



APPROXIMATELY 1.4 BILLION POUNDS **LESS** ACTIVE INGREDIENT OF INSECTICIDE HAS BEEN USED IN THE UNITED STATES BECAUSE OF GM CROPS BETWEEN 1996 AND 2015...⁴

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WHAT ARE GMOS?

Biotechnology in plant agriculture has come to mean the process of intentionally making a copy of a gene for a desired trait from one plant or organism and using it in another plant. The result is a GMO (genetically modified organism).

WHY DO FARMERS USE GMOS?

Farmers choose seeds based on what is best for their farms, market demand and local growing environments. Farmers select GMOs to reduce yield loss or crop damage from weeds, diseases, and insects, as well as from extreme weather conditions, such as drought. Farmers choose to use GMOs to reduce the impact of agriculture on their environment and their costs – by applying pesticides in more targeted ways, for example. Farmers have also used genetic modification to save a crop – such as papaya from Hawaii – that was being threatened by a disease.

THERE ARE CURRENTLY 10 CROPS COMMERCIALY AVAILABLE FROM GMO SEEDS IN THE US:

GENETIC TRAITS EXPRESSED IN GMOs IN THE U.S.

APPLE
Genetic Traits
Non-browning
Uses: Food



POTATO
Genetic Traits
Reduced Bruising and Black Spot
Non-browning
Low Acrylamide
Blight Resistance
Uses: Food



FIELD CORN
Genetic Traits
Insect Resistance
Herbicide Tolerance
Drought Tolerance
Uses:
- Livestock and poultry feed
- Fuel ethanol
- High-fructose corn syrup and other sweeteners
- Corn oil
- Starch
- Cereal and other food ingredients
- Alcohol
- Industrial uses



CANOLA
Genetic Traits
Herbicide Tolerance
Uses: Cooking oil, Animal feed



ALFALFA
Genetic Traits
Herbicide Tolerance
Uses: Animal feed



SOYBEAN
Genetic Traits
Insect Resistance
Herbicide Tolerance
Uses:
- Livestock and poultry feed
- Aquaculture
- Soybean oil (vegetable oil)
- High oleic acid (monounsaturated fatty acid)
- Biodiesel fuel
- Soy milk, soy sauce, tofu, other food uses
- Lecithin
- Pet food
- Adhesives and building materials
- Printing ink
- Other industrial uses



RAINBOW PAPAYA
Genetic Traits
Disease Resistance
Uses: Table fruit



COTTON
Genetic Traits
Insect Resistance
Herbicide Tolerance
Uses: Fiber, Animal feed, Cottonseed oil



SUGAR BEET
Genetic Traits
Herbicide Tolerance
Uses: Sugar, Animal feed



SWEET CORN
Genetic Traits
Insect Resistance
Herbicide Tolerance
Uses: Food



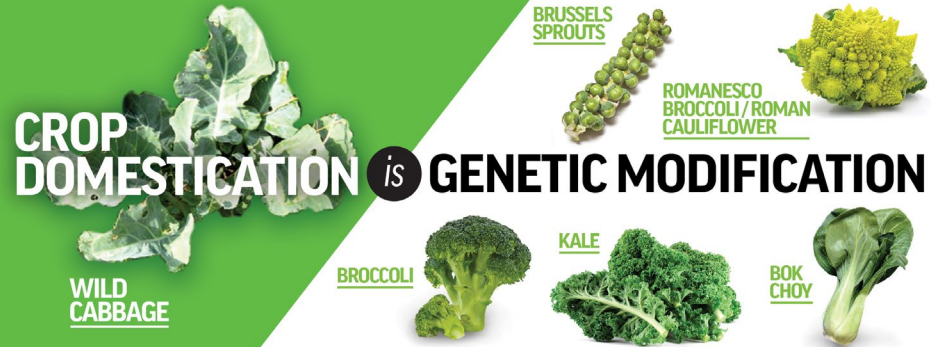
SUMMER SQUASH
Genetic Traits
Disease Resistance
Uses: Food



THE EVOLUTION OF CROP IMPROVEMENT BUILDING ON GENETIC DIVERSITY

Farmers have intentionally changed the genetic makeup of all the crops they have grown and the livestock they have raised since domestic agriculture began 10,000 years ago. Every fruit, vegetable and grain that is commercially available today has been altered by human hands, including organic and heirloom seeds.

CROP DOMESTICATION is GENETIC MODIFICATION



In the late 20th century, advances in technology enabled us to expand the genetic diversity of crops. For years, university, government and company scientists intensively researched and refined this process. A major result has been GM seeds that maintain or increase the yield of crops while requiring less land and fewer inputs, both of which lessen the impact of agriculture on the environment and reduce costs for farmers.

HUMANS CREATED TODAY'S CORN CROP

Over the past century, corn has evolved with the availability of hybrid corn in the 1930s and the planting of GM crops in the mid-1990s. Due to the benefits provided by insect resistance and/or herbicide tolerance traits in GM corn, more and more of it has been planted. Contrary to popular belief, the development and increased usage of GM corn has not changed the physical appearance of corn.



What has changed, due to modern plant breeding, is size, consistency, seed performance, yield, the number of ears per stalk, and the position of the ear and the leaves on the stalk. Currently, a plant has only one ear located about waist high (the height of a combine blade), and its leaves grow at a more upright angle to better catch sunrays and rain. A century ago, farmers planted about 8,000 corn plants per acre. Today they plant about four times as many plants per acre.¹

EXTENSIVELY RESEARCHED AND STUDIED

Before they reach the market, crops from GM seeds are studied extensively to ensure they are safe for people, animals and the environment. Today's GM products are the most researched and tested agricultural products in history.

Bringing a new GMO to market involves comprehensive safety and environmental reviews by regulatory bodies around the world. In addition to the review process conducted in the U.S. by the U.S. Department of Agriculture (USDA), U.S. Environmental Protection Agency (EPA) and U.S. Food and Drug Administration (FDA), other nations conduct their own rigorous certification processes and regulatory approvals. There are more than 75 countries that currently certify GM products for cultivation (growing), food import for people, feed import for animals and/or trials and testing. In 2016, 26 countries grew GMOs and even more imported GMOs.²



THE SAME AS OTHER CROPS

Biotech crops currently available on the market are the same from a compositional and nutritional standpoint as their non-GM counterparts. For example, GM corn is the same as non-GM corn. Testing has shown and FDA review has confirmed that GMOs are nutritionally the same as non-GM crops, including the same levels of key nutrients like amino acids, proteins, fiber, minerals and vitamins.

No commercially available crops in the U.S. were created by nature alone. Every fruit, vegetable and grain that is commercially available today has been altered by human hands, including organic and heirloom seeds, for taste, yield or disease resistance.

THE HISTORY OF GENETIC MODIFICATION IN CROPS

10,000 years ago
Humans begin crop domestication using selective breeding.

1700s
Farmers and scientists begin cross-breeding plants within a species.

1940s and 1950s
Breeder and researchers seek out additional means to introduce genetic variation into the gene pool of plants.

1980s
Researchers develop the more precise and controllable methods of genetic engineering to create plants with desirable traits.

1990s
The first GMOs are introduced to the marketplace.