24. Herbicide Tolerant Canola

Canola oil is usually blended with other vegetable oils for the production of cooking oils and salad dressings. Canola meal is used as an animal feed. North Dakota accounts for 80% of the total canola production in the US. Canola was grown on 1.3 million acres in North Dakota in 2000 with a production volume of 1.6 billion pounds of seed worth $108 million. North Dakota canola acreage increased by 49% in 2000 compared to 1999. This increase is largely attributable to the commercialization of herbicide tolerant transgenic canola, which improved the economics of weed control. Weeds are the most limiting factor in canola production as seedling canola is not very competitive. Uncontrolled weeds can reduce canola yields by up to 77%. Contamination of harvested and processed canola with wild mustard causes serious price discounts or rejection in the market due to reduced quality.

Mechanical cultivation to remove weeds is not feasible as canola is a shallow-seeded crop and tillage can injure canola seedlings.

North Dakota's entire canola acreage is treated with herbicides annually. Prior to the introduction of transgenic herbicide tolerant canola, the commonly used canola herbicides included trifluralin, ethalfluralin, sethoxydim and quizalofop. These herbicides are not effective on all the weed species including perennials and broadleaf annuals. Continuous use of trifluralin in preceding cereals has led to the development of resistant weed populations.

Two transgenic herbicide-tolerant canola systems developed through genetic engineering were introduced in 1999; Roundup Ready and LibertyLink. Roundup Ready canola withstands applications of the herbicide glyphosate while LibertyLink canola was developed to be tolerant to the herbicide glufosinate. Both herbicides are effective against a wide-range of weed species including perennials, often with only one application. Both glyphosate and glufosinate improved weed control efficiency and reduced cost of weed control in canola.

Approximately 70% of North Dakota's canola acreage was planted with transgenic herbicide tolerant cultivars in 2001. Since 1999 several new herbicides have been registered for use in North Dakota canola for use with conventional varieties (ethametsulfuron, clopyralid). These herbicides in combination with the older herbicides control the full spectrum of annual grass and broadleaf and perennial weeds infesting canola. However, the combination of herbicides costs approximately $13 more per acre than the use of the transgenic technology. In addition, the conventional herbicides are used at a higher per acre rate than the herbicides used with the transgenic varieties.

**Impacts of Herbicide Tolerant Transgenic Canola**

<table>
<thead>
<tr>
<th>Change in Pesticide Use:</th>
<th>531,000 Lbs./ yr. Decrease in herbicide active ingredients</th>
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<tbody>
<tr>
<td>Change in Production Costs:</td>
<td>$11.0 million/ yr. Savings in weed control costs</td>
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**Full Report:** *Plant Biotechnology: Current and Potential Impact For Improving Pest Management In U.S. Agriculture 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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