REGISTRATION OF CROP GERMPLASMS

The USDA-ARS in cooperation with the Beet Sugar Development Foundation and the California Beet Growers Association released four random-mated populations of sugarbeet (Beta vulgaris L.) between 1977 and 1986. Plants in these populations are self-fertile (S), and random mating is facilitated by the segregation of genetic male sterility (a,a). The populations are genotypically monogerm (mm), although the quality of this trait remains varied. The diversity and structure of these populations should provide useful germplasm to public and private breeding programs for both parental line development and continued population improvement. Specific lines extracted from these populations have been released (1), and several of these are being used as parental lines in commercial hybrids. These populations should be increased by harvesting seed from randomly mated male-stereile plants. At the time of their release, a cytoplasmic male sterile version of each of these populations was made available.

A germplasm base was shared by these populations when they were formed in the late 1960s and early 1970s. Specifically, this common germplasm included lines similar to multigerm NB 1 and monogerm C2563 (4), also known as C563, that segregated for genetic male sterility. Collectively, these populations encompass much of the germplasm and many of the breeding lines that had been developed in the USDA breeding programs in the far west from about 1940 to 1968 and especially those which were self-fertile and resistant to the curly top virus. Despite this, each of the four populations is distinctive.

Each of the populations has been improved for genetic structure (monogermity, O-type, etc.), agronomic traits, and disease resistance. Usually mass selection or some form of individual plant selection was used. Progeny testing also has been used within several of the populations to improve specific traits. Predominantly, individual plant selection has been practiced to improve performance under disease conditions. A selection index for gross sugar yield weighted toward sucrose concentration was used as a criterion to select plants that had been infected with virus yellows (beet yellows and/or beet western yellow viruses), powdery mildew, (caused by Erysiphe polygoni D.C.), and rust (caused by Uromyces betae Tul. ex Kickx.), however, high levels of genetic variability still exist within and among these populations for reaction to all of these and other diseases (caused by Peronospora farinosa (Fr.) F. sp. betae Byford), and rust (caused by Uromyces betae Tul. ex Kickx.), respectively. However, high levels of genetic variability still exist within and among these populations for reaction to all of these and other diseases (caused by Peronospora farinosa (Fr.) F. sp. betae Byford), and rust (caused by Uromyces betae Tul. ex Kickx.), respectively. However, high levels of genetic variability still exist within and among these populations for reaction to all of these and other diseases.

In addition these populations can generally be classed as being moderately resistant to downy mildew [caused by Peronospora farinosa (Fr.) F. sp. betae Byford], and rust [caused by Uromyces betae Tul. ex Kickx.], however, high levels of genetic variability still exist within and among these populations for reaction to all of these and other diseases. Pots 1986, C310 was formed by recombining 13 advanced self-fertile lines. The early developmental history of C310 was given in 1986. C310 was formed by recombining 13 advanced self-fertile lines. The early developmental history of C310 was given in 1986.