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Report Highlights:
Despite Government support for biotechnology amounting to over $ 700 million in 2005, it is still difficult to find any products labeled as "GM Food" on Korean shelves. Korea is expected to ratify the Cartagena Protocol on Biosafety (CPB) before March 2006. After implementation of the CPB, sales and imports of biotechnology crops that have not completed environmental risk assessments will not be allowed. In contrast to the 3 percent adventitious presence level maintained for regular food, Korea maintains a zero-tolerance policy for inadvertent presence of GM content in organic processed products.

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SECTION I. EXECUTIVE SUMMARY

Biotechnology is considered to be one of the new frontiers of national development for Korea in the 21st century. Proponents have had some success in emphasizing the prospects for biotechnology to be a new engine of growth and a solution to public health and environmental concerns. Accordingly, Korea aims to have the fifth largest investment in biotechnology and to hold over 5 percent of the market share in the world biotechnology market by 2012. To accomplish these goals, the Korean government invested 708.6 billion won (approximately $ 708 million dollars) in biotechnology research in 2005.

Despite the Korean government's support for biotechnology research, the Korean public still has a negative perception of crops and foods produced using biotechnology. Accordingly, most biotech research in Korea is focused on bio-medicine, bio-chemical and bio-processing. For example, the majority of the government funds provided for biotechnology research in 2005 was directed toward non-agricultural projects such as stem cell cloning and gene therapy.

The Korean public's positive view toward non-agricultural biotechnology was manifested recently in response to the highly-publicized advances made by a Korean researcher (Dr. Hwang Woo-suk) in the field of human stem cell cloning.

Local non-governmental organizations (NGOs) and media propagate a negative perception of biotech agricultural products among Korean consumers. In general, Korean food processors respond to consumer concerns by avoiding use of ingredients produced through biotechnology that would have to be listed as "GM Food" on the labels of products. However, highly refined oils that do not contain recombinant DNA are exempt from the "GM Food" labeling requirement. Consequently, Korea imports substantial amounts of crops and products produced using biotechnology that are further processing to make products such as soybean oil.

Korea is a signatory to the Cartagena Protocol on Biosafety (CPB) but has not ratified it. Korean officials had hoped that the National Assembly would ratify the CPB before the Meeting of Parties III (MOP III) scheduled for March 2006 so Korea would be an official party to the CPB prior to MOP III. However, Korea has experienced some delays in the process of preparing regulations to implement the CPB. Consequently, the timeline for ratification of the CPB is uncertain.

Korea has a fairly extensive regulatory system for biotechnology products. The Ministry of Agriculture & Forestry (MAF) regulates labeling of unprocessed biotech products and conducts environmental risk assessments (ERAs) of biotech crops. The Korea Food & Drug Administration (KFDA) regulates food safety approval of biotech crops and labeling of processed food products containing biotech components. The Ministry of Commerce, Industry, and Energy (MOCIE) is the national competent authority for implementation of the CPB. MOCIE coordinates the efforts of seven ministries that have been making regulations and guidelines to implement the CPB. How the CPB implementing regulations and guidelines turn out will have a great impact on exports of U.S. products to Korea. Draft guidelines are expected to be issued in the latter part of 2005.

No crops produced using biotechnology have been commercialized in Korea. Thus, the process to approve biotech crops and food has only applied to imported products to date. Korea has two separate approval systems to conduct food safety approval and environmental risk assessments (ERAs) for biotech food and crops. At present, food safety approval of biotechnology crops is mandatory but ERAs are voluntary. However, ERAs will become mandatory when the Living Modified Organism (LMO) Act goes into effect. The LMO Act is

Korea's regulation to implement the CPB. As of July 11, 2005, 30 biotech "events" (i.e., unique genetic lines produced via genetic engineering) have completed food safety approval. Ten biotech events have completed ERAs. To date, no requests to conduct ERAs for intentional environmental release (planting) have been completed. The scope of all ERAs that have been completed so far has been limited to assessing the environmental risk of unintentional release.

Unprocessed biotech soybeans, soybean sprouts, corn, and potatoes intended for human consumption are required to carry labels. Three percent adventitious presence of biotech components is allowed. Therefore, no "GM Food" label is required as long as full identity preserved documentation verifying that the product is non-biotech is submitted.

For processed products and consumer-ready products, biotech labeling is required for 27 food categories if either of the following two situations applies:

- Biotech soybeans or corn are one or more of the top five ingredients in the final product.
- Foreign protein or DNA is still present in the final product.

Although Korean regulations allow for the sale of biotech foods, it is not easy to find products with a "GM Food" in the marketplace. Retailers explain that they are very sensitive to the possibility that they would be singled out for criticism by NGOs or local media if they were to sell biotech products in their outlets. As a result, mandatory labeling of "GM Food" has effectively eliminated the consumer choices it was supposed to facilitate.

SECTION II. BIOTECHNOLOGY TRADE AND PRODUCTION

A. Commercial Production of Biotechnology Crops

Korea has yet to commercially produce any biotech crops. However, Korea is investing substantial resources in the development of biotech crops. In 2005, the Ministry of Agriculture & Forestry (MAF) invested 79.2 billion won (approximately $79.2 million dollars) in activities to develop new biotech crops, biomedicine and organs from animals that can be transplanted into humans.

B. Biotechnology Crops Under Development

Development of biotechnology crops is being led by government agencies. The National Institute of Agricultural Biotechnology (NIAB) under the Rural Development Administration (RDA) is currently developing 44 separate biotech events among 15 crops. Herbicide tolerant rice, pepper, perilla seed, and virus resistant potatoes, are expected to become the first locally developed crops to become commercially produced in Korea. The first Korean-made biotech crops are undergoing safety assessments at the moment and are expected to be commercially produced in three to four years. No official statistics on development of biotechnology crops by private entities are available. Rough estimates from industry indicate that approximately 52 varieties are under development although they are still at the laboratory development stage.

C. Imports of Biotechnology Crops/Products

Korea imports biotechnology crops and products. Biotech events must undergo a complete safety assessment for human consumption conducted by the Korea Food & Drug Administration (KFDA). Biotechnology crops/products that contain unapproved events are not allowed to be imported or sold on the Korean market. To date, 36 events have completed KFDA's assessments (See Section III-B for a list of approved events). Major biotech crops originating from the United States are soybeans and corn which are used for further processing in Korea. Biotech crops/products need to carry a biotechnology label unless they originate from shipments accompanied by full identity preserved handling documentation or a government issued certificate certifying non-biotech status of the shipment.

D. Food Aid

South Korea is not a food aid recipient and is not likely to become a food aid recipient in the future.

E. Production of biotechnology crops that were developed outside of the United States

At present, Korea does not commercially produce any biotechnology crops regardless of origin.

SECTION III. BIOTECHNOLOGY POLICY

A. Regulatory Framework for Agricultural Biotechnology

The Act on Transboundary Movement of Living Modified Organism (LMO Act), a regulation to implement the CPB, was drafted by the Ministry of Commerce, Industry, and Energy (MOCIE) and finalized and announced on March 28, 2001. The LMO Act will become effective 90 days after Korea's ratification of the CPB. Draft versions of the Presidential Decree and Ministerial Ordinance of the LMO Act, announced on June 25, 2002 are still pending. Guidelines for Environmental Risk Assessments (ERAs) were drafted by the Ministry of Agriculture & Forestry (MAF) and finalized on January 9, 2002. Currently, MAF operates a voluntary ERA program. However, ERAs will become mandatory when the CPB goes into effect in Korea. Korea is planning to ratify the CPB in the latter part of 2005, which would enable Korea to implement the CPB before the end of 2005 or in early 2006.

The Agricultural Product Quality Control Act is the legal basis for MAF to require labeling of un-processed soybeans, corn, bean sprouts, and potatoes for food use. Labeling Guidelines for un- processed biotech crops were finalized on April 22, 2000 and entered into force on March 1, 2001. MAF has not required labeling of products of agricultural biotechnology used for feed.

The Food Sanitation Act is the legal basis for safety assessments of products of agricultural biotechnology for human consumption and labeling of processed food products containing biotech ingredients. The Ministry of Health & Welfare (MHW) delegates authority to enforce safety assessments of biotech crops for human consumption and labeling of processed food products containing biotech ingredients to the Korea Food & Drug Administration (KFDA). Based upon the Food Sanitation Act, KFDA issued safety assessment guidelines and biotech labeling guidelines. The KFDA guidelines for safety assessments of biotech crops for human consumption were finalized on August 29, 1999. A voluntary safety assessment program since August 29, 1999 was shifted to a mandatory program for soybeans, corn, and potatoes on February 27, 2004 and for all other biotech crops on February 27, 2005. Labeling guidelines for processed food products containing biotech soybeans and corn as ingredients were finalized on August 30, 2000 and enforced from July 13, 2001.

<u>Ministries involved with agricultural biotechnology with their responsibilities</u>

Ministry of Commerce, Industry and Energy: National Competent Authority for the CPB and responsible for the LMO Act

Ministry of Foreign Affairs & Trade: National Focal Point for the CPB

Ministry of Agriculture & Forestry (MAF): Responsible for ERAs of biotechnology crops including LMOs for food, feed, and processing (FFP) and labeling of unprocessed biotechnology crops

National Institute of Agricultural Biotechnology, Rural Development Administration, MAF: Responsible for ERAs of biotechnology crops and leading developer of biotechnology crops in Korea

Ministry of Health & Welfare: Responsible for monitoring and/or enforcing regulations pertinent to the Food Sanitation Act

Korea Food & Drug Administration: KFDA is under the auspices of the Ministry of Health & Welfare and is responsible for enforcement of food safety approval of biotechnology crops and labeling of processed food products containing biotech ingredients

Ministry of Environment: Responsible for risk assessments of LMOs that are used for the purpose of environmental purification or release into the natural environment (This does not include agricultural LMOs for planting.)

Ministry of Science & Technology: Responsible for risk assessments of LMOs that are used for testing and research

Ministry of Maritime Affairs & Fisheries: Responsible for risk assessments of fisheries

Role and membership of biosafety committee and its political implication

In accordance with Article 31 of the LMO Act, a Biosafety Committee (the Committee) shall be established under the Prime Minister to review the following factors relevant to the import & export of LMOs:

- Factors relevant to implementation of the protocol;
- Establishment and implementation of the safety management plan of LMOs;
- Notification of a commodity list of LMOs that pose no harm in accordance with the provision of Article 15;
- Reexamination in accordance with the provision of Article 18;
- Factors relevant to legislation and notification pertinent to the safety management, import, export, etc. of LMOs;
- Factors relevant to prevention and measures taken for damage caused by LMOs;
- Factors requested for review by the chairman of the committee or the head of competent national authority.

The Committee (including the Chairman) shall be composed of 15 or more members but will not exceed 20 members. The Prime Minister shall be the chairman and Committee members will include ministers from nine ministries (the seven relevant ministries noted above plus the Ministry of Finance and Economy and the Ministry of Education). Private sector specialists can be also members of the Committee. The Committee may have Subcommittees and Technical Committees for effective operation. Necessary factors relevant to formation, function, operation, etc. of the Committee, Subcommittees, and Technical Committees shall be designated by Presidential Decree (Decree). Since the Decree is still pending, the Committee will be formed after the Decree is finalized. The Korean government expects that the Committee will be formed before the end of 2005.

The major role of the Committee is to reconcile different positions among the relevant ministries. As each relevant ministry holds authority and responsibility in its respective areas, it may not be easy to reach consensus on some issues. In such cases, the Prime Minister as the Chairman of the Committee can be called upon to resolve matters lacking consensus.

B. Approval of Biotechnology Crops

To date, Korea has not had any commercial production of biotechnology crops. Thus, the approval process has been applied to imported products to date. Korea has two separate approval systems for biotechnology crops; approval for human consumption (food safety approval) and environmental risk assessments (ERAs). At present, food safety approval of biotechnology crops is mandatory while ERAs are operated as a voluntary program.

However, ERAs will become mandatory when the LMO Act, Korea's regulation to implement the CPB, goes into effect. Implementation of the LMO Act is expected in late-2005 or early-2006 at the earliest.

As of July 11, 2005, 30 events have completed food safety approval and 10 events have completed ERAs. The scope of the ERAs that have been completed so far has been limited to environmental approval of biotechnology crops for unintentional release. No ERAs have been completed for planting. Thus, no product has been approved for commercial planting to date. Please refer to Section IV, Appendix A for the status of approval of biotechnology crops in Korea.

C. Field Testing

MAF and RDA have not decided which agricultural biotechnology products will be subject to in-country field tests. RDA's initial plan is to require in-country field tests for LMOs used for seed and exempt LMOs to be used for food, feed, and for processing. However, no specifics regarding in-country field tests have been determined yet.

For biotechnology crops being developed by RDA, field trials must follow "Guidelines for Research and Handling of Recombinant Organisms Related to Agricultural Research." For biotechnology crops under development by private entities including universities, no guidelines currently exist. MAF plans to revise its regulation to include a provision for MAF to oversee field trials conducted by private entities in the near future.

D. Stacked Events

KFDA does not require additional approval for stacked events if they meet the following criteria:

- Traits that are being combined were already approved individually,
- There is no change in the given traits, intake amount, edible part and processing method compared with the conventional non-biotech counterpart, and
- There is no crossbreeding among subspecies

With regard to ERAs, MAF has not set its policy on the treatment of stacked events. Post will provide an update through a voluntary GAIN report once MAF's policy is set.

E. Coexistence

Although many Korean consumers express negative perceptions about biotech crops and products, Korean regulation provides for the production, import, use and consumption of biotech crops and products. Similarly, regulations exist in Korea that provide for organic agricultural production. At present, however, Korean regulation for organic processed products is largely focused on the components of the final product rather than the process used to produce it. Accordingly, the Korean Food & Drug Administration maintains a zero-tolerance policy for inadvertent presence of GM content in organic processed products.

F. Labeling

Both unprocessed biotech crops and processed food products containing biotech ingredients must carry "GM Food" labels. Unprocessed biotech soybeans, soybean sprouts, corn, and potatoes intended for human consumption are required to carry "GM Food" labels. KFDA regulations for processed products, including consumer-ready products, require biotech labeling for 27 food categories if biotech soybeans or corn are one or more of the top five

ingredients of the final product or if a foreign protein or DNA is still present in the final product.

For unprocessed biotech crops, MAF allows a three percent adventitious presence of biotech components. The MAF's threshold is the default threshold for processed food products subject to biotech labeling requirements. This means that KFDA allows three percent adventitious presence of biotech components for raw soybeans and corn. Intentional mixture of biotech ingredients triggers the labeling requirement even if the final level of biotech presence is within the three percent threshold.

Contents of the label text

Shipments that consist of 100 percent unprocessed biotech crops should carry labels stating "GM 'commodity'" (e.g. "GM soybeans"). Shipments that contain biotech-enhanced crops should carry labels stating, "the product contains GM 'commodity'" (e.g. "contains GM soybeans"). Shipments that may contain biotech-enhanced crops should carry labels stating that the product "may contain a GM 'commodity'" (e.g. "may contain GM soybeans").

Processed products containing biotech ingredients should carry labels as follows:
- "GM food" or "food containing GM corn or soybeans" for products that contain biotech corn or soybeans composing less than 100 percent of the product ingredients;
- "GM" or "GM corn or soybeans" for 100 percent biotech corn or soybean products;
- "May contain GM corn or soybeans" for products that may contain biotech corn or soybeans.

Use of labels such as "biotech-free", "non-biotech", "GMO-free", or "non-GMO"

Concerning unprocessed biotech crops, MAF allows voluntary labeling of "non-GMO" if the product is composed of 100-percent non-biotech enhanced material. For products with "non-GMO" labeling, the maximum threshold allowance is, however, "zero." Unprocessed bulk crops that contain an adventitious presence of biotech components are not permitted to carry a "non-GMO" label. Importers must keep the relevant documents that support a "non-GMO" claim for "non-GMO" labeled products. Such documents can include a testing certificate showing no presence of GMO components. Concerning processed food products, however, KFDA does not permit "non-GMO" or "GMO-free" labeling even if products do not contain any biotech component.

From the retail level, it is very rare to find products that carry any sort of "GM Food" label as retailers tend to avoid placing biotech products on their shelves. Retailer behavior in this regard is the result of a widely-held perception that the Korean consumer holds negative opinions about biotech products.

G. Biosafety Protocol

Korea signed the Cartagena Protocol on Biosafety (CPB) but has not ratified it to date. Korea intends to ratify and implement the CPB during the course of 2005 in order to be an official party to the Meeting of the Parties III (MOP III) to be held in March 2006. However, the exact timing for ratification remains unclear. The draft Presidential Decree of the Act on Transboundary Movement of Living Modified Organisms (LMO Act), a regulation to implement the CPB, is still pending. Once this draft is finalized, regulatory guidelines from relevant ministries will be issued. Depending on whether Korea chooses a simultaneous or consecutive process for ratification and implementation of regulatory guidelines, the timing of final entry into force of the CPB and related guidelines will be determined. In order to avoid disruption in trade in biotech products as a result of implementation of the CPB, it is

essential that environmental risk assessments (ERAs) be completed before the CPB and implementing regulations go into effect. ERAs have been completed for ten of the 17 biotech crops currently in use, and the rest are expected to be completed in 2005. Treatment of stacked events could be problematic as Korea has not set its policy for conducting ERAs on stacked events. After implementation of the CPB, sales and imports of biotechnology crops that have not completed ERAs will not be allowed.

H. Biotechnology-Related Trade Barriers

Recently, KFDA revised its labeling guidelines in order to formalize its policy on zero tolerance of biotech components in organic products. Exporters from any country where biotech crops are produced could face difficulty in exporting organic products to Korea because of Korea's zero-tolerance policy.

A StarLink-free certificate and StarLink-free statement are still required to accompany shipments of corn intended for food use and corn-based processed food products from the United States.

I. Pending Legislation

As noted in G. above, the draft Presidential Decree of the LMO Act is still pending. Regulatory guidelines elaborating on the requirements set in the Decree have not been issued. The guidelines will define in detail how the LMO Act will be implemented and, therefore, have the potential to affect U.S. exports. Since regulatory guidelines have trade implications, based upon past experience, Korea will issue the draft guidelines, notify them to the WTO, and collect comments from foreign trading partners. Issuance of draft guidelines is expected before the end of 2005.

J. Technology Fees

Korea does not commercially plant biotechnology crops. Korea also does not have legislation in place to collect technology fees.

SECTION IV. MARKETING ISSUES

A. Market Acceptance

Contradictory views about biotechnology characterize the Korean marketplace. While the Korean public used to be very negative in general about most aspects of biotechnology, the widely-publicized success of a Korean scientist in the field of stem cell research received broad support from the Korean public. Since the human stem cell accomplishments surfaced there have been two distinct responses to biotechnology among the Korean public. On one hand, Koreans hold positive views about using biotechnology in human and animal research. On the other hand, Koreans maintain negative perceptions about the use of biotechnology in food production. Polls indicate that Koreans are willing to pay extra for non-biotech products.

Non-governmental organizations and media have reinforced negative consumer perceptions about biotechnology in food production. Concern about negative reactions from NGOs, media and consumers severely limits retailers' willingness to stock products with a "GM Food" label. Consequently, Korea appears on the surface to be a market limited to non-biotech products. However, Korea imports substantial amounts of food ingredients produced using biotechnology for further processing into vegetable oil, corn syrup, and other products that are exempt from "GM Food" labeling requirements.

B. Korean Market Survey on Biotechnology Products

Post Survey

Agricultural Trade Office/Seoul conducted two market surveys on biotechnology products. The first survey was conducted in 2001 and targeted consumers. The survey resulted in responses from 1,500 regular shoppers. The second survey polled 100 professors in 2003.

Results of the two surveys revealed that both professors and consumers had concerns about biotech food products although the degree of concern was much different between the two groups. Fifty-two percent of professors agreed that biotech foods were safe for consumer health, whereas only 21 percent of consumers did. Only 14 percent of consumers stated that they would ever purchase food with biotech contents and 51 percent of consumers thought biotech food would be bad for their health. Only 5 percent of professors thought biotech foods would be bad for their health. In the second survey among professors, eighty-one percent supported the use of biotechnology in food and agriculture mainly as a means to increase production. However, a large percentage of the professors felt biotech foods should be handled separately and 57 percent were willing to pay more for non-biotech agricultural products.

Korea Biosafety Clearing House Survey

The Korea Biosafety Clearing House conducted a survey in October 2004 of 240 companies nationwide (not limited to biotech-related companies) to discern the industry's perception of biotechnology and living modified organisms (LMOs). The survey showed that most companies thought commercial application of biotechnology was desirable and such application would improve human life. Seventy-two percent of companies thought the biotech product market would expand rapidly. Seventy-five percent of companies thought the development of biotech products would be beneficial to the company. Forty-four percent of companies indicated that they might develop or deal with biotech products in the future. Seventy-six percent of companies thought society would recognize the need for biotech products over time.

The Korea Biosafety Clearing House conducted another survey in November 2004 of 1,518 people nationwide to identify consumer perceptions on biotechnology and living modified organisms (LMOs). The survey showed that 84 percent of respondents were aware of biotechnology. Sixty-five percent and 67 percent of respondents expressed concern that LMOs would be harmful to human and environmental health, respectively. Six percent of the respondents thought LMOs are greatly beneficial to humans whereas 49 percent thought they are not beneficial. Sixty-seven percent of the respondents said that they would not purchase biotech products whereas only 2 percent were willing to purchase them. Social acceptance of LMOs was very low; only 4 percent of the respondents had a positive outlook on LMOs in terms of social acceptance. The survey also revealed that housewives showed the least willingness to purchase biotech products.

SECTION V. CAPACITY BUILDING AND OUTREACH

A. U.S. Government or USDA Funded Outreach Activities

A number of activities have been organized and funded to provide outreach in the area of biotechnology in Korea:

- Biotech Press Mission consisting of six reporters in 2000;
- Cochran Fellowship Program for three Korean regulators in 2002;
- Inclusion of biotech briefings for participants in the International Visitors Program since 1999;
- Video Conference for professors and media in 2002;
- Speakers from the USDA, the State Department, and other agencies/organizations for various local symposiums organized by Korean government agencies including KFDA, RDA, Korea Research Institute for Bioscience and Biotechnology, etc.

B. Country Specific Needs

Increasing Korean understanding of U.S. second generation biotechnology products will help to encourage the adoption of science-based regulatory systems and will develop support for trade in U.S. biotech products. To widen Korean public understanding, a group of the local press and key decision makers (CEO's) from large food manufacturing companies will be brought together with one Korean food science expert (to help guide the discussions) to travel to the U.S. to review the U.S. biotechnology and food safety system through meetings and site visits. The group will interface with U.S. policy makers, regulators, agricultural producers and processors at the federal, state and local levels, if possible. It is anticipated that the group will return to Korea and begin to publish positive press about U.S. second generation biotech crops. In addition, it is hoped that the CEO's will develop a greater interest in using U.S. biotech food products in their manufacturing process.

SECTION VI. REFERENCE MATERIAL

APPENDIX A. TABLE OF APPROVED BIOTECHNOLOGY PRODUCTS

* FA: Food approval
* ERA: Environmental Risk Assessments (not for planting)

Crop	Trait Category	Applicant	Event	Trait Description	Approval
Soybean	Herbicide Tolerance (HT)	Monsanto	GTS40-3-2	Glyphosate tolerant soybean variety produced by inserting a modified 5-enolpyruvylshikimate-3-phosphate synthase (EPSPS) encoding gene from the soil bacterium *Agrobacterium tumefaciens*	FA* and ERA*
Corn	Insect Resistance (IR)	Monsanto	Mon810	Insect-resistant maize produced by inserting a truncated form of the *cry1Ab* gene from *Bacillus thuringiensis* subsp. kurstaki HD-1. The genetic modification affords resistance to attack by the European corn borer (ECB)	FA and ERA
Corn	HT, IR	Dupont	TC1507	Insect resistant and Glufosinate ammonium herbicide tolerant maize produced by inserting the cry1F gene from Bacillus thuringiensis var. aizawai and the phosphinothricin N-acetyltransferase encoding gene from Streptomyces viridochromogenes	FA and ERA
Corn	HT	Monsanto	GA21	Introduction, by particle bombardment, of a modified 5-enolpyruvyl shikimate-3-phosphate synthase (EPSPS), an enzyme involved in the shikimate biochemical pathway for the production of the aromatic amino acids	FA
Corn	HT	Monsanto	NK603	Introduction, by particle bombardment, of a modified 5-enolpyruvyl shikimate-3-phosphate synthase (EPSPS), an enzyme involved in the shikimate biochemical pathway for the production of the aromatic amino acids	FA and ERA
Corn	HT, IR	Syngenta	Bt 11	Insect-resistant and herbicide tolerant maize produced by inserting the *cry1Ab* gene from *Bacillus thuringiensis* subsp. kurstaki, and the phosphinothricin N-acetyltransferase (PAT) encoding gene from *S. viridochromogenes*	FA
Corn	HT	Aventis /	T25	Glufosinate herbicide tolerant maize produced by inserting	FA and ERA

		Bayer		thephosphinothricin N-acetyltransferase (PAT) encoding gene from the aerobic actinomycete Streptomyces viridochromogenes	ERA
Corn	Pest Resistance (PR)	Monsanto	MON863	Corn root worm resistant maize produced by inserting the cry3Bb1 gene from Bacillus thuringiensis subsp. Kumamotoensis	FA and ERA
Corn	IR	Syngenta	Bt176	Insect-resistant maize produced by inserting the *cry1Ab* gene from *Bacillus thuringiensis* subsp. Kurstaki. The genetic modification affords resistance to attack by the European corn borer	FA
Corn	HT	Monsanto	DLL25	Glufosinate ammonium herbicide tolerant maize produced by inserting the gene encoding phosphinothricin acetyltransferase (PAT) from Streptomyces hygroscopicus	FA
Corn	HT, IR	Monsanto	DBT418	Insect-resistant and herbicide tolerant maize produced by inserting genes encoding Cry1AC protein from *Bacillus thuringiensis* subsp. kurstaki, and the phosphinothricin N-acetyltransferase (PAT) from Streptomyces hygroscopicus	FA
Corn	Ht, IR	Monsanto	MON863 X NK603	Stacked	FA
Corn	IR	Monsanto	MON863 X MON810	Stacked	FA
Corn	HT, IR	Monsanto	MON810 X GA21	Stacked	FA
Corn	HT, IR	Monsanto	MON810 X NK603	Stacked	FA
Corn	HT, IR	Monsanto	MON810 X MON863 X NK603	Stacked	FA
Corn	HT, IR	Dupont	1507 X NK603	Stacked	FA
Cotton	PR	Monsanto	531	Lepidopteran Resistant including, but not limited to, cotton bollworm, pink bollworm, tobacco budworm; *cry1Ac* from *Bacillus thuringiensis* (*Bt*)	FA and ERA
Cotton	PR	Monsanto	757	Lepidopteran Resistant including, but not limited to, cotton bollworm, pink bollworm, tobacco budworm; *cry1Ac* from *Bacillus thuringiensis* (*Bt*)	FA and ERA
Cotton	HT	Monsanto	1445	Glyphosate Tolerant; -enolpyruvylshikimate-3-phosphate synthase (EPSPS) from CP4 strain of *Agrobacterium tumefaciens*	FA and ERA

Cotton	PR	Monsanto	15985	Lepidopteran Resistant, including, but not limited to, cotton bollworm, pink bollworm, tobacco budworm; from the hybrid cotton variety DP50B (a cross between DP50 and transgenic cotton line MON 531), expresses both Cry1Ac and Cry2Ab	FA and ERA
Cotton	HT, PR	Monsanto	15985 X 1445	Stacked	FA
Cotton	HT, PR	Monsanto	531 X 1445	Stacked	FA
Canola	HT	Monsanto	GT73	Glyphosate tolerant; Enzymes 5-enolypyruvylshikimate-3-phosphate synthase (EPSPS) from the CP4 strain of Agrobacterium tumefaciens and glyphosate oxidase from Ochrobactrim anthropi	FA
Canola	HT	Bayer	Ms8/Rf3	Glufosinate ammonium herbicide tolerance and fertility restored; MS lines contained the *barnase* gene from *Bacillus amyloliquefaciens*, RF lines contained the *barstar* gene from the same bacteria, and both lines contained the phosphinothricin N-acetyltransferase (PAT) encoding gene from *Streptomyces hygroscopicus*.	FA
Canola	HT	Bayer	T45	Glufosinate ammonium tolerant; phosphinothricin-N-acetyltransferase (PAT) isolated from the common aerobic soil actinomycete, *Streptomyces viridochromogenes*	FA
Potato	IR	Monsanto	SPBT02-05	Colorado Potato Beetle Resistant; *cry3A* from Bacillus thuringiensis subspecies tenebrionis (Btt)	FA
Potato	IR	Monsanto	RBBT06	Colorado Potato Beetle Resistant; inserting genes encoding *cry3A* from Bacillus thuringiensis subspecies tenebrionis (Btt) and nptII	FA
Potato	IR, Virus Resistance (VR)	Monsanto	Newleaf Y	Colorado Potato Beetle Resistant and Potato Virus Y (PVY) Resistant; *cry3A* gene from *Bacillus thuringiensis* subsp. *Tenebrionis* and coat protein (CP) gene from PVY-O	FA
Potato	IR, VR	Monsanto	Newleaf Plus	Colorado Potato Beetle Resistant and Potato Leafroll Virus (PLRV) Resistant; *cry3A* gene from *Bacillus thuringiensis* subsp. *Tenebrionis* and ORF-1 and ORF-2 regions from PLRV for resistance to PLRV infection	FA