20. Herbicide Tolerant Sugarbeet

Sugarbeets are grown in twelve states on 1.5 million acres with a production value of $1.2 billion/yr and a production volume of 4.4 million tons. Competition from uncontrolled annual weeds can suppress sugarbeets so severely that no crop is produced.

U.S. sugarbeet growers typically make 3 to 4 herbicide applications each year and each application typically consists of 3 to 4 active ingredients. Consequently, an average U.S. sugarbeet acre receives 12 herbicide acre treatments during the year. A total of 1.4 million pounds of active ingredients were used in 2000, averaging 0.89 lb a.i./acre. Certain weeds, such as kochia, are not adequately controlled by available herbicides. Consequently, in addition to herbicides, sugarbeet growers make extensive use of row cultivations and hand labor for removing weeds. Annually, sugarbeet growers spend approximately $115 million for herbicides and $33 million to apply them, and approximately $22 million and $42 million for cultivation and handweeding, respectively. An estimated total of $136/acre is spent annually by sugarbeet growers for weed management.

Glyphosate is broad-spectrum, postemergence herbicide effective against weeds in sugarbeets, but its use is limited in sugarbeet fields because it also causes toxicity in the sugarbeets themselves. Sugarbeets transformed with a gene from a soil bacterium produces glyphosate resistance. Experimental data show two glyphosate applications in glyphosate resistant sugarbeets provided greater than 95% control of the weed species most troublesome in conventional sugarbeet fields. The weed control and subsequent yields in the transgenic plots were equivalent to or better than those in conventional plots treated with the standard herbicide regime of 3-4 applications of 4-6 herbicides. Cultivation did not improve yield in the glyphosate tolerant plots. In addition, herbicide injury to the sugarbeets plants was lower in the transgenic plots.

The estimated cost of the glyphosate resistant sugarbeet weed control system, including seed cost and fees, herbicide, and application, is estimated at $76.00/acre, and the two herbicide applications used total 1.5 lbs a.i./acre.

Although glyphosate-tolerant sugarbeets were approved for planting in 1999, none have been planted through 2001 because no sugarbeet processor has approved them for processing.

Potential Impacts of Herbicide Tolerant Transgenic Sugarbeet
Change in Pesticide Use: 953,000 lbs a.i./yr increase
Change in Production Costs: $94 million/yr net savings in weed control

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