SPECIES COMPOSITION AND RELATIVE ABUNDANCE OF STINK BUGS IN COTTON AND OTHER CROPS IN THE BRAZOS RIVER BOTTOM PRODUCTION AREA OF TEXAS

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Abstract

Stink bugs have recently emerged as an economic pest of cotton in the Brazos River Bottom (BRB) production area of Texas, but the species responsible for most of the damage remains unclear. A study was initiated in 2011 to determine which species commonly infest cotton fields in the BRB. Ten cotton fields throughout the BRB were sampled weekly with sweep nets (240 sweeps x two rows per field) from the 1st week of bloom until defoliation. The species composition and relative abundance of stink bugs in nearby corn, milo, and soybean fields was also examined to determine which of these crops may be contributing stink bugs to cotton. Based on collections of adult stink bugs, 10 species were identified among the four crops. Four species, *Chinavia hilaris* (Say) [formerly *Acrosternum hilare*], *Euschistus servus* (Say), *Oebalus pugnax* (F.), and *Thyanta custator accerra* McAtee were collected from all four crops. Soybean fields contained the greatest diversity (9 species) and abundance of stink bugs. Six species were found in cotton, but *E. servus* and *T. c. accerra* accounted for the majority (65 and 18%, respectively) of stink bugs collected from cotton. *E. servus* also was the predominant species found in corn (67%) and soybean fields (67%). *O. pugnax* was the prevalent species (90%) in milo. Our findings indicate *E. servus* and *T. c. accerra* are likely responsible for most of the damage observed in BRB cotton, and also suggest nearby corn and soybean fields may be contributing these stink bugs to cotton.

Introduction

Historically, stink bugs have been a minor or non-economical pest of cotton in the Brazos River Bottom (BRB) production area of Texas, largely because insecticide applications for the boll weevil, *Anthonomus grandis* (Boheman), kept stink bug populations in check. However, the number of insecticide applications and acreage treated for boll weevils in the BRB has been greatly reduced over the past several years due to the success of the Texas Boll Weevil Eradication Program. As a result, stink bugs have only recently emerged as a major pest of cotton in the production area. Many BRB producers reported substantial yield losses to stink bugs in 2009 and 2010, but were uncertain which species were infesting fields and causing the majority of damage. We initiated a study in 2011 to determine which species commonly infest cotton fields in the BRB. We also examined the species composition and relative abundance of stink bugs in nearby corn, milo, and soybean fields to determine which of these crops may be contributing stink bugs to cotton. Presented herein is an overview of our preliminary findings from the first year of the study.

Materials and Methods

Ten cotton, eleven corn, seven milo, and four soybean fields throughout the BRB production area were sampled weekly for stink bugs in 2011. Sampling was initiated when crops reached the following growth stages: green silk for corn; first week of bloom for cotton; and full bloom for milo and soybean. Sampling was continued in a field until respective plants were harvested or reached physiological maturity. Standard 16-inch sweep nets were used to sample cotton and soybean fields (200 sweeps x two rows per field). Corn fields were sampled by visually examining plants (240 plants per field) and hand-collecting observed stink bugs. Milo plants were sampled by vigorously tapping the entire seed head into a sweep net (240 heads per field) to dislodge stink bugs. Samples were collected from all sides of each field and >15 m from the field margin to minimize border effects. Collected stink bugs (adults and nymphs) were transferred to sealable plastic bags and returned to a laboratory. Nymphs were placed in 100-ml Petri plates and reared to adulthood for identification. Nymphs were reared on green beans and/or soybean pods (replaced as needed), and were held at ≈85°F and a photoperiod of 14:10 (L:D) h. Adult stink bugs were identified to species using dichotomous keys (Rolston 1974, Rider and Chapin 1992, McPherson and McPherson 2000) and published illustrations (Esquivel et al. 2009). Occasionally, identified specimens were sent to the Texas A&M University Insect Collection Facility for confirmation by the Associate Curator, Edward G. Riley.

Results and Discussion

Although numerous nymphs were collected from soybean and milo fields, six nymphs in total were found in cotton fields and one nymph was observed among the 11 corn fields. Additionally, many nymphs died before reaching adulthood and subsequently, could not be positively identified to species. Therefore, we elected to only present and discuss data based on field collections of adults.

A total of 10 stink bug species were collected and identified among the four crops (Table 1). Four species, *Chinavia hilaris* (Say) [formerly *Acrosternum hilare*], *Euschistus servus* (Say), *Oebalus pugnax* (F.), and *Thyanta custator accerra* McAtee, were found in all four crops. Stink bugs were most abundant in soybean fields on a per field basis (212/field), followed by milo (154/field), cotton (14/field), and corn (9/field). Soybean fields also contained the greatest diversity of species (Table 1). Six species were found in cotton fields (Table 1) with *E. servus* and *T. c. accerra* constituting the majority of stink bugs (65 and 18%, respectively) collected from cotton. *E. servus* also was the prevalent species (67%) found in soybean fields, followed by *A. hilare* (14%) and *T. c. accerra* (12%). Similarly, *E. servus* was the predominant species (67%) collected from corn, followed by *O. pugnax* (15%) and *T. c. accerra* (13%). *O. pugnax* (90%) and *T. c. accerra* (8%) were the two prevalent species in milo.

Table 1. Species of stink bugs found in various crops produced in the Brazos River Bottom production area of Texas, 2011.

Stink bug species	Corn	Cotton	Milo	Soybean
Chinavia hilaris	X	X	X	X
Thyanta custator accerra	X	X	X	X
Oebalus pugnax	X	X	X	X
Euschistus servus	X	X	X	X
E. quadrator		X		X
E. crassus		X		X
Edessa bifida				X
Piezodorus guildinii				X
Mecidea major			X	*X*
Cosmopepla lintnerinia	*X*			

X indicates only one specimen found in a particular crop.

In light of these findings, *E. servus* and, to a lesser extent, *T. c. accerra* appear to be the main species infesting BRB cotton fields, and subsequently are likely responsible for most of the observed stink bug damage in cotton. Given the prevalence and abundance of *E. servus* in soybean fields and to a lesser extent in corn fields, our results also suggest these crops may be contributing stink bugs to cotton, particularly when these crops begin to mature and become less attractive to stink bugs. However, the spatial and temporal utilization of non-cultivated hosts (i.e., weeds) by stink bugs also needs to be examined to determine whether the presence or absence of these weed hosts affect stink bug populations in cotton.

Of particular interest is the fact that no southern green stink bugs, *Nezara viridula* (L.), were found this year (2011) in any of the sampled fields or in blacklight traps established throughout the BRB. This species was commonly observed in cotton and soybean fields in previous years, and was captured in large numbers in black light traps last year (2010). It has been speculated that temperature during the winter is probably the most important factor contributing to the annual variation in *N. viridula* populations (Kiritani 1964, Kiritani et al. 1966; Jones and Sullivan 1981). Indeed, the winter of 2010/2011 was unusually cold in the BRB and may have resulted in substantial mortality of overwintering adults. Severe drought conditions during the 2011 growing season also may have been a contributing factor as stink populations, in general, were considerably lower in 2011 than in previous years. Interestingly, a general decline in *N. viridula* populations has been observed in the Southeast Cotton Belt (M. Toews, pers. comm.), but the complete absence of *N. viridula* populations, as observed in the BRB production area in 2011, has not been documented elsewhere. Further investigation of this phenomenon may provide insight on factors that influence stink bug population dynamics in cotton.

Conclusions

Based on the first year of data, the brown (*E. servus*) and red-shouldered stink bug (*T. c. accerra*) appear to be the two main species infesting cotton fields in the BRB production area, and subsequently are likely responsible for most of the stink bug damage observed in cotton. Our findings also suggest soybean and corn fields may be contributing these stink bugs to cotton as these two species were abundantly found in nearby soybean fields and, to a lesser extent, in corn fields. Although stink bug populations, in general, were considerably lower in 2011 than in previous years, factors responsible for the complete absence of the southern green stink bug remain unknown and warrant investigation. Such investigations may ultimately provide information that can be used to enhance management strategies for this pest in cotton.

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