POPULATIONS OF FORAGING HONEYBEES IN MIDSOUTH COTTON AND OTHER CROPS

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Abstract

In recent years there has been a global decline in populations of both native and managed pollinators. Pesticides are considered to serve some role in these declines. A study was conducted to see when and at what densities honeybees forage agronomic crops in the Midsouth. Fields of corn, cotton, and soybeans were visually sampled for foraging honeybees across Arkansas, Mississippi, and Tennessee. Honeybees were observed at three time intervals and at four distances into each field. The most honeybees were observed in flowering soybeans. The Mid-Day time interval had the largest number of honeybees observed. To avoid spraying the highest density of foraging honeybees in agronomic fields, pesticides could be applied in the evening to allow the residual activity to diminish before honeybees visit fields in larger numbers in the middle of the day.

Introduction

Populations of honeybees have declined worldwide in recent years. One suspected cause is the widespread use of pesticides in agriculture. The major concern with pesticides stems from the possibility of foraging honeybees returning to their hives with sublethal doses of insecticides that could potentially affect the behavior and performance of honeybee tasks that contribute to overall colony health. One suggested option to reduce foraging honeybee exposure to pesticides is to start applying pesticides at night when honeybees are less active.

Materials and Methods

An experiment was conducted in 2013 to determine when and at what densities honeybees visit agronomic crops across the Midsouth region of the United States consisting of Arkansas, Mississippi, and Tennessee. Fields of cotton, corn, and soybeans were scouted for honey bees at three time intervals: Morning, Mid-day, and Evening. “Morning” was defined as the three hours after sunrise. “Evening” was defined as the three hours before sunset. ”Mid-day” was defined as the time interval from 11:30 AM to 1:30 PM. For each time interval and location, weather parameters were measured that included temperature, humidity, wind speed and direction, and cloud cover. Field data was also taken consisting of crop sampled, plant growth stage, average plant height, average canopy closure, row spacing width, and distance to nearest apiary if known. Scouting consisted of three observers slowly walking 50 meters of row and counting the number of honey bees within the field using a hand counter. The 50 meters of row were sampled at the distances of 0 meters, 20 meters, 50 meters, and 100 meters from the field edge. An unchecked planted row was used as a buffer between each observer. The three observers served as three repetitions at each distance from the field edge. The number of honey bees was recorded at each distance. Fields

were randomly selected throughout the agricultural regions of each state. A total of 82 fields were sampled: 28 corn fields, 36 cotton fields, and 18 soybean fields. The number of honeybees per 50 meters of row was converted to honeybees per acre using the row width obtained from each field.

Results and Discussion

Significantly more honeybees were observed in flowering soybeans than in any other crop (Table 1). Distance was found not to have a substantial effect on the number of honeybees observed. The highest number of honeybees were observed during the Mid-Day time interval, and the least number of honeybees were observed during the Evening time interval (Table 2). Therefore, applying pesticides during the evening may be more effective than applying them at night to reduce foraging honeybee exposure. If pesticides are applied during the evening when there are fewer honeybees in the fields, there is more time to allow the residual activity of the pesticides to diminish before the middle of the day when there are more honeybees in the fields.

Table 1: Bees/Acre per Flowering Crop

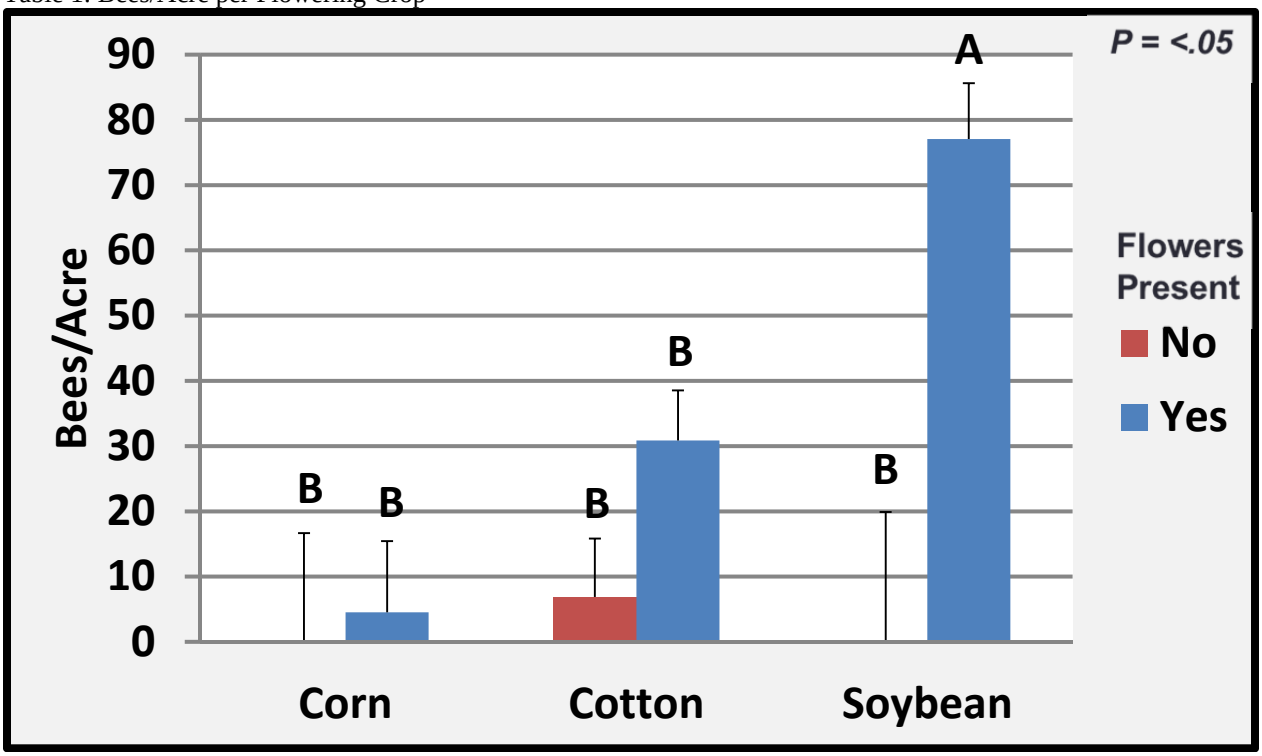

Table 2: Bees/Acre per Time Interval