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Controlling Late-Season Redbanded Stink Bug Infestations in Soybean

Abstract

The redbanded stink bug [*Piezodorus guildinii* (Westwood)] is a major pest of soybean [*Glycine max* (L.) Merr.] throughout the Mid-South and is currently the most economically important stink bug pest of soybean in Louisiana. Extension entomologists recommend controlling threshold populations until soybean maturity. To validate this recommendation, experiments were conducted in soybean fields in Franklin and Vacherie, LA in 2020 to evaluate the effect of tank-mixing insecticide with paraquat as a harvest aid on redbanded stink bug control, soybean yield, and soybean damage. At both sites, the inclusion of insecticide with paraquat significantly reduced redbanded stink bug density, however, no differences in soybean yield were observed. At the Franklin site, where initial redbanded stink bug populations were above the action threshold, soybean damage was 10.7% when paraquat was applied alone and was significantly lower (1.8–4.2%) when insecticide was included with paraquat. At the Vacherie site, where initial redbanded stink bug populations were below the action threshold, soybean damage was equivalent (1.5–1.7%) for all treatments. This research shows that soybean seed quality can be preserved by controlling late-season redbanded stinkbug infestations that are above the action threshold.

Keywords: redbanded stink bug, soybean, desiccant, harvest aid, insecticide

Introduction

Soybean [*Glycine max* (L.) Merr.] is the dominant oilseed crop grown in the United States, accounting for 90% of total oilseed produced (USDA, 2025). In 2024, soybean production in Louisiana was valued at \$776.3 million with 59.2 million bushels produced on 1.09 million acres by 1,475 producers (Anonymous, 2025). When considering only row crops, soybean is the second-highest value commodity crop produced in the state (\$776.3 M) behind sugarcane (*Saccharum* spp.; \$1.59 B). Soybean is commonly grown in rotation with sugarcane in Louisiana. Early Group IV soybean is typically planted on raised, 72-in-wide sugarcane beds in two or three equally spaced drills on the top of the row from late March to late April to ensure a timely harvest and so as not to delay sugarcane planting (Boudreaux and Griffin 2009; Morgan et al. 2017). In the Mid-South, desiccant-type herbicides are commonly applied in soybean to potentially improve harvest efficiency. Several herbicides are labeled for use in soybean as a harvest aid, but paraquat is the most widely used. Several arthropods can negatively impact soybean, but the phytophagous stink bug complex is one of the most detrimental to soybean in the Mid-South. The annual impact of stink bugs on soybean yield and quality across the Mid-South consists of decreased profitability from direct yield losses, reduced seed quality, and greater need for management inputs (Funderburk et al. 1999). The redbanded stink bug (RBSB) [*Piezodorus guildinii* (Westwood)] was first reported in South Louisiana in 2000 and reached all soybean growing areas by 2006. Currently, the RBSB is the dominant stink bug species in Louisiana soybean, comprising 59 to 72% of all stink bugs observed during the growing season. Since its arrival, soybean producers have increased their insecticide applications from one to two per year to as many as three to five applications per year (Davis 2022). Since the RBSB can damage soybean past the R6.5 growth stage, extension entomologists recommend controlling threshold populations until soybean maturity. The objective of this research was to validate management recommendations for late-season RBSB infestations in soybean.

Methods

Experiments to evaluate the effect of tank-mixing insecticide with the standard paraquat harvest aid on RBSB control, soybean yield, and soybean damage took place in commercial soybean fields in Franklin and Vacherie, LA in 2020. The soil type of the Franklin and Vacherie fields were a Baldwin silty clay loam and Cancienne silt loam, respectively. Indeterminate soybean cultivars and maturity groups were Pioneer P43A42X (relative maturity 4.3) in Franklin and NK S45-J3X (relative maturity 4.5) in Vacherie. Planting dates were March 24, 2020 in Franklin and April 20, 2020 in Vacherie. Treatments were applied at 20 gal/A with a Bowman self-propelled sprayer fitted with TeeJet XR11003VS flat fan nozzles and included: paraquat (Gramoxone SL 2.0®) at 16 oz/A alone, paraquat at 16 oz/A + methomyl (Lannate LV®) at 16 oz/A, and paraquat at 16 oz/A + acephate (Acephate 97UP®) at 0.5 lb/A. Induce® non-ionic surfactant was added to all treatments at 0.25% v/v. A randomized complete block design and four replications were used at each site. The plot size was 35 ft (six sugarcane rows spaced 70 in apart) x 1,240 ft at the Franklin site and 30 ft (five sugarcane rows spaced 72 in apart) x 965 ft at the Vacherie site. The planting configurations consisted of two drills per row, spaced 19 in apart in Franklin and 18 in apart in Vacherie.

To determine initial RBSB density, plots were sampled with a sweep net immediately prior to the harvest aid application and were found at a density of 15 per 25 sweeps (above the action threshold of 4 per 25 sweeps) at the Franklin site and 3 per 25 sweeps (below the action threshold of 4 per 25 sweeps) at the Vacherie site.

Treatments were applied at both sites when 65% of soybean seed pods had reached a mature brown color. Application dates were August 3 and 17, 2020 at the Franklin and Vacherie sites, respectively. Based on the product labels, the most restrictive pre-harvest interval was 15 days. Immediately before harvest, plots were sampled with a sweep net to determine RBSB density. The Franklin site was harvested on August 19, 2020, and the Vacherie site on September 5, 2020, with a full-sized combine to determine soybean yield (calculated at 13% grain moisture). Soybean injury symptoms

were determined at a USDA grading facility. Data for each experiment were subjected to ANOVA using the MIXED procedure in SAS (version 9.4; SAS Institute, Cary, NC, USA). Means were separated using Fisher's protected least significant difference (LSD) at $P < 0.05$.

Results and Discussion

On the day of harvest at both sites, significantly lower RBSB densities were observed for the treatments that included an insecticide, however, no differences in soybean yield were observed when compared to the paraquat only treatment (Tables 1 and 2). As the initial RBSB population in Franklin was above the action threshold, soybean damage was significantly reduced when insecticide was tank-mixed with paraquat. Soybean damage averaged 1.8% for the paraquat + acephate treatment, 4.2% for the paraquat + methomyl treatment, and 10.7% when paraquat was applied alone (Table 1). Correa-Ferreira and Azevado (2002) showed that RBSB injury can decrease soybean seed quality, with no loss in yield. Due to low initial RBSB populations (below action threshold) in Vacherie, soybean damage was equivalent (1.5–1.7%) for all treatments (Table 2).

Table 1. Effect of tank-mixing insecticide with paraquat harvest aid on redbanded stink bug density, soybean yield, and soybean damage in Franklin, LA, in 2020

Treatment ^a	Rate/A	Redbanded		
		Stink Bug ^b (no./25 sweeps) 16 DAT ^c	Soybean Yield (bu/A ^e)	Soybean Damage (%)
Paraquat	16 oz	59.3 a ^d	43.3 a	10.7 a
Paraquat + methomyl	16 oz + 16 oz	30.3 b	42.3 a	4.2 b
Paraquat + acephate	16 oz + 0.5 lb	22.0 b	45.5 a	1.8 b
P-value		0.0010	0.3756	0.0012

^aInduce® non-ionic surfactant at 0.25% v/v was added to all treatments.

^bField averaged 15 redbanded stink bugs per 25 sweeps prior to application of treatments.

^cDays after treatment.

^dMeans within a column that are followed by the same letter are not statistically different according to Fisher's protected LSD test at $\alpha < 0.05$.

^ePlots were harvested on August 19, 2020; moisture was adjusted to 13%.

Table 2. Effect of tank-mixing insecticide with paraquat harvest aid on redbanded stink bug density, soybean yield, and soybean damage in Vacherie, LA, in 2020

Treatment ^a	Rate/A	Redbanded		
		Stink Bug ^b (no./25 sweeps)	Soybean Yield	Soybean Damage
		19 DAT ^c	(bu/A ^e)	(%)
Paraquat	16 oz	10.3 a ^d	65.0 a	1.6 a
Paraquat + methomyl	16 oz + 16 oz	1.5 b	63.3 a	1.7 a
Paraquat + acephate	16 oz + 0.5 lb	1.3 b	66.5 a	1.5 a
P-value		<0.0001	0.0500	0.6627

^aInduce® non-ionic surfactant at 0.25% v/v was added to all treatments.

^bField averaged 3 redbanded stink bugs per 25 sweeps prior to application of treatments.

^cDays after treatment.

^dMeans within a column that are followed by the same letter are not statistically different according to Fisher's protected LSD test at $\alpha < 0.05$.

^ePlots were harvested on September 5, 2020; moisture was adjusted to 13%.

Conclusion

Findings from this research show that soybean seed quality can be preserved by controlling late-season RBSB infestations that are above the action threshold. These results validate current RBSB management recommendations in Louisiana. However, these results are based on a limited number of cultivars, environmental conditions, and pest pressure scenarios, which may not fully represent production systems across the Mid-South. Future research should incorporate a broader range of soybean cultivars, environments, and pest pressures to refine and strengthen late-season RBSB management strategies.

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