



Cooperative Extension Service
 Biotechnology Outreach Program
 College of Tropical Agriculture and Human Resources
 University of Hawai'i at Manoa

January 2015

Issue 25

Developing GM Crops in Hawaii, Part 1

In a previous bulletin, we described how a genetically modified (GM) papaya variety that is resistant to Papaya Ringspot Virus has become a mainstay for Hawaii growers. In this and the next bulletin, we'll examine a different set of GM plants grown in Hawaii: genetically engineered crops that are undergoing field trials.

To set the stage for this discussion, we'll review the framework for regulating GM crops in the United States. Three federal agencies—the U.S. Environmental Protection Agency (EPA), the U.S. Food and Drug Administration (FDA), and the U.S. Department of Agriculture (USDA), —oversee GM crops. Though the current system used by these agencies is considered effective, as new approaches and issues arise, the regulations may need further changes.

EPA regulates the distribution, sale, use, and testing of pesticides, including the pest-targeted proteins produced in some GM crop plants. Other EPA responsibilities include defining the amount of pesticide residue allowed in food or animal feed and establishing rules for growing GM plants that produce their own pesticide to prevent pests from developing pesticide resistance.

The FDA assesses the nutritional value of GM foods and feeds, determines whether edible GM products should be labeled as containing food additives, and enforces EPA's pesticide residue limits.



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Thank you to Carol Oshiro for
 web design, Jessica Radovich for
 graphics and Kathleen Vickers
 for text editing.



USDA's Animal and Plant Health Inspection Service (APHIS) is responsible for protecting farmers from pests and diseases, among other functions. Before new GM crops enter the marketplace, they are studied to determine whether they are likely to become plant pests by establishing themselves as weeds, breeding with wild plants, or harming non-target organisms. At this stage of GM crop development, the crops are what USDA calls regulated articles. Field trials, a late stage of GM crop development, take place during this period of USDA regulation.

THE CRUCIAL LAST STEP

Field trials are the crucial last step in the evaluation of new varieties generated through traditional, mutational, or genetic engineering practices. These replicated trials are necessary to evaluate a crop's agronomic performance and final harvested product characteristics when grown in different agroecological zones. This testing allows a breeder to determine the environmental adaptability and market quality of a new variety. New varieties often fail this field-testing due to poor adaptability and significant variation in final product quality. This testing may also show that growers may need to change their crop management strategies for the new variety.



While a GM crop is regulated by USDA, crop breeders must notify APHIS to be permitted to import the plant material, move it across state lines, or release it into the environment, for example by planting the crop to conduct a field trial. Crop developers can petition APHIS to have their GM crops deregulated by reporting their findings about the crop's unique GM characteristics and demonstrating that the GM crop is unlikely to become a pest.

Continued Regulations



Once a GM crop is deregulated by APHIS, the USDA does not distinguish it from non-GM varieties of the same crop. When the USDA grants non-regulated status to a GM plant that produces its own pesticides, the plant continues to be regulated by the EPA.

Available Info

Information Systems for Biotechnology (ISB), a program funded by the USDA and administered by Virginia Tech, provides a searchable database that lists permits and notifications for the environmental release of APHIS-regulated GM crops.



Hawaii GM Acreage



The acreage numbers listed for Hawaii permits issued in 2014 and 2015 alone exceeds 250,000 acres, in a state with 1.12 million acres currently in farming operations. Do GM crops really account for a quarter of Hawaii's farmland?

Actually, in 2013 about 7,000 acres were dedicated to seed production in Hawaii in total. This includes almost all of the state's field trials for regulated GM crops as well as the acreage planted to conventional seed crops and non-regulated GM seed crops. In our next bulletin, we'll take a closer look at what the ISB database and other sources can tell us about field trials for GM crops in Hawaii.

