New Jersey farmers produce approximately twenty million pounds of eggplant annually. Eggplant ranks among the top three vegetable crops in the state of New Jersey. Colorado potato beetle (CPB) is a primary pest of eggplant, feeding on above ground plant parts and causing significant reductions in yield or even plant death. Effective control of CPB on eggplant was initially provided by DDT in the 1940s. However, CPB populations quickly developed resistance to DDT and to the entire succession of insecticide classes subsequently used for CPB control. By the early 1980s, growers were applying up to 12 sprays per acre per year to suppress CPB. In response, a biological control program was developed using a wasp which parasitizes CPB eggs. The wasp provided moderate CPB control in the field, but releases had to be repeated each season at a cost of $100/acre, and supplemented with two applications of rotenone. This program was widely adopted in New Jersey and resulted in significant reductions in the number of insecticide sprays applied to eggplant.

Imidacloprid, a member of a novel class of systemic insecticides, was introduced in the mid 1990s, providing effective control of CPB and reducing defoliation. The success of imidacloprid against CPB, and its low cost relative to the wasp release program, has lead to its dominance of eggplant insect management, and discontinuation of the management program based on wasp releases. There is concern however, that consistent widespread use of imidacloprid against CPB will hasten resistance.

Researchers at Rutgers University have developed CPB-resistant eggplants by transforming an elite variety with a synthetic Bt gene, designed for expression in plants. In field trials, Bt plants produced harvestable yields comparable to untransformed plants that were treated with one application of imidacloprid. In varietal field trials, the Bt cultivars met commercial standards for preferred plant and fruit qualities such as color and shape. Assuming the additional cost of the transgenic cultivars would be equivalent to or less than the cost of imidacloprid use, adoption of Bt eggplant cultivars would likely be widespread in New Jersey.

Potential Impacts of Insect Resistant Transgenic Eggplant
Changes in Pesticide Use: 22% reduction in annual insecticide use (208 pounds/yr.)

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