TUNGLAND, L. R.*, and R. H. HELMERICK. Hilleshög Mono-Hy Inc., 11939 Sugarmill Road, Longmont, CO 80501. - Environmental selection during pollinator seed increase in sugar beet.

Yield losses have been observed in sugar beet varieties when seed production shifts from experimental to commercial status. The objective of this study was to investigate potential yield loss in sugar beet hybrids resulting from environmental selection over several sequential pollinator seed increases. Three generations of three heterogeneous pollinators were used to evaluate drift during seed production. Hybrid seeds representing nine population/generation combinations were sown in a randomized complete block design with two replicates at three locations. Traits measured were white sugar yield (WSY), white sugar content (WSC), root yield (RY), sugar content (SC), and juice purity (JP). A significant positive change was observed for JP in population 1. Although nonsignificant, important negative changes were observed in all three populations for RY and WSY. These results indicate that environmental selection during a pollinator seed increase is one explanation for yield reductions in commercial sugar beet hybrids.

Miller, J.*, A. Quinn, J. R. Stander and R. Jansen. Betaseed, Inc., P.O. Box 195, Shakopee, MN 55379. - Use of partially enclosed plastic structures for controlled matings in sugarbeets.

Various types of plastic barriers are used in our sugarbeet breeding program to facilitate controlled matings. Plastic barriers consist of two types: "partitions" and "sleeves". Partitions are portable crosswalls modified from an earlier KWS design. Each consists of various types of plastic sheeting stretched over a 2 m X 3.8 m metal frame. Partitions are placed parallel to each other and 1.4 m apart. Sleeves consist of various rectangular and hexagonal sizes surrounded by 1.8 m high plastic tubes held rigidly upright by a system of 1.2 cm metal posts. Posts within and between sleeves are held in place by a system of triangles constructed from metal bars. Both structures are economical. The sleeves have lower initial costs, but are more labor intensive. For both structures, the vernalized plants to be mated are planted in precise patterns, but are treated as a row crop until the plastic structures are erected. Outcross contamination levels for these structures have been 5 to 10%.

LEWELLEN, R. T.*, and S. R. TEMPLE. USDA-ARS, 1636 E. Alisal St., Salinas, CA 93905 and Agronomy and Range Science, University of California, Davis, CA 95616. - Response of sugarbeet line C31/6 to selection for resistance to beet yellows virus.

Beet yellows virus (BYV) continues to plague sugarbeet growers and processors in the Central Valley of California. Partially resistant or tolerant breeding lines that have been developed at Salinas over the past 35 years reduce the losses caused by BYV; however, higher levels of resistance in more productive backgrounds would be highly desirable. From moderately resistant breeding line C31/6, 100 half-sib families were evaluated for yield under BYV infected conditions at Davis and Salinas to determine if additional progress for resistance or performance under BYV conditions could be made. A wide dispersion for sugar yield occurred at both Davis and Salinas, but the rank correlation was poor. Six half-sib families were selected and individually advanced. Based upon data from each site, separate cycle 1 (C1) synthetics from a 10% selection intensity were made. Corresponding hybrids were produced with the source, C1 synthetics, and advanced lines. These were evaluated at Salinas and Davis in 1990 under BYV infected and noninfected conditions. The performance and resistance (% loss) of the source and C1 synthetics were not significantly different. Differences did occur among the six lines and their hybrids. The relative performance of the progenies and lines at Davis and Salinas suggested that location effects were important.