

Use Patterns of Neonicotinoid Insecticides on Cucurbit Crops  
and their Potential Exposure to Honey Bees

Funded by the Strategic Agricultural Initiative Grants Program, EPA Region III

**Executive Summary**

Galen P. Dively and Cerruti Hooks  
Department of Entomology  
University of Maryland

Soil- or foliar-applied neonicotinoid insecticides widely used on cucurbit crops are highly toxic to honey bees. Residue studies have detected low levels of neonicotinoids in pollen and nectar of treated crops. According to label directions, chemigation, and side-dress or foliar sprays of neonicotinoids can be applied during the bloom period provided that bees are not active. We propose here that post-plant applications close to or during bloom will result in sublethal levels of neonicotinoid residues in pollen and nectar that may cause disorientation and associative learning problems in honey bees.

The proposed research focuses on two priority issues noted under the EPA Region III FY2009 Request for Proposals. We will conduct a questionnaire survey at major vegetable meetings in the Region III states to determine the extent of neonicotinoid use on cucurbit crops, what specific insecticide products and rates are used, and how and when are they applied. We also will address the pollinator protection issues by conducting a field experiment on a pumpkin crop treated with label allowed rates of various neonicotinoid insecticides using different application methods to measure levels of insecticide residues in pollen and nectar. The information will help to address the comparative exposure risks to honey bees associated with neonicotinoid insecticides. Changes in current and future labels of neonicotinoid products on cucurbit crops with more explicit risk mitigation directions will directly result in environmental benefits, including improvements in protecting honey bees and other pollinators as well as expected reductions on neonicotinoid use. Results will have impacts on cucurbit acreage nationwide and influence regulators to consider risk management decisions for neonicotinoid insecticides on other crops that require managed bees for pollination. Results also will be disseminated via various extension outreach activities to educate producers to judiciously apply neonicotinoid insecticides in ways that minimize exposure risk to bees.