35. Herbicide Tolerant Alfalfa

California ranks first in the production of alfalfa hay producing 7.1 million tons on one million harvested acres in 2000. Alfalfa is the major feedstock for the state’s $3.6 billion/year dairy industry. California is the nation’s leading state in the production of milk and cream producing 25 billions lbs./yr.

Alfalfa is a perennial legume crop, usually grown for a three-to-five-year period. Seedlings of alfalfa are small, grow slowly, and are extremely susceptible to competitive suppression by various weeds that germinate with the crop. Many annual weeds and perennials overtop the slow-growing alfalfa seedlings soon after they emerge. When effective herbicides are not used, weeds represent up to 76% of the first cutting yields.

Many alfalfa fields can be infested with summer grasses. By August, if not controlled, the level of infestation can get very heavy; it is not unusual for the grass to be 50 to 70% of the forage. In the case of yellow foxtail, the sharp spikes or awns on the flower head irritate or ulcerate the inside of the mouths of livestock. Most weeds reduce the quality of alfalfa. Because weeds are usually less palatable and less nutritious than alfalfa, their presence reduces the feed value and palatability of the total forage and reduces the forage intake compared with that of alfalfa alone. Quality can be reduced from US no.1 hay to US no.3 or sample grades. This reduction in quality can translate into a $25 to $40 per ton loss to the grower.

Many alfalfa growers limit herbicide use in alfalfa during the last year of a stand because of anticipated planting of the land in the following year with a crop other than alfalfa. All of the preemergence herbicides used in alfalfa have plantback restrictions of 1-4 years due to their persistence in soil and potential for damage to sensitive rotation crops. Weeds can contribute up to 30% by weight of the total forage yield during the last cuttings in the final year of a stand.

It is estimated that approximately 20% of California’s alfalfa hay acreage does not receive adequate herbicide treatments currently and, as a result, weedy bales are produced during one half of the cuttings annually on 200,000 acres. It is estimated that a $30/ton discount occurs due to weediness on half of the annual production (3.5 tons) on these acres. The total discount due to weediness is estimated at $21 million/year. Weedy bales result when herbicides are not used or when they are applied and do not perform effectively. Weed control in seedling alfalfa is often unattainable with available herbicides.

Through genetic engineering, researchers have transformed alfalfa varieties through the insertion of a gene from a soil bacterium. This transformation confers glyphosate tolerance to the alfalfa. Research has demonstrated that the glyphosate tolerant alfalfa has excellent tolerance to glyphosate at all stages of plant development. Field tests with the glyphosate tolerant alfalfa are underway in California and several other states.

**Impacts of Herbicide Tolerant Transgenic Alfalfa**

| Change in Pesticide Use: | 200,000 lbs/yr. increase in herbicide active ingredients |
| Change in Net Income: | $17.6 million/yr. increase |

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