



# Factsheet

## USDA Coexistence Fact Sheets Corn

### Growing Corn in the United States

In 2013, more than 95 million acres of corn were planted, which led to nearly 14 billion bushels of corn harvested – making it the top crop in the United States. Corn farmers in the United States have the choice of planting biotech, organic or conventional seeds, depending on their production systems and the end-use markets they are supplying. Of the 95 million acres planted in corn, 93 percent (or more than 88 million acres) of the seeds were biotech. In 2011, 234,470 acres, or 0.26 percent of the corn acres planted that year, were organic seeds.

Today, corn yields per acre are 8 times more than they were a century ago, ensuring U.S. corn supplies keep up with growing global demand.

### The Global Markets for Corn

The largest market for corn grown in the United States is animal feed, as it provides a good source of energy. Nearly half (48.7 percent) of the corn grown in 2013 was used as animal feed. Nearly 30 percent of the crop was used to produce ethanol. Only a small portion of the corn crop was used for high-fructose corn syrup, sweeteners and cereal, at 3.8 percent, 2.1 percent and 1.6 percent, respectively. Organic corn is grown as feed for certified organic livestock, or as an ingredient in certified organic foods. It should be noted that organically grown corn generally receives a premium price from end buyers.

Though the leading crop in the United States, the corn industry only exported 11 percent of its harvest in 2013 to foreign countries, where it is primarily used as animal feed.

### Challenges for Corn Farmers

U.S. corn farmers face a variety of challenges, regardless of whether they plant biotech, organic or conventional seeds. Corn is susceptible to the European corn borer, a pest that can cost farmers as much as 25 bushels an acre in damaged corn. Through the use of biotechnology, some corn varieties have had a gene from *Bacillus thuringiensis* (Bt) inserted into its genetic material. Bt is a naturally occurring bacterium that exists in some soils, and when eaten, is poisonous to insects like the European corn borer. The bacteria has been used by organic farmers in a spray to control the insect. The Bt gene in these plants produces a protein that is lethal to corn borer larvae, so in areas where farmers know the European corn borer can cause a problem, they can choose to use Bt corn varieties. Use of the Bt corn varieties has led to effective control of the European corn borer without the use of pesticides. The Bt protein in this corn is very specific. Only moths and butterflies are vulnerable to the protein; it is safe for humans and livestock to consume.

Another biotechnology advance for corn farmers is the availability of herbicide-resistant corn varieties. Before this technology was available to farmers, corn crops were susceptible to damage from herbicides used to kill weeds. With herbicide-resistant varieties available, crop injury is reduced, a broader spectrum of weeds is controlled, and crop management now offers more flexibility and simplicity for many biotech farmers.

For organic corn farmers, who cannot use biotech seed due to standards or contractual requirements, approved pesticides can be used to control pests that damage corn plants. They can also turn to other pest control methods, such as deep plowing before seeds are planted, or supplementing wooded areas nearby to encourage natural predators. Additionally, approved pesticides listed under the National Organic Program guidelines can be used by organic farmers, such as copper sulfate or hydrogen peroxide, to control pests.

Another family of pests – both the Western and Northern corn rootworm – can be devastating to corn farmers. Biotech farmers can choose to plant Bt corn to reduce the risk of rootworm damage. All types of corn farmers may also rely on crop rotations to manage infestations and reduce the risk of rootworm damage.

Corn farmers also closely manage any disease that has the potential to induce yield loss on their farms. A variety of diseases can impact corn fields, from different types of rust to leaf spots. Biotech and conventional corn farmers can rely on fungicides to help control the disease. Organic farmers must follow the standards or contractual requirements by which they abide, and use only approved fungicides.

Other challenges such as extreme weather conditions, wildlife damage, and nutrient deficiencies affect all corn farmers, regardless of the type of seed they plant.

Organic and conventional corn farmers must manage the risk of commingling of their crop by biotech seeds, as they are often growing for markets that have sensitivities against biotechnology. Biotech commingling can occur from impure seed, mixing of seed, pollen drift, volunteer plants from previous crop years, or residue on equipment or transport vehicles. To manage the risk effectively and ensure coexistence among corn farmers, all farmers should follow best practices.

### **Best Practices for Coexistence Among Corn Farmers**

Because corn is a wind-pollinated crop that can easily spread pollen between fields, production of conventional, organic, or identity preserved (IP) corn can be challenging in areas where biotech corn is widely grown. Biotech farmers can support and assist neighboring farmers who are growing organic and/or conventional corn by following these guidelines:

- Follow refuge regulations if planting Bt corn varieties. Bt is an effective tool to minimize damage from pests, but must be managed properly to reduce the development of Bt resistant pests. If those resistant pests begin to emerge, the Bt varieties will be less effective, as will the Bt spray organic farmers use to control these pests. A refuge is a block or strip of crops that do not contain the Bt gene, making those plants a safe haven for Bt-sensitive insects and reducing the likelihood of developing resistant insects.

- Establish good communication with neighboring farmers, know where organic or conventional crops are planted in your area, and work with those neighbors when possible to address coexistence challenges.
- Coordinate planting dates with neighbors to minimize pollen drift during critical times.
- Spray pesticides in correct weather conditions to avoid pesticide drift
- Clean equipment regularly, particularly if used in multiple fields – dust and grain can come in to contact with organic and conventional fields
- Keep good records to ensure correct best management practices were taken

Organic and conventional farmers can follow the guidelines below to minimize the risk of commingling by biotech seeds:

- Verify seeds are non-biotech from supplier(s)
- Establish good communication with neighboring farmers
- Know which neighbors are planting biotech corn, and in which fields and consider proactively discussing with neighbors challenges that may arise and ways these could be addressed
- Post fields as organic, conventional, or IP Set up physical barriers by isolating fields with wind breaks or by distance
- Coordinate planting with biotech neighbors to offset pollen drift
- Keep harvesting and hauling vehicles clean, or segregate to keep commingling risk low
- Keep equipment, storage facilities and transportation units clean, or segregate
- Keep good records
- Save samples of seed, harvest crop and delivered crop
- Know biotech tolerances, if any, written into contracts