

Genetically Modified Organisms (GMOs)

Learning Objectives

The learner will:

- Understand the history, significance, and risks of GMO crops and foods.
- Gain exposure to common myths and underlying truths related to GMOs.

History of GMOs

- Genetic modification refers to technology that makes it possible to manipulate the genes of living organisms to change the characteristics of that organism. Combining multiple genes from different living organisms is referred to as recombinant DNA technology. Resulting products are said to be transgenic or genetically engineered.
- First commercial GMO food crop was FlavrSavr tomatoes by Calgene released in 1992. FDA recognized the FlavrSavr as a food and therefore decreed it did not need to be labeled. Released in 1994, the tomato did poorly and was gone by 1997. Radically changed direction of GMOs

GMOs around the world

- Transgenic crops are now grown in 42 countries on 6 continents.
- Currently over 1 billion acres of land contain GMO crops. 2/3 of that acreage is in USA. Principal crops being herbicide/insecticide resistant soybeans, cotton, corn, and canola.
- 70% of products on grocery shelves in USA contain GMO ingredients
- Over 125 crops are currently registered in biotech database

GMOs, WTO, USA, and the World

- The WTO (World Trade Organization) ruled the EU (European Union) broke trade rules with their de facto moratorium on the import and use of biotech products. Ban effectively denies access of US corn and corn products for sale in Europe. Case brought before WTO by USA, Canada, and Argentina.

Controversies surrounding Biotech

- Proponents claim less use of pesticide, however studies show that GMO crops are been sprayed with up to 5 times the herbicide and insecticide than used on traditional crops.
- Loose gene syndrome, GMO crops have accidentally cross pollinated with non-engineered crops resulting in loss of control of patented genes. This has been referred to as "loose gene syndrome." Companies such as Monsanto have sued small farmers over "escaped" genes when their genes have turned up in other crops.
- Genetic escapees are polluting the gene pool, rendering many non GMO crop seed sterile. The result is a major threat to natural genetic diversity that has developed over a long period and is fundamentally necessary to long term genetic viability.



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- Terminator genes implanted in genetic make up make seed sterile after one generation therefore making it impossible for farmers to save seeds. Seed saving is one of the longest standing and most important practices in sustainable agriculture. Because GMO genes are patented it makes it illegal for farmers to save seed, or liable for lawsuits if GMO genes drift into their fields and plants.
- The USDA has shown no restraint in pushing biotech as they have reviewed 5000 requests for field trials and not turned one down.

Common GMO myths perpetuated by industry

- *GMO food will feed the hungry of the world.* Truth: GMO foods destroy diversity, sustainable agriculture, and make developing countries dependent on receiving seed from USA every year, taking more money away from local farmers and local economies and sending profits overseas.
- *GMOs are safe for our food source.* Truth: The technology is so new that we have no way of understanding the radical long term impacts of genetically altering living organisms. The public has been used as guinea pigs for a dangerous experiment. Doctors say problems such as allergies and other complications can and will take years to develop.
- *GMO products reduce the need for chemicals on the farm.* Truth: An overwhelming number of GMO crops require the use of heavy chemicals such as the widely used Round-Up Ready line of crops produced by Monsanto. The company not only benefits from the seed profit, but from the worlds most widely used herbicide Round-Up manufactured by Monsanto.
- *GMO foods can make products more nutritious, long lasting, and more appealing.* Truth: The creation of GMO food products has nothing to do with food quality or ability to withstand shipping and distribution. Foods have been modified to withstand heavy herbicidal spraying, or to produce their own insecticides.
- *GMO products are just the logical next step in plant and organism breeding that has been happening since the beginning of agriculture.* Truth: Genetic modification crosses genes that would never interact in nature, such as the crossing of spider genes with milk goats to produce large amounts of spider silk in goat milk to be used for body armor and industrial applications.

List of GMO products available for human consumption.

(insert list)



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Assessment and Review

- What are GMOs and why are they a significant concern to the consumer and the small-scale organic farmer?
- What in your opinion is the most dangerous myth perpetuated by the biotech industry?

