

INSECTICIDAL TRANSGENIC CROPS (PIP—PLANT INCORPORATED PROTECTANTS)

David Buntin, Research/Extension Entomologist
Phillip Roberts, Extension Entomologist

A “transgenic” crop is a cultivar or variety that expresses a trait or traits derived from genetic sources (transgenes) that are not inherent in the plant. An insecticidal transgenic crop produces toxic components to insects, but these materials supposedly have no impact on other organisms. To date, all insecticidal transgenic crops have resulted from transgenes derived from the insect pathogenic bacteria *Bacillus thuringiensis* (Bt), which produces proteins that are lethal to certain insects. Different Bt toxins are highly lethal to specific insects and have little or no toxicity to others. Bt toxins are not considered to be broad spectrum insecticides. It is important to understand which Bt transgenes are present in a crop cultivar and whether or not the Bt toxin(s) that the plant produces has high toxicity to a target pest of interest. The Environmental Protection Agency (EPA) registers and regulates insecticidal transgenes and the Bt protein toxin that is produced by the transgene, and together these are called Plant Incorporated Protectants (PIP). Note that herbicide-resistant transgenes and others are not regulated by EPA since they do not produce toxins. The United States Department of Agriculture (USDA)

regulates herbicide resistant transgenes and others that are not considered PIP traits. Currently in the USA, corn, cotton, soybean, and potato have PIP registrations of Bt insecticidal transgenes. At present, only corn and cotton have PIP cultivars for sale to the public in the USA. Most transgenic crops have multiple transgenes (one or more insecticidal or herbicidal transgenes) present and there is a loose terminology associated with these plants that express more than one transgenic trait. Transgenic crops that possess multiple transgenes are termed either “stacked gene” or “pyramided gene” crops.

For information on the efficacy of specific Bt technologies consult the 2024 Georgia Corn Production Guide for corn Bt products and the 2025 Georgia Cotton Production Guide for cotton Bt products.

For a full listing of PIP registrations see:

<https://www.epa.gov/ingredients-used-pesticide-products/current-and-previously-registered-section-3-plant-incorporated>