C790-54 have moderate resistance to powdery mildew caused by Erysiphe polygoni DC. All have moderate susceptibility to Erwinia root rot caused by Erwinia carotovora (Jones) Bergey et al. subsp. betavasculorum Thomson et al. As components of single-cross experimental hybrids, they expressed high combining ability for sugar yield in trials at Salinas, Brawley, and Davis, CA, under both nondiseased and diseased conditions. All have moderately good sucrose concentration. C790-15 appears to be superior for sugar yield combining ability; in most trials in 1992 and 1993, its hybrid ranked number one among all entries (commercial and experimental hybrids) for sugar yield and powdery mildew resistance.

C790-6, C790-15, and C790-54 are sister lines that were selected from Population-790(C4). Population-790(C4) was released earlier (2) and was developed by S₁ progeny recurrent selection for sugar yield under prevailing disease conditions. Eight lines have been released from earlier cycles of recurrent selection (1). The present releases appear to have better performance than these earlier releases or the cycle four or five synthetics in equivalent hybrids. For the fifth cycle of S₃ progeny recurrent selection, good monogerm, fully fertile plants were selfed in the field without pollen protection. The S₁ progeny were evaluated per se at Brawley under severe lettuce infectious yellows conditions and at Salinas in tests under virus yellows and moderate bolting induction conditions. Powdery mildew was epidemic at Salinas. The superior S₃ lines based on per se performance for sucrose concentration, sugar yield, nonbolting tendency, and powdery mildew resistance were selected and, facilitated by genetic male-sterility, topcrossed to a multigerm tester. These experimental hybrids were evaluated under a wide range of conditions and diseases at Salinas and Brawley. From the performance of these S₃-TX hybrids, S₃ lines that ultimately became C790-6, C790-15, and C790-54 were selected, increased, and released. These lines should retain most of the genetic variation present in their original S₀ plant, because within-line selection was not practiced.

Breeder seed is maintained by the USDA-ARS and will be provided to sugarbeet breeders in quantities adequate for reproduction, upon request to the author.

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References and Notes