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SPATIAL AND TEMPORAL OCCURRENCE OF BROWN STINKBUG (EUSCHISTUS SERVUS, SAY) IN EASTERN NORTH CAROLINA AGROECOSYSTEMS

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Abstract

Reduced use of synthetic insecticides on Bollgard® has allowed brown stink bug populations to flourish and exploit cotton in North Carolina. Movement and host utilization patterns of brown stink bugs were monitored in four North Carolina agroecosystems on crops and wild hosts. Hosts were surveyed weekly from mid-June through harvest by whole plant examination or sweepnet sampling. In conjunction, pheromone traps were placed at interfaces of crops and wild hosts to monitor brown stink bug movement. Adult brown stink bug populations were greatest in soybean fields, while weedy environments contained the highest populations of brown stink bug nymphs. No differences occurred for either adult or nymphal stink bug trap captures at any interface. The continuation of monitoring brown stink bug movement across North Carolina agroecosystems is required to substantiate the current findings.

Introduction

Stink bug pest status on cotton has increased across North Carolina with the increased use of Bollgard® cotton varieties. The reduction in the use of synthetic insecticides on Bollgard® cotton has allowed several species of plant feeding bugs to flourish and exploit the crop (Greene and Herzog 1999, Leonard et al. 1999, Peters et al. 2004, Roberts 1999, and Willrich et al. 2004). Currently, there is minimal information on the ecological movement of these insect pests among habitats within North Carolina agroecosystem habitats.

Reported here are results of a study to monitor the movement of brown stink bug within several farm-scape habitats through the use of surveys and stink bug pheromone trap captures.

Materials and Methods

Survey Samples

Survey samples were conducted in northeastern North Carolina at two locations in Beaufort and Perquimans counties and two locations in Halifax County. The surveys consisted of sampling corn, cotton, peanut, soybean, weed banks, and wheat stubble. Survey samples occurred weekly beginning on June 25 and continued until August 20 for a total of seven samples.

All habitats, except corn, were sampled with a 15 inch diameter sweep net. Samples consisted of 25 sweeps beginning approximately 20 feet from the field or weed bank edge. Each corn sample consisted of visual examination of five whole plant counts in the field approximately 20 feet from the field edge. Five different sites were selected at random and sampled weekly for each crop. Samples were taken to the lab and sorted to determine the numbers of stink bug and the stage of each specimen (nymph or adult).

Trap Captures

Trap captures occurred only in Perquimans County. Twenty-one traps were constructed with yellow corrugated board and metal capturing containers, which were baited with brown stink bug pheromone. Traps were set up at seven different crop interfaces, three traps per interface, and baited with brown stink bug pheromone (methyl-2,4-decadienoate). The seven interfaces were: Tree-Tree, Cotton-Tree, Cotton-Cotton, Cotton-Soybean, Soybean-Soybean, Soybean-Corn, and Corn-Corn. Traps were checked weekly beginning on July 23 and ended on October 1 for a total of eight samples.

Data collected from both studies were square root transformed and analyzed using Proc GLM in ANOVA. An LSD test was performed when applicable.

Results

Survey Samples

Adult brown stink bug populations per sample were greatest in soybean with a square root mean of 0.062, followed by corn and weed banks (0.35), peanut (0.32), cotton (0.22), and wheat stubble/late soybean (0.13) (Figure 1). Nymph brown stink bug populations per sample were greatest in weed banks with a square root mean of 0.11 followed by corn and soybean, each with 0.03. No nymph brown stink bugs were found in cotton, peanut, or wheat stubble/late soybean (Figure 2).

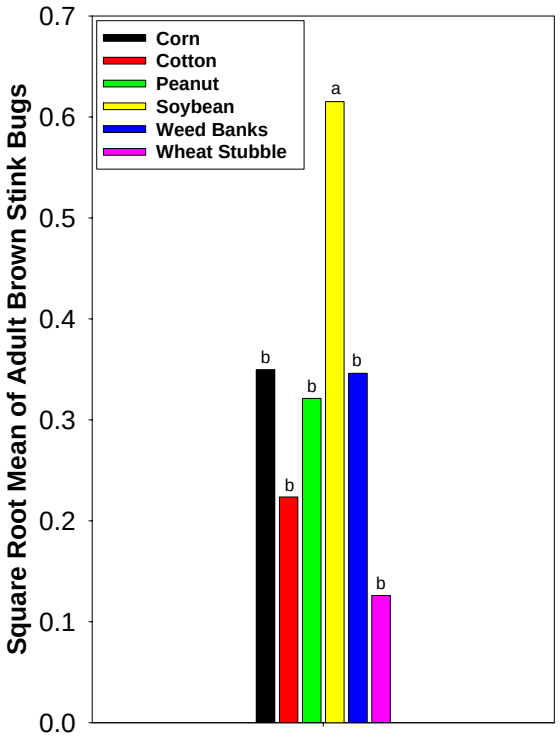

Figure 1. The square root mean of adult brown stink bugs per sample collected during survey samples in Eastern North Carolina ($P < 0.05$; ANOVA, LSD).

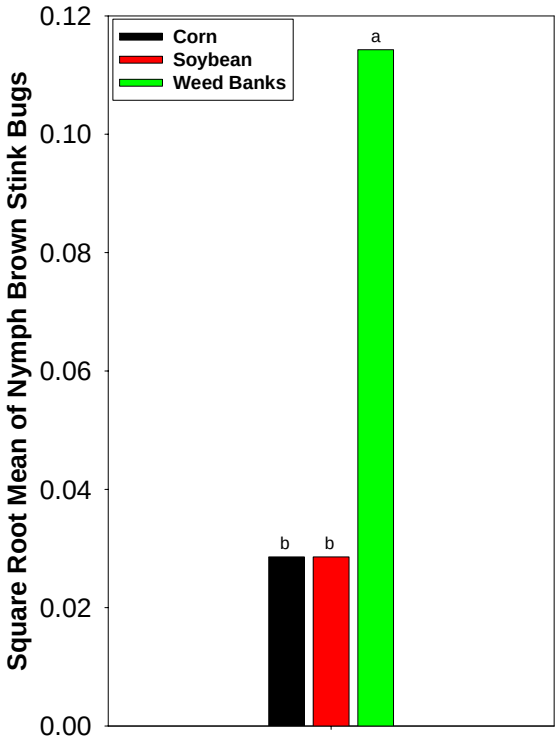

Figure 2. The square root mean of nymph brown stink bugs per sample collected during survey samples in Eastern North Carolina ($P < 0.05$; ANOVA, LSD).

Trap Captures

There were no differences found between trap captures of brown stink bugs among any interface. The square root means and standard deviations for adult brown stink bugs per sample were as follows: corn-soybean (1.41 ± 0.98), corn-corn (1.38 ± 0.76), soybean-soybean (1.32 ± 0.96), cotton-soybean (1.09 ± 1.14), cotton-cotton (0.77 ± 0.8), cotton-tree (0.68 ± 0.82), and tree-tree (0.56 ± 0.86) (Figure 3). The square root means and standard deviations for nymph brown stink bugs per sample were as follows: corn-corn (0.07 ± 0.25), cotton-tree (0.034 ± 0.19), and cotton-soybean, cotton-cotton, and tree-tree all with 0.033 ± 0.18 (Figure 3). No nymphs were caught in traps located at a corn-soybean or soybean-soybean interfaces.

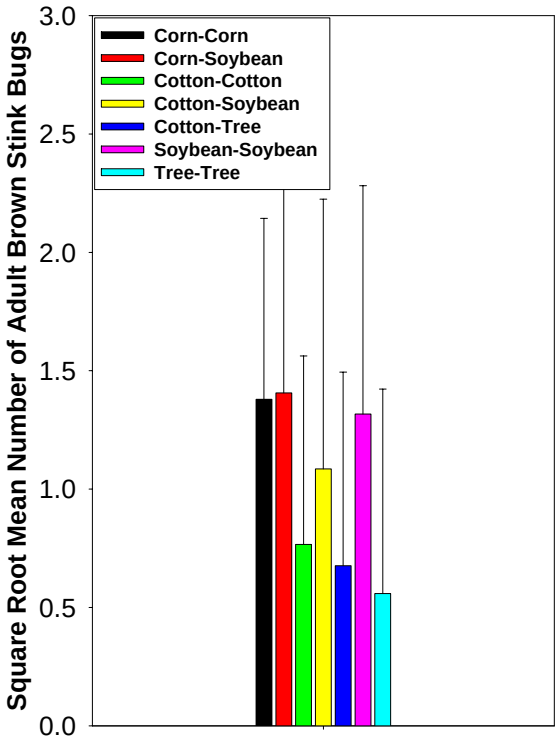

Figure 3. The square root mean and standard deviation of adult brown stink bugs per sample collected from traps in Perquimans County, North Carolina ($P < 0.05$; ANOVA).

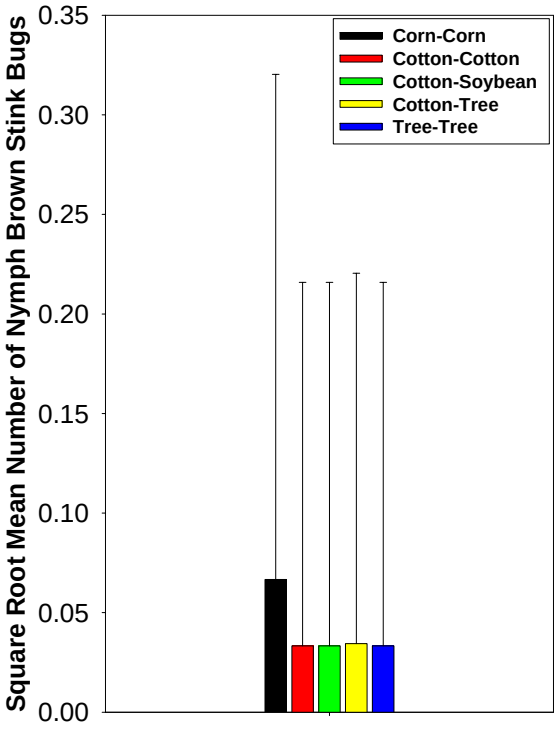

Figure 4. The square root mean and standard deviation of nymph brown stink bugs per sample collected from traps in Perquimans County, North Carolina ($P < 0.05$; ANOVA).

Discussion

Results from survey samples indicate that weed banks maybe a preferred host area for brown stink bug reproduction, while soybeans appear to be a preferred feeding host area. Movement of brown stink bug between these areas could not be substantiated by our first year trap captures.

Acknowledgments

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