

## **THE INFLUENCE AND IMPLICATIONS OF ROW CROP AGRICULTURE ON THE EXPOSURE OF HONEY BEES TO PESTICIDES**

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### **Abstract**

In the spring of 2015, experimental apiaries were established at four locations in west Tennessee to evaluate how row-crop agriculture, including the traditional use of pesticides, affected honeybee health. Hive health parameters were intensely evaluated for one year. Apiaries were established in areas ranging from very low agriculture to moderate, high and intense agricultural production of corn, soybean, cotton, and sorghum. Summarized results indicated that hive health was positively correlated to the presence of agriculture. Hives in the non-agricultural area struggled to find adequate food resources and produced fewer brood. Soybean, corn and sorghum pollen were commonly collected by bees in agricultural areas, but no cotton pollen was found in pollen traps placed at the front of hive entrances. Testing of pollen indicated some agricultural pesticides, including insecticides and fungicides, were present. Neonicotinoid insecticides were not found in pollen except for one location at a low level (3 PPB). Sometimes potentially lethal levels of insecticides were detected in the flowers of crops, particularly cotton and soybean. However, pesticides were not detected in honey, random samples of foraging bees, or wintering bees with the exception of those used to control varroa mite. On four occasions, dead bees in front of hives were found to be contaminated with presumably lethal concentrations of insecticides including neonicotinoids, but these bee death 'events' did not have measurable effects on hive health. Varroa mite populations were inversely correlated with the number of bees within a hive, and thus, were lower in the hives placed in the non-agricultural area. After 1 year, overall hive losses were consistent (31%) with those that have been recently observed in Tennessee.

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