Economic Perspectives on GMO Market Segregation

by

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Abstract: Genetically modified organisms (GMO) crops have become increasingly popular with Iowa farmers over the past few years. The current genetic modifications are focused on pest management technologies. Although there were early efforts by environmental activists to disrupt the adoption of GMO technology, few concerns were raised by U.S. food retailers and consumers. The primary concern was getting European Union (EU) regulatory approval for each GMO crop variety event as late as spring 1999. The situation has changed dramatically in the last few months, and the current situation is highly uncertain.

This paper provides the economic perspective on the issues surrounding non-GMO/GMO market segregation, the potential price impacts that may materialize with 1999 corn and soybeans, potential benefits from segregating, and issues in certifying non-GMO crops. This information should be useful as producers make decisions about marketing their 1999 crop.

Economic Perspectives on GMO Market Segregation

Introduction

Genetically modified organisms (GMO) crops have become increasingly popular with Iowa farmers over the past few years. The current genetic modifications are focused on pest management technologies. Although there were early efforts by environmental activists to disrupt the adoption of GMO technology, few concerns were raised by U.S. food retailers and consumers. The primary concern was getting European Union (EU) regulatory approval for each GMO crop variety event as late as spring 1999. The situation has changed dramatically in the last few months, and the current situation is highly uncertain.

Sainsbury and other food retailers in Britain have removed all products containing soya from supermarket shelves in response to a focused campaign by consumer activists against GMO products. Other EU supermarket chains have indicated they are or soon will be shifting to non-GMO products. Japan, one of the United States' largest export markets for corn and soybeans, plans to introduce mandatory labeling of GMO foods in April 2001 and at least three Japanese food manufacturers have indicated they will be using non-GMO corn and soybeans in beverages and food products. Gerber and Heinz have announced they will only purchase non-GMO crops for their food products. Recently ADM and Consolidated Grain and Barge Co. announced they would require segregation of non-GMO and GMO corn and soybeans that they purchase beginning this fall. Other food processors and retailers have indicated similar intentions.

Farmers and grain handlers face much uncertainty as fall harvest begins. Several questions come to mind. Are there more segregated purchasing announcements forthcoming from food retailers and processors? How do we determine what is GMO and non-GMO? Do we have the handling capabilities in the current oilseed and grain marketing infrastructure to segregate without incurring large costs and creating serious bottlenecks? What will farmers be required to do to certify non-GMO crops and will non-GMO testing be required? What premiums for non-GMO or discounts for GMO may develop during the marketing year?

The sections that follow provide an economic perspective on the issues surrounding non-GMO/GMO market segregation, the potential price impacts that may materialize with 1999 corn and soybeans, potential benefits from segregating, and issues in certifying non-GMO crops. This information should be useful as producers make decisions about marketing their 1999 crop.

— by John A. Miranowski

GMOs and Identity Preservation: The Roots of the Problem

Identity preservation (IP) is not a new concept. It has become more and more common, independent of the rise of GMOs, as specialty crops such as high oil corn have developed to fill particular market niches. But GMOs bring a new motivation for indentity preservation that has distinctive features. There are at least three separate reasons why increased attention to IP issues is expected in connection with GMOs in the near future.

First, the set of GMOs approved in different countries is not the same. This is a problem for corn, where some varieties grown in the United States include transformation events not yet approved in the EU. This year's EU imports of corn from the United States have virtually dried up. The issue is not so immediate for soybeans, partly because this year AgrEvo decided to withhold commercialization of LibertyLink soybeans, which are approved in the United States but not in many overseas markets. But in view of the fact that the EU is implementing a de facto moratorium on new approvals until new EU regulations are agreed upon and implemented, this problem could last a few years and become more serious.

Second, there is a need to meet emerging GMO-labeling requirements. In addition to the existing EU regulation, Australia, New Zealand and Japan have announced plans to introduce mandatory labeling for GMO foods in the near future. For all these countries, critical tolerance levels have not yet been decided (i.e., what is the threshold level below which a food need not be labeled as containing GMOs?). Such tolerance levels are obviously crucial to the nature and costs of the IP system that may emerge, as well as for the resulting premiums/discounts that may apply.

Third, and related to the issue of labeling, there is an interest by processors and distributors to supply some segments of consumers with what they are asking for — GMO-free food. But the size of such a market is really not known at present time, nor is it known whether it is feasible to supply GMO-free food at the level of purity that may be of interest to these consumers. Indeed, some European companies that are trying to fill this market niche are careful to claim they are supplying a "non-GMO" product rather than a "GMO-free" product. In other words, the guarantee seems to be that a particular, possibly very rigorous, IP process has been followed, but this falls short of guaranteeing the final product is GMO-free. In any event, the cost of supplying non-GMO food could be substantial, given the many opportunities for GMO contamination and co-mingling that exist along the production, marketing, processing and distribution chain.

— by Giancarlo Moschini

Availability and Market Penetration of GMO Corn and Soybeans

This new generation of corn and soybean seed that enables farmers to better control pest damage could be the leading edge of a technological revolution that changes the way farmers produce crops and changes the characteristics of those crops. The uncertainty about whether these crops are the leading edge or simply a trial run that goes nowhere arises not because of scientific uncertainty—scientists are certain that many new seeds will become available—but rather because of uncertainty about the extent of consumer acceptance of food produced using genetically engineered seed.

For corn, there are four main products that express Bt, a protein that is toxic to lepitopteran insects (moths and butterflies whose larvae are caterpillars).

1. KnockOut and NatureGard. Bt toxin gene: CrylAb. Genetic event name: 176. Developed and marketed by CIBA Seeds (now Novartis), and Mycogen. Approved for sale in August 1995. Commercial sales started in 1996.
2. Bt-Xtra. Bt-toxin gene: CrylAb. Genetic event names: DeKalBt and DBT418. Developed and marketed by DeKalb (now part of Monsanto). It was approved for sale in March 1997 and commercial sales started in 1997.
3. YieldGard. Bt toxin gene: CrylAc. Genetic event names: Mon810 and Bt11. YieldGard was developed by Monsanto and Northrup King (now Novartis) and is marketed by Pioneer Hi-Bred, Cargill, DeKalb, and Golden Harvest. The Monsanto event was approved for sale in December 1996, the Novartis event in October 1996, and commercial sales started in 1997.

4. StarLink. Bt toxin gene: Cry9C. Genetic event name: CBH-351. StarLink was developed by AgrEvo. The event was approved for sale in May 1998. Sales started in 1998.

There are two corn products that are resistant to herbicides. The benefit of a herbicide-resistant crop is that a broad spectrum herbicide can be sprayed as a post-emergent herbicide without stunting the crop.

1. Liberty Link corn resistant to glufosinate-ammonium. Developed and marketed by AgrEvo. Approved in January 1997. First year of commercialization 1997.
2. RoundReady corn resistant to glyphosate. Developed and marketed by Monsanto. First year marketed was 1998.

There is one soybean product that is resistant to herbicides.

1. Roundup Ready soybeans resistant to glyphosate. Developed by Monsanto. First year of commercial production was 1996.

USDA's Economic Research Service conducts surveys of seed use by region. This table shows USDA estimates of adoption rates from 1996 to 1998.

Adoption Rates for GMO Seeds in the United States and Central Cornbelt

	Corn belt 1996	United States 1996	Corn Belt 1997	United States 1997	Corn belt 1998	United States 1998
CORN						
% acres planted with Bt seed	1.5	1.4	8.1	7.6	19.4	19.1
% acres planted with herbicide resistant seed*				0.01		0.03
SOYBEANS						
% acres planted with herbicide resistant seed**	6.9	7.4	14.7	17.0	44.3	44.2

*Excludes acreage planted to herbicide resistant corn obtained by traditional breeding but developed using biotechnology techniques that helped to identify the genes.
**Estimates reported for Roundup Ready soybeans in 1996 are much higher than estimates from Monsanto.

No reliable estimates are available for 1999, although press reports citing industry sources commonly use 55 percent of soybeans planted to Roundup Ready seed and 35% of all corn planted to Bt corn, Roundup Ready corn, or Bt-Roundup Ready corn.

Data from a 1998 USDA cost-of-production survey were used to examine the economic impact of GMO crops at the farm level. This survey was a cross-section of randomly selected corn and soybean fields in Iowa. In 1998 more than 40 percent of Iowa soybean acres were planted with GMO soybeans. Of the farmers surveyed, 52 percent said they planted GMO beans to increase yields through improved pest control. Twenty-seven percent said they used GMO soybeans to decrease pesticide costs, and another 12 percent cited increased planting flexibility. The average yield reported for the GMO soybeans was 49.3 bushels per acre. The non-GMO soybeans averaged 51.2 bushel per acre.

There are more genetic modification options available in corn. In 1998, 24 percent of the Iowa corn acres were planted to Bt corn, 14 percent had some other genetically modified seed, and the remaining 62 percent used conventional seed. More than three-fourths of the farmers using Bt corn said they did so to increase yields. Another 7 percent said they used it to reduce pesticide costs, and the remaining 16 percent gave some other reason. Increased yields with Bt corn did occur in 1998 in Iowa. Bt corn averaged 160.4 bushels per acre whereas the non-Bt corn averaged only 147.7 bushels per acre.

Even though reports indicate that about 35 percent of the 1999 U.S. corn crop was planted to GMO varieties, the usable percent of the crop that is non-GMO is uncertain. Some observers say that many fields were planted with alternating strips of Bt and non-Bt corn to provide a refuge for corn borers so that Bt resistance would not develop. The alternating strips would have cross-pollinated and would be co-mingled during harvest. Others in the industry indicate that a significant part of the refuge corn was planted in adjoining fields (maximum of one-fourth mile away, and equal to a minimum of 20 percent of the Bt acreage), which would result in less co-mingling. Either way, the effective supply of GMO corn (including old-crop co-mingled grain) may be considerably above 35 percent of the total.

For soybeans, the situation is slightly less complex. Cross-pollination is not a concern for soybeans, and refuge strips are not a problem. Reports indicate that 55 percent of this year's soybean acreage was planted to GMO varieties. Allowing for co-mingling of the old-crop carryover (which is about 12 percent of the total supply), perhaps 30 to 35 percent of the total U.S. soybean supply is non-GMO.

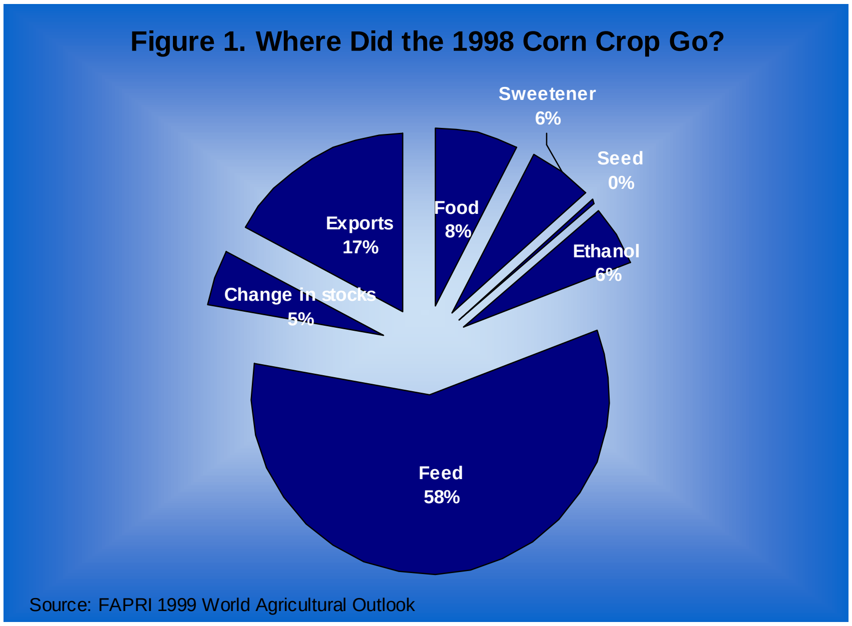
— by Bruce Babcock, Mike Duffy and Robert Wisner

Potential Market for Non-GMO Corn and Soybeans

A critical factor in determining the effects on farmers, the transportation industry, and processors from the emerging demand for non-GMO corn and soybeans is the magnitude of the new demand relative to the demand for GMO or mixed corn and soybeans. If the demand for non-GMO corn and soybeans is large relative to the supply, severe market disruptions may occur as processors scramble to locate and purchase non-GMO crops. If the new demand is relatively small, marketing of the 1999 crop may not be affected.

To date, consumers in the EU, Japan, and other countries have begun to demand that their food be produced without GMO corn and soybeans. This presents a potential problem for U.S. farmers and processors because the EU and Japan are two of the largest markets for U.S. corn and soybeans. The EU imports large amounts of soybeans and corn gluten—a byproduct of U.S. ethanol production—and Japan is a large importer of corn and soybeans.

A great deal of uncertainty exists concerning the extent to which U.S. processors and exporters will demand non-GMO corn and soybeans in 1999. However, upper-limit estimates can be made by looking at how the 1998 U.S. corn and soybean crops were utilized.



As shown in Figure 1, the 1998 U.S. corn crop was used to feed domestic livestock, exported, processed into food and corn sweeteners, or used to produce ethanol. A small portion was used to produce seed for the 1999 crop and about 5 percent of the crop was stored. The present source of demand for non-GMO corn is from the food processing industry. If the entire U.S. food processing industry switched to non-GMO corn, the market for non-GMO corn would constitute 8 percent of the corn market. If the sweetener industry joined the food processing and ethanol industries, non-GMO corn would constitute 14 percent of the corn market.

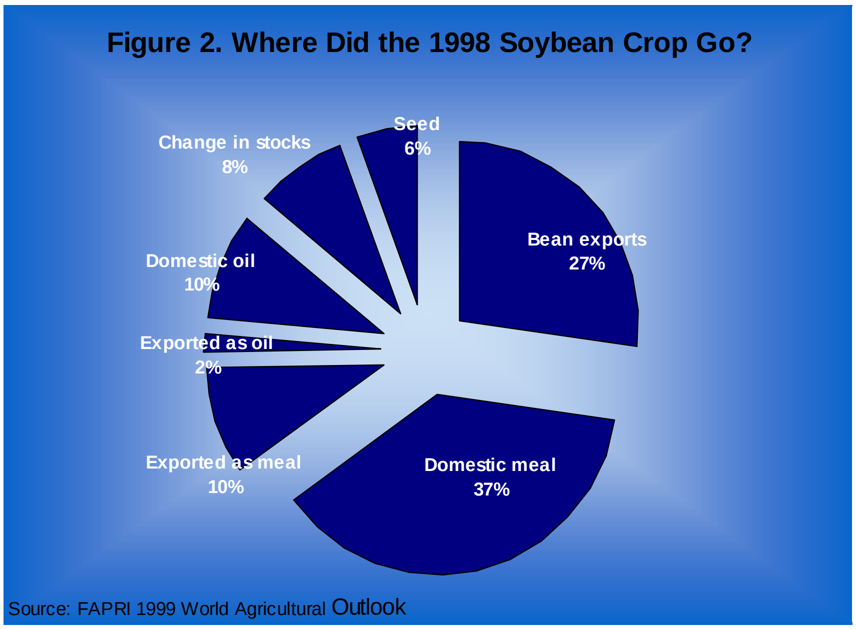
At first glance there seems to be no reason for ethanol producers to demand non-GMO corn, but a byproduct of ethanol production is corn gluten. In the 1998/99 marketing year, exports to Europe of corn gluten were worth $520 million. If European customers demand corn gluten made from non-GMO corn, another 6 percent, for a total of 20 percent, of the corn market would move to non-GMO corn. There seems to be no reason for this demand to materialize, however, because corn gluten is fed to livestock.

And finally, while 80-90 percent of exported U.S. corn is fed to livestock, a small portion is processed into food products. Hence, some international food processors may demand non-GMO corn. If difficulties arise in segregating non-GMO corn from GMO corn at export terminals, the entire export market could move to non-GMO corn, in which case another 17 percent of the market for U.S. corn could be for non-GMO corn. This implies that an upper limit on the market share for non-GMO corn is 37 percent.

The current demand for non-GMO soybeans is comprised of a portion of the soybeans exported, a portion of the soybeans crushed domestically and exported as soybean products (oil and meal) that are used in food processing, and a portion of soybeans crushed domestically and used to produce food that is exported. Figure 2 shows distribution of the 1998 U.S. soybean crop. The percentages are based on weight.

One cannot simply add the percentages shown in figure 2 to come up with a potential non-GMO soybean market because oil and meal are produced together in fixed proportions. Thus if consumers demand non-GMO soybean oil, then the soybean meal produced in conjunction with the oil will also be non-GMO even if there is no consumer demand for non-GMO meal. This constraint holds true for both soybeans crushed domestically and soybeans exported and crushed abroad.

For example, the soybean oil export market represents 2 percent of the soybeans by weight but 14.6 percent of the total domestic soyoil production. Thus 14.6 percent of the soybeans crushed domestically would have to be non-GMO soybeans if the soybean oil export market were to switch to non-GMO soybeans. If the domestic soybean oil market were to follow suit, 100 percent of the domestically crushed soybeans would have to be non-GMO. Thus, if all domestic and international food processors demand non-GMO soybean oil, 100 percent of the oil and meal markets would go non-GMO.



A more likely scenario is that a portion of the soybean export market and a portion of the soybean oil export market will switch to non-GMO soybeans. If both markets switched completely, it would constitute 31.6 percent of the soybeans produced in 1999, based on 1998 utilization patterns.

— by Bruce Babcock and John Beghin

Will an Increased Demand for non-GMO Corn and Soybeans Harm the Market for GMO Corn and Soybeans?

In the short run, the answer to this question depends on the share of production that is non-GMO compared to the share of total demand for non-GMO products.

Suppose the share of U.S corn supply that is non-GMO is 50 percent and the share of total demand for non-GMO corn is 30 percent. In this case, there is a relative surplus of non-GMO corn and much of it will be used by individuals who don't care if the corn is non-GMO. These individuals will not pay a premium or discount for non-GMO corn and producers who own GMO corn will not have to take a discount.

Suppose the proportion of total soybean supply that is non-GMO is 30 percent and that 15 percent of soybean customers want non-GMO products. As with the corn example, there is a relative surplus of non-GMO soybeans and producers with GMO soybeans will not have to take a discount.

In both of these cases, it's possible some customers who want non-GMO products will offer a premium to compensate the producer for segregating the crop, and for certifying the crop is non-GMO. These premiums are very much like the premiums for high oil corn or white corn and reflect the emergence of a niche market for non-GMO crops.

If the share of total demand for non-GMO crops is greater than the share of supply that is non-GMO, serious problems could emerge for GMO crops. For example, suppose 30 percent of the U.S. soybean crop is non-GMO but that 40 percent of soybean customers want non-GMO beans. In this scenario, there is a surplus of GMO soybeans and some of the customers who desire non-GMO products will have to be given an incentive to change their minds. The only way to do this is to offer these customers a discount to buy the GMO crop.

In the first two examples, the surplus of non-GMO crops did not cause problems because this surplus ended up being consumed by a customer that didn't care whether the product was non-GMO. In the last example, the consumer would prefer the product be non-GMO. Processors will be forced to develop a price schedule that reflects the relatively low value of GMO soybeans in the market. Producers who own GMO soybeans will find they are in a buyers' market and the discount will be applied to all GMO soybeans and not just to the proportion of GMO soybeans that are in surplus.

At harvest-time, the share of consumers who want non-GMO crops is uncertain. If this share grows, and if there is some possibility that it might exceed the share that is non-GMO, it won't make sense to store GMO corn unless it can be purchased at a discount. Hence the mere possibility that problems might emerge may be enough to cause problems to emerge. This points to an immediate need for accurate estimates of the shares of production that are non-GMO and the likely share of demand for non-GMO crops.

Estimates presented in the previous sections suggest that for corn an upper limit on the consumption share for non-GMO is about 37 percent with the most realistic scenario at about 20 percent of the total. The supply scenario indicates that about 65 percent of the corn acreage was planted to non-GMO, but given the caveats on co-mingling in the previous section, let's assume a worst-case scenario where 30 percent of the available supply is non-GMO and 37 percent of the customers want non-GMO corn.

This suggests that 7 percent of the customers will need to be offered a discount to encourage them to purchase GMO corn. The customers who switch will likely be corn processors who choose to use GMO corn and target that portion of their gluten feed and meal production to domestic users. There is a ready market for corn gluten in the U.S. livestock industry and this suggests that the necessary discount would not be all that large. If we use the more realistic scenarios discussed in the previous two sections, about 20 percent of the customers will want non-GMO corn while more than 50 percent of the available supply is non-GMO. This suggests that discounting of GMO corn will not be necessary.

The size of premiums paid for non-GMO corn will be market determined, depending on the supply of such corn, and willingness of consumers to pay for it, as well as costs of identity preservation. As the figures above indicate, resulting premiums will depend heavily on the final percent of the supply that is useable non-GMO corn. If the potential demand for non-GMO corn exceeds the available supply, it could result in substantial premiums. The size of the premiums is unknown, since at some price substitutions will occur. In the other case, modest premiums might be expected for non-GMO corn. With the non-GMO demand that currently exists, discounts for GMO corn are not anticipated, but the demand picture is fluid. Premiums being reported for non-GMO corn in some markets reportedly have been in a 10-15 cent range.

For soybeans, seed industry reports suggest that 30 percent to 45 percent of the available supply is potentially non-GMO. The market share for non-GMO soybeans estimated above is 32 percent if the U.S. export markets for soyoil and soymeal both switched over to non-GMO. However, the soybean varieties approved in the U.S. also are approved in Europe, and it is therefore not likely that the entire EU market will switch. If 7 percent to 10 percent of customers ask for non-GMO soybean products, the market should handle the situation quite easily. If EU food retailers and consumers decide to reject meat from animals fed GMO soymeal, the GMO discounts will emerge.

Like corn, soybean premiums will be market determined, and will depend considerably on the useable percentage of supply that is non-GMO. Recent trade reports indicate premiums have been in a 5-35 cent range for non-GMO soybeans at some markets. At this writing, the main part of the soybean export demand that is transitioning toward non-GMO is the food use in Japan, which is about 174 million bushels or 6 percent of the currently forecast 1999 production. South Korea, the EU, and Mexico are other markets to watch closely for GMO/non-GMO developments. Together, these three areas accounted for 64 percent of the 1998-99 U.S. soybean exports. The EU market was nearly twice as large as either Japan or Mexico.

In the long run farmers will be able to adjust the share of production that is non-GMO to suit the needs of the market. The relative prices of GMO and non-GMO crops will reflect differences in production costs.

For example, if GMO soybeans cost 10 percent less to produce and market, the lower cost will be reflected in price differentials between GMO and non-GMO soybeans. The share of total production that is non-GMO will depend on the share of total demand for the non-GMO crop at this relative price. In the scenario just described, if 40 percent of consumers are prepared to pay a 10 percent premium for non-GMO soybeans, about 40 percent of production will eventually be non-GMO. Some sectors of the grain-handling infrastructure will specialize in GMO crops and others will specialize in non-GMO crops.

— by Dermot Hayes, Sergio Lence and Robert Wisner

Transportation Issues

There are several transportation issues to be considered, in both domestic and export markets. Let's first look at domestic markets.

Assume that Iowa farmers will store all non-GMO corn and soybeans on-farm. Those who own semis likely will haul the non-GMOs directly to corn processors and soybean crushers, especially in eastern Iowa, and increasingly so in central and western Iowa.

Farmers without semis will haul their corn and soybeans to the local elevator. Elevators will be forced to handle at least four types of grains—at least two types of corn (more likely three including high oil corn) and at least two types of soybeans. This will reduce the capacity to quickly and efficiently receive grain at harvest time and will reduce their effective storage capacity. Most eastern Iowa elevators ship by truck while most western Iowa elevators ship by cycle trains that are typically controlled by processors and large merchandising firms. While doubling the number of types of grains will reduce the available storage for and supply of any one type of grain at each elevator, most elevators with rail service have enough grain storage to be able to load a 75-car cycle train (260,000 to 275,000 bushels) with one type of grain.

Turning to export markets, again assume that all non-GMO grain is stored on farms. In eastern Iowa, most of the exported grain moves by truck to the Mississippi River and then by barge to New Orleans. This will create no transportation problems for farmers and local elevators. However, barge terminals will have difficulty handling at least four types of grain at the same time. Some grain will be transferred directly from trucks into barges and then directly from barges into ocean vessels without moving through elevators. This direct transfer system will minimize the mixing problem. However, it is more costly because it requires barge terminals to tightly schedule inbound loaded trucks and trains and inbound empty barges. Likewise, export elevators will be required to tightly schedule inbound loaded barges and empty ocean vessels. In addition, the direct barge-to-ocean vessel transfer through a mid-streamer is more costly than through an export elevator.

Most central and western Iowa export grain moves by railroad. Central and western Iowa grain shipments to the Mississippi River are typically shipped in 75-car cycle trains to the Mississippi River. Grain shipped directly from elevators to export ports typically is shipped in 100-car shuttle trains (350,000 to 400,000 bushel per train). Shuttle trains require multiple consecutive trips. Doubling the number of types of grain will make it more difficult for one elevator to accumulate enough available non-GMO grain to load the lowest-cost shuttle trains.

The major problem in exporting non-GMO grain will occur at export ports. If importers strictly prohibit the import of GMO grains and country elevators rely on the farmer's word that it is GMO or non-GMO, how will the exporter know if all the grain is non-GMO grain and/or approved GMO grains? And what does the exporter do if the wrong kind of grain has been loaded in the hold of a ship while it is still at the port or even worse, in a ship that has already sailed to its import destination?

The scheduling problems at barge terminals and export elevators combined with the additional cost of direct barge-to-ocean vessels and increased risk will increase costs and widen margins at these transfer points. This raises the question of who will pay for these additional costs.

— by C. Phillip Baumel

Genetically Modified Crops: Legal Guidelines for Producers

With the consumer resistance to products containing genetically modified ingredients in Europe and Asia rising in recent weeks, and processors responding to that resistance, the focus is on how producers can protect themselves. It's especially critical for those producing non-GMO varieties. Here are some points to consider.

- Several processors have signaled that products must be kept separate and there will likely be differential pricing for GMOs and non-GMOs.

- That means exporters have to keep the products separate if they are to sell into that market.

- In turn, elevators and other first purchasers are expected to request the same of producers.

- As a practical matter, actual testing for GMO germ plasm for the 1999 crop is expected to be spotty with heavy reliance on producer representation as to which loads are GMO and which are non-GMO.

But it's not as simple as stating that a load of corn, soybeans or other crops is GMO or non-GMO. Some of the seed companies concede that their seed purporting to be non-GMO contained low levels of GMO germ plasm. Besides, contamination from pollen drift may have added to the level of GMO germ plasm in non-GMO crop. And there may have been mechanical contamination in augers, wagons, storage bins or even in the combine itself.

This adds up to a high-stakes legal problem for everyone involved. Eventually, with reliable testing at every point at which the crop is commingled—at the elevator, the processor's bins or at export vessels—it will be possible to monitor more closely what is GMO and what contains only low levels of GMO germ plasm. But the system is not there yet and won't be capable of that type and extent of testing this crop season.

If producers are asked by the first purchaser to promise that the crop is non-GMO, they should be very careful what they sign or what oral comments are made.

Here's what producers *can* realistically do.

- State that no seed represented by the seed company as GMO seed was planted.

- State that seed represented by the seed company as non-GMO seed *was* planted.

- State that care was taken in avoiding contamination in bins, augers and in the combine.

Here's what producers should be careful *not* to do.

- State that the crop in question has no GMO germ plasm.

- State that no contamination has occurred from mechanical handling and storage of the crop.

- State that no contamination has occurred from pollen drift.

There's another worry. The Uniform Commercial Code imposes implied warranties or promises in some situations. An implied warranty of fitness is imposed on the producer as seller if the seller has reason to know any particular purpose for which the goods are required if the buyer is relying on the seller's skill and judgment in providing the goods. This could very well be invoked against a producer if the conditions are met. You can disclaim or nullify an implied warranty of fitness but it takes a conspicuous, written provision in a contract.

An implied warranty of merchantability is imposed on merchants. Nearly half of the states treat farmers as merchants. One feature of this warranty is that the goods must be fit for the ordinary purposes for which they are to be used. Implied warranties of merchantability can be disclaimed or nullified by the producer as seller if done orally or in writing in language that mentions merchantability.

So what does this all mean for producers? Check immediately with likely purchasers. What are they requiring? Some may not yet know. Once the answer to that question is known, check carefully the language in any statement the producer is asked to sign. Use caution in responding orally.

Remember, even a non-GMO crop likely isn't completely free of GMO germ plasm. But the GMO level may be at an acceptably low level. A key problem—no one has set tolerances. Without tolerances, no one knows for sure where the line will be drawn.

Although testing at every point of co-mingling may be a reality next year or later, for 1999, identity preservation is likely to be attested to by certification. The Office of the Iowa Attorney General and Iowa State University have developed a proposed voluntary certification program for producers wishing to segregate non-GMO hybrids in response to a premium offered for crops meeting the purchaser's requirements. Form 1 can be completed in part by producers before delivery to the first purchaser with the form completed at delivery. Form 2 is for first purchasers (such as country elevators) to certify as to their handling of the crop and the fact that they have on file producer certifications.

— by Neil E. Harl

All authors are faculty members in the Iowa State University economics department.
September 30, 1999

PROPOSED UNIFORM CERTIFICATION

(PRE-DELIVERY PORTION OF CERTIFICATION)

I, ________________________________, residing at _____________________________________
(Name of Producer) (Address)

___________________________, have delivered ___________________ in the amount of _______ bushels.
(corn or soybeans)

The delivery(ies) are represented by scale ticket numbers and sample numbers which will be specifically identified after delivery is completed in the "Post-Delivery" portion of this Certification.

With regard to the above-referenced grain, by placing my initials in the corresponding blank, I hereby certify and affirm the following:

__________ 1. The above-referenced grain was grown from the following varieties of seed:

	Seed company	Variety No.
a.	___________________	___________________
b.	___________________	___________________
c.	___________________	___________________
d.	___________________	___________________
e.	___________________	___________________;

__________ 2. I used ordinary care to clean my harvesting equipment prior to harvesting the above-referenced grain.;

__________ 3. I used ordinary care to clean my on-farm storage facilities prior to placing the above-referenced grain in said facilities;

__________ 4. I used ordinary care to clean the transportation delivery vehicles prior to using said vehicles to deliver the above-referenced grain; and

__________ 5. (Other) ____
____
____

No other warranties, express or implied, including implied warranties of fitness and implied warranties of merchantability, are made as to the commodity in question with respect to the commodity's nature, genetic composition, fitness for a particular purpose or use or otherwise.

____ _____________________
Name Date

____
Address

____ ____
Telephone No.

Source: Office of the Iowa Attorney General and Iowa State University.

(POST DELIVERY PORTION OF CERTIFICATION)

The delivery(ies) made pursuant to this Certification are evidenced by scale ticket number(s) ___________________________, and sample number(s) ___________________________.

____ _____________________
Name Date

____
Address

____ ____
Telephone No.

APPROVAL STATUS OF TRANSGENIC CORN HYBRIDS

Last updated March 10, 1999

EVENT	REGISTRANT	TRADE NAME	PROPERTY	APPROVAL STATUS
Event 176 **Approved**	Novartis	NaturGard™ KnockOut™	Insect Resistance	EU Approval 12/96
Bt11 **Approved**	Novartis	YieldGard™	Insect Resistance	EU Approval 12/96
MON810 **Approved**	Monsanto	YieldGard™	Insect Resistance	EU Approval 6/98
T25 **Approved**	AgrEvo	LibertyLink™	Glufosinate Tolerance	EU Approval 8/98
MON GA21	Monsanto	Roundup Ready Corn™	Glyphosate Tolerance	Currently under UK review
T14*	AgrEvo	LibertyLink T14™	Glufosinate Tolerance	90/220 application withdrawn, currently under Novel Label Feed Safety review
MON 810 + T25	Pioneer	YieldGard™ LibertyLink™	Stacked - Insect Resistance & Glufosinate Tolerance	Netherlands approval pending in 1999
DLL 25	DeKalb	DeKalb GR™	Glufosinate Tolerance	To EU from France early 1999
DBT 418	DeKalb	Bt Xtra™	Insect Resistance	To EU Commission 6/98
MON 810 + MON GA 21	Monsanto	YieldGard/Roundup Ready Corn™	Stacked - Insect Resistance & Glyphosate Tolerance	Not Pending
CBH 351	AgrEvo	Starlink™	Insect Resistance	Import clearance filed by the rapporteur country (Netherlands) in early 1999; Novel Food submission being prepared for spring 1999.

* Registration application for event T14 under EU regulation 90/220 has been withdrawn. Application for feed safety approval (Netherlands) under review.

Source: National Corn Growers Association.

The following hybrids have NOT been approved by the European Union (EU):

Pioneer Hi-Bred Int'l.
33Y11
38B22
34T14

DeKalb Genetics
387RR
448RR
493RR
512RR
520RR
545RR
566RR
574RR
580RR
589RR
607RR
626RR
658RR
560GR
566GR
574GR
626GR
687GR
493BtX
566BtX
595BtX
618BtX
626BtX

Garst
8756RR
8557RR
8349RR
8896BLT
8773BLT
8692BLT
8600BLT
8585GLS/BLT
8539BLT
8481BLT
8366Bt/LL
8692LL
8539LL
8481LL

Cargill Hybrid Seeds
5021Bt/LL
7821Bt/LL

Pfister Hybrids
1545RR
1553RR
2653RR
3053RR
2653Bt/RR

Asgrow Seed Co.
RX738RR
RX740RR
RX770RR
RX770RR/YG

Agrigold Seed
6413 RR
6443 RR
6483 RR
XA 2814 RR
XA 4840 RR
XA 6819 RR
XA 5844 BTRR
6605 LL

Wyffels Hybrids
W1927
W7284

Beck's Hybrids
5229RR
5409RR
5727RR
5229RR/Bt

Croplan Genetics
562Bt/LL
592Bt/LL
692Bt/LL
D5862Bt/LL
466RR
496RR
566RR
666RR
666RR/BT
676RR
D5862LL
286LL
336LL
402LL
542LL
622LL
722LL

Growmark (FS)
6860RR
6760RR

Great Lakes Hybrids
4701RR
5701RR
5901BtRR

Merschmans
M-8112

Schlessman
SX-698RR

Trisler
T-5272RR

NC+
3544LL
4799LL
5277LL
2019R
4339R
5029R
4799LL/IMT/Bt

Golden Harvest
H-2404LL
H-2553LL

Burrus Bros. & Assoc. Growers
671RR
575LL
86LL

LG Seeds
LG 2632LL
LG 2582RR

Gutwein
2609LL

*Any Roundup Ready, Starlink, or Bt Xtra Hybrid from any company is unapproved at this time.

Over 99% of LibertyLink (T25 event) and warranted (Bt11 event) hybrid seed corn that can be treated with Libertyâ Herbicide has been APPROVED for export to the European Union and Japan. The LibertyLink hybrid seed corn based on the T14 event has not been approved for export to the EU. In addition to the hybrids identified above, the following companies may be selling LibertyLink T14 hybrids. The volume from these companies represents less than 13,000 units or roughly 0.004% of the LibertyLink seed corn available in 1999. If you have purchased LibertyLink seed corn from one of these companies, there is a chance it could be based on the T14 event, and therefore not approved for export to the EU. If you have questions regarding the export status of the grain resulting from your LibertyLink seed purchase, please contact your seed company, or if you need assistance contacting your seed company, please call 1-877-GoLiberty.

AgriPro Seeds Inc.
AgVenture
Akin Seed
Ames Best Hybrids
Battleground Hybrids
Bo-Jac
Brown Seed Farm
Cornelius Seed
Crow's Hybrid
Dahlco
DEF Seeds
Doebler Hybrids
Fontanelle Hybrids
Gold Country
Gray's Certified
Hawkeye Hybrids
Hoegemeyer Ent.
Hughes Seed
Jung Seed
Kaltenberg Seed
Kruger Seed
Kussmaul
Legend
Midwest Seed Genetics
Ottillie Seed Farms
Patriot Seed
Producers Hybrid
Renze Hybrids
Sand Seed Company
Seed Cons.
Select Seed
Schlessman Seed Company
Sieben Hybrids
Steward Seed
Stine Seed Company
Top Farm Hybrids
Trelay Farms
Triumph
Wilson Seeds

Proposed Purchaser Certification Statement

I hereby certify and affirm that the lot of ______________________ which is the subject
(corn, soybeans)
of this statement, described as containing approximately _______________ bushels and sold this ______ day of __________________, 1999, was harvested from seed represented by the seed supplier as non-genetically modified, and that the commodity in question was not the product of seed represented by the seed supplier as genetically modified. The undersigned has on file certifications of producers indicating the variety planted in each case and certifying that ordinary care was used in harvesting, handling, drying and storing the commodity in question to avoid contamination with genetically modified varieties. The undersigned further certifies that reasonable care was used in receiving, handling, storing and shipping the commodity in question.

No other warranties, express or implied, including implied warranties of fitness and implied warranties of merchantability, are made as to the commodity in question with respect to the commodity's nature, genetic composition, fitness for a particular purpose or use or otherwise.

____
Purchaser

____
Address

____
Date