

GM backlash leaves US farmers wondering how to sell their crops

American farmers have warmly embraced biotechnology. But resistance abroad and regulation at home are threatening to turn the affair sour.

As the consumer movement against genetically modified (GM) foods spreads across Europe, Japan and elsewhere, maize (corn) and soybean farmers preparing for harvest in the United States face a shrinking export market, together with growing demands from food processors that they separate GM from conventional grains.

While American farmers generally like the convenience of the built-in pesticides featured by GM crops, they are fearful that their harvest will fail to find a buyer.

On 1 September, food-processing giant Archer Daniels Midland asked suppliers to segregate fields, grain bins and storage elevators. Consolidated Grain and Barge, another major processor, said it would pay a premium for unmodified crops. And several US food companies, including Gerber, H. J. Heinz and Iams, a pet-food maker, have started to reject GM varieties.

Resistance spreads

The American Corn Growers Association (ACGA), a progressive farmers' group, has advised its members to stop planting maize modified to produce pesticides. Separately, the Organic Trade Association is debating whether to fight the regulatory renewal of crops engineered to contain insect toxins, and has produced guidelines to protect organics from 'genetic trespass'. Some maize and soybean farmers who planted GM seed are even talking about class-action lawsuits against seed and chemical companies for misrepresenting their products as benign.

Gary Goldberg, chief executive of the ACGA, says that Archer Daniels Midland's demand is a wake-up call. "GM organisms have become the albatross around the neck of farmers," he says.

The corn harvest has begun in Texas and will reach the Midwest in mid-September. GM maize accounts for more than one-third of this year's grain, and few have tried to separate it out. But Japan has now announced a labelling programme, a major Mexican tortilla maker has banned GM maize, and the European Union has barred several of the most widely used GM varieties (see *Nature* 398, 736; 1999).

One-fifth of the maize harvest was sold overseas last year; Japan, the biggest customer, bought about one-third of the



Lost in a maize? Farmers face a hard time keeping GM and non-GM grains apart.

exported crop. Korea and Mexico followed, with Europe buying most of the maize gluten for animal feed.

Now that there is a market for unmodified grain, an important farmers' concern is 'contamination' of such grain by GM crops. Modified and unmodified seeds can mix in harvesting equipment, storage elevators and processing machinery.

For maize and canola, cross-fertilization by wind-borne pollen is a risk. Growers say they are starved for data on the need for buffer zones, and wonder aloud who would be liable if GM pollen transformed unmodified crops. Organic farmers, who feel especially threatened, say that even the identity of seed stock is uncertain.

Growers may not be able to comply with requests for grain segregation, warns Susan Keith, public-policy director for the National Corn Growers Association, the other main maize-farmers group, which is more supportive of GM crops than the ACGA. Keith says food processors are being overly cautious, adding that the demand for identifiable unmodified grain may make it hard for US maize farmers to sell this year's crop.

Producer groups worry about the cost of tests to ensure that crops are not contaminated. The American Soybean Association has released a statement saying that consumers and processors ought to pay a premium to cover the extra expense of certifying unmodified crops. (GM plants make up about half of this year's soybean crop.) Organic growers wonder if such testing is even possible, especially in processed foods such as soybean oil or lecithin, as transgenic crops become ubiquitous in the food supply.

"As more [organic] processors are testing the ingredients that they're receiving, we're

finding other cases," says Katherine DiMatteo, executive director of the Organic Trade Association in Greenfield, Massachusetts.

Organic farmers are afraid that GM crops will rob them of some key management tools. The spread of plants containing a toxin from the bacteria *Bacillus thuringiensis*, for example, could create resistance to *Bt* sprays amongst the caterpillars and moths that ruin maize, cotton and potatoes.

Bt or not Bt?

The Environmental Protection Agency (EPA) is concluding a series of workshops on managing fields to protect against resistance to *Bt* toxins in maize and cotton. In its position paper, the agency praises GM crops for helping to boost production and cut chemical use. The EPA cites figures from the biotechnology company Monsanto that cotton insecticide use dropped by 3.6 million litres per year after *Bt* cotton entered the market. Farmers use about 300,000 kg less of insecticide because of GM maize, the agency says. In addition, herbicide-resistant varieties have improved erosion control by enabling farmers to avoid tilling.

But the Organic Trade Association may fight the renewal of these plants' status as approved pesticides, says DiMatteo. Besides potentially eliminating a safe insecticide, she says, these crops pose unknown risks to the environment: "It's trading one bad solution for another". Expanding organic acreage would be a better idea, she says, especially because organic maize is easy to grow.

The EPA is evaluating the emerging data on harm to non-target insects such as the monarch butterfly, says Steve Johnson, EPA associate deputy assistant administrator for the Office of Prevention, Pesticides and Toxic Substances. "We really believe the science is raising some important concerns," he says.

The EPA may expand requirements for insect refuges and untreated buffer zones. In addition, companies requesting registration renewal may be asked to provide data on ecological questions such as the effect of *Bt* pollen on monarch habitat, the dose-response relationship for different butterfly life stages, and the relationship between monarch colonization of milkweed and the distance to a maize field. "To the extent that we need to be more aggressive as an agency, we will be," Johnson promises. **Sally Lehrman**