

**MORTALITY OF TARNISHED PLANT BUG NYMPHS
FOLLOWING DIFFERENTIAL EXPOSURE TO
CENTRIC, ACTARA, STEWARD, CALYPSO
AND LEVERAGE IN FIELD CAGES**

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Abstract

The insecticides, Steward 1.25 SC (indoxcarb), Centric 40 WG (thiamethoxam), Actara 25WG (thiamethoxam), Calypso 480 SC (thiacloprid) and Leverage 2.7 EC (imidacloprid + cyfluthrin) were evaluated for control of tarnished plant bug (*Lygus lineolaris* (Palisot de Beauvois)) in a small plot field cage test in cotton. Laboratory reared nymphs were held for 1 or 4 days in sleeve cages following insecticide application. Mortality at 1 day after treatment was variable between treatments with levels >85% in only the thiamethoxam sprayed plots. At 4 days after treatment, mortality was above 90% in all insecticide treatments except the low rate of Steward and for Calypso. The 4-day testing period appeared to be appropriate for control evaluations in sleeve cages.

Introduction

Evaluating insecticides for tarnished plant bug (TPB) (*Lygus lineolaris* (Palisot de Beauvois)) control remains a high priority research effort in Midsouth cotton research as new insecticides that have novel modes of action become commercially available. With these new products, performance evaluation criteria may require adjustment. For instance, crop protection activity of products such as the neonicotinoid, Provado (imidacloprid), includes anti-feeding effects against TPB (Teague and Tugwell 1996, Teague et al. 2000). While determination of % mortality after a brief exposure time (24 hr) may be suitable for measuring performance of a fast-acting organophosphate insecticide such as Orthene (acephate), it would be inappropriate for an insecticide such as Provado.

Materials and Methods

Cotton was planted 16 May in 8 row wide plots 50 ft long with 10 ft alleys. The experiment was arranged in a RCBD with 3 replications. Insecticides were applied 20 Jul using a 4-row electrostatic, high-clearance sprayer calibrated to deliver 10 gpa at 28 psi with Turbo Teejet nozzles (TT1002-VP) set on 19 inch spacing to provide 2 nozzles per row. In the center 2 rows of each plot, 6 organdy sleeve cages, 6 inches diam by 18 inches long, were secured to randomly selected individual plants. The lower end of each cage was tied around the plant ca. 1 ft from the terminal. The cages were rolled down to the tie and covered with aluminum foil leaving plant terminals exposed. Immediately following the application, while the foliage was still wet, the foil was removed, the cage pulled up, and 5 TPB nymphs (3rd instar) were placed into each cage. Cages were secured with twist ties. TPB were obtained from a laboratory colony reared on artificial diet at the USDA-ARS laboratory in Mississippi State, MS (Cohen et al. 2000).

One day following application, 3 plants were cut below the cage and taken to the laboratory where TPB mortality was determined. The procedure was repeated for the remaining 3 cages at 4 days after treatment (DAT). Mortality data were analyzed with AOV, and means separated with LSD.

Results

Significant differences between treatments were observed after 1 day exposure in cages (Table 1). Mortality of >85% was observed in the thiamethoxam treatments (Actara and Centric). A longer exposure time appeared to appropriate for evaluating the other compounds. At 4 days, mortality was >90% for all insecticides tested except the low rate of Steward and the Calypso. The tank-mix of Calypso plus Steward did not significantly increase mortality over Steward alone. Benefits from a tank-mix might appear at a lower Steward rate; further testing is needed.

Concluding Remarks

The extended exposure time (4 days compared to 1 day) used in this cage study appears to be appropriate for insecticides that do not immediately result in insect death following exposure. Compounds that have repellent activity may require a longer testing period for evaluation because for the first few hours of the test the insect may rest on the cage rather than the treated plant. Mortality from insecticides that act following ingestion or from those with anti-feeding properties also will be less rapid. Observations from similar 1999 cage work indicated that 3 day testing was not sufficient for evaluating such products; a 4-day evaluation interval was adopted (Teague et al 2000).

Growers and crop advisors should be aware that the perception of insecticide performance will differ with some new chemistry products compared to the organophosphate standards. Live insects may remain in the field in the first few days following application; however, crop injury may not be occurring. To assess crop protection provided by these insecticides, crop monitoring of new injury is required. Simply counting live insects may not suffice.

References

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Table 1. Mortality of tarnished plant bug nymphs observed 1 and 4 days after treatment (DAT) with insecticides in cage studies at the UA Cotton Branch Experiment Station, Marianna AR, 2000.

Treatment/formulation	Rate lb (AI)/acre	% TPB Dead 1 DAT	% TPB Dead 4 DAT
Untreated		10.87 d	18.0 c
Steward 1.25 SC	0.0650	53.3 bc	74.2 b
Steward 1.25 SC	0.1100	48.5 dc	91.4 a
Centric 40 WG	0.0473	88.9 ab	97.8 a
Actara 25 WG	0.0473	93.3 a	91.1 a
Calypso 480 SC	0.0469	55.9 abc	62.2 b
Calypso 480SC+ Steward 1.25SC	0.0469+0.11	60.0 abc	97.8 a
Leverage 2.7 EC	0.0634	12.8 d	93.3 a
P>F (AOV)		00.05	00.05
LSD (.05)		37.8	12.64