SMIGOCKI, ANN[1]*, SUNGGI HEU[1], IRIS McCANNA[1] and GEORGE BUTA[2], [1]USDA, ARS, Plant Molecular Biology Laboratory, and [2]Horticultural Crops Quality Laboratory, Beltsville, MD 20705. - Insecticidal compound(s) induced by regulated expression of a cytokinin biosynthesis gene in transgenic plants.

Cytokinins as well as other plant hormones have commercial applications as bioregulators and in combination with endogenous hormones have been shown to affect natural plant defense mechanisms. Since current interests are focusing on combined effects of natural defense mechanisms of plants and biotechnology for crop improvement, we evaluated cytokinin's role as a modulator of insect resistance in transgenic plants carrying a cytokinin biosynthesis gene that was engineered for leaf expression by mechanical wounding or insect feeding. We were able to demonstrate that the herbivorous *Manduca sexta* larvae consumed up to 70% less of the leaf material from transgenic plants expressing the cytokinin gene as compared to control plants. The effect on newly hatched *Myzus persicae* (green peach aphid) nymphs feeding on transgenic plant material was more dramatic in that only about 35% of the nymphs matured and of those only about 60% were able to reproduce. The green peach aphid is an efficient vector for transmission of viruses causing beet yellows, western yellows, and mosaic diseases in sugar beet. Insecticidal activity was associated with the leaf surface extracts of transgenic plants and upon further fractionation yielded high molecular weight compounds that are in the process of purification. The activity in the extracts is stable at 4 C for more than 2 months in water but appears to be light sensitive. Coating of normal leaf disks with 0.1% solutions of the partially pure extracts completely retards insect feeding and, in most cases, kills the hornworm within two hours of exposure. The insecticidal activity may only be specific for certain orders of insects such as Lepidoptera and Homoptera but not Coleoptera since it appeared not to have an affect on the alfalfa weevil.