

REGISTRATION OF PARENTAL LINES

Registration of B107, B108, and B109 Inbred Lines of Maize

Inbreds B107 (Reg. no. PL-292, PI 597925), B108 (Reg. no. PL-293, PI 597926), and B109 (Reg. no. PL-294, PI 597927) are yellow dent maize (*Zea mays* L.) lines developed cooperatively by the Iowa Agriculture and Home Economics Experiment Station and the USDA-ARS. The lines were released 11 Apr. 1997 because of their potential value as sources of germplasm in pedigree-selection breeding programs.

B107 was derived from Pool 41 (Northern Temperate Region) developed by the International Maize and Wheat Improvement Center (CIMMYT) (1,2). B107 (CIMMYT POOL 41-C15-19-1-1-1-1-2-1-1) was identified in a cooperative trial with CIMMYT conducted at Ames, IA, in 1986. Above-average entries for grain yield, root and stalk strength, and first-generation European corn borer (*Ostrinia nubilalis* Hübner) resistance were advanced ear-to-row in the breeding nursery by self pollination and were included in the A632 topcross nursery. Based on testcross performance, the line was included in the crossing nursery to produce single-cross seed with A632, A681, B87, B100, N196, and W570. B107 had consistent performance in single-cross trials conducted at five locations in 1994, 1995, and 1996. Grain yield of single crosses that included B107 as one parent exceeded the experiment mean and was similar to the commercial checks. Grain moisture of B107 at harvest (196 g kg^{-1}) was similar to the grain moisture of the commercial checks (200 g kg^{-1}), but average root lodging was 2.6% less and stalk lodging was 4.0% greater for B107 than for the commercial checks. B107 had similar performance in crosses with lines from both heterotic groups.

B107 has flowering dates similar to A632, A681, and B100. Pollen production is good, and silk emergence coincides with pollen shed. Plant and ear height are similar to A632 and A681. Ears have 10 to 12 rows of yellow, flinty kernels on red cobs. Grain yield of B107 (in quintals: 33.8 q ha^{-1}) itself is similar to A681 (39.0 q ha^{-1}) and B100 (34.4 q ha^{-1}). B107 has average root and stalk strength, and average resistance to first-generation European corn borer, gray leaf spot (caused by *Cercospora zeae-maydis* Tehon & Daniels), and common corn rust (caused by *Puccinia sorghi* Schw.). Maturity classification is AES 500-600.

B108 was developed from Pool 41 (Northern Temperate Region) developed by CIMMYT (1,2). B108 [CIMMYT POOL 41 (IA)-C15-55-1-1-1-1-1-1-1] was identified as one of the superior lines in a cooperative trial with CIMMYT conducted at Ames in 1986. Above-average entries for yield, root and stalk strength, and first-generation European corn borer resistance were advanced ear-to-row in the breeding nursery by self pollination and were included in the A632 topcross nursery. Based on testcross performance, the line was included in the crossing nursery to produce single-cross seed with A632, A681, B100, SD46, and W570. B108 had consistent performance in single-cross trials conducted at five locations in 1994, 1995, and 1996. Average grain yield of single crosses that included B108 as one parent exceeded the average of the experiments, but was significantly less (11.0 q ha^{-1} with LSD $0.05 = 5.7 \text{ q ha}^{-1}$) than the average of commercial check hybrids. Grain yield (86.5 vs. 92.0 q ha^{-1}) and moisture (204 vs. 200 g kg^{-1}) of B108 \times SD46 were similar to the commercial check hybrids. B108 has only average stalk strength (10.5 vs. 4.8%) but above-average root strength (1.8 vs. 4.6%) in crosses. B108 did not

have consistent performance in crosses with lines from the same heterotic group (e.g., A632 and A681) and had similar performance in crosses from different heterotic groups (e.g., A681 and B100).

B108 flowers 2 to 4 d later than A632 and A681. Pollen production is good, and the time of silk emergence is similar to that of pollen shed. Plant and ear height of B108 are greater than B103 and B107. Ears have 14 rows of yellow dent kernels on white cobs. Grain yield of B108 is similar to A632 but less than for B103 and B107. B108 has above-average resistance to gray leaf spot and second-generation European corn borer; it has good stay-green. It seems that B108 has potential in crosses with both heterotic groups. Maturity classification is AES 500-600.

B109 was developed from the cross of B73 and BS20(S)C1-73-1-1. The cross was backcrossed to B73, and pedigree selection within the backcross generation was used to develop B109 [(B73 \times BS20(S)C1-73-1-1)B73-144-1-1-1-1-1-1]. The nonrecurrent parent, BS20(S)C1-73-1-1, was used because of excellent root development and strength. Selections were evaluated in testcross with Mo17 as tester. Based on testcross performance, the line was advanced ear-to-row by self pollination in the breeding nursery and was included in a crossing nursery to produce single-cross seed with B97, B98, B99, and Mo17. Single-cross trials were conducted in 1993 (9 locations), 1994 (9 locations), 1995 (7 locations), and 1996 (9 locations). Yields of the single crosses that included B109 as one parent consistently exceeded the experiment average and either exceeded or were similar to the yields of the commercial check hybrids (99.4 q ha^{-1} for B109 vs. 88.8 q ha^{-1} for the average of check hybrids). Grain moisture at harvest for B109 crosses (231 g kg^{-1}) was similar to B73 \times Mo17 (215 g kg^{-1}). Root strength, however, was not improved significantly for the crosses that included B109.

B109 flowers similar to the dates for B73 and Mo17. Pollen production is excellent, and silk emergence coincides with pollen shed. Plant and ear height are similar to B73. Ears of B109 have 16 rows of yellow dent kernels on red cobs. Grain yield of B109 (38.5 q ha^{-1}) either exceeds or is similar to B73 (33.7 q ha^{-1}). B109 is similar in phenotypic appearance to B73, has very good stay-green, and has average resistance to gray leaf spot, common corn rust, and first- and second-generation European corn borer. Maturity classification is AES 700-800.

Breeder seed of B107, B108, and B109 is maintained by the Iowa Agriculture and Home Economics Experiment Station and is distributed (100 seeds per request) by the Committee for Agricultural Development, 117 Curtiss Hall, Iowa State University, Ames, IA 50011-1010.

ARNEL R. HALLAUER,* KENDALL R. LAMKEY,
AND PAUL R. WHITE (3)

References and Notes

1. CIMMYT. 1981. CIMMYT report on maize improvement 1978-79. CIMMYT, El Batán, Mexico.
2. CIMMYT. 1988. CIMMYT report on maize improvement 1982-83. Mexico City.
3. A.R. Hallauer and P.R. White, Dep. of Agronomy, Iowa State Univ., Ames, IA 50011; K.R. Lamkey, USDA-ARS, Corn Insects and Crop Genetics Res. Unit, Ames, IA 50011. Joint contribution from the Iowa Agric. and Home Econ. Exp. Stn., Ames, IA, as Journal Paper no. J-17340. Registration by CSSA. Accepted 31 May 1998. *Corresponding author (hallauer@iastate.edu).

Published in Crop Sci. 38:1730 (1998).