#### MANAGING TARNISHED PLANT BUG POPULATIONS IN COTTON IN ARKANSAS Glenn Studebaker Shawn Lancaster University of Arkansas Cooperative Extension Service Keiser, AR

## Abstract

The tarnished plant bug (TPB) is one of the most important pests of cotton in Arkansas. Two efficacy trials were conducted in Northeast Arkansas to evaluate tank mixes and rotations of different insecticide chemistries and standard insecticides commonly recommended for TPB. TPB numbers, damage and yields were taken from both studies. In both tests two applications were applied to all treatments. Seasonal totals gave the best indication of control. In trial 1, all treatments significantly reduced seasonal TPB totals, with the combinations of different chemistries performing the best. The combinations also had higher yields with the exception of Bidrin XP. Bidrin XP and Carbine were the only treatments that did not have a significant increase in yield in test 1.

In Test 2 only Bidrin and Brigade performed well when looking at seasonal totals. There were few significant differences in trial 2 when looking at TPB numbers or small square set. All treatments did have yields that were significantly higher than the untreated check, but there were few differences between insecticide treatment yields. Trimax Pro did have lower yields than some of the other treatments.

#### **Introduction**

The tarnished plant bug (TPB) is one of the most important pests of cotton in Arkansas. From 2003 to 2008 it caused more yield losses than any other pest averaging a loss of 49,449 bales in Arkansas (Williams 2008). Applying recommended insecticides when TPB reach treatment threshold is the most commonly used option to manage this pest (Studebaker 2009). However, increasing levels of resistance to insecticides are beginning to make some chemistries less effective. Therefore, it is important to evaluate recommended insecticides and combinations of these insecticides for their efficacy against TPB in order to update University recommendations. Two efficacy trials were conducted in Northeast Arkansas. In trial one tank mixes and rotations of different insecticide chemistries were evaluated. In trial two commonly recommended insecticides were evaluated.

#### **Materials and Methods**

Trials were conducted at the Northeast Research and Extension Center, Keiser, AR. Plots were 8-rows by 50-ft long arranged in a randomized complete block design with 4-replications. When TPB reached the treatment level of 3 bugs per 5-row feet, treatments were applied with a high clearance sprayer calibrated to deliver 10 gpa through two hollow cone nozzles per row. Plots did not reach treatment level until after bloom in late July. All plots were evaluated at 5-7 and 10-14 days after treatment by taking two 5-ft drop cloth samples per plot. When TPB numbers reached treatment level again, treatments were reapplied. A total of two applications were made in each trial. Small square set was also taken on each plot during each sampling date by examining the first position on the third node down from the terminal for the presence of a small square. Yields were taken from the center 4-rows of each plot at the end of the season. All data were analyzed using Agricultural Research Manager (ARM) version 8 software (Gylling). Treatment means were separated at the P=0.05 alpha level.

Insecticide	Rate lbs ai/acre	Chemistry	Application
1. Untreated			
2. Carbine 50WP	0.072	Pyridinecarboximide	$1^{st} \& 2^{nd}$
3. Carbine 50WP	0.072	Pyridinecarboximide	$1^{st}$
3. Bidrin 8EC	0.5	Organophosphate	$2^{nd}$
4. Bidrin 8EC +	0.5	Organophosphate	$1^{st} \& 2^{nd}$
Hero 1.24EC	0.05	Pyrethroid	$1^{st} \& 2^{nd}$
5. Hero 1.24EC+	0.05	Pyrethroid	$1^{st} \& 2^{nd}$
Orthene 97S	0.5	Organophosphate	$1^{st} \& 2^{nd}$
6. Hero 1.24EC	0.05	Pyrethroid	1 <sup>st</sup> & 2 <sup>nd</sup>
7. Orthene 97S	0.5	Organophosphate	$1^{st} \& 2^{nd}$
8. Bidrin XP	0.32	Organophosphate +	1 <sup>st</sup> & 2 <sup>nd</sup>
		Pyrethroid	
9. Discipline 2EC	0.08	Pyrethroid	1 <sup>st</sup> & 2 <sup>nd</sup>

Table 1. Insecticides and rates used in trial 1.

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Table 2. Insecticides and rates used in trial 2.
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Insecticide	Rate lbs ai/acre	Chemistry
1. Untreated		
2. Orthene 97S	0.75	Organophosphate
3. Bidrin 8EC	0.375	Organophosphate
4. Vydate C-LV	0.364	Carbamate
5. Centric 40WG	0.05	Neonicotinoid
6. Trimax Pro 4.44	0.052	Neonicotinoid
7. Carbine 50WP	0.078	Pyridinecarboximide
8. Leverage	0.095	Neonicotinoid + Pyrethroid
9. Intruder 70WP	0.048	Neonicotinoid
10. Endigo	0.08	Neonicotinoid + Pyrethroid
11. Diamond	0.058	IGR
12. Brigade 2EC	0.08	Pyrethroid

#### **Results and Discussion**

TPB numbers, small square set after each application and yields for trial one are shown in Tables 1 through 3. The same data for trial two are shown in Tables 4 through 6.

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Insecticide	Rate lbs ai/acre	TPB 7 DAT	TPB 10 DAT	
1. Untreated		8.0 a	10.3 a	
2. Carbine 50WP	0.072	3.0 a	5.0 a-e	
3. Carbine 50WP	0.072	1.3 a	3.8 b-e	
3. Bidrin 8EC	0.5			
4. Bidrin 8EC	0.5	3.8 a	9.0 a	
5. Bidrin 8EC +	0.5	0.8 a	1.3 e	
Hero 1.24EC	0.05			
6. Hero 1.24EC+	0.05	0.5 a	3.5b-e	
Orthene 97S	0.5			
7. Hero 1.24EC	0.05	2.8 a	7.0 a-d	
8. Orthene 97S	0.5	2.3 a	3.8 d-e	
9. Bidrin XP	0.32	0.5 a	1.8 de	
10. Discipline 2EC	0.08	2.0 a	3.0 cde	

Table 1. TPB per 10 row-ft after first application Trial 1.

Means within a column followed by same letter do not significantly differ (P=0.05).

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Insecticide	Rate lbs ai/acre	TPB 7 DAT	TPB 10 DAT
1. Untreated		9.0 ab	3.5 a-d
2. Carbine 50WP	0.072	5.8 bc	3.5 a-d
3. Carbine 50WP	0.072	4.3 c	2.5 a-d
3. Bidrin 8EC	0.5		
4. Bidrin 8EC	0.5	3.8 c	1.0 d
5. Bidrin 8EC +	0.5	4.0 c	2.5 a-d
Hero 1.24EC	0.05		
6. Hero 1.24EC+	0.05	2.5 c	1.3 cd
Orthene 97S	0.5		
7. Hero 1.24EC	0.05	3.8 c	4.5 abc
8. Orthene 97S	0.5	9.3 ab	4.8 ab
9. Bidrin XP	0.32	4.5 c	2.0 bcd
10. Discipline 2EC	0.08	6.0 bc	1.5 bcd

Table 2. TPB per 10 row-ft after second application Trial 1

Means within a column followed by same letter do not significantly differ (P=0.05).

Table 3. TPB seasonal total, seasonal average small square set and seed cotton yields Trial 1.

Insecticide	Rate lbs ai/acre	TPB/10 FT	% Small square set	Seed cotton yield
				lbs/acre
1. Untreated		30.8 a	79.0 c	2436 e
2. Carbine 50WP	0.072	17.3 bcd	89.5 ab	2887 cde
3. Carbine 50WP	0.072	11.8 cd	89.8 ab	3153 a-d
3. Bidrin 8EC	0.5			
4. Bidrin 8EC	0.5	17.5 bcd	90.3 a	3049 a-d
5. Bidrin 8EC +	0.5	8.5 d	90.5 a	3424 ab
Hero 1.24EC	0.05			
6. Hero 1.24EC+	0.05	7.8 d	90.8 a	3521 a
Orthene 97S	0.5			
7. Hero 1.24EC	0.05	18.0 bcd	89.3 ab	3525 a
8. Orthene 97S	0.5	20.0 bc	87.0 ab	3062 a-d
9. Bidrin XP	0.32	8.8 d	89.8 ab	2706 de
10. Discipline 2EC	0.08	12.5 cd	89.8 ab	3214 abc

Means within a column followed by same letter do not significantly differ (P=0.05).

Table 4. TPB per 10 row-ft after first application Trial	2.
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Insecticide	Rate lbs ai/acre	TPB/10 FT 7 DAT	TPB/10 10 DAT
1. Untreated		8.8 a	10.3 a
2. Orthene 97S	0.75	6.5 a	6.5 a
3. Bidrin 8EC	0.375	1.5 a	7.3 a
<ol><li>Vydate C-LV</li></ol>	0.364	7.3 a	10.3 a
5. Centric 40WG	0.05	4.0 a	9.3 a
6. Trimax Pro 4.44	0.052	5.5 a	12.0 a
7. Carbine 50WP	0.078	3.3 a	5.5 a
8. Leverage	0.095	11.5 a	10.5 a
9. Intruder 70WP	0.048	7.3 a	10.0 a
10. Endigo	0.08	2.5 a	5.5 a
11. Diamond	0.058	1.8 a	2.8 a
12. Brigade 2EC	0.08	1.8 a	3.5 a

Means within a column followed by same letter do not significantly differ (P=0.05).

Insecticide	Rate lbs ai/acre	TPB/10 FT 7 DAT	TPB/10 10 DAT
1. Untreated		10.5 abc	3.8 a
2. Orthene 97S	0.75	4.8 de	3.8 a
3. Bidrin 8EC	0.375	3.0 e	2.3 a
4. Vydate C-LV	0.364	9.0 bcd	7.0 a
5. Centric 40WG	0.05	7.0 cde	2.3 a
6. Trimax Pro 4.44	0.052	15.3 a	2.8 a
7. Carbine 50WP	0.078	5.8 cde	2.0 a
8. Leverage	0.095	5.5 cde	4.0 a
9. Intruder 70WP	0.048	14.0 a	2.5 a
10. Endigo	0.08	3.8 de	2.8 a
11. Diamond	0.058	6.3 cde	4.0 a
12. Brigade 2EC	0.08	2.5 e	2.8 a

Table 5. TPB per 10 row-ft after second application Trial 2.

Means within a column followed by same letter do not significantly differ (P=0.05).

Table 6. seasonal total, seasonal average small square set and seed cotton yields Trial 2.

Insecticide	Rate lbs ai/acre	TPB/10 FT 7	% Small square set	Seed cotton yield
				lbs/acre
1. Untreated		35.5 ab	74.8 a	2628 d
2. Orthene 97S	0.75	21.8 a-d	91.5 a	3340 abc
3. Bidrin 8EC	0.375	14.3 cd	94.0 a	3386 ab
4. Vydate C-LV	0.364	35.3 ab	89.8 a	3123 abc
5. Centric 40WG	0.05	23.5 a-d	92.0 a	3360 abc
6. Trimax Pro 4.44	0.052	36.3 a	79.8 a	3017 c
7. Carbine 50WP	0.078	17.3 a-d	90.5 a	3286 abc
8. Leverage	0.095	32.3 abc	87.8 a	3045 bc
9. Intruder 70WP	0.048	35.3 ab	86.8 a	3176 abc
10. Endigo	0.08	14.8 bcd	86.5 a	3467 a
11. Diamond	0.058	17.0 a-d	85.8 a	3450 a
12. Brigade 2EC	0.08	10.5 d	92.5 a	3396 a

Means within a column followed by same letter do not significantly differ (P=0.05).

### <u>Summary</u>

In both tests most treatments performed well after the first application with the exception of Vydate, Intruder and Leverage in Test 2. By 10 to 11 days after application many treatments began to break down, requiring a second application. Seasonal totals seem to give the best indication of control (Table 3). In trial 1, all treatments significantly reduced seasonal TPB totals, with the combinations of different chemistries performing the best (Table 3). The combinations also had higher yields with the exception of Bidrin XP (Table 4). Bidrin XP and Carbine were the only treatments that did not have a significant increase in yield in test 1 (Table 4).

In Test 2 only Bidrin and Brigade performed well when looking at seasonal totals (Table 5). There were few significant differences in trial 2 when looking at TPB numbers or small square set. All treatments did have yields that were significantly higher than the untreated check, but there were few differences between insecticide treatment yields (Table 6). Trimax Pro did have lower yields than some of the other treatments.

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# **References**

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