6. Herbicide Tolerant Tomato

California is the source of 90% of the national supply of processing tomatoes and produces 40% of the world's supply. Tomato prices contracted at the beginning of the season between growers and processors have declined steadily since 1998, in part because of a surplus in processing tomatoes. As a result, growers look for ways either to increase yields or to reduce costs as a way of maintaining or improving their income. Weed control costs are a major part of the operating costs for processing tomatoes.

Ninety nine percent of California's tomatoes are treated with herbicides for weed control. Pigweed, lambsquarters and barnyardgrass are prevalent weed species in California processing tomato fields, and they are controlled adequately with available herbicides such as napropamide, pebulate, trifluralin, and the soil fumigant metam sodium.

Some weed species found on California processing tomato acreage, however, are not adequately controlled by registered herbicides. Nightshade species and nutsedge are widespread and competitive weeds in California processing tomatoes, causing substantial yield reductions, and bindweed interferes with mechanical harvests. Handweeding and cultivation are used on all of California's tomato acreage to manage these problem weeds not controlled by herbicides. However, the control provided by handweeding and cultivation is not long lasting. In addition, hand crews may accidentally remove significant numbers of tomato plants, especially when targeting nightshade species which are very similar in appearance to tomato seedlings.

Tomato plants have been transformed via microprojectile bombardment with a gene that makes them tolerant to direct broadcast application of glufosinate, a nonselective herbicide with efficacy against a wide range of grass and broadleaf weeds. The gene originates from a bacterium and codes for an enzyme called phosphinothricin acetyl transferase (PAT). Transformed tomato plants were backcrossed with elite cultivars and the resulting hybrids have been field-tested. The genetically engineered tomatoes show tolerance to glufosinate at all developmental stages, allowing its use for control of problem weeds.

Potential Impacts of Herbicide Tolerant Transgenic Tomato

| Change in Pesticide Use: | 4.2 million lb/yr net reduction in pesticide use due to replacement of metam sodium with glufosinate |
| Change in Production Costs: | $30 million/yr net savings in handweeding, cultivation and pesticide costs |

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