7. Herbicide Tolerant Lettuce

The vast majority of lettuce produced in the U. S., both head and leaf lettuce, comes from California where 7 billion pounds of lettuce are produced annually. Most lettuce plantings are seeded directly into the ground rather than transplanted. Weed control during seedling emergence and establishment is essential for a healthy crop because weeds will compete with seedlings for water, nutrients and light. Weeds also reduce the efficiency and quality of routine production practices such as thinning and harvesting, which are often done by hand in lettuce.

Before the development of effective herbicides, severe weed infestations sometimes resulted in complete lettuce crop losses. The herbicides used in California lettuce have changed little in more than 30 years. No individual herbicide, or combination of herbicides, control all weed species under all production conditions and soil types in California lettuce. Several herbicides registered for use on lettuce can damage the developing lettuce crop under certain conditions. Herbicide use is therefore only part of weed management in lettuce. Cultivation and handweeding are used extensively to control weeds after lettuce seedlings have emerged. An estimated $166 per acre per year is spent on weed control in a typical California lettuce field. As a result of this combination of herbicide applications, cultivation and handweeding, California lettuce fields are largely free of weeds, and aggregate yield losses related to weed infestations are estimated to be less than 2% annually.

Lettuce has been transformed with a gene from a soil microorganism for resistance to the nonselective herbicide glyphosate, allowing glyphosate to be applied to emerging and established fields without causing crop damage. California field trials determined that a glyphosate-based weed management system, consisting of transformed lettuce plants treated with two glyphosate applications, provided adequate control of the key weed species and has the potential to reduce handweeding costs without causing crop damage.

The potential costs of a glyphosate system are estimated to be essentially equivalent to current weed control costs in California lettuce. The amount of herbicide applied would be reduced by 72% in the glyphosate system. One primary factor that could significantly increase the potential value of the glyphosate system would be if the currently used herbicides were cancelled for use on lettuce. There has been little success in identifying potential alternative herbicides that can be used safely on lettuce that will control problem weeds.

Potential Impacts of Herbicide Tolerant Transgenic Lettuce
Change in Pesticide Use: 140,000 Lbs./yr. decrease in herbicide use (-72%)

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An Analysis of 40 Case Studies by Leonard P. Gianessi Cressida S. Silvers, Sujatha Sankula and Janet Carpenter
National Center for Food and Agricultural Policy, June 2002.
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