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Performance trial results of transgenic glufosinate ammonium (Liberty™) tolerant sugarbeet hybrids.

Effective weed control is essential for economic sugarbeet production in all growing areas of the world. The concept of herbicide tolerant varieties offers new possibilities for the utilization of efficient and environmentally safe chemicals which also offer additional advantages for the grower.

With the objective of developing Liberty™ tolerant hybrids, PLANTA/KWS used the PAT-gene construct provided by AgrEvo to produce numerous transgenic genotypes via *Agrobacterium tumefaciens* mediated gene transfer. These transformants were analyzed for their molecular properties, gene expression, etc. A single transformation event which was determined to be stably inherited as a single dominant Mendelian gene was selected for further increase.

By selfing the original transformed single plant, a multigerm self-fertile elite line homozygous for glufosinate ammonium tolerance was developed. This line, designated T120-7, was used to pollinate different glufosinate susceptible MS elite lines. Seed of these experimental hybrids was used for evaluation of yield and quality in multilocational trials in Western Europe (3 sites in France an 2 sites in England) and the U.S. (6 sites) by KWS and BETASEED respectively. The trials were designed as randomized blocks and were placed adjacent to routine trial fields. The plots were of standard size (approximately 10 m^2). Liberty™ treated plots were surrounded by rows planted with the same genotype to avoid drift effects and possible overestimation of herbicide tolerant entries.

Results:

1. There is no indication of any harmful effects of this transformation event on the phenotype or the combining ability of T120-7. This is true whether the transgenic genotypes remain untreated or are treated with recommended doses of Liberty™.

2. In some cases, the hybrids made using the T120-7 pollinator can compete in yield and quality parameters with top listed commercial varieties.

Outlook:

The experience with this transformation event supports hopes and expectations for the technical possibility of simply adding herbicide tolerance to existing sugar beet varieties. 1997 will be the first year of testing targeted at variety approval for Liberty™ tolerant sugar beet varieties in some European countries as well as in different regions of the U.S.