among those meeting the criteria, were discarded. The best three ears from sibbed plants of the selected plots were retained for the next cycle. With this scheme of development, the cytoplasm of the original collection was retained.

Seeds from Cycle 6 (selected under insect pressure) were grown as S₀'s to make S₁'s in a winter nursery in Puerto Rico. Six generations of selfing followed completion of the sixth cycle of modified half-sib recurrent selection. The odd-numbered generations of selfing were placed under insect pressure at Columbia for maintenance of ECB resistance. No selection occurred during the even-numbered selfing generations in Puerto Rico.

Mean plant and ear heights were 142 and 74 cm for Mo45, 140 and 52 cm for Mo46, and 126 and 43 cm for Mo47, respectively. Number of days to 50% flowering was 82 for Mo45, 76 for Mo46, and 78 for Mo47 when planted 26 Apr. 1994 at Columbia, MO. These selected S₁'s inbreds rated very resistant (1.8 to 3.2) for first-generation ECB and averaged <3 cm of tunneling when manually infested with 100+ neonate larvae during the whorl stage of plant development and at anthesis, respectively. A susceptible inbred line check, WF9, rated 9 for whorl-leaf feeding damage and had stalk tunneling of 45.7 cm plant⁻¹. The S₁'s of these S₀'s were crossed to Mo17 and Missouri Second Cycle Stiff Stalk Synthetic as testers, and the S₁'s were crossed to CI31A and Oba43 (Table 1). Yields of the testcrosses were determined at two locations with four replications at each location. The Mo45 testcross yields ranged from 7.9 to 10.9 t ha⁻¹, Mo46 testcross yields ranged from 6.4 to 11.3 t ha⁻¹, and Mo47 testcross yields ranged from 7.5 to 9.8 t ha⁻¹. For comparison, yield of a commercial hybrid check ranged from 9.0 to 12.9 t ha⁻¹.

Seed from the S₁ generation of Mo45, Mo46, and Mo47 is available in lots of 30 kernels each. Seed may be obtained from the Missouri Foundation Seed, 3600 New Haven Rd., Columbia, MO 65201. We ask that appropriate recognition be given of its source when this germplasm contributes to a new cultivar.

DEAN BARRY,* A. Q. ANTONIO, AND L. L. DARRAH (6)

References and Notes
2. D₀ is a cross of inbred line Mpg226 × 96478. Inbred line Mpg226 is a white endosperm inbred line recovered from inbred line Mp305 which was extracted from the open-pollinated variety 'Jellicorse'. Inbred line 96478 was selected from the cross of inbreds lines CI138B and C5-83-D2, where inbred lines CI138B and C5-83-D2 were derived from inbred line 38-11.

Registration of 12 Hybrid-Oriented Maize Germplasms Tolerant to Inbreeding Depression

Six inbreeding-stress-tolerant (IST) tropical maize (Zea mays L.) populations (Pop.), 21 (IST) (Reg. no. GP-305, PI 576015), Pop. 23 (IST) (Reg. no. GP-306, PI 576016), Pop. 24 (IST) (Reg. no. GP-307, PI 576017), Pop. 25 (IST) (Reg. no. GP-308, PI 576018), Pop. 29 (IST) (Reg. no. GP-309, PI 576019), Pop. 32 (IST) (Reg. no. GP-310, PI 576020), and five subtropical maize populations, Pop. 33 (IST) (Reg. no. GP-311, PI 576021), Pop. 34 (IST) (Reg. no. GP-312, PI 576022), Pop. 42 (IST) (Reg. no. GP-313, PI 576023), Pop. 44 (IST) (Reg. no. GP-314, PI 576024), and Pop. 45 (IST) (Reg. no. GP-315, PI 576025), and one subtropical maize gene pool, Pool 32 (IST) (Reg. no. GP-316, PI 576026), were developed and improved at the International Maize and Wheat Improvement Center (CIMMYT), Mexico. In 1985, when CIMMYT started its hybrid maize program, CIMMYT scientists were aware that many of our tropical and subtropical maize populations would not be ideally suited for hybrid development. This was due to the genetic constitution of populations and past breeding methodologies. To make them more useful for line development, selection for tolerance to inbreeding depression was started so that CIMMYT germplasm would be better adapted to inbred-hybrid breeding programs.

The latest cycles of the populations that were available in 1994 were used as source germplasm. Detailed descriptions of these populations have been published elsewhere (1-5). Promising S₁ lines were identified from the inbred families used at CIMMYT. Each line was planted in a 5-m row, with half of the plants used for selfing and the other half used for observation. Data on 50% flowering (male and female), vigor, and reaction to diseases and pests were recorded before harvest. Selection of lines was based on performance of lines for yield, synchronization of pollen shedding and silking, vigor, standability, plant and ear height, husk cover, ear characteristics and resistance to foliar diseases. Approximately 15 to 25 S₁ lines that satisfied the above criteria were recombined by making plant-to-plant crosses among lines. The crosses of a particular line with other lines were planted adjacent to each other to facilitate rejection of agronomically undesirable crosses at pollination and harvest time. Selected crosses were recombined through bulk pollination to produce the F₂ generation seed of Cycle 1 (C₁). Inbreeding was reinitiated in C₁ to generate 200 to 300 S₁ lines in each population. Between and within line selection was practiced. Selected plants were advanced to the S₂ generation and in a similar manner to the S₃ generation. Selected S₃ ears were planted in a progeny evaluation trial with three replications at Poza Rica, Mexico. Based on yield and agronomic performance of the lines, ~20 lines were selected and recombinated as in C₀ to form the C₁.

Evaluation of both per se yield and inbreeding tolerance of the tropical populations was done in 1991 summer and 1992 winter cycles at Poza Rica and Tlaltizapán, México. A bulk of selfed seed from 100 randomly selected plant from C₀, C₁, and C₂ constituted the S₀ bulk seed, whose performance was used to measure inbreeding tolerance. The F₂ bulk seed of the cycles represented the noninbred cycle. Yield of S₀, S₁, and F₂ bulks, expressed as a percentage of F₂ bulks, was treated as a quantitative measure of inbreeding tolerance. In general, S₀ showed better per se and S₁ yield, but were accompanied by an increase in plant height and maturity in some cases. Improvement for tolerance to inbreeding was evident in all the populations (6-7). Among tropical populations Pop. 23 (IST) and Pop. 29 (IST) showed significant increase for inbreed-