REGISTRATION OF GERMPLASMS

population known as the "German red beet" acquired from Germany about 1940 by the Great Western Sugar Company. FC 704 has relatively high root yield but has low sucrose content and thin juice purity. The source population of FC 704 is the only sugarbeet germplasm found that has a significant amount of inherent resistance to *Rhizoctonia solani*. Other sugarbeet strains with similar levels of resistance have been derived only through extensive breeding. This relatively high level of inherent resistance is the primary reason for release of this material. It is not known at this time if the resistance in FC 704 is genetically the same as the resistance accumulated in previously released *Rhizoctonia*-resistant sugarbeet strains (Reg. No. GP 1, 2, 11, 12, 13, and 14).

In inoculated field tests about 25% of the roots of FC 704 were healthy, compared with 0 to 3% for commercial hybrid cultivars and 50% for the most resistant lines developed from our resistance breeding program. The source population of FC 704 has been used as a top-cross tester for general combining ability. FC 704 may be similarly useful. FC 704 is susceptible to cercospora leaf spot (caused by *Cercospora beticola* (Sacc.) and curly top virus and flowers after a relatively short induction period. This breeding line is not directly useful in sugarbeet production, but it is released as a new and diverse source of resistance to *R. solani* and for possible use as a top-cross tester parent, particularly in commercial resistance breeding programs.

Seed is maintained by AR, SEA, USDA, and is provided to sugarbeet breeders in quantities sufficient for reproduction upon written request. Request for seed should be made to Sugarbeet Research, USDA Crops Research Laboratory, Colorado State University, Fort Collins, CO 80523.


FIVE sugarbeet breeding lines (*Beta vulgaris* L.) were developed by AR, SEA, USDA, in cooperation with the Beet Sugar Development Foundation and the Colorado State University Experiment Station. All five lines were bred and developed especially for resistance to *Rhizoctonia solani* Kühn, the cause of root and crown rot. All lines are multiresistant to cercospora leaf spot (caused by *Cercospora beticola* Sacc.), and self-sterile. They flower after a short induction period (easy bolting). All lines are diploids of FC 702/4 (4X), which is tetraploid (4X=36).

FC 702/4 (GP 55) is a product of two cycles of selection and four cycles of mass selection for *Rhizoctonia* resistance. FC 702/4 (GP 56) is a product of mass selection from an obsolete, open-pollinated cultivar, 'GW-674-56C.'

FC 706 (GP 57) is a *Rhizoctonia*-resistant synthetic developed from FC 701 (Reg. No. GP 1) with four cycles of selection for resistance. FC 707 (GP 59) is a product of one cycle of *Rhizoctonia* resistance from an inter-pollinator hybrid: lines, each of which had been subjected to three to five cycles of selection for *Rhizoctonia* resistance. Characteristic of these five source strains included monogerm, high sucrose, some genes from *B. maritima* L., and resistance to black root, leaf spot and *Botrytis*.

These strains all have high general combining ability for sucrose production and for possible use as a top-cross tester parent, particularly in commercial resistance breeding programs.

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