

Overview of Agricultural Biotechnologies in the United States

USDA supports the safe and appropriate use of science and technology, including biotechnology, to help meet agricultural challenges and consumer needs of the 21st century. USDA plays a key role in assuring that products produced using biotechnology are safe to be grown and used in the United States. Once these products enter commerce, USDA supports bringing these and other products to the worldwide marketplace.

Examples of Genetically-Engineered (GE) Products:

Currently commercialized genetically engineered crops, such as herbicide-tolerant or insect-resistant crops, capitalize on traits easily created by inserting a single gene. However, next generation genetically engineered crops will likely focus on more complex traits, such as drought and heat tolerance, which will likely require the transfer of multiple genes.

GE plants that were designed to benefit production systems for the major crops in the U.S. have been rapidly adopted by American farmers. For 2011, GE soybeans, GE cotton, and GE corn have respective U.S. adoption rates of 94%, 90%, and 88%. Examples of engineered minor crops approved for use in the United States include virus-resistant papaya and squash. And examples of crops under development for potential use in the developing world include virus-resistant cassava, insect-resistant cowpea, and drought-tolerant corn.

GE animals are being developed to improve animal health and productivity, to enhance food safety, and to protect public health. GE animals also can produce biological pharmaceuticals that cannot be made by conventional means. GE insects may reduce the spread of insect-borne diseases, such as Dengue fever and malaria. And microbes such as GE algae may be used as sources of renewable energy. Only one GE animal has been approved to date for commercial use in the United States – a goat producing a biological pharmaceutical in its milk to treat people with a rare hereditary blood disorder.

Next Generation Biotechnologies:

Next generation biotechnologies include cisgenics, gene editing and synthetic biology. Cisgenics refers to the transfer of DNA between closely related or same species organisms. Gene editing is the introduction or modification of a trait in an organism without transferring any DNA, but instead, by altering the organism's own DNA. Synthetic biology is an engineering approach using biological organisms and processes as the building blocks for new biological systems and/or organisms.

My presentation will cover:

- U.S. regulatory oversight for biotechnology approvals
- Biotechnology as evolving continuum of a variety of technologies
- Genetic engineering provides great potential for quicker, more precise, and more innovative development of new agricultural products