REGISTRATION OF BSP2C1 POPCORN (MAIZE) GERMPLASM

BSP2C1 is a popcorn (Zea mays L.) breeding population (Reg. no. GP-207, PI 533603) released by the Iowa Agriculture and Home Economics Experiment Station, Ames, in 1988. Distribution of 500-seed samples is by the Committee for Agricultural Development, Department of Agronomy, Iowa State University, Ames, IA 50011.

BSP2C1 was developed to provide a source of large-expansion popcorn inbred lines to cross with inbred lines derived from dent corn × popcorn germplasm. A resurgence of the use of dent corn germplasm to improve the agronomic traits of popcorn has occurred. A loss in popping volume is inherent in dent corn × popcorn crosses (2). Lines with good agronomic traits, however, that have acceptable, although smaller popping expansions, can be recovered by backcrossing. Lines from BSP2C1 with large popping expansion should combine well with agronomically good lines derived from dent × popcorn germplasm to produce popcorn hybrids improved for both types of traits. Popping expansion volumes of inbred lines give a fairly reliable indication of their general performance in hybrid combinations (1).

In 1983, four popcorn hybrids, A3004, 33122, P203, and 62180 were inbred and selfed to information on hybrid performance. The A3004 is a private hybrid from Ames Seed Farms, P203 is a released hybrid from Purdue, and 33122 and 62180 are Purdue experimental hybrids. Both A3004 and 33122 were chosen for their large popping expansion, 62180 for its excellent stalk strength, and P203 because its pedigree includes inbred parents of the other hybrids.

In 1984, the component hybrids from the diallel crosses were intermated by making the following four-way crosses and reciprocals among the hybrids: (A3004 × 33122) × (62180 × P203), (33122 × P203) × (A3004 × 62180), (62180 × A3004) × (P203 × 33122), and (P203 × 33122) × A3004. For the 1984–85 winter nursery, equal numbers of kernels were taken from each of each cross 10 ears from each reciprocal cross and bulked. The bulk was planted, and 158 selfpollinated ears were produced.

In 1985, the 158 S1 lines were planted ear-to-row, and data were collected on 17 agronomic traits and four popping traits. With major emphasis on popping expansion, 30 S1 lines were selected and intermated in 1986 by utilizing a partial diallel mating scheme. This partial diallel mating scheme also made it possible to select within S1 lines based on popping expansion. This resulted in 125 ears being selected with 1 to 9 ears from each of the 30 original lines. Four kernels from each ear were bulked, planted in 1987, and seed was increased by making approximately 300 plant-to-plant pollinations. An equal number of kernels from each of the 300 ears was bulked to obtain seed for distribution. In 1985, the 30 selected lines averaged 33 cc g–1 popping expansion, whereas the hybrid checks, lopop 12 and A3004, averaged 35 and 38 cc g–1, respectively. However, 48 ears selfpollinated on S1 plants averaged 37, with a range of 27 to 43 cc g–1 for individual-ear popping data. These included one or two random ears from each of the 30 original lines. The 125 ears selected in 1986 averaged 31 cc g–1, whereas lopop 12 and A3004 averaged 25 and 31, respectively. The causes of the low popping expansions in 1985 and 1986 are not known; however, the relative rank of each check hybrid remained constant each year.

Selfpollinated ears from the population were evaluated for popping expansion in 1987. These 285 ears averaged 42 cc g–1, with a range of 20 to 53 cc g–1. Popping expansions for hybrid checks were: lopop 12 = 40, A3004 = 45, M140 = 46, and Rob 30-71 = 48 cc g–1. Of the 285 ears, 23 had popping expansions above 48 cc g–1. This indicates that BSP2C1 can be a source of inbred lines with large popping expansion.

European corn borer (Ostrinia nubilalis Hübner) (ECB) data also were collected in 1987 on the performance of the population per se. The population per se averaged a rating of 2 for first-generation ECB resistance and a 4 for second-generation resistance on a scale of 1 to 9 where 1 is resistant and 9 is susceptible. Dent corn standard checks for the first-generation ECB nursery were PI 5310A (Resistant = 5), and PI 5311B (Susceptible = 8). Standard checks for the second-generation nursery were dent inbreds B52 = 2-resistant and W182E = 9-susceptible. It seems that, along with large popping expansion, the population also carries fair resistance to both generations of the ECB.

The population is cross sterile (Gal-S Gal-S) and under

References and Notes


8. J. SCHULTZ-SCHAEFFER (7).

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