

## Genetically Modified Organisms and Food

All modern agricultural crops and livestock are the result of genetic modification, first through the domestication process and in recent times through the application of scientific breeding (hybridization and selection, induced mutations and selection). Thus in plain English, all of agriculture is based on “genetically modified organisms”.

Public awareness of “Genetically Modified Organisms” (GMOs) in the food supply stems from the introduction, beginning in the 1980s, of recombinant DNA (“gene splicing, “genetic engineering”) to modify the genetic makeup of organisms. Recombinant DNA involves the isolation (or “cloning”), modification, and introduction of DNA into a target organism; when the target organism is a crop plant or domesticated animal used for food, the purpose is usually to impart to the target organism a desired trait that is unknown or very difficult to obtain by traditional methods (those in use before the invention of recombinant DNA in the mid-1970s), such as breeding or inducing mutations.

GMO foods can refer to the crop or livestock species itself or processed food made, in whole or in part, with GMO-containing ingredients.

Rutgers has conducted limited work to develop GMO crops and has not released any crop or livestock species whose development included the introduction of genes by recombinant DNA (also called “transformation”). There have been a few projects at Rutgers focused on use of recombinant DNA to modify the genomes of turf species and one many years ago to develop insect-resistant eggplant varieties. These projects have been abandoned.

The tools of recombinant DNA are widely used in laboratories at the University (and indeed around the world) for research, particularly in microorganisms and for development of markers used in plant breeding programs (marker assisted selection). We have contributed to genome sequencing of numerous crops (sorghum, cranberry, blueberry, maize, rice, hazelnut) as well as oysters. We have also been involved in genome sequencing of many microbial species (bacteria, fungi, algae, etc.).

Today, in production agriculture, the vast majority of field corn, soybeans, and cotton produced world-wide are from planting GMO seeds. GMO livestock are still at a very early stage of development and are not used in production agriculture. GMO fish are beginning to be used in production aquaculture but this is not yet widespread. In the US, all processed foods and the vast majority of feed for livestock production (and pet foods), except for those (by law) labeled organic, contain GMOs.

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