REGISTRATION OF GERMLASM

Registration of SR94 Sugarbeet Germplasm with Smooth Root

Sugarbeet (Beta vulgaris L.) germplasm SR94 (Reg. no. GP-202, PI 598076) was developed by the USDA-ARS and the Michigan Agricultural Experiment Station, in cooperation with the Beet Sugar Development Foundation, and released in September 1997. SR94 is the highest-sucrose-concentration smooth-root line released to date. SR94 has moderate root smoothness similar to SR80 and has broader genetic diversity than SR 87 (1) or SR80. The smooth-root characteristic reduces soil quantities taken from the field on harvested beets, as well as subsequent soil disposal costs at the sugar factory (1). Smooth-root beets are also prospective components of redesigned sugarbeet harvesting and piling systems that reduce bruising and subsequent storage-pile sugar losses due to rot and excess respiration.

SR94 is an open-pollination increase of seed produced from three cycles of mass selection for the smooth-root trait and high sucrose percentage (with 4 to 11 beets per cycle), following three individual plant pair hybridizations of beets from high-sucrose-percentage lines with smooth-root selections from smooth-root line SP85700 (PI 590776) (1). One high-sucrose-percentage root each came from F1 hybrids C40×L19, C51×L19, and C51×4611. C40 (8400040) and C51 (8400051) are high-sucrose lines kindly provided by Crystal-Maribo Seeds. L19 is a high-sucrose line (2). 4611 is a high-sucrose-percentage, curly top resistant line from the former USDA-ARS sugarbeet breeding program at Logan, UT. The parentage of SR94 is approximately 50% SP85700, 17% L19, 17% C51, 8% C40, and 8% 4611. SR94 has been tested under the identification numbers 94HS21 and WC960448.

SR94 is diploid multigerm and segregates for red and green hypocotyl. SR94 is relatively easy-bolting, and although male-fertile plants are largely self-sterile, a significant degree of pseudo-self-fertility was observed under individual plant isolation. Male sterility exceeds 20%, and its source in the pedigree is unknown.

SR94 has yielded sucrose concentrations 94% of the commercial cultivar ACH185 (American Crystal). Cercospora leaf spot (caused by Cercospora beticola Sacc.) disease index (average for three dates) for SR94 at the USDA-ARS evaluation in CO, in 1997 was 3.94, compared with 3.24 and 7.00 for the resistant line EL50 and the susceptible check, respectively, on a scale of 0 to 7. In the 1997 Betaseed root rot evaluation at Shakopee, MN, which largely measures response to Aphanomyces cochlioides Drechs., the causal agent of black root, SR94 had an intermediate stand rating of 4.5 (compared with 3.7 for the resistant Michigan hybrid check and 5.7 for the susceptible Canadian hybrid check) on a scale of 1 to 9.

SR94 provides a germplasm source for breeders developing smooth-root breeding lines or cultivars. Breeder seed will be maintained by USDA-ARS and will be provided in quantities adequate for reproduction. Address written requests to the second author, J. Mitch McGrath.

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References and Notes
