

Section V: Biological and Cultural Controls

Transgenic and Traditionally Bred Potatoes
and IPM of Colorado Potato Beetles

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Host plant resistance has the potential of serving as an effective first line of defense against the Colorado potato beetle (CPB). This is true for both traditionally produced and genetically engineered resistant plants. Single genes such as the endotoxin gene of B.t. have been transferred into potato plants, thus the plants are able to produce the toxin and kill CPB larvae. In 1991 we conducted field evaluations of genetically transformed B.t.-Russet Burbank potatoes with plantlets produced by Monsanto Co. Fifty transgenic lines were evaluated in replicated tests against non-transformed and insecticide treated potatoes. Forty-nine of the fifty transgenic lines had 0% defoliation while the non-transgenic lines were completely defoliated and insecticide treated had about 10% defoliation. Resistance can be anticipated if the use of high expression B.t. transgenic potatoes is widespread, thus making this new and novel strategy useless. A prudent approach may be to incorporate an intermediate or even a low level of B.t. in conjunction with other suppressive management strategies making use of plant resistance as one component of the system. We are conducting research on integrating low expression B.t. plants with inoculative releases of beneficial agents.

In 1992 twenty-seven traditionally bred cultivars were field evaluated to establish the feeding preference of CPB. Based on levels of defoliation and yield, several cultivars were highly preferred by CPB. Also, several cultivars received only limited defoliation and had the highest yields. The least preferred could be used in breeding programs and the highly preferred incorporated into programs which use trap rows planted at the edge of the CPB overwintering site (last year's potatoes) or at the edge of the current season potato fields. The CPB that collect on these strategically located trap rows could then be eliminated by spraying, vacuuming or flaming.