

## **Insecticides for Fleahoppers: Effects on Beneficial Arthropods**

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A small plot efficacy trial was conducted at the Hiler Farm of the Texas A&M Research and Extension Center in Weslaco, Texas, to evaluate the effects of selected insecticides on beneficial insects. The insecticides evaluated were selected based on their potential use for control of cotton fleahoppers. A single application of each treatment was made on May 10, 2000. Beneficial insects were monitored on 11, 12 and 15 May.

Plot size: 6 rows (40 inch centers) by 40 feet

Experimental design: RCBD with 4 replications

### Treatments:

Karate Z 2.08SC at 0.016 lb AI/ac  
Actara 25WG at 0.0374 lb AI/ac  
Centric 40WG at 0.038 lb AI/ac  
Fulfill 50WG at 0.0687 lb AI/ac  
Bidrin 8EC at 0.16 lb AI/ac  
Provado 1.6F at 0.0374 lb AI/ac  
Orthene 90S at 0.18 lb AI/ac  
Vydate CLV 3.77EC at 0.2 lb AI/ac  
Non-treated check

All rates are 8/10 of intended rates, as calculations for mixing the sprays were based on application volume of 10 GPA, but applications were made at 8 GPA.

### Application methodology:

CO<sub>2</sub> pressurized backpack sprayer  
30 PSI  
8 GPA  
2 TX10 hollow cone nozzles per row (broadcast application)

### Sampling:

Arthropods were sampled with a modified leaf blower/vacuum. On each sample date, one row of the middle four rows was sampled in each plot. The same row was sampled in each plot on a given sample date, and different rows were sampled between sample dates. Collection bags were tagged and held in a freezer until they were counted. The following arthropods were counted:

Lady beetle adults and larvae (non-Scymnus)  
Scymnus lady beetle adults and larvae  
Green lacewing adults and larvae  
Big-eyed bug adults and nymphs  
Pirate bug adults and nymphs  
Nabids  
Assassin bugs  
Parasitic wasps  
Spiders  
Cotton fleahopper adults and nymphs  
Empoasca sp.

Where adult and immature stages were counted, they were counted separately and analyzed both separately and combined. For Total Lady Beetles, both non-Scymnus and Scymnus were combined.

#### Statistical Analyses:

All data were analyzed with the PROC GLM procedure of PC-SAS. Where significant differences ( $P < 0.1$ ) were detected, means were separated with DMRT ( $P = 0.05$ ).

#### General Results:

Only data for arthropod densities that exceeded an average 1 per sample for at least one treatment on at least one sample date are presented. Although fleahopper pest pressure was light, all treatments, except Bidrin, provided significant reduction in fleahopper adult densities by 2 days after treatment (5/12). All insecticides reduced fleahopper nymph densities at 5 days after treatment (5/15). Thus, the pest data indicates that we did make an efficacious application despite the slightly reduced rates.

Data on beneficial arthropods was fairly variable with only a few significant differences among treatments, but showed somewhat consistent numerical trends. Where significant differences did occur, reductions were largely limited to the day after treatment, with few or no significant differences at 2 and 5 days after treatment. Karate generally showed the largest numerical reductions in beneficial densities. Overall trends indicated that adverse affects of these pesticides were short lived following a single application.

Treatment	Number per sample		
	5/11	5/12	5/15
	Fleahopper Adults		
Check	2.00 a	3.00 a	3.00 a
Centric	0.00 d	0.50 b	0.00 c
Vydate	0.25 cd	0.75 b	0.25 c
Bidrin	1.5 ab	1.75 ab	2.75 ab
Actara	1.25 abc	0.50 b	1.50 abc
Orthene	0.50 bcd	0.75 b	0.75 abc
Fulfill	0.50 bcd	0.25 b	1.25 abc
Provado	1.0 abcd	0.25 b	0.25 c
Karate	0.25 cd	0.25 b	0.50 bc
	Fleahopper nymphs		
Check	1.00 a	1.00 a	3.00 a
Centric	0.50 a	0.00 a	0.25 b
Vydate	0.00 a	0.50 a	0.25 b
Bidrin	0.25 a	0.25 a	0.50 b
Actara	0.00 a	0.25 a	0.25 b
Orthene	0.25 a	0.25 a	1.00 b
Fulfill	0.25 a	0.00 a	0.50 b
Provado	0.25 a	0.25 a	0.50 b
Karate	0.25 a	0.25 a	0.25 b
	Empoasca		
Check	4.50 a	3.50 a	2.50 a
Centric	0.50 c	1.00 b	1.25 a
Vydate	0.25 c	1.50 ab	2.00 a
Bidrin	0.75 c	1.25 b	1.25 a
Actara	2.50 b	2.00 ab	3.50 a
Orthene	0.50 c	2.25 ab	1.75 a
Fulfill	2.75 b	2.00 ab	2.50 a
Provado	2.75 b	2.00 ab	3.25 a
Karate	0.50 c	0.25 b	0.50 a

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Treatment	Number per sample		
	5/11	5/12	5/15
	Total Lady Beetles		
Check	4.25 a	3.25 a	3.50 ab
Centric	2.75 ab	1.25 a	4.00 a
Vydate	2.25 ab	1.50 a	2.50 abc
Bidrin	2.00 ab	3.00 a	4.25 a
Actara	2.00 ab	2.00 a	1.25 bc
Orthene	1.75 ab	1.75 a	3.5 ab
Fulfill	1.50 b	0.75 a	0.50 c
Provado	1.25 b	1.00 a	3.00 abc
Karate	0.50 b	0.00 a	2.00 abc
	Lady Beetle Adults		
Check	1.50 ab	1.00 a	1.00 a
Centric	1.75 ab	0.75 a	2.25 a
Vydate	0.50 ab	1.00 a	1.25 a
Bidrin	2.00 a	2.25 a	1.25 a
Actara	1.75 ab	1.75 a	0.50 a
Orthene	1.00 ab	1.50 a	0.50 a
Fulfill	0.25 ab	0.25 a	0.25 a
Provado	0.25 ab	0.50 a	2.00 a
Karate	0.00 b	0.00 a	1.00 a
	Scymnus Adults		
Check	2.75 a	2.25 a	2.50 abc
Centric	0.75 b	0.25 a	1.75 abcd
Vydate	1.50 ab	0.50 a	1.00 bcd
Bidrin	0.00 b	0.75 a	2.75 ab
Actara	0.25 b	0.25 a	0.75 cd
Orthene	0.75 b	0.25 a	3.00 a
Fulfill	1.25 ab	0.50 a	0.25 d
Provado	1.00 ab	0.50 a	1.00 bcd
Karate	0.50 b	0.00 a	1.00 bcd

Treatment	Number per sample		
	5/11	5/12	5/15
	Total Pirate Bugs		
Check	6.00 a	4.5 ab	25.50 abc
Centric	2.25 bc	2.75 ab	18.75 bc
Vydate	1.25 bc	2.50 b	57.05 abc
Bidrin	3.25 abc	5.75 a	34.00 ab
Actara	2.00 bc	3.00 ab	16.50 c
Orthene	3.75 ab	3.75 ab	32.00 abc
Fulfill	5.75 a	5.25 ab	37.50 a
Provado	4.00 ab	5.50 ab	27.75 abc
Karate	0.25 c	2.50 b	18.00 bc
	Pirate Bug Adults		
Check	5.25 a	3.50 a	25.00 ab
Centric	1.00 bc	2.25 a	18.50 b
Vydate	0.25 c	2.25 a	27.00 ab
Bidrin	2.75 b	4.25 a	32.25 ab
Actara	1.50 bc	2.50 a	16.50 b
Orthene	2.50 bc	3.00 a	31.25 ab
Fulfill	5.00 a	5.00 a	36.75 a
Provado	2.75 b	4.75 a	27.25 ab
Karate	0.25 c	2.50 a	17.50 b

	Pirate Bug Nymphs		
Check	0.75 a	1.00 a	0.50 ab
Centric	1.25 a	0.50 a	0.25 b
Vydate	1.00 a	0.25 a	0.50 ab
Bidrin	0.50 a	1.50 a	1.75 a
Actara	0.50 a	0.50 a	0.00 b
Orthene	1.25 a	0.75 a	0.75 ab
Fulfill	0.75 a	0.25 a	0.75 ab
Provado	1.25 a	0.75 a	0.50 ab
Karate	0.00 a	0.00 a	0.50 ab

Treatment	Number per sample		
	5/11	5/12	5/15
	Total Big-Eyed Bugs		
Check	0.75 ab	0.50 a	4.00 a
Centric	1.00 ab	0.25 a	2.50 a
Vydate	0.50 b	0.00 a	1.00 a
Bidrin	2.00 a	0.25 a	1.75 a
Actara	0.50 b	0.25 a	1.00 a
Orthene	0.00 b	0.00 a	1.00 a
Fulfill	0.25 b	0.50 a	3.00 a
Provado	0.50 b	1.00 a	3.75 a
Karate	0.50 b	0.25 a	1.25 a
	Big-Eyed Bug Adults		
Check	0.50 a	0.25 a	2.75 a
Centric	0.50 a	0.00 a	1.25 ab
Vydate	0.00 a	0.00 a	0.75 ab
Bidrin	0.75 a	0.25 a	0.75 ab
Actara	0.00 a	0.00 a	1.00 ab
Orthene	0.00 a	0.00 a	0.50 b
Fulfill	0.25 a	0.00 a	2.25 ab
Provado	0.25 a	1.00 a	1.50 ab
Karate	0.50 a	0.25 a	0.75 ab
	Parasitic Wasps		
Check	2.75 bc	3.00 a	10.00 a
Centric	3.00 abc	3.25 a	8.75 a
Vydate	1.75 c	4.50 a	5.25 a
Bidrin	4.00 abc	3.25 a	8.75 a
Actara	5.25 a	5.00 a	8.00 a
Orthene	3.75 abc	4.00 a	9.75 a
Fulfill	4.25 ab	3.75 a	9.25 a
Provado	5.25 a	5.00 a	10.25 a
Karate	1.75 c	4.50 a	10.00 a