

UNITED STATES DEPARTMENT OF AGRICULTURE  
AGRICULTURAL RESEARCH SERVICE  
WASHINGTON, D.C.

and

BEET SUGAR DEVELOPMENT FOUNDATION  
DENVER, COLORADO

and

MICHIGAN AGRICULTURAL EXPERIMENT STATION  
MICHIGAN STATE UNIVERSITY  
EAST LANSING, MICHIGAN

NOTICE OF RELEASE OF EXPERIMENTAL SUGARBEET GERMPLASM EL-X1 WITH WILD  
ANCESTRY AND SELECTION FOR APHANOMYCES RESISTANCE

The Agricultural Research Service of the U. S. Department of Agriculture, the Beet Sugar Development Foundation, and Michigan State University announce the joint release of experimental sugarbeet germplasm EL-X1. This experimental germplasm was last selected at the Betaseed, Inc. Aphanomyces nursery in Shakopee, MN in 2003 by Margaret Rekoske and Jay Miller, followed by seed production at Shakopee, MN in 2004 and East Lansing, MI in 2008. The derivation of this material has the goal of understanding and broadening the genetic base for Aphanomyces resistance in sugar beet. This line may be useful for a number of basic and applied investigations, and limited quantities of seed are available to facilitate further testing and development of these and additional goals, since wild beet germplasm has been used in its development.

Construction and evaluation of original and derived materials was done in the program of J. Mitchell McGrath, USDA-ARS East Lansing, MI beginning in 1997. This line is not currently suitable for variety development since it still has many characteristics of wild materials; however, it has some improvement in taproot characteristics relative to the wild accession. In 2003, 64 genetically similar entries, standards and the sugarbeet parents were tested in the Shakopee Aphanomyces nursery and rated on a 1 (resistant) to 9 (susceptible) scale. The average rating of two Aphanomyces tolerant and two susceptible standards was 2.0 and 7.0, respectively (LSD<sub>0.05</sub>=1.83, average of two late readings), the sugar beet parents SP6822 and 6869 had scores of 1.0 and 5.5, respectively, and EL-X1 scored 2.8. From this nursery in 2003, approximately 20 roots were selected for improved root conformation and relative freedom from disease. Subsequently seed was produced by inter-pollination of the selected plants the following year.

WB879, a wild *Beta vulgaris* spp. *maritima* accession (PI 540625) collected in 1989 on the coast of Brittany, France, was used as the wild beet donor germplasm in EL-X1. WB879 was used because its potential resistance to Aphanomyces diseases caused by *Aphanomyces cochlioides* by having a disease score of 1 (resistant) (rating system of 0-9 scale with 0 showing no symptoms and 9 being dead) in the 1994 Beta germplasm evaluation nursery conducted by C.M. Rush in Amarillo, Texas (Sugarbeet.Aphan.94.Rush; <http://www.ars-grin.gov/cgi-bin/npgs/html/eval.pl?269>). WB879 is diploid, biennial, and has resistance reported for beet western yellows virus and *Polymyxa betae*. SP6822 (PI 615525), as a traditional Aphanomyces resistance source, and 6869 (a progenitor of C869, PI 628754) as a donor of the self-fertility (Sf) and nuclear male sterility characters were used as sugar beet parents. This

release is expected to be self-fertile and segregating for nuclear male sterility. Tested seed was harvested from the sugar beet parent.

EL-X1 (4PS1926) was constructed as seed mixture of nine independent F1 hybrids between a single plant each of WB879 and SP6822. The F1 hybrids were grown in an observation nursery in Saginaw, MI in 1998 and 30 roots were selected for plant vigor. In the greenhouse, all plants were male sterile, and were pollinated with the self-fertile line 6869. Seed was harvested from individual plants, and nine of these seed harvests were combined later to obtain sufficient seed for Aphanomyces testing at Shakopee, MN in 2003. Other progeny were previously tested in this nursery previously and in the Saginaw Valley Bean and Beet Farm seedling disease nursery between 2001 and 2004, with wide variability observed in plant morphology and disease reaction.

A series of EL-X (for experimental) lines are being released as germplasm resources for breeders to use in developing parental lines with potentially new sources of resistance to diseases caused by Aphanomyces and other traits. These lines also contain a series of useful characters at low allele frequencies derived from the parents' components, such as those necessary to breed for seed parents used to create cytoplasmic male sterility-mediated hybrids. Seed will be available for use by writing to Dr. J. Mitchell McGrath, USDA-ARS, 494 PSSB, Michigan State University, East Lansing, MI 48824-1325 (mitch.mcgrath@ars.usda.gov). Genetic material of this release will be deposited in the National Plant Germplasm System where it will be available for research purposes, including development and commercialization of new cultivars. Efforts of Yi Yu, Tim Duckert, and Teresa Koppin as well as Betaseed, Inc. in generating these materials are gratefully acknowledged. It is requested that the author be notified if this germplasm contributes to the development of a new breeding line or cultivar. U.S. Plant Variety Protection will not be requested.

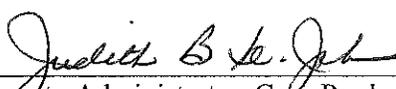
Signatures:

  
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Executive Vice President  
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4/14/09  
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