwood.

J87-233 was derived from an F2 plant selection composited in the F2 from the cross ‘Bedford’ (2)/D79-5353/D79-5353/PI 90763. D79-5353 is a selection from J74-77/D72-8927. J74-77 is of the same parentage as Bedford and has the same resistance to SCN Races 3 and 14 as Bedford (derived from PI 88788). D72-8927 was developed from the cross D66-12392/‘Hill’*2 (3)/PI 90763. PI 90763 provided resistance to SCN Races 1, 2 and 5. D66-12392 was a selection from D63-6100/‘Dyer’ (1). D63-6100 was a selection from Hill*4/PI 171442. Progenies of D79-5353/PI 90763 were screened in the F3 generation for resistance to SCN Race 2, and resistant plants were transplanted to the field. The resistant plants were crossed to a Race 5-resistant selection from Bedford/D79-5353. Progenies of these crosses were screened in the F4 generation for Race 2 resistance and in later generations for reaction to other SCN races and M. incognita.

J87-233 is of Maturity Group V, maturing 7 d earlier than Bedford. Plants have a determinate growth habit, tawny pubescence, tan pod walls at maturity, and purple flowers. Seeds are yellow with black hila. Seed yield is similar to that of Bedford in the absence of SCN.

A sample of 50 seeds will be available for research purposes from the author.

References and Notes

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Registration of Five Sugarcane Borer Resistant Sugarcane Germplasm Clones

Five sugarcane germplasm clones trispecific hybrids of Saccharum spontaneum L., S. officinarum L., and S. barberi-Jeswiet), US 90-18 (Reg. no. GP-4, PI 562574), US 90-21 (Reg. no. GP-5, PI 562755), US 90-24 (Reg. no. GP-6, PI 562576), US 90-26 (Reg. no. GP-7, PI 562578) and US 90-27 (Reg. no. GP-8, PI 562570) were developed by the USDA-ARS, Houma, LA, and Canal Point, FL, and released in 1992 as resistant to the sugarcane borer (Diatraea saccharalis F.). Sugarcane is a complex polyploid and one of the few crops with clones consisting of aneuploids developed as tri- and quadra specific hybrids. Given this interspecific complexity of the sugarcane genome, the large number of chromosomes (2n = 106 to 116), the absence of genetic markers, and the fact that most of the economically important characters of sugarcane (including insect resistance) are quantitative in nature, the applicability of simple Mendelian inheritance is limited. Further, there are as yet no reliable methods for sugarcane of determining how many of these polygenes segregate in the inheritance of insect resistance to the sugarcane borer; however, it does appear that resistance is inherited additively. These germplasm clones provide plant breeders with material expressing greater resistance to the sugarcane borer (while maintaining an acceptable yield and plant form).

Germplasm clones were identified in progeny of biparental crosses made at Canal Point, and selected over a 5-yr. period at Houma, (Table 1). Parental lines were of near-commercial type, but were not released as cultivars. Selection began with evaluation of spaced single-stool seedlings established in the spring of 1987. Seedlings were intercrossed with corn (Zea mays L.), which was artificially infested with sugarcane borer larvae and served as an inoculated host, thus creating sufficient insect pressure to allow selection (2). Seedlings were considered resistant when visual inspection detected little borer damage: i.e., absence of broken stalks and absence of the premature germination of lateral buds (1). Seedlings selected as resistant were clonally propagated in 1988 in unreplicated 1.8-m plots for additional evaluation (3). Sufficient borer pressure was again achieved by intercrossing each plant with infested corn; clones continuing to express resistance to the sugarcane borer were identified by visual inspection of plots. Final testing was conducted in the plant-cane crop (artificial infestation) and first-stubble crop (natural infestation) on a group of 46 clonal selections in single-row, 1.8-m plots with four replications. Damage by the sugarcane borer was determined by percent damaged internodes and visual damage ratings. Damage ratings were based on a scale of 1 to 9, where a rating of 1 indicates little damage and 9 indicates extensive damage.

Ward’s minimum-variance cluster analysis (SAS PROC CLUSTER) was used to assign germplasm clones to one of four discrete groups (4). Percent damaged internodes and damage rating data from both the plant-cane and first-stubble crops were included in the cluster analysis. All germplasm clones were assigned to Cluster Groups 1 or 2 (Table 1). Means for mean % damaged internodes and damage ratings, both in plant-cane and first-stubble crops, of Cluster Groups 1 and 2 were less than the means for all clones tested for plant-cane % damaged internodes (4.3%) and damage ratings (2.9) and first-stubble % damaged internodes (8.2%) and damage ratings (3.5). Cluster Group 1, containing the germplasm clones US 90-18, US 90-24, and US 90-27, sustained an average of 2.6% damaged internodes and an average damage rating of 1.8 in the plant-cane crop. In the second-stubble crop, Cluster Group 1 averaged 3.2% damaged internodes and a damage rating of 2.3. The germplasm clones US 90-21 and US 90-26 were assigned to Cluster Group 2; a group averaging 2.6% damaged internodes and an average damage rating of 2.5 in the plant-cane crop and 7.0% damaged internodes and a damage rating of 2.9 in the first-stubble crop. Both Cluster Group 1 and 2 expressed higher levels of resistance to sugarcane borer than Cluster Group 3. Cluster Group 3 contained the resistant standard ‘CP 70-521’.

All five germplasm clones exceeded the commercial standards in number of mature stalks at harvest (9 mon.). All germplasm clones, with the exception of US 90-24, were comparable to the commercial standards in commercially recoverable sugar (CRS, kg ha-1). US 90-18 and US 90-21 produced somewhat lower cane yields (Mg ha-1) than the commercial standards, while US 90-21 produced the lowest yield of sugar (kg ha-1). US 90-18 has moderate fiber content (12.8%), which...