ArkLaMiss Emergency Forum on Redbanded Stink Bug August 17, 2017

Redbanded Stink Bug: Biology and Injury Potential

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Redbanded Stink Bug Injury Potential





- Common name: redbanded stink bug (RBSB)
- Scientific name:
 Piezodorus guildinii (Westwood)
- Most damaging species
 - Deeper seed damage
 - Greater enzyme activity
 - Salivary pectinases
 - Larger food and salivary canals









3 stink bugs per 25 sweeps



ET-MR-5

12 stink bugs per 25 sweeps



Delta Grow 5565

Yield (bu/A)



Screening current high yielding varieties for RBSB tolerance 2013 and 2014

	b		
Variety	Sprayed	Unsprayed	Diff. (bu/A)
Terral REV 4753	69.2	53.8	+15.4
Dyna-Gro 31RY45	67.9	61.5	+6.4
Syngenta NK S44-D	59.5	49.6	+9.9
Delta Grow 4670	70.6	69.0	+1.6
Armor DK 4744	68.9	61.3	+7.6
Dyna-Gro 39RY57	66.1	63.6	+2.5
Terral REV 56R63	65.6	64.5	+1.1
Delta Grow 5565	64.3	57.4	+6.9
Delta Grow 5625	64.3	45.9	+18.4
Armor 55R22	61.1	58.7	+2.4



Sprayed at 4 RBSB per 25 sweeps

Keys to successful control of redbanded stink bug: 1. Understanding the biology



Typically over threshold of 4 per 25 sweeps from R5 to R7





Figure 3. Redbanded stink bug sex ratio during soybean reproductive growth stages.

More females at R2, R5, and R7 = more eggs

More eggs = more stink bugs

Fable 2. Redbanded stink bug	g oviposition preferen	nce during reproductive	growth stages ^a
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Growth Stage	Mean % Egg	Clusters \pm SE
oronan orașe	MG IV	MG V
R2	$10.0\pm9.0~\mathrm{bc}$	1.9 ± 1.2 ^b
R3	$1.0\pm0.6~^{ m c}$	2.8 ± 1.3 ^b
R4	$6.0\pm3.7~\mathrm{bc}$	5.6 ± 3.1 a
R5	45.0 ± 12.0 ^a	44.0 ± 14.4
R6	$23.7\pm9.3~\mathrm{ab}$	41.7 ± 16.9
R7	14.3 ± 9.0 ^b	4.0 ± 2.0 a

Controlling the second generation on soybean: In MG IV, 69% of eggs oviposited R5 to R6 In MG V, 86% of eggs oviposited R5 to R6

30% of eggs found in the top 30 cm in MG IV

19% of eggs found in the top 30 cm in MG V

Where are redbanded stink bug eggs found?

70% or more found in lower twothirds of canopy

40% of damaged seed found in the top 30 cm

Where are redbanded stink bugs feeding?

60% found in lower two-thirds of canopy

Why should I be concerned about where they are feeding and ovipositing?

A typical sweep net is 38 cm in diameter and swept in the upper canopy.

Due to oviposition and feeding preferences for the lower canopy, sweep nets are <u>underestimating</u> redbanded stink bug adult and nymphal populations.

Why should I be concerned about where they are feeding and ovipositing?

Regardless of spray rate or ground speed, spray deposition is "highly variable" with most pesticide deposited in the <u>upper canopy</u> (Barbosa et al. 2009)

With a high frequency of egg clusters and feeding damage found in the lower two-thirds of the plant canopy, redbanded stink bugs are exposed to less insecticide residues.

Keys to successful control of redbanded stink bug: 2. Rotate insecticide chemistries

- Redbanded stink bugs are difficult to control
 - Tolerant to all insecticides
 - Multiple insecticide applications needed
 - Resistant populations exist

2011 Stink Bug Foliar Efficacy Trials

8	V			
Treatment/	Rate amt	Mean	RBSB/25	sweeps
formulation	product/acre	2 DAT	7 DAT	14 DAT
Untreated check		7.7 a	9.0 ab	20.2 a
Endigo 2.06 ZC	4.5 fl oz	3.5 b	6.2 ab	22.7 a
Karate 2.08 CS	1.9 fl oz	3.0 b	6.7 ab	19.0 a
Besiege 1.25 ZC	12.5 fl oz	3.8 b	9.7 a	11.7 a
Leverage 360	2.8 fl oz	3.2 b	7.2 ab	16.5 a
Brigadier 2EC	6.1 fl oz	0.3 c	3.3 b	19.7 a
Cobalt Advanced 2.63 EC	22 fl oz	3.7 b	7.3 ab	21.0 a

2011 redbanded stink bug foliar efficacy trials

Means followed by the same letter within columns are not significantly different (REGWQ; *P*>0.05).

Treatment

Treatment

2016 Stink Bug Foliar Efficacy Trial

Identification of microsatellite alleles for a population genetics study of the invasive pentatomid soybean pest, *Piezodorus guildinii*

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- Small founder population with limited genetic diversity.
 - Harsh winters and/or extreme insecticide pressure are reducing genetic diversity.
 - RBSB has limited dispersal rates and mate with individuals in their vicinity, most likely their relatives.
 - All this is contributing to increased insecticide resistance
 - Resistance will be localized but will be permanent

Keys to successful control of redbanded stink bug: 3. Continue to scout until harvest

Harvest Aids in Soybean

Applied to:

AgCenter

- **Desiccate weeds**
- Desiccate leaves and speed plant drying

Insecticide Termination Trials

<u>Treatment</u>	Rate/Acre Ib ai	Sprays (No.)	Yield (bu/A)	Moisture (%)	100 seed wt. (g)	Abnormal seed (#/100)
Non-treated		0	29.2 b	18.5 a	10.7 b	19.3 a
Orthene (R5)	0.8	4	35.0 b	17.6 ab	11.3 b	6.3 a
Orthene (R6)	0.8	5	39.8 a	16.3 b	11.6 b	7.4 a
Orthene (R7)	0.8	6	40.5 a	16.0 b	12.1 a	3.8 a
(P>F)			< 0.01	< 0.01	0.04	0.09

Insecticide applications started at R4.

Soybeans are still susceptible to stink bug damage after harvest aids are applied (yield loss as much as 10 bu/A)

Stink bugs should be controlled prior to or at harvest aid application if at action thresholds

Reduces chance of stink bugs moving to adjacent fields

Reduces overwintering populations

Keys to successful control of redbanded stink bug: 4. Reduce overwintering hosts

Cover crops

Crimson clover (*Trifolium incarnatum* L.) Cardinal red clover (*Trifolium pratense* L.) Austrian winter pea (*Pisum sativum* L.) Berseem clover (*Trifolium alexandrinum* L.) Hairy vetch (*Vicia villosa* Roth) White clover (*Trifolium repens* L.). RBD with four replications per location

3 locations each year for 3 years – (2013 to 2015)

Individual plot size was 7.62 m x 3.04 m with a 3.04 m alley

Stink bug composition by adult and nymph

Redbanded stink bug	59%
Southern green stink bug	14%
Spined soldier bug	13%

Piezodorus guldinii

- Piezodorus guldinii nymph
- Nezara virdula
- Nezara virdula nymph
- Acrosternum hilare
- Acrosternum hilare nymph
- Euschistus servus
- Euschistus servus nymph
- Podius maculiventris
- Podius maculiventris nymph
- Euschistus quadrator
- Euschistus quadrator nymph

Mean (± SE) of RBSB (adults and nymphs) collected from different host plants at New Iberia, Louisiana. Value bars with different letters within adult or nymph are significantly different (*P*<0.05,Tukey's HSD)

Conclusions

- Cover crops can increase pest populations
- Crimson clover and white clover cover crops are a bridging host for RBSB when soybean is not present
- Based on mean nymphal production over 3 years, a single acre of crimson clover in a 12 week period can produce 570,000 RBSB
- In comparison, a single acre of soybeans produces 35,000 RBSB, 16 times less.

Keys to successful control of redbanded stink bug: 5. Hope for cold weather

Lethal Temperatures (LT) for Redbanded Stink Bug

Table1. Lethal exposure time (hrs.) required for 50% and 90% mortality of RBSB population from Ben Hur, Louisiana to subzero temperatures.

Temp (°C)	N	LT ₅₀ (hrs.)	95% FL	LT ₉₀ (hrs.)	95% FL	Slope ± SE
0	810	53.41	51.18 - 55.64	75	72.32 – 79.17	0.058 ± 0.0035
-2	720	37.41	35.45 - 39.4	55.24	52.43 – 58.67	0.068 ± 0043
-5	630	6.48	6.0 - 6.9	9.64	9.02 - 10.46	0.363 ± 0.031

Non-overlapping 95% fiducial limits shows the significant differences in lethal exposure time for given temperature

Questions?

Thank you 🔪

ACKNOWLEDGEMENTS: These projects were funded in part by the Louisiana Soybean and Grain Research and Promotion Board and the United Soybean Board.

LOUISIANA SOYDEAN & GPAIN RESEARCH & PROMOTION BOARD

