



Allegato 2

Agricultural Biotech Products on the Market

LibertyLink[®] Corn (Produced by AgrEvo)

Introduced in 1997 in the United States and 1998 in Canada, LibertyLink[®] Corn allows growers to apply Liberty[®] herbicide over the top during the growing season. Liberty herbicide kills over 100 grass and broadleaf weeds fast, with no crop injury. LibertyLink[®] Corn hybrids are offered by seed company partners like Pioneer, Novartis, Cargill, Garst and over 100 other seed companies. Liberty[®] herbicide is offered by AgrEvo.

LibertyLink[®] Canola (Produced by AgrEvo)

Introduced in 1995, LibertyLink[®] Canola allows growers to apply Liberty[®] herbicide over-the-top during the growing season. This results in weed control with no effect on crop performance or yield.

StarLink Corn (Produced by ArgEvo)

Expected to be introduced in 1998, these plants express a protein toxic to various lepidopteran pests, which allow less insecticide usage.

CLEARFIELD[®] Corn

(Produced by American Cyanamid)

Introduced in 1992, imidazolinone-tolerant and -resistant corn allows growers to apply the flexible and environmentally friendly imidazolinone herbicides to corn. Registration of LIGHTNING[®] herbicide, a new imidazolinone specifically for use on CLEARFIELD Corn was approved by the EPA on March 31, 1997. One postemergence application of LIGHTNING[®] herbicide provides both contact and residual control of broadleaf and grassy weeds resulting in maximum yield potential.

SMART[®] Canola Seed

(Produced by American Cyanamid)

Introduced in 1995, imidazolinone-tolerant canola allows growers to apply environmentally friendly imidazolinone herbicides to canola. In Canada, registration of ODYSSEY[®] herbicide, a new imidazolinone for use on imidazolinone-tol-

erant canola, was approved on April 4, 1997. One postemergence application of ODYSSEY[®] herbicide provides both contact and residual control of hard-to- control broadleaf and grassy weeds resulting in maximum yield potential.

Bollgard with BXN Cotton (Produced by Calgene, LLC, unit of Monsanto)

These cotton plants will require less chemical herbicide and insecticide to lower grower input costs and to achieve greater crop yield.

Laurical[®] (Produced by Calgene, LLC)

A less- expensive source of high-quality raw materials for soaps, detergents and cocoa butter replacement fats. Rapeseed plants with more than 35 percent laurate in oil have been produced.

DeKalBt[™] Insect-Protected Hybrid Corn

(Produced by DeKalb Genetics Corporation)

Approved in 1997, select DeKalb leader hybrids are now available with built-in protection against the European corn borer.

DeKalb Brand Roundup Ready[®] Corn

(Developed by DeKalb Genetics Corporation)

Approved in 1998, DeKalb offers several elite hybrids with resistance to Roundup Ultra[™] herbicide.

DeKalb GR Hybrid Corn

(Produced by DeKalb Genetics Corporation)

Approved in 1996, DeKalb GR hybrids provide growers the added weed control benefits of over-the-top glufosinate herbicide application during the growing season.

FreshWorld Farms[®] Tomato

(Produced by DNAP Holding Corporation)

The FreshWorld Farms[®] tomato is a premium, fresh market tomato developed through **somaclonal variation** ³ to have superior color, taste and texture and a 10- to 14-day shelf life.



**FreshWorld Farms Endless Summer[®] Tomato
(Produced by DNAP Holding Corporation)**

The Endless Summer[®] tomato is a genetically engineered version of the FreshWorld Farms[®] tomato on the market since April 1993, and shares its superior color, taste and texture. What's new is its greatly extended shelf life of more than 30 to 40 days after harvest. Company scientists used Transwitch[®] technology to suppress production of ethylene, the hormone that causes tomatoes and other fruits to ripen. It is the company's first whole-food product developed through recombinant DNA technology.

**FreshWorld Farms[®] Sweet Mini-Peppers
(Produced by DNAP Holding Corporation)**

The FreshWorld Farms[®] sweet mini-pepper has a novel sweet taste, deep red color and is nearly seedless. It was developed through anther culture, an advanced breeding technique that captures and stabilizes preferred characteristics such as taste, texture and low seed count.

**FreshWorld Farms[®] Cherry Tomatoes
(Produced by DNAP Holding Corporation)**

The FreshWorld Farms[®] cherry tomato is specially bred for superior taste, color and texture. It is sold through distributors and supermarket chains in the Mid-Atlantic, Northwest and Midwest regions.

**High pH Tolerant Corn Hybrids
(Produced by Garst Seed Company)**

These corn hybrids are capable of growing successfully on the severely alkaline soils that characterize the western U.S. corn belt.

**Gray Leaf Spot Resistant Corn Hybrids
(Produced by Garst Seed Company)**

Corn hybrids tolerant to the disease *Cercospora* spp., which attacks corn hybrids in the Central and Southeastern corn belts.

**G-Stac[™] Corn Hybrids
(Produced by Garst Seed Company)**

Corn hybrids featuring "stacked" genes providing multitask capability. For example, hybrids that contain genes for the control of European corn borer (B.t.), genes for resistance to Liberty[®]

herbicide and genes for resistance to imidazolinone herbicide all in the same corn hybrid.

Chymogen[®] (Produced by Genencor International and marketed by Chr. Hansen's)

Chymogen is the biotechnology-produced version of an enzyme (chymosin) found in calves that makes milk curdle to produce cheese. Because it is produced through biotechnology, it is purer, more plentiful and eliminates variability in the quality and availability of calves' stomachs. It is used in approximately 60 percent of all hard cheese products made today.

**Bollgard[®] Insect-Protected Cotton
(Produced by Monsanto)**

Introduced in 1996, cotton with Monsanto's Bollgard gene is protected against cotton bollworms, pink bollworms and tobacco budworms.

**NewLeaf[®] Insect-Protected Potato
(Produced by Monsanto)**

Introduced in 1995, the NewLeaf[®] Potato is the first commercial crop to be protected against insect pest through biotechnology. Thanks to a gene from a variety of the B.t. bacteria, the NewLeaf[®] Potato is resistant to the Colorado potato beetle.

**Posilac[®] Bovine Somatotropin,
Recombinant Bovine Somatotropin, (rBST)
(Produced by Monsanto)**

BST is a naturally occurring protein hormone in cows that induces them to produce milk. rBST improves milk production by as much as 10 to 15 percent and is now used by farmers whose herds represent over 30 percent of the nation's cows. It was approved by the FDA in 1993.

**Roundup[®] Ready Cotton
(Produced by Monsanto)**

Approved in 1996, Roundup Ready[®] cotton tolerates both topical and post-directed applications of Roundup[®] herbicide.

**Roundup Ready[®] Soybeans
(Produced by Monsanto)**

Introduced in 1996, Roundup Ready[®] Soybeans allow growers to apply Roundup[®] herbicide over-



the-top during growing season. The result is dependable, superior weed control with no effect on crop performance or yield.

**Roundup Ready[®] Corn
(Produced by Monsanto)**

Approved in 1997 Roundup[®] Ready Corn allows over-the-top applications of Roundup[®] herbicide during the growing season for superior weed control.

**YieldGard[™] Insect-Protected Corn
(Produced by Monsanto)**

The YieldGard gene provides control of the European corn borer throughout the corn plant during the season.

**NatureGard[®] Hybrid Seed Corn
(Produced by Mycogen)**

These corn plants express a protein toxic to European corn borer that reduces or eliminates the need for insecticides.

IMI-Corn (Produced by Mycogen)

Corn hybrid that can tolerate application of imidazolinone herbicides.

High Oleic Sunflower (Produced by Mycogen)

Sunflower plants modified by mutagenesis to produce sunflower oil that is low in trans- fatty acids, does not require hydrogenation and has improved temperature stability.

High Oleic Peanut (Produced by Mycogen)

Peanut plants modified by mutagenesis to produce nuts in high oleic acid results in longer life for nuts, candy and peanut butter.

**NK Knockout[™] Corn, NK YieldGard[™] d[™]
Hybrid Corn, Attribute[™] B.t. Sweetcorn
(Produced by Novartis Seeds)**

Novartis seeds has produced several corn varieties that have been modified to provide natural protection against certain pests.

**Novartis Seeds Roundup Ready[®] Soybeans
(Produced by Novartis Seeds)**

High Oleic Acid Soybeans

(Produced by Optimum Quality Grains, L.L.C.)

These soybeans produce an oil that contains a

higher level of oleic acid than that found in currently available soybean oil and also contains lower levels of saturated fat. The oil will fit applications that require enhanced stability without the need for chemical hydrogenation, which generates trans-fatty acids.

**Low Linolenic Soybean Oil
(Produced by Optimum Quality Grains, L.L.C.)**

With less than 3.5 percent, linoleic is an enhanced stability oil that will reduce the need for chemical hydrogenation, therefore reducing trans-fatty acids.

**Low Saturated Soybean Oils
(Produced by Optimum Quality Grains, L.L.C.)**

This oil is 50 percent less saturated fat than commodity soybean oil (vegetable oil), or approximately 8 percent total saturated fat. A 14-gram serving has just one gram of saturated fat - the same as canola oil. Zero saturated fat can be reached in many formulations when a low saturated soy is used in place of commodity soy.

**High Oleic Sunflower Oil
(Produced by Optimum Quality Grains, L.L.C.)**

As an enhanced-stability oil, high oleic sunflower oil (less than 80 percent oleic) is excellent for use as an ingredient, in cooking or as spray oil, without the need for chemical hydrogenation. New hybrids currently in production are expected to increase oleic acid content to around 85 percent.

**Chy Max[®] (fermentation-derived)
(Produced by Pfizer, marketed by Chr. Hansen's)**

Chy Max[®] is another version of chymosin, an enzyme that causes milk to coagulate. It is an advanced fermentation ingredient that is of higher purity, quality and activity than natural rennet.

**Increased Pectin Tomatoes
(Produced by Zeneca Plant Sciences)**

Tomatoes that have been genetically modified to remain firm longer and retain pectin during processing into tomato paste.

Source: BIO Member Survey



Agricultural Biotechnology Products Expected on the Market Within Six Years Genetically Engineered Cotton Fiber (Produced by Agracetus, unit of Monsanto Company)

This biotech product will enhance fiber performance, reduce dye-shop pollution and improve textile manufacturing efficiency.

LibertyLink[®] Soybean, Cotton, Sugar Beet and Rice (Produced by AgrEvo)

These LibertyLink[®] crops will be available in Canada and/or the United States. Like LibertyLink[®] Corn, when used together with Liberty[®] herbicide, they will allow farmers greater flexibility and environmental soundness in weed control.

SeedLink Corn (Produced by AgrEvo)

These plants provide a more reliable pollination control system for corn seed production. The use of the SeedLink System eliminates the need for hand or mechanical detasseling.

CLEARFIELD[®] Wheat (Produced by American Cyanamid)

American Cyanamid is cooperating with universities, public and private laboratories and seed companies to develop wheat varieties tolerant to imidazolinone herbicides. Imidazolinone herbicides are flexible, environmentally friendly and provide contact and residual control of weeds common to wheat production, including ones not controlled by currently registered wheat herbicides.

CLEARFIELD[®] Rice (Produced by American Cyanamid) - American Cyanamid is cooperating with universities and public and private seed companies to develop rice varieties tolerant to imidazolinone herbicides. Imidazolinone herbicides are flexible, environmentally friendly and provide superior contact and residual control of weeds.

CLEARFIELD[®] Sugar Beets (Produced by American Cyanamid)

American Cyanamid is cooperating with universities and seed companies to develop sugar beet varieties tolerant to imidazolinone herbicides. Imidazolinone herbicides are flexible, environ-

mentally friendly and provide superior contact and residual control of weeds.

Insect Protected Tomatoes (Produced by Calgene, LLC, unit of Monsanto Company) - These tomato plants will require less chemical insecticides to achieve higher yields.

High-Stearate Oil (Produced by the Calgene, LLC, unit of Monsanto Company)

High-stearate oil is an ingredient in margarine, shortenings and other food ingredients that would not require hydrogenation, thus reducing the expense.

Medium Chain Fatty Acids/Medium Chain Triglycerides (Produced by Calgene, LLC)

This will be a less-expensive source of raw materials for high-performance lubricants, nutritional formulas and high-energy foods.

High Sweetness Tomato (Produced by Calgene, LLC)

Tomato plants that produce high flavor tomatoes.

Genetically Engineered Fruits and Vegetables with Longer Post-Harvest Shelf Life (Produced by Agritope, Inc., a wholly owned subsidiary of Epitepe, Inc.)

Using ethylene-control technology, Agritope, Inc., has created delayed-ripening, longer-lasting tomatoes, raspberries and strawberries.

Virus Resistance Tomatoes (Produced by Calgene, LLC)

These tomato plants will be resistant to infection by certain plant viruses.

AquaAdvantage[®] Salmon, Tilapia, Trout, and Flounder (Produced by A/F Protein)

The AquaAdvantage[®] salmon, tilapia, trout and flounder have the capability of growing from egg to market size (8 to 10 lb.) in one to one-and-a-half years. Conventional fish breeding techniques require three years to bring a fish to market. This new salmon could make fish more plentiful, decrease overfishing of wild salmon and lower consumer costs. A/F Protein expects to introduce the AquaAdvantage[®] salmon within four to six



years to a public for whom salmon is an increasingly popular food.

**Ripening-Controlled Cherry Tomatoes
(Produced by DNAP Holding Corporation)**

Using the same technology as in its Endless Summer™ fresh market tomato, the company has developed cherry tomatoes with longer market life, improved flavor and better harvest traits through ripening control.

**Firmer Pepper s
(Produced by DNAP Holding Corporation)**

This sweet pepper has been modified using Transwitch® technology to remain firmer after harvest. Pepper plants are currently in field evaluations.

**Sweeter Pepper s
(Produced by DNAP Holding Corporation)**

This pepper has been modified to be sweeter and tastier by overexpressing a gene for sweetness. Pepper plants are in early stages of seed increase and field evaluation.

**Ripening-Controlled Bananas and Pineapples
(Produced by DNAP Holding Corporation)**

Using the same ripening control technology as in its Endless Summer™ tomato, the company is developing banana and pineapple varieties with extended market life.

**Strawberry
(Produced by DNAP Holding Corporation)**

The company is improving the market life of fresh strawberries by using Transwitch® technology to keep fruit firmer after harvest and adding genes to resist disease.

Messenger™ (Produced by EDEN Bioscience)

This is the first of a series of products based on the Harpin Protein technology. Harpin Proteins induce disease resistance and promote increased yield in a broad range of agriculture and horticulture crops. Harpin Proteins induce the natural disease immune system and growth pathways inherent within each plant.

High-Solids Potato (Produced by Monsanto)

Monsanto has developed a higher-solids (or

starch content) potato by introducing a starch-producing gene from a soil bacteria into a potato plant. With the reduction in the percentage of water in the genetically improved potato, less oil is absorbed during processing, resulting in a reduction of cooking time and costs, better-tasting french fries and an economic benefit to the processor.

**Roundup Ready® Canola
(Produced by Monsanto)**

Roundup Ready canola allows growers to apply Roundup® herbicide over-the-top of the crop during the growing season, for superior weed control with enhanced crop safety.

**Roundup Ready® Sugar Beets
(Produced by Monsanto)**

Roundup Ready sugar beets are tolerant of Roundup® herbicide and provide growers with a new weed-control option while the crop is growing.

NewLeaf® Plus (Produced by Monsanto)

Insect -and virus- protected potatoes. These potatoes are protecting themselves against Colorado potato beetles and potato leaf roll virus.

New-Leaf® Y Insect-and Virus-Protected Potatoes (Produced by Monsanto)

These potatoes protect themselves against the Colorado potato beetle and the potato virus Y.

Second-Generation Bollgard® Insect-Protected Cotton (Produced by Monsanto)

This cotton controls insect pests, like the original Bollgard cotton, but using a different mode of action to help growers manage insect resistance concerns.

High-Stearate Soy Oil (Produced by Monsanto)

This is a functional oil with healthier properties for margarines and shortenings. High-stearate oil requires no hydrogenation and contains no trans-fatty acids, which increase cholesterol.

B.t. Sunflower, Soybeans, Canola and Wheat (Produced by Mycogen Corp.)

These crops will express a protein toxin providing protection against various caterpillar and beetle pests.



Fresh Market Tomato

(Produced by Zeneca Plant Sciences)

Zeneca is modifying the tomatoes for enhanced flavor, color and increased antioxidant vitamin content.

Banana (Produced by Zeneca Plant Sciences)

Zeneca is developing an inherent resistance to Black Sigatoka and modifying ripening characteristics in bananas. This will reduce the need for chemical fungicides, as well as improve the agronomics of production and the quality to the consumer.

Modified Lignin in Paper Pulp Trees

(Produced by Zeneca Plant Sciences under separate agreements with Shell Forestry and Nippon Paper)

By making lignin easier to remove from cellulose - the primary ingredient in paper - papermakers can make high-quality paper with less energy and bleaching, which benefits both the paper processor and the environment.

Source: BIO Member Survey.

