What are Genetically Modified Organisms (GMOs)?

Crop varieties which have been developed using genetic engineering techniques are commonly known as GMOs (genetically modified organisms). Genetic engineering allows the transfer of one specific gene or a set of genes within a plant family or across genetic lines. The overall goal of genetic engineering is to add a gene that will express a desirable trait in the plant such as resistance to a herbicide or resistance to pests. Genetic engineering techniques involve extracting and isolating a specific DNA segment that makes up a gene and inserting it into plant cells. Whole plants are grown from the successfully transformed cells using tissue culture, and then using traditional plant breeding the new gene is transferred into the crop population.

Currently there are nine (9) crops that have GMO varieties available. These include: Corn (field and sweet corn), soybeans, canola, papaya, cotton, alfalfa, sugar beets, squash and rice. Soybean, canola, sugar beet, alfalfa, and corn GMO varieties have been modified for resistance to Roundup (Roundup Ready) and in some cases, Rely (Liberty Link); field corn, sweet corn and cotton varieties have been modified to contain and express one or more B.t. (*Bacillus thuringiensis)* genes to make them resistant to some insect pests; papaya and squash have been modified to be resistant to insect vectored viruses (ring spot virus in papaya and squash mosaic virus). Scientists have also developed a genetically modified rice variety (Golden Rice) that is high in vitamin A.

Crops that are genetically modified are food and feed crops. The only crops that are likely to be in a greenhouse would be squash or sweet corn transplants being grown for setting out in a field. Those plants cannot be sold to homeowners. Farmers must sign a technology agreement with the seed producer much like an agreement when buying software. Only those growers signing the agreement can grow the crops, so sale to other growers or homeowners is not allowed. There are currently no flowers or ornamental GMO crops on the market. Some greenhouse growers are posting signs on their operations to assure customers that there no GMOs in their product line.

In addition, seeds packaged for home garden use are not and cannot be genetically modified. In saying this, there is a bit of confusion in that one home garden seed supplier has told customers that all seeds are genetically modified (GMO) but not all seeds are modified using genetic engineering. Although this is true, the term GMO is commonly used to refer to seeds that have been modified using genetic engineering. Also, all commercial (farmer) seed packages are clearly marked if they contain genetically modified seeds.

Attitudes about GMOs vary widely both in the US and around the world. Many commodity crop farmers in the US have adopted GMOs as a way to grow better crops with fewer pesticides. Many consumers are concerned about GMOs due to the fear about potential health risks and fear of potential environmental risks. Many scientists support GMOs because of many years of studies showing little or no health and

ecological risks, and the potential for developing higher yielding crops to feed the rapidly increasing world population.

In the United States GMOs are regulated by the US Department of Agriculture (USDA), The Environmental Protection Agency (EPA) and the Food and Drug Administration (FDA). The USDA ensures the health and safety of the GMOs to plant and animal health. Developers of GMO Crops must apply for a permit that requires them to address the potential risks of the GMO to plant and animal health and the possibility of the organism spreading into the environment. The EPA regulates only the genetic material incorporated into the plant not the plant itself. It regulates any GMO that contains a pesticide (e.g. B.t.) as part of the genetic makeup and requires developers to address the short term and long term consequences of the pesticide on humans, livestock and the environment

The FDA regulates the safety of the GMOs consumed by people or animals. The FDA requires that the GMOs be substantially equivalent to non GMOs and therefore classifies them as safe. Under the FDA policy GMOs do not require approval from FDA before they are marketed. However the GMO developers are given voluntary option to consult with the FDA to discuss nutritional or safety issues.

The FDA does not require the labelling of GMOs unless a food contains an allergen, a known toxicant that exceeds tolerable limits, or has nutritional properties that have been significantly altered. Currently the only food label that ensures absence of GMO is the USDA Certified Organic label. GMOs are prohibited in organic production and in organic products. In addition, organizations such as "The Non-GMO Project (***www.nongmoproject.org***)" list foods that do not contain GMO's on their web site.

Geoffrey Njue MS, UMass Extension and Richard Bonanno PhD, UMass Extension

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