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A SEED INDUSTRY RESPONSE TO ISSUES RAISED BY THE PRESENCE OF BIOTECH SEED IN CONVENTIONAL SEED LOTS

EXECUTIVE SUMMARY

Commentaries on the presence of biotech seed in conventional seed lots have often mischaracterized modern seed production practices and offered recommendations unsupported by science, regulation, and modern farm practices.

The American Seed Trade Association (ASTA) believes the following with respect to the presence of biotech seed in conventional seed lots:

1. The presence of trace amounts of commercially-approved, biotechnology-enhanced seed in conventional seed lots is accepted in crop production and presents no risk to humans or the environment.

2. Fully tested, deregulated biotech seeds are not "contaminants." They are free to move through U.S. commerce, the same as any other seed.

3. Fully tested, deregulated biotech seeds have neither special rules regarding handling nor threshold levels to be maintained in food or feed in the U.S.

4. Because fully tested, deregulated biotech seeds move through the same channels as conventionally bred seeds: some low level of commingling is fully understood and expected.

Some reports have made two primary assertions--both unfounded; namely:

1. That if deregulated traits can be found in food or feed, it would be "minimally prudent" to assume that experimental, regulated traits also are present in the food and feed supply.

In response, the seed industry asserts that these experimental traits are stringently regulated precisely to prevent this sort of commingling.

2. That biotechnology is a threat to the organic industry.

On the contrary, biotech crops pose essentially no threat to organic certification. According to existing regulations, farmers growing for organic certification can't plant biotech crops. But there are no restrictions on what is allowable in terms of unintended biotech presence. This issue is one that seed companies and farmers will continue to address using appropriate economical solutions and market approaches.

The American seed industry has had a long and rich history of producing quality products that meet rigorous seed purity standards. Federal and international seed purity standards set stringent guidelines that allow the commingling of commercially-approved seeds. Working within these standards, our industry will continue to fulfill its responsibility for producing high quality, economically viable seeds that benefit farmers, consumers, and our global food production system.

Introduction – Regulated vs. Deregulated Traits
The development of seeds that contain biotechnology traits is regulated by three agencies of the federal government. Developers of such seeds must conduct an extensive array of studies to demonstrate the health and environmental safety of their products prior to commercialization. These studies are reviewed by the U.S. Food and Drug Administration (FDA), the U.S. Department of Agriculture (USDA) and in some cases the U.S. Environmental Protection Agency (EPA). During this developmental and testing phase, seeds containing the biotech trait are not to be commingled with conventional seeds, and

extensive protocols are in place to prevent commingling.

When regulators receive enough scientific data to conclude that biotech seeds are substantially equivalent to and therefore as safe as their conventional counterpart, the seeds are de-regulated. De-regulation means just what it implies. There are no special rules concerning the planting of de-regulated seeds. Likewise, food safety regulations treat the presence of de-regulated transgenic material in food or feed no differently than any other agricultural commodity because they are considered as safe as their conventionally bred counterparts. Once a biotech trait has been de-regulated, the seeds and grain may enter the commodity system in countries where the trait is approved and typically are handled the same as conventionally-bred seeds and non-GM grain.

The Presence of De-regulated Biotech Seed in Conventional Seed Lots Are Not "Contaminants"

The presence of biotech seed in conventional seed lots has been characterized by some as "contaminants." Using the word "contaminant" to depict the presence of biotech seed in conventional seed lots unnecessarily confuses the public by implying that the U.S. seed industry must segregate de-regulated biotech seeds from conventionally bred seeds when, in fact, there is no regulation that requires segregation and no science that would justify it. Such claims disregard the seed industry's use of stringent purity standards in its production systems for many years and the vast differences between handling procedures for regulated and de-regulated biotech traits. It is erroneous to assume that if de-regulated biotech seeds can be found in non-biotech seed bags, then regulated, experimental seeds are present as well.

Industry Purity Procedures Pre-date Biotechnology

While there are no requirements to segregate deregulated seeds, the U.S. seed industry does strive to serve all segments of its customer base, and some customers choose to plant non-transgenic seeds. Seed companies are providing such seeds in adherence with industry-wide purity standards that were in place long before biotech seeds were developed.

The seed industry assures seed varietal purity by production processes based on best management practices, quality assurance processes, and quality control checks. These standards ensure a very high level of purity, but the industry and its customers know that it is impossible to ensure that a shipment of conventional seed is 100 percent free of off-types, including biotech traits. Just as a low level of off-types is expected in a bag of a specific hybrid or variety, it is possible that conventionally-bred seed will have a low level biotech presence.

If a higher degree of seed purity is requested and the customer is willing to pay for such an extra measure of purity, the seed industry can take steps to further reduce commingling. Even then, however, when millions of tons of conventional and de-regulated biotech seeds are produced, shipped and stored each year, it is inevitable that some genetic and physical commingling will still occur at low levels.

Requirements for Regulated Seeds

Unlike de-regulated commodities, which are grown on millions of acres, regulated traits in development are grown on small test plots. Consistent with current rigorous regulatory requirements, these plots are isolated from de-regulated material and measures such as shoot and tassel bagging may be in place to control pollen flow. The American Seed Trade Association supports these rigorous and mandatory precautions for regulated material and agrees that biotech traits that have not met the safety criteria for food and feed use should not be tolerated in commodities.

Crops Grown for Specialty Uses

A number of pharmaceutical and industrial traits are now being tested, with the intention to extract specialty proteins from plants and use them to make high-value end products. Even when these high-value crops receive regulatory approvals, they are grown in very limited quantities, on small plots, by only a few experienced growers specifically selected by the manufacturers for their ability to adhere to rigorous containment procedures. These growers readily agree to maintain proper procedures because they know they derive significant financial benefit from producing a high-value, premium crop, which may be rendered valueless if it exceeds specifications for material from conventional or other biotech crops.

None of these rigorous requirements apply to de-regulated crops. When growers farm conventional crops or crops with deregulated traits, they can use the same planting and harvesting equipment, storage facilities and shipping procedures. Consequently, some level of commingling is inevitable. Since de-regulated biotech seeds have regulatory clearance in the U.S. and are considered to be as safe as conventionally-bred seeds, there is no safety concern that pollen may be transferred from one crop to another; and no need to ensure that volunteer crops are destroyed for safety purposes in following years.

But with regulated crops, the situation is almost the direct opposite. There must be segregation or extensive cleaning of equipment, storage facilities and shipping vessels; every practical measure must be taken to avoid pollen transfer either from or to the site; and volunteer crops must not be allowed to grow.

Government Oversight of Field Trials

Field trials for experimental traits are regulated by the USDA's Animal and Plant Health Inspection Service (APHIS). Field testing of regulated crops is conducted in phases. Field testing typically begins with a small number of plants contained in greenhouses and

APHIS

expands to small field plots as more data are generated. Developers conduct initial testing in USDA-approved laboratories and greenhouses that meet or exceed USDA standards. After those evaluations, trait developers seek APHIS approval to conduct confined, isolated, small-scale field trials typically consisting of only a few dozen plants. Only when the required information has been gathered can developers receive permission to move to larger scale field trials, but the material is still regulated. APHIS evaluates each request for a regulated field trial on a case-by-case basis and develops appropriate procedures for each trial.

APHIS typically requires a combination of procedures to ensure that regulated biotech traits are not commingled with conventional seed. These procedures include:

- Proper isolation - The regulated crop must be planted in a defined area with a buffer between it and its conventional commercial counterpart. The distance of the buffer strip varies depending on the trait being tested and the type of crop. For pharmaceutical and industrial traits, APHIS requires a one-mile buffer.
- Crop destruction - All seeds and plant material from the field trial must be destroyed, with the exception that developers may collect and safely store enough plant material and seeds to continue testing.
- Equipment hygiene - Any equipment used in planting or harvesting the field trial must be thoroughly cleaned before it can be used for other trials. In some cases, equipment may be dedicated solely for the trait being tested.
- Pollen Containment - In addition to buffer strips, other procedures may be required to minimize out crossing. For example, corn tassels may be removed or covered with bags to control pollen from moving off site.
- Control of Volunteer Plants - After a trial has been completed, the site must be monitored for volunteer plants the following season and procedures implemented to destroy them. Also, no crop of the same species can be planted on that site the following season. This prevents any volunteers from the field trial from being harvested accidentally.

APHIS

In addition to these in-field procedures, APHIS requires a number of restrictions on the shipping and handling of seed and plant material to ensure against release into the environment.

Since 1986, when the first biotech field trials were begun, there have been tens of thousands of regulated field tests for various traits, primarily agronomic. Because seed developers have adhered rigorously to prescribed testing measures for regulated trials, these field trials have not resulted in any known commingling with conventional seeds. Now, in an effort to achieve more flexibility to anticipate and keep pace with new types of biotech seeds, such as pharmaceutical and industrial traits, APHIS is proposing to enhance its regulations. By formalizing its authority under the Plant Protection Act, APHIS will in all likelihood add new restrictions for field testing and strengthen the regulation of certain traits that may be perceived to have higher risk. Some traits may never reach the de-regulated status and always be managed as a regulated event.

ASTA supports APHIS' intent to review and strengthen its regulations. The current system has been effective and protective, but the proposed changes will give APHIS a stronger statutory footing for its science-based oversight and will provide increased assurance that unfamiliar regulated biotech traits will not commingle with the commercial seed supply.

Presence of De-regulated Material Does Not Mean Presence of Regulated Material

Given the preceding, it is clearly incorrect to conclude that because de-regulated material has been commingled, this must also be the case for regulated material. The procedures followed and the precautions taken in each case are entirely different and there is no evidence that the commingling of regulated traits with other crops has occurred. Moreover, the proposed changes in regulation will provide further assurances that commingling of regulated traits will remain highly unlikely.

Biotech Seeds Do Not Threaten Organic Markets

Biotechnology poses essentially no threat to organic certification. When the United States was in the process of adopting standards for organic certification, organic producers requested that the planting of biotech seeds not be allowed. Thus, even though some biotech crops control important insect pests without the use of chemical insecticides, they were not approved for use in organic operations. However, contrary to what some may believe, U.S. organic standards do not prohibit the adventitious or unintended presence of biotech-derived material in organic produce.

USDA's National Organic Program website http://www.ams.usda.gov/nop/Q&A.html#Production/Handling explains the regulatory policy:

"This regulation prohibits the use of excluded methods [which include biotech varieties] in organic operations. The presence of a detectable residue of a product of excluded methods alone does not necessarily constitute a violation of this regulation. As long as an organic operation has not used excluded methods and takes reasonable steps to avoid contact with the products of excluded methods as detailed in their approved organic system plan, the unintentional presence of the products of excluded methods should not affect the status of an organic product or operation."

U.S. Organic Standards

In other words, an organic producer is not prohibited from selling his or her produce as certified organic if it contains unintentional or adventitious levels of biotech material as long as the producer has followed the certification process. The product could still be certified organic and the producer could realize any premiums that such a certification would afford in the marketplace. In order to sell their crops as organic under U.S. regulations, growers must be able to demonstrate that they did not intentionally plant a biotech variety.

The National Organic Program has not established any threshold for the presence of biotech material in organic food as it does for residues of other prohibited substances, such as pesticides. If an organic crop is unintentionally contaminated by a pesticide, the

crop cannot be sold as organic if the pesticide residues exceed five percent of the amount allowed on non-organic foods. USDA established no such yardstick for the presence of de-regulated biotechnology traits in organic material. It is incongruous that some call for a zero tolerance for biotech materials, which are de-regulated and have been found to be as safe as conventionally derived material, when allowances are made for residues of other non-organic materials.

Biotechnology has had no effect on the vast majority of organic growers, who tend to specialize in higher value fruit and vegetable crops. In North America, the primary biotech food crops to be commercially planted are canola, field corn and soybean. In 2003, organic production accounted for only 0.22 percent of the acres devoted to those three crops. In contrast 60 percent of the acres of those crops were planted with biotech seeds – 80 percent of soybeans, 70 percent of canola and 41 percent of corn planted in the U.S. and Canada in 2003 were biotech. Farmers choose biotech seeds because they help them cut back on pesticide usage, reduce tillage trips and fuel consumption, produce higher yields and reduce costs.

It is also important to note that there are a growing number of companies in the American Seed Trade Association that are focused on providing the organic producer with high quality organic seed varieties produced using organic standards. These companies are certified under current National Organic Program requirements to produce certified organic seed and continually endeavor to meet the market needs and desires of organic producers.

Given that the majority of farm producers are choosing to plant biotech seeds, it seems inappropriate to impose the large costs of a zero tolerance policy on the entire seed industry, and ultimately the consuming public. This is especially true when the presence of biotech traits poses no certification restrictions or safety issues and there are a number of seed companies that are successfully meeting the requirements of the organic niche market and its customers.

A survey conducted by the Organic Farming Research Foundation in 2003, indicates that organic growers with the potential to be affected by neighboring GM crops have felt very little adverse impact. The survey shows that the vast majority (92 percent) have not incurred any costs or losses due to GM crops having been grown near their crops. Only 4 percent reported any lost organic sales or downgrading of produce as a result of GM adventitious presence. The other 4 percent incurred small additional costs for testing only.

Lowering Adventitious Presence Increases Seed Costs

The seed industry understands that there is a market for conventional seed. Indeed, a significant minority (about 40 percent) of non-organic crop acres are planted with conventionally bred seeds. For that market, the seed industry strives to deliver products that are of high varietal purity and, as a result have low presence of biotech traits. The quality control practices that seed companies have used for many years minimize the amount of off-types.

As discussed previously, in seed production it is impossible to ensure 100 percent purity. It is possible to achieve lower levels of off-types, including biotech off-types, by employing a number of strategies such as:

- ☐ increasing field isolation distance
- ☐ increasing the isolation time
- ☐ increasing male field border rows
- ☐ harvesting fields separately
- ☐ cleaning equipment more thoroughly
- ☐ moving the seed production to areas where the commodity crop is not grown

However, these measures increase the cost of producing seed while still not ensuring zero tolerance. A recent study by Dr. Nick Kalaitzandonakes of the University of Missouri-Columbia explores the economic impacts of variable thresholds on the global corn seed industry and its customer base. Assuming co-existence of GM and non-GM crops, researchers used industrial and economic simulation models that were calibrated with data from company records and practices of seed production facilities in the Midwest in order to quantify the potential economic impact of complying with various adventitious presence threshold levels. The research found, through a survey of seed companies worldwide, that a company's average per unit costs would increase by 5-15 percent by going from a 2 percent to a 1 percent threshold. At a stricter 0.3 percent threshold, a company's average per unit cost would go up by 27-42 percent.

Some growers may be interested in obtaining seed with extremely high levels of purity and may be willing to pay the cost for such seed. Since the needs of growers vary widely, demands regarding seed purity are more appropriately managed at the individual customer level, not as an overall national standard.

Having a low level of off-type material in seed won't be of consequence to a grower who is not planning to meet a specific contract or marketing standard, yet that grower would pay a higher cost for 'traditional' seed if a more stringent standard were broadly applied. Additionally, a grower who isn't taking appropriate measures to meet a contract or market quality standard would not benefit from a specific varietal standard.

Rather than strive for unobtainable levels of seed purity that would increase costs to everyone, the seed industry believes the best course is to serve the vast majority of customers, who simply want high quality seed at an economical price.

Biotechnology's Effect on Foreign Markets

According to the report, "Global Status of Commercialized Transgenic Crops: 2003," by the International Service for the Acquisition of Agri-Biotech Applications (ISAAA), farmers planted 67.7 million hectares of biotech crops in 2003, an increase of 15% from 2002. For the seventh consecutive year, farmers around the world continued to increase the amount of biotech crops they planted in 2003. In addition, 7 million growers planted biotech crops in 17 countries in 2003, up from 6 million growers in 16 countries in 2002.

With increased acceptance of biotech crops worldwide, the global market for GM crops

such as corn, soybean, and canola continues to grow. The global market potential for biotech crops and products remains strong despite existing barriers to the export of these crops to some parts of the world. ASTA supports the establishment of a science-based process for acceptance of adventitious presence of traits that have an approval by a member country of the Organization of Economic Cooperation and Development (OECD). This process would allow a realistic level of biotech seeds to be present in shipments of conventional seeds and would largely remove any barriers to the transport of U.S. seed and crops.

The Banking of non-GM Seeds
Some commentators have specifically advised USDA to establish a reservoir of seeds for non-engineered varieties of major food and feed crops free of transgenically derived sequences.
In response, the American Seed Trade Association points out that the National Plant Germplasm System, (www.ars-grin.gov/npgs), which is part of USDA's Agricultural Research Service (ARS), maintains a storehouse of seed, ranging from wild relatives of agronomic crops to modern improved varieties. Much of the seed in the facility was collected prior to commercial use of genetically engineered crops. Periodically, the seed samples must be increased to assure viability and provide enough for further research and distribution. These increases are carried out under controlled conditions to maintain the integrity of each germplasm entry in the system. In addition, there are international repositories for nearly every major crop operating under similar procedures to preserve and maintain germplasm resources.

University, Governmental and Private Research
There have been calls on the USDA and land grant (agricultural) universities to reinvigorate the public plant-breeding establishment to help ensure a supply of pure seed of traditional crop varieties.
Many universities are actively engaged in germplasm improvement in both major and minor crops, and routinely collaborate with private breeding programs to ensure that discoveries are incorporated and available in commercially available seeds. These public programs are focused on improving seed varieties, and generally embrace both traditional and advanced technologies, including biotechnology.
The availability of traditional and biotech-improved seeds depends upon market forces that reflect the demand for traditional and biotech varieties. At the present time, demand for traditional and biotech seeds continues and there is choice in the marketplace.
Growers are aware that traditional seed varieties may contain a low level presence of approved biotech traits, and if they need varieties produced to more stringent standards, such as to meet a contractual agreement or marketing quality standard, they can contract with a seed supplier to produce traditional seeds consistent with their needs. In reality, this is rarely done, since the majority of growers planting traditional seeds are currently meeting their contractual commitments.

Summary
In summary, the causes of seed commingling are already well understood, both via hybridization and via mechanical processes. Additionally, transgenic plants currently being commercially grown have been extensively reviewed by the USDA, FDA and in some cases EPA, with regards to food and feed safety and their impacts on the environment. Since these plants have been shown to be substantially equivalent to their conventional counterparts, the commingling of biotech traits in conventional seed is well understood and equivalent to the commingling within conventional seed.
Extensive rules are in place to ensure that crops in development do not commingle with the food and feed supply. Biotech plants not designed for use as food or feed, such as industrial and pharmaceutical crops, are a unique case and specific strategies for appropriate containment are being implemented. Because of distinct differences in the way regulated and de-regulated traits are handled, it is not appropriate to suggest that the presence of de-regulated traits signals that regulated traits are likely to be in the seed supply.
Organic production is a process based system and under the US regulations, organic growers must simply be able to demonstrate that they did not intentionally plant a biotech variety. Therefore, the growing use of biotech-derived crops should not impact the ability of organic producers to market their product as organic.
The demand in some international locales, such as the EU, for GM-free seeds is a frustration in that de-regulated seeds, approved for import, may be rejected. However, the market demand for non-GM is a small fraction of overall commodity sales. The establishment of realistic adventitious thresholds would help to remove existing trade barriers. Setting thresholds at an unrealistically low level would serve only to increase seed costs, and ultimately food costs, for everyone.
Large repositories of non-GM seeds are stored throughout the world, providing assurances that seeds developed before the advent of biotechnology and non-GM seeds developed since that time remain available for future breeding purposes.
The American seed industry has a long and rich history of producing quality products that meet rigorous seed purity standards. Our producers are capable and willing to supply seeds produced to even more rigid standards for customers who need and are willing to pay for such seeds. While we will strive to meet those demands, we stake our reputation on producing high quality, economically viable seeds that make the most sense for the greatest number of customers.
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A US PERSPECTIVE ON GM CULTIVATION AND LABELLING

The issues embodied in the title of my comments, "A US Perspective on GM Cultivation and Labeling" are probably known by most of you. A quick review of the data on acres planted to biotech crops in the United States and of United States government policy provides a concise answer on the perspective of the United States. The United States has led the world not only in the development of important biotechnology traits that have been safely incorporated into crops, but also has led the world in the cultivation of these crops. However, given the differences in approaches among countries on these issues, I think it is quite appropriate to share thoughts on them. I thank the conference organizers for including us in these discussions. I will divide my comments into two sections – cultivation and tracing and labeling.

Permit me to begin with some comments about the seed industry and its contribution to improving agricultural productivity, quality of life and the environment.

The seed industry is one with a rich heritage and a record of outstanding contributions to the productivity of agriculture and to improving the welfare of people and the environment around the world. Over the past century yields in the U.S. have increased five-fold for corn, three-fold for wheat, and four-fold for cotton. Such gains have not been confined to the U.S. The International Seed Federation reports that between 1910 and 2000 wheat yields in France increased five-fold; that in India wheat yields increased three-fold between 1960 and 2000 and that between 1950 and 2001 maize yields in South Africa increased almost three-fold. These gains were the result of investments in research and development and of the willingness of farmers to adopt new technologies. It goes without saying that without these gains hunger would be greater as would be the concern about our rural environment.

But, there is still more to do. As great as our accomplishments have been, millions of people are still hungry and malnourished and the environment is being stretched in far too many places by attempts to produce more food on fragile land. It is my belief that it is imperative that we continue our past successes into the future and that modern biotechnology should and will be a major contributor to our future progress.

With the world's population recently having reached six billion people and expected to reach seven billion in another 10 years or so; with organizations such as the International Food Policy Research Institute projecting as many as 100 million malnourished people in Africa in 2020; with increasing limitations of land and water resources; and with the need to protect the rural environment; biotechnology and the benefits it offers should be welcomed and embraced.

However, achieving a global consensus supportive of a harmonized approach to the introduction, cultivation and marketing of biotech products remains elusive. Many still try to delay or even derail the adoption of these new agricultural technologies. Success by those who would derail the advancement of such agricultural technologies would only relegate more people to hunger and low incomes for a longer period of time and further jeopardize our rural environment.
Fortunately, despite the efforts of some, the global adoption of biotechnology crops is a phenomenal success story. Led by the United States, six biotechnology crops are now being planted by seven million farmers on 167 million acres in 18 countries on six continents. These 18 countries include Brazil where until this year production of Round-up Ready® soybeans was not officially approved. Brazil recently extended this approval to the 2005 crop. The principal biotech crops include corn, cotton, canola and soybeans. I am sure that Clive James will provide more details tomorrow on global adoption rates.

Importantly, of the seven million farmers benefiting from these crops, 85 percent were resource poor farmers in China and South Africa. These benefits include: 1) the saving of time, water, pesticide costs and labor; 2) increased health and safety through the reduced handling of chemicals; 3) improved yields and profits and 4) less impact on the

environment from reduced chemical usage. And, while we tend to think of these as farmer benefits, many of them are of direct benefit to the rural community and indirectly to consumers through environmental and other benefits.

Thus, despite the efforts of some to slow the adoption of the technology, its acceptance is moving ahead at an unprecedented pace - and rightfully so.

As we turn to the US position on cultivation of biotech crops, one does not have to look beyond the numbers. As noted, the US has led the world in the introduction and cultivation of biotech crops. We plant a combined total of over 118 million acres of soybeans, corn, cotton and canola. Approximately 80 percent of U.S. soybeans and 38 percent of U.S. corn acres are now planted with biotech seeds. And, the numbers continue to grow. We plant insect resistant crops. We plant herbicide resistant crops. We plant crops with stacked traits. Although the number of cultivated acres and the number and combination of traits tell a compelling story, they are not the whole story. There is more.

First, there is the belief in the United States of the importance of a science-based regulatory system to review these new tools for agricultural and food solutions. The science based regulatory system in the U.S. involves three federal agencies – the United Stated Department of Agriculture (USDA), the Environmental Protection Agency (EPA) and the Food and Drug Administration (FDA). These bodies are charged with a variety of mandates, most importantly, ensuring food safety or protecting the environment or both in the case of EPA and pesticidal products.

The FDA is responsible for the safety and labeling of most human or animal whole foods and food ingredients, including food additives. Since 1992 – more than a decade now - the FDA has determined that foods from plants produced through biotechnology are, as a class, as safe as those from plants developed through conventional breeding. Therefore, they should be regulated the same way as any other foods entering the market.

The Animal and Plant Health Inspection Service (APHIS) of the USDA is the primary agency regulating the safety testing of biotechnology-enhanced plants that are not insect- or disease-resistant. An APHIS permit must be obtained or certain performance standards must be met before field testing a biotech plant. Commercialization occurs through a deregulation process after extensive review of environmental effects.

The EPA has primary jurisdiction over crops that are insect- or disease-resistant. Prior to field testing, EPA officials must usually review and approve permit applications of crop plants engineered to contain pesticidal properties. These pest traits in plants are called "Plant Incorporated Protectants" or PIPs. Field testing of PIPs not reviewed by EPA are reviewed by APHIS. Commercialization of PIPs occurs through an EPA product registration process, which usually is limited in time, after which a renewed registration must be sought.

Second, we have a strong belief in stewardship at all steps of the food chain. Stewardship programs range from continuing education, to insect resistant management programs, to Market Choices® -- a certification program to help direct proper channeling of biotech grain. Support of these efforts, support for the development of biotechnology and support for the growing of biotechnology crops, comes from all stakeholders in the food chain. Within all of this there is also a sensitivity to the expectations of customers and end users of products produced using modern biotechnology.

Third, there is the explicitly stated belief of our government officials that modern biotechnology not only is properly regulated and safe, but also that biotechnology offers a valuable tool to food exporting and to food deficit countries as well. As Lester Crawford, Commissioner of FDA has noted, "Based on two decades of experience with bioengineered foods and overwhelming scientific data that these foods are safe to eat, we believe that biotechnology can offer a safe and important tool for both exporting and food-deficit countries".[1]

Before making the next comments, I must say that if I were writing them after hearing the comments that have been made by speakers before me, I would probably not be so optimistic. However, I will take the risk and go forward with the comments I have prepared.

There are now indications that positions may be shifting in Europe. Just recently it was announced that European Commission officials would present agricultural ministers with a proposal to lift the ban on GM sweet corn as part of a drive to get the product legalized across the region. It was also announced that Germany plans to authorize the commercial cultivation of maize later this year which would be a major policy shift reflecting the acceptance of biotechnology. There were of course some rather stringent conditions coupled with the announcement. Last week Poland confirmed that it will overturn its ban on the sale of genetically modified food and the cultivation of GM crops once it accedes to the European Union (EU). Each of these can be seen as movement to acceptance in the EU.

Progress in EU is important because the EU's recent position has had a negative influence on the global acceptance and adoption of modern biotechnology – even to the point of affecting food aid distribution in countries experiencing famine. Acceptance in the EU will lessen overall concerns and result in more choices and quantity of food for those who need it most in many parts of the world.

Tracing and labeling seems to be the "in" issue these days. It is on the agenda of most

meetings such as this. University professionals, foundations and others are writing papers, holding seminars and organizing workshops on the topic.
Why? Tracing and labeling are not new issues. Nor are they limited to biotech products. The U.S. seed industry for example operates with a well documented system governed by Federal and state seed laws and by commercial necessity. Every lot of seed is identified by variety from breeder seed to foundation seed to commercial seed. For certified seed, records are kept of production, field records, field inspections, transportation, etc. Labeling is required by law and by commercial reality to be accurate and contain appropriate information for growers.

Similarly food processing companies have been tracking ingredients for years in order to implement a recall in the event that something did happen to affect the safety of a product. Food products are typically labeled to provide consumers with information related to safety, health and nutrition.

[1] "Understanding Biotechnology in Agriculture", Lester M. Crawford, Deputy Commissioner, U.S.
Food and Drug Administration

What's new? The EU regulation on GM Food and Feed that will go into effect in April of this year is new. The requirements contained in these regulations are an issue of great concern among participants in the U.S. food chain. Clearly, the approach taken in these regulations is different from that in the United States and in other parts of the world.

As I see it, US government agencies in carrying out their mandates for labeling requirements for nutrition, health and safety adhere to the following basic principles:
Labeling should:
- Not be misleading, so as to not to confuse or misinform the customer
- Not be false
- Be science-based
- Not be partial to one production or development process over another

And, by adhering to these principles U.S. labeling regulations not only impartially provide appropriate information to consumers, but also are consistent with our international treaty obligations such as the WTO.

In the case of use of modern biotechnology, the FDA focuses on the final product and not the crop that was used to manufacture the food product in determining how it should be labeled. Accordingly, the FDA does not require labeling to indicate whether or not a food or food ingredient is a bioengineered product.

It does require labeling of the product, however, if the modification materially changes its nutritional attributes, its safety, or other important characteristics. But, since modern biotechnology methods have been found to be as safe as other developmental or production methods as mentioned previously, such methods are not material information that must be labeled. Furthermore, FDA has asserted that a statement that a food was not bioengineered or does not contain bioengineered ingredients may be misleading if it implies that the labeled food is superior to foods that are not so labeled.

South Africa recently took a similar approach. Regulations to its Foods, Cosmetics and Disinfectants Act, published on January 16 state that food with genetically modified ingredients requires labeling only if its composition, nutritional value or mode of storage or cooking is significantly different from conventional food. Labels are also required if the food contains an allergen such a peanuts.

In recognition that some manufacturers may want to voluntarily label their products FDA has provided draft guidance to ensure that such labeling is truthful, not misleading and the claims are verifiable. This guidance addresses the issue of "choice" without deviating from the principles of science, impartiality and materiality.

In contrast, the EU traceability and labeling regulations set to go into effect in April are seen by stakeholders in the U.S. food chain as:
Not being science based: Instead they are based upon the method of development of the crop from which the food and feed were produced.
Discriminating against modern biotechnology: Products are labeled because of how the crops were developed and not for health, nutrition or safety information. They also impose an onerous administrative burden and additional costs on products produced from modern biotechnology.
Not being necessary to provide "choice": Consumers could be provided information on "GM free" options through an option of labeling a product GM free.
Not being internally consistent: Food products produced from biotech crops must be labeled whether or not any detection is possible. Feed produced from genetically modified feed must be labeled but the food produced from the feed does not. How does this inform the consumer? And, finally foods produced with biotech processing aids do not have to be labeled.

The discrimination and additional costs imposed by these regulations lead to the strong belief of many in the U.S. food chain that the EU traceability and labeling rules are non-tariff barriers to trade as defined under the WTO - in particular, they are inconsistent with

the Technical Barriers to Trade (TBT) and the Sanitary and Phytosanitary (SPS) provisions. Reflecting this widely held view, twenty-two US food chain organizations recently sent a letter to the United States Trade Representative saying this is their belief and urged the USTR to initiate dispute settlement action immediately.

So, while there is some hope that the gap may be narrowing on the cultivation of crops of modern biotechnology, the positions on tracing and labeling of crops of modern biotechnology still leave a very wide gap. Hopefully, as the gap in positions on the cultivation of crops of modern biotechnology narrows the gap on tracing and labeling will narrow also.

To summarize, the U.S. position on GM cultivation as manifested in its rapid adoption and continued investment in the technology reflects not only the benefits of the technology, but also a belief in science-based systems, a belief in strong and appropriate regulatory oversight, a belief in sensitivity to customers, a belief in a belief in stewardship and a pattern of cooperation throughout the food chain. We also believe that investment in and adoption of the technology will continue to accelerate outside the United States. On labeling we strongly support the principles of science, impartiality and materiality. We are also hopeful that the gaps that currently exist will continue to close. The potential of modern biotechnology is too great not to be fully realized.

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Founded in 1883, the American Seed Trade Association (ASTA), located in Washington, DC, is one of the oldest trade organizations in the United States. Its membership consists of about 900 companies involved in seed production and distribution, plant breeding, and related industries in North America. As an authority on plant germplasm, ASTA advocates science and policy issues of industry importance. Its mission is to enhance the development and free movement of quality seed worldwide.

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DATE: July 15, 2004
CONTACT: Dick Crowder
(703) 837-8140

AMERICAN SEED TRADE ASSOCIATION
POSITION STATEMENT ON INTELLECTUAL PROPERTY RIGHTS
FOR THE SEED INDUSTRY

1. One of the most pressing issues of our time is the development of crops that will enable farmers to feed the increasing world population in a sustainable fashion while protecting the environment. In the past, significant investments in crop breeding and development were primarily funded by the public sector. These investments took place through national and international research systems. For various reasons funding for these systems has decreased. There is, therefore, increasing reliance throughout the world upon crop breeding research and product development that is funded by the private sector. Strong intellectual property protection will encourage the investment needed to maintain continued crop improvement required to feed the world and add value to agriculture and society through new products.

2. In recent decades private companies have invested heavily in plant breeding to develop improved cultivars including hybrids. The advent of biotechnology, the entry of additional private companies into the agricultural arena and the subsequent development of crops that are modified with specific traits have contributed even more to agricultural productivity and genetic diversity. However, the improvement of crop germplasm remains an essential activity of plant breeding.

3. One of the key drivers of innovation within any industry is the capital that is invested in research. Research investments are generally long-term and many require significant amounts of capital resources and entail large risks. The level of investment in the seed industry is directly related to the effectiveness of the intellectual property protection available. In order to attract the size and scope of investment necessary to develop improved products, either varietal, hybrid, or from biotechnology, investors must have the opportunity to earn competitive returns on their original investment. Markets or countries that provide weak protection are unlikely to attract substantial investments for research and development.

4. Currently there are several ways that intellectual property resulting from such investment and risk taking can be protected by an inventor. One avenue is to rely on trade secret protection coupled with either licenses or use agreements. Unlike other forms of protection, as long as trade secrets are maintained, the intellectual property never enters the public domain.

5. A second way to protect intellectual property is through utility patents. Utility patents, which in most countries are granted for a term of 20 years from application, provide a broad and strong form of protection that in many ways is preferential to license or use agreements. As a result, utility patents generally encourage investments in all facets of plant breeding including germplasm, specific traits or genes and technologies more than any other form of intellectual property available to investors. However, plant varieties are ineligible for patent protection in countries other than the United States, Japan and Australia. In some countries, such as Mexico, utility patents are available, but patent examination has not been implemented for plant varieties.

6. Another approach to protection, limited to plant varieties, is through Plant Variety Protection. The current UPOV system as enacted in 1991 provides exclusive marketing rights for varieties, their harvested material, and, optionally, for products made directly from them. These rights extend for a fixed period of not less than 20 years from the date of the grant of the right. In some circumstances PVP also provides exceptions for experimental use by third parties for the purpose of plant breeding and new variety development. An optional exception for farmers permits them to save seed for propagating use on their own holdings within reasonable limits and subject to the safeguarding of the legitimate interests of the breeder.

7. Protection of intellectual property through utility patents and a UPOV-based Plant

Breeders' Rights (PBR) system ultimately puts the protected invention in the public domain because the protection of the invention is of limited duration. And, in the case of a utility patent, a public deposit is made; an important difference from the UPOV based PBR system, which puts the protected invention in the public domain for breeding use only if the protected invention is commercialized. Patent and PVP laws also provide a fair balance between the protection afforded and the disclosure to the public to stimulate further research in the field. However, open access to germplasm allowed under UPOV for breeding immediately upon commercialization has the effect of diminishing the developer's opportunity to earn a competitive return on research investments.

8. ASTA believes that, worldwide, affordable intellectual property protection systems, including patents and PVP and other methods of protection including trade secret and contracts, should be available to allow new inventions to be protected in the most appropriate manner as determined by the inventor. The ASTA encourages voluntary licensing of protected intellectual property. However, any licensing should be at the sole discretion of the intellectual property owner consistent with the form of intellectual property associated with the germplasm.

9. ASTA further believes that advancements in genetic technologies such as markers, as well as the need to remain consistent with global agricultural needs, mandate that intellectual property protection systems in the United States and in other countries must be updated and improved if intellectual property protection systems are to continue to serve the public interest by attracting the research investment in plant breeding and biotechnology needed worldwide.

10. ASTA will work with and encourage others to provide global leadership in the improvement of intellectual property systems for the benefit of agricultural productivity and resource conservation. ASTA, in collaboration with other industry associations, will:

a. Work to create affordable intellectual property systems including contracts, patents, trade secrets and PVP/PBR, for owners of intellectual property in all countries.
b. Emphasize the importance and legitimacy of legally enforceable contractual terms in the protection and use of trade secrets including plant germplasm held as a trade secret.
c. Maintain the effectiveness of the utility patent system.
d. Strengthen the UPOV/PVP system by
i. Providing compensation for and/or limits on saved seed in all countries.
ii. Making the EDV system more effective.
iii. Revising the breeders' exemption to include a period of "x" years (where x varies by crop) for which the breeders' exemption would not be available for PVP protected material.

iv. Moving all countries to the most current UPOV system and achieving consistency in administration and enforcement in all countries.

e. Encourage all TRIPs signatory countries to meet their TRIPs obligations including:
i. Protection of germplasm of plant varieties
ii. Patentability of other technologies
iii. Effective enforcement mechanisms
f. Provide for global benefit sharing consistent with the International Treaty on Plant Genetic Resources for Food and Agriculture.
g. Create a PCT like system to facilitate filing of PVP applications.

In summary, the ASTA encourages worldwide adoption of more effective intellectual property protection in all its various forms. Stronger and more comprehensive intellectual property protection systems globally will result in increased investment in seed research, support the conservation and use of genetic resources, facilitate benefit sharing through mechanisms such as the International Treaty for Plant Genetic Resources for Food and Agriculture and facilitate the continued development of new and improved crops that will benefit the public.

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DATE: February 18, 2005
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ASTA Comments on Vermont Senate Bill S.18

February 16, 2005

Honorable Richard Sears, Jr.
Chairman
Senate Committee on Judiciary
115 State Street
Montpelier, VT 05633-5301

Vermont

VIA FACSIMILE: 802.828.2424

Dear Senator Sears:

The American Seed Trade Association (ASTA) appreciates the opportunity to offer comments on S.18, a bill that proposes to place on seed companies the liability for claims and damages resulting from the use, according to the label and directions for use, of genetically engineered seeds and plant parts. We are very concerned about the negative impact of S.18 on Vermont farmers, Vermont consumers and the seed industry in Vermont.

Founded in 1883, ASTA is one of the oldest trade organizations in the United States. Its membership consists of about 850 companies involved in seed production and distribution, plant breeding and related industries. ASTA's membership is comprised primarily of U.S. companies, although it does have members from 15 other countries. ASTA advocates science and policy issues of importance to the seed industry. Its mission is to enhance the development and free movement of seed worldwide.

ASTA is a diverse organization. It represents all types of seed companies and technologies – seed from alfalfa to zucchini, technologies from organic to biotechnology and companies from "mom and pop" to multinationals. Among others, it has a standing committee on organic seed and a standing committee on biotechnology. Both report to the board. ASTA has members in 47 states. It works on behalf of all of its members at the state, national and international levels.

ASTA is pleased and proud to work cooperatively with state departments of agriculture, farm groups, allied industry organizations, and consumer and environmental groups to promote stewardship and responsible planting and harvesting of crops, including seed and crops developed through modern biotechnology. Indeed, most recently, for example, ASTA and its members have been working with Secretary Kerr voluntarily to provide supplemental information to farmers in Vermont about biotech products in addition to information already provided in seed labeling pursuant to legal requirements.

Seeds improved with biotechnology have been and are continuing to be adopted rapidly across the United States and around the world. In the United States, 85 percent of the soybeans, 76 percent of the cotton and 45 percent of the corn acres are planted with seeds improved with biotechnology. Globally, the planting of crops improved through biotechnology reached 200 million acres in 2004 – a 20 percent increase over 2003. These crops are grown by over 6 million farmers in 16 countries. The adoption of these crops is the result of economic, environmental and human health benefits provided by the crops.

Through their purchases of seed improved through modern biotechnology, Vermont farmers have also spoken to the importance of high quality biotechnology improved crops

to them and their farming operations. According to data released by the Vermont Department of Agriculture, genetically enhanced corn in 2004 made up 19 percent of all field corn grown in Vermont. This was the third consecutive annual increase and is up from 8 percent in 2002. The story for soybeans is similar. Sales of genetically enhanced soybeans increased 46 percent in 2004. The data support Secretary Kerr's statement that "Vermont farmers are obviously finding these products to be useful. Farmers are notoriously skeptical and notoriously frugal, so the word of mouth on these crops must be pretty positive."

Our principal concerns with S.18 relate to the definition of injury, the strict liability provisions of the bill and the negative implications for Vermont farmers, consumers and the seed industry in Vermont.

The definition of injury is overly broad, and includes components difficult to measure and terms that the farmer who does not grow crops improved with biotechnology controls himself. The consequences of such a broad definition of injury -- ranging from reductions in exports to damage to company reputations to loss of livelihood -- generate an open ended risk and would significantly increase the cost of doing business in Vermont for a seed company.

The added cost of doing business will force companies selling biotechnology seed in Vermont to compare their estimates of the increased costs against the margin they earn on seed sold in Vermont. This will have one or both of two effects. The cost of biotechnology seed for farmers will increase and/or the availability of biotechnology seed will decrease. Both of these outcomes would penalize unnecessarily the many Vermont farmers producing high quality crops from such seed. It will also penalize all others in the seed supply chain including dealers as well as small and large companies; and will reduce the size, offerings and competitiveness of the Vermont seed industry compared to other states. To the extent that increases in input and production costs are passed through the food chain, the bill would penalize others in the food chain such as dairy farmers and Vermont consumers.

The provision in the definition of injury dealing with breach of contract including the loss of organic certification is within the control of the growers of organic and traditional crops. In the case of organic, for example, the USDA confirmed in a letter to the National Association of State Departments of Agriculture that organic standards are processed based. "As long as an organic operation has not used excluded methods and takes reasonable steps to avoid contact with products of excluded methods as detailed in their approved organic system plan, the unintentional presence of the products excluded methods will not affect the status of the organic operation." Complete letter at: http://www2.nasda.org/NR/rdonlyres/671D6BD0-6F34-46D2-A911-A4F137BBC594/647/ResponsefromUSDA.pdf

Thus, the risk of loss to an organic grower would stem from specific contract terms that the grower voluntary entered into. The non-organic grower should not be penalized for voluntary actions on the part of the organic grower. The same should hold for other contracts that growers of non-biotechnology improved crops enter into voluntarily.

The strict liability provision of the bill raises both commercial and legal issues.

Commercially, the bill would preclude a farmer who would otherwise sign a contract assuming any liability in order to obtain seeds improved with modern biotechnology from doing so. This has the potential to restrict the choice of seeds for farmers who have found them to be important to their farming operation. This and the increased costs discussed above unnecessarily penalize the farmer who uses biotechnology seeds compared to the farmer who does not use biotechnology seeds.

From a legal standpoint, the bill is both unnecessary and contrary to public policy. Existing legal remedies for individual farmers who allege injury from biotechnology seed are well-established and adequate. Common law provides several avenues of relief for farmers, including negligence and nuisance. Special remedies are unnecessary. As technology has advanced throughout the past century, the standard common law remedies have been able to adapt to novel situations. There is nothing radically different about the development and use of biotechnology seed. The well-established common law remedies are sufficient, and there is no need for the legislature to fashion new remedies for this one type of technological advancement. That this bill is unnecessary from a legal point further calls into question the wisdom of placing one group of farmers in Vermont at a competitive disadvantage versus other farmers in Vermont and other states.

The bill is not only unnecessary, but it is contrary to public policy. The private right to contract should be protected by the state. Instead of protecting this right, the bill threatens to erode it.

In summary, the use of seeds improved through modern biotechnology continues to grow around the world as a result of their economic, environmental and human health benefits. Farmers' use of these seeds in Vermont is no exception to this pattern of growth. In our view, S.18 as it is now drafted is unnecessary from a legal standpoint; is contrary to the public policy as it relates to the private right to contract; adds unnecessarily to the costs of doing business in Vermont and penalizes one group of Vermont farmers versus others. Affecting seed companies large and small including farmer dealers, S.18 would also reduce the size, offerings and competitiveness of the seed industry in Vermont compared to other states.

We appreciate the opportunity to provide input on this important issue. Should you have any questions we would be more than happy to try to answer them.

Sincerely,

Richard T. Crowder
President/CEO

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PRODUCTION

ARTICLE

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Put Seed Costs In Perspective

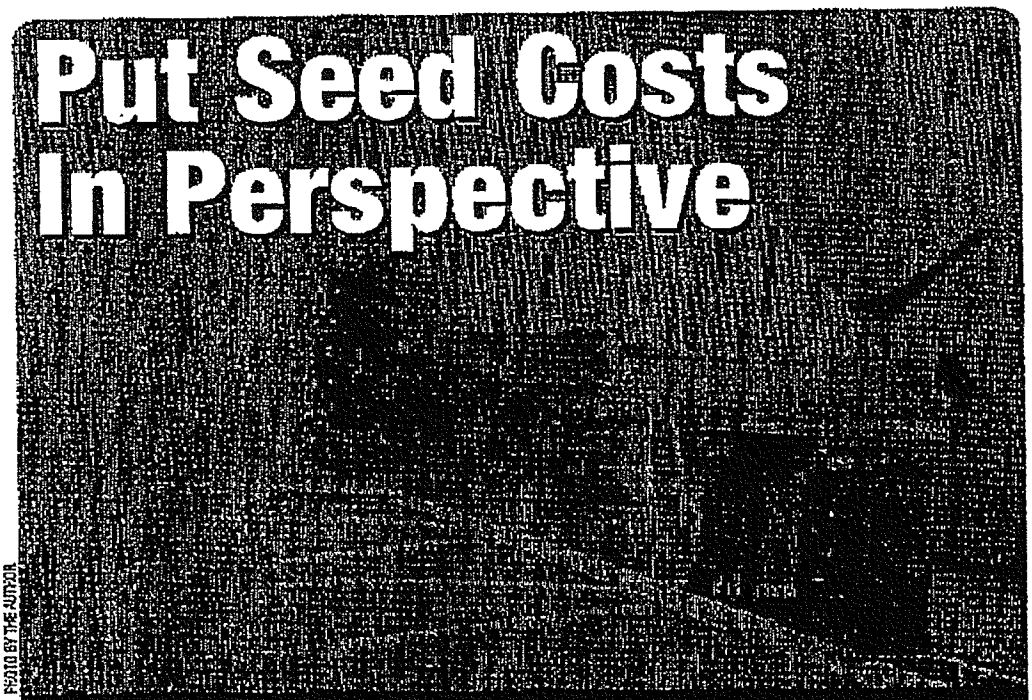


PHOTO BY THE AUTHOR

Reports of yield increases from using Roundup Ready corn sound good to Weeping Water, Neb., farmer and Fontanelle seed dealer Rick Bond. He says farmers in his area like the system even if it yields the same.

The cost of one high-tech hybrid prepays much of your crop protection bill

BY ANDREW BURCHETT

Have you ever been to one of those island resorts where everything is free for guests? Well, you pay a pile of money upfront, but when you break it down to daily costs, you probably get a better deal than if you pay as you go. That's how several seed companies are pitching high-priced, technology-loaded hybrids these days—a package deal with savings in cost per acre.

The message is that seed is more valuable than it used to be. Seed companies stress the fact that the higher prices you pay for that value don't all come from your wallet. Instead, they come from your herbicide and insecticide bill, not to mention application, fuel and equipment costs. It's not simply a shell game with your dollars, either. Some traits cost less this year.

"Our seed dealers are learning how to talk to farmers about total input costs per acre," says Steve Pike, sales manager for Fontanelle Hybrids. One tool his company uses is a spreadsheet that lets farmers plug in different herbicide and seed costs per acre to total seed and crop protection costs in different scenarios.

Other companies use this strategy as well. The results show that farmers can cut total input costs in some situations. If nothing else, it turns the sticker shock of the price of a bag of seed into more reasonable per-acre costs that account for money saved on chemical inputs.

The numbers are as compelling as an ad for a Las Vegas buffet. "If you are planting a conventional hybrid, by the time you pay for insecticide and

Pay for What You Use

Technology Refund	Program Name	Product Use Requirements
$21/bag	GT Optional	Lumax, Lexar and Camix or Dual II Magnum followed by Callisto
$6/bag	LL Optional	Lumax, Lexar and Camix or Dual II Magnum followed by Callisto
$12/bag	GT Combo	Lumax at foundation rates followed by Touchdown
$4/bag	LL Combo	Lumax at foundation rates followed by Liberty
$3/bag	GT Traditional	Dual II Magnum at foundation rates followed by or tank-mixed with Touchdown
$3/bag	LL Traditional	Dual II Magnum at foundation rates followed by or tank-mixed with Liberty
$8/bag	CB Insect Combo	Cruiser Extreme Pak or Cruiser Extreme Pak CRW and Force

SOURCE: SYNGENTA SEEDS

Syngenta Seeds refunds money to farmers who pay for Agrisure traits upfront, but use herbicides and insecticides sold or approved by Syngenta. This approach gives farmers in-season flexibility with crop input choices. Agrisure CB hybrids include Liberty Link technology and qualify for herbicide-use refund programs. Likewise, Agrisure GT/CB stacked hybrids qualify for more than one product use program.

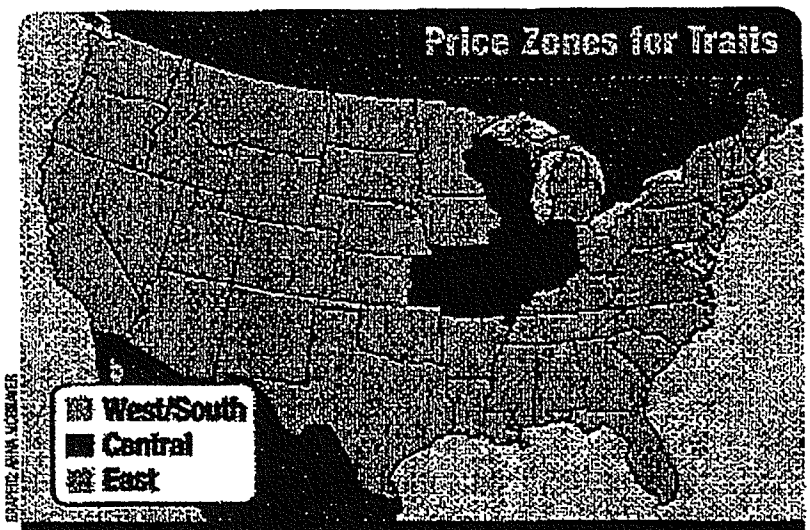
herbicide you can switch to a triple-stack hybrid for as little as 50¢ [more] an acre," explains Craig Newman, vice president of sales and marketing for AgReliant Genetics, which includes AgriGold, Great Lakes Hybrids, LG, Producers Hybrids and Wensmans. Newman's example is based on Great Lakes Hybrids' estimated seed and input cost for farmers in the central Corn Belt. The company urges farmers to plug in their own numbers, and find out the results. (See "Three Traits for 50¢" on page 44.)

The challenge for farmers is nailing down crop protection plans months before planting and spending a lot more money in one place. Seed companies offering corn traits licensed by Syngenta Seeds want farmers to keep weed and insect control options open and settle costs after the farmers have made final input decisions in the spring. This also leaves room for flexibility for unpredictable factors like weather. In a nutshell, AgriEdge corn programs refund the cost of traits purchased with seed if farmers use herbicide and insecticides sold or approved by Syngenta.

Agrisure traits are available through Syngenta's Garst, Golden Harvest and NK brand hybrids and from about 50 other seed companies.

"With Agrisure traits, growers are free to choose what inputs to use to maximize their corn profit potential," says Jack Bernens, head of Syngenta Seeds Agrisure Traits. The trait offerings include Agrisure CB corn borer resistance, Agrisure GT glyphosate tolerance and a stack of the two in Agrisure GT/CB. Farmers that use certain herbicide programs qualify for "technology reinvestment" (refunds). (See "Pay for What You Use") In some cases, it's possible that farmers will get money back simply by continuing to use the same products as before.

Trait stack discounts and technology refunds are good news for farmers who want to save money. But to figure out how much traits cost in different scenarios, get a calculator and plug in your own numbers. One Monsanto ad in the central Corn Belt says adding the YieldGard Rootworm trait to a YieldGard Corn Borer hybrid costs about $11 an acre compared with granular insecticides that costs about $15 per acre. This assumes one bag will cover 2.9 acres at a seeding rate of 27,600 per acre. On productive ground, most farmers plant a few thousand more seeds per acre, which would drive up the cost.



This map outlines where YieldGard Rootworm stack prices published by Monsanto and its seed company partners change. Seed companies set different prices, but the cost of YieldGard Rootworm stacks is lowest for farmers in the East, followed by prices in the central Corn Belt and then the West and South.

Location matters. There is another catch. The $11-per-acre upgrade from a YieldGard Corn Borer hybrid to a YieldGard Plus hybrid varies by farm location. In Monsanto's central royalty zone, this is about the right price. In the eastern zone, a seed company pays less for the trait, more in the western zone. Monsanto says confidential business agreements don't allow it to confirm where the zone boundaries lay, but published price information shows where YieldGard Rootworm stack prices change (see map above). The exact royalties seed companies pay Monsanto are confidential, but Monsanto says royalties for rootworm stacks in all areas are lower for 2006.

For seed corn company icorn.com, the difference in list price between trait stacks containing YieldGard Rootworm is $9 a bag more in the central zone than the eastern zone. The company doesn't market in the western zone. Monsanto charges seed companies higher royalties for YieldGard Rootworm stacks sold to western farmers, because insect damage is heavier in that region.

Another trait that benefits from input cost number comparisons is Roundup Ready Corn 2. Farmers can save by reducing the rate of residual herbicide used and by using glyphosate as a post-emergence treatment instead of a selective herbicide that may be more expensive.

Weeping Water, Neb., farmer and Fontanelle seed dealer Rick Bond says most farmers in his area manage corn rootworm with rotation and don't use a rootworm-resistant trait. YieldGard Corn Borer plus Roundup Ready Corn 2 stack, however, is popular. In addition to cutting costs, Monsanto claims the crop safety of the Roundup Ready system improves yield.

"I can't confirm that I've seen a yield advantage to Roundup Ready corn," says Bond, who sold out of Roundup Ready hybrids last year. "It may yield more, but farmers buy it because it works so well."

Farmers also should consider that seed companies have final say in pricing the technology. In the example above, icorn.com charges $45 to upgrade to YieldGard Plus from YieldGard Corn Borer—more than $11 per acre. The company charges $48 to treat a bag of seed corn with Cruiser Extreme Pak at the corn rootworm rate—$3 more than the trait.

Phil Askey of Trumbull, Neb., did the math and decided YieldGard Rootworm hybrids save him money on dryland corn. "I'd have to put down a full rate of insecticide for corn rootworm, but I only plant 20,000 seeds per acre, so it was cheaper to buy the trait ▶

Three Traits for 50¢

Costs per Acre

	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Seed/Trait	$34	$51	$53	$48.50	$53	$59
Residual Herbicide	$19.50	$19.50	$19.50	$13	$13	$13
Post Herbicide	$10	$10	$10	$6	$6	$6
Soil Insecticide	$14	—	—	$14	—	—
Total	$77.50	$80.50	$82.50	$81.50	$72	$78

SOURCE: GREAT LAKES HYBRIDS

This table assumes a planting rate of 27,600 seeds per acre, trait prices for the central price zone (see map on page 43) and chemical costs supplied by Doane Market Research. The result: A triple-stacked hybrid might only increase input costs by 50¢ per acre. In the western price zone, it might cost $3.50 more per acre; in the eastern price zone, it might be $2.50 cheaper.

protection," Askey says. He continues to use granular insecticides on irrigated fields with higher populations.

Askey also planted some Roundup Ready YieldGard Corn Borer hybrids last year. He asked his seed dealer to drop the Roundup Ready trait on part of his order for the hybrid. "When I got my statement, I saw that I only got about a $4-per-bag credit for the Roundup Ready trait," he says. This sheds light on another fact about trait-stacked hybrids—each additional trait costs less than if you bought it by itself.

In addition to pricing incentives, seed companies are branding trait stacks. Being able to offer the triple stack of YieldGard Plus and Roundup Ready corn in several hybrids serves as a technological savvy badge. Great Lakes Hybrids has branded triple-stack offerings as G3 hybrids. Clint Hawks, company spokesman, says the G3 hybrids are popular this year.

Dow AgroSciences and Pioneer Hi-Bred International Inc. received approval of the Herculex RW trait for corn rootworm resistance. Pioneer Hi-Bred will offer it stacked with the Roundup Ready Corn 2 trait. No prices were available at press time.

Seed treatment. Corn seed treatment continues to be a rapidly expanding market. "In 2006, we expect 65% of planted acres to be treated with an insecticide seed treatment," says Mark Jirak, Syngenta crop manager for seed treatment. He says several factors drive that increase. Convenience, performance on insect pests and seedling diseases, better stand establishment and yield are most important to farmers. Plus, more farmers are buying corn with a rootworm trait, which always comes with a seed treatment. Meanwhile, seed companies try to reduce the number of items in inventory, so seed treatment is offered as part of the standard product.

Syngenta's Cruiser Extreme Pak seed corn treatment comes in rates for secondary insects and corn rootworm. It competes with Bayer CropScience's Poncho 250 and Poncho 1250 in the insecticide seed treatment market. Most seed companies will offer one seed treatment brand or the other.

However, more seed companies are beginning to custom-build their seed treatments by picking and choosing insecticides and fungicides. For example, Cruiser Extreme Pak includes Dynasty fungicide, but Poncho products don't. Syngenta offers Dynasty by itself, so companies like Pioneer Hi-Bred can add the fungicide to Poncho-treated seed.

More than 30% of soybeans will be treated with fungicide for 2006

Other combinations are available, too. Hubner seed offers a custom seed treatment combination of Maxim XL, Allegiance and Trilex for disease protection. The fungicides also come with Poncho 250 or Poncho 1250.

Soybeans have not had the trait pipeline like corn, so there are fewer new technologies to consider bundling with soybean seed. However, Jirak reports that two million acres-worth of soybean seed were treated with Syngenta's Cruiser-Maxx Pak insecticide– fungicide product for 2005; and he expects that possibly three or four times as much will be treated for 2006. The goal of soybean insecticide seed treatments is to protect against early season bean leaf beetle and soybean aphids.

The growth in soybean seed treatments will be spurred by the fact that Gaucho seed-applied insecticide from Bayer recently received approval for use on soybeans.

"Early season aphid infestations have been identified as causing a reduction in pod numbers on the soybean plant," says Ray Knake, technology development manager with Bayer CropScience. If conditions are favorable for aphid reproduction and survival, populations may reach an economic threshold that requires spraying. Gaucho only controls aphids for up to 65 days after planting, but sometimes that's enough.

Fungicide seed treatments are also picking up steam in soybeans. Protection from seedling disease equals a better stand with high-value seed. "More than 30% of soybeans will be treated with fungicide for 2006," Jirak predicts.

More seed companies are offering Roundup Ready soybeans with STS technology, which makes them tolerant of Harmony GT herbicide and glyphosate.

Dairyland Seeds offers a Roundup Ready stack with STS soybeans in the Group 0 and early Group 1 maturity range to lend a hand to farmers trying to control such weeds as wild buckwheat lambsquarters and volunteer canola.

"This offering gives producers the ultimate flexibility in their weed control program," says Tom Strachota, CEO of Dairyland Seed. Best of all, it doesn't cost extra.

So when it comes to deciding on seed and crop protection choices months ahead—and paying a pile of money upfront—think of it in terms of cost per acre and do the math. You may save money that you can use for a vacation to an island resort.