

Update on Bt Corn and Other New Technology

Acreage Expanding Rapidly

Acreage of corn derived through biotechnology increased sharply in 1998 and is expected to continue expanding in 1999. The leading type of new corn is Bt corn, which incorporates a protein from *Bacillus thuringiensis*, a naturally occurring soil bacteria. Bt corn was first available commercially in very small quantities in 1996. Industry sources estimate plantings reached 16 million acres in 1998, up from around 5 million in 1997. In 1999, Bt corn plantings could grow to 25 million acres or more. (USDA does not collect separate data on individual types of corn, but includes them in total estimates of area, production, and use. Thus, none of the numbers in this box are "official" USDA estimates, but they are believed to be reasonably accurate.)

The popularity of Bt corn stems from its effectiveness in preventing damage from the European corn borer, a major insect pest. The effects are most noticeable when Bt corn is compared side by side with non-Bt corn in areas of heavy infestations. More systematic evaluations are becoming available from State extension and university trials. However, corn borer populations are not consistent from year to year and are difficult to predict. Thus, many producers choose Bt corn as a kind of insurance, just in case. Farmers pay a premium for the seed, but price discounts were widespread in 1998, apparently because of competition for market share among seed suppliers. The control available through Bt corn is generally considered superior to spraying insecticides, and it largely eliminates scouting needs.

Another category of biotech or genetically modified corn features herbicide resistance. This means that a herbicide can be sprayed on a field to kill weeds without harming the corn plant itself. This usually reduces the number of herbicide applications needed and allows more flexibility in their timing. The herbicide resistance feature is currently more common in the soybean sector than corn, but it is expanding rapidly as corn with resistance to different herbicides becomes available. A significant amount of herbicide tolerant corn is also available with Bt protection in "stacked" varieties. Industry sources estimate that acreage planted to herbicide resistant corn was over 11 million acres in 1998, up from around 5 million in 1997. However, these totals include a portion of imidazolinone (IMI) resistant corn developed through conventional breeding and not through biotechnology, and a portion of corn with stacked traits.

The total acreage planted to all biotech corn in 1998 was reportedly on the order of 18 million acres, over 20 percent of all corn, after subtracting IMI varieties and accounting for stacked products to avoid double counting. Virtually all

biotech corn currently grown features input traits that offer improved growing characteristics to the farmer. Biotech corn with value-enhanced output traits to enhance various end uses is expected to reach the market in the next few years and will offer improvements in animal nutrition, food qualities, starch content, processing, and other traits.

Corn that has improved output traits of interest to end users is currently available from conventional types of corn. Acreage of existing output trait corn, often called specialty corn, increased in 1998, although on a much smaller scale than the input trait corn. Some of the leading types are high oil corn, white corn, hard endosperm corn, waxy corn, and nutritionally dense corn. They are mostly geared for food and industrial uses, although high oil and nutritionally dense corn have improved feed characteristics for livestock and poultry. A large share of both high oil and white corn goes to export markets. The collective acreage of all these specialty varieties remains under 5 percent of total area planted to corn. (For background information, see the special article: "The Impact of New Technology on the Corn Sector: 1998 Update and Prospects for the Future," in the 1998 *Feed Yearbook*. Also, see the U.S. Grains Council web site for "Value Enhanced Corn Quality Reports," at <http://www.grains.org/>.)

Slow Approval Process Blocks U.S. Corn Exports to the EU, Some Marketing Changes in Store

All Bt and herbicide resistant corn commercially grown in the United States has been cleared through a regulatory process involving USDA, the Environmental Protection Agency, and the Food and Drug Administration. Because the corn is essentially the same as any corn grown from conventional hybrids, no special marketing arrangements have generally been followed, unlike some of the value-enhanced corn that is segregated or identity preserved to capture user premiums. However, there have been problems exporting biotech corn to the European Union (EU) in the last 2 years, although exports to other destinations have not been affected.

U.S. exports of corn to the EU were effectively cut off in 1997/98 because of the slow pace of EU approvals of genetically modified corn. The EU imported corn from other suppliers such as Argentina and Eastern Europe, which grew only approved biotech corn or non-GMO (containing no genetically modified organisms) varieties. By the time the EU had approved all the biotech products grown in the United States in 1997, it was late summer 1998, leaving only a small window for U.S. sales. U.S. exports to the EU in 1997/98 (September-August) amounted to only 135,000

tons, compared with 1.7 million the previous year. When the main 1998 U.S. harvest began, the window for sales closed quickly because there were some genetically modified corn varieties not yet approved by Europe and importers feared some could be co-mingled with approved corn. The United States exported 185,000 tons of corn to the EU early in the 1998/99 marketing year and no more sales are expected for the balance of the year.

The European Union has not yet approved all the genetically modified corn varieties grown in the United States in 1998, and it does not allow imports of unapproved products. The EU has a very slow approval procedure at best and the system has effectively broken down in the last year, while more new biotech corn products are coming on stream in the United States in 1999. The EU also mandated a labeling requirement for genetically modified (GMO) products, although the guidelines are still somewhat vague. The topic of biotechnology in agriculture in Europe is politically charged and is undergoing extensive debate, suggesting no breakthroughs in trade will occur soon.

U.S. corn exports to the EU averaged more than 2.1 million tons per year between 1990/91 and 1996/97, and accounted for close to 5 percent of all U.S. exports. Spain and Portugal are usually the leading EU markets. The EU is also the leading export market for U.S. corn gluten feed and meal, byproducts of corn wet milling, that are used for animal feed.

Because of the ongoing trade friction, some major U.S. corn processors announced in the spring of 1999 that they would not purchase biotech corn that is not approved by the EU. Farmers are advised to feed this grain on farm, market it to local elevators for domestic use, or sell to livestock producers. This is in line with recommendations from the National Corn Growers Association and others in the grain industry to prevent this corn from reaching export channels. Assistance is available to identify domestic market opportunities. Seed bags for corn not yet approved by the EU carry a reminder to growers to feed the corn on farm or sell for domestic use only. Growers typically sign agreements to follow these guidelines. Precise estimates of the amount of corn acreage planted to varieties not approved by the EU are not possible, but industry sources suggest it could rise somewhat from around 3 percent of total acreage in 1998.