

PEPPER LEAF BIOASSAY FOR INSECTICIDES FOR BEET ARMYWORM, 2006

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Introduction

Laboratory bioassays for beet armyworm; *Spodoptera exigua* (Hubner), can provide valuable information on the efficacy of products when field populations are not high enough to conduct a standard field trial. The following was conducted with field sprayed pepper leaves to increase the similarity to field conditions. A new BASF product, metaflumizone, was highlighted in this test.

Materials and Methods

A laboratory bioassay of field treated pepper leaves diet was conducted on a beet armyworm population collected from Tifton, GA during the summer of 2006 (J. Ruberson's colony). The beet armyworm population was reared through one generation at 25⁰C, L:D 12:12 h, and the bioassays were conducted on 2nd instar larvae in the first experiment and 3rd instar larvae in the second experiment. One gallon solutions of each of 9 different insecticide treatments were prepared based on field-rate concentrations at 60 gal/a spray volume plus 0.25% v/v Penetrator Plus to improve coverage. Sprays were applied to mature bell pepper plants in the field and treated leaves from the top of the plant were harvested and brought back to the lab for the bioassay. Each

of the bioassays was replicated 6 times in two separate experiments (12 replicates total) and had 10 larvae per sample. The leaves were placed into a 15 cm Falcon Petri dish with a dry filter paper and 10 larvae were introduced. The mortality was recorded as either dead or moribund at 24, 48, 72, 96 and 144 h post treatment. A final damage rating to the leaves was recorded as 0=no feeding damage, 1=slight, 2=moderate, and 3=severe or mostly consumed leaves.

Results and Discussion

Significant differences were observed in terms of number of dead BAW with all of the insecticide treatments compared to the check by 120 h after initial exposure. The order of efficacy ratings in terms of leaf damage was similar between experiments. Of course, the Bt product, Xentari, was slower acting than Tesoro, BAS 320 (metaflumizone), and Asana. The highest initial mortality was with Xentari+Tesoro, BAS 320+Asana and Tesoro alone in experiment 1 and Tesoro alone in experiment 2. The Spintor+Asana treatment was intermediate in initial efficacy, but by 72 h no significant live larvae remained. A rate response was not detected with BAS 320, but was detected by 96 h in experiment 2. Tolerance to the pyrethroid insecticide, Asana, was not apparent in this test.

Table 1. Experiment beginning with 2nd instar beet armyworm larvae.

Insecticide Treatment (kg or l product or g AI/ha)	Live - 24 h	Dead - 24 h	Live - 48 h	Dead - 48 h	Live - 72 h	Dead - 72 h	Live - 120 h	Dead - 120 h	Leaf Damage
Xentari 1.1 kg prod + Tesoro 0.35 l prod	0.0c	8.8a	0.0e	10.0a	0.0c	10.0a	0.0b	10.0a	0.0d
Tesoro 0.35 l prod	1.5c	7.3a	0.0e	9.5a	0.0c	10.0a	0.0b	10.0a	0.0d
BAS 320 280 g AI + Asana XL 56 g AI	6.3b	3.3b	2.8bc	6.2b	0.3c	7.8bc	0.0b	9.3a	0.3cd
Spintor 2SC 88 g + Asana XL 56 g AI	5.8b	3.5b	3.3b	5.3b	0.5c	8.2ab	0.0b	9.3a	0.3cd
BAS 320 200 g AI + Asana XL 56 g AI	0.8c	8.2a	0.3de	9.3a	0.0c	10.0a	0.0b	10.0a	0.5cd
BAS 320 240 g AI	8.5a	0.0c	0.8cde	0.50c	0.0c	1.2de	0.0b	9.5a	1.3b
BAS 320 200 g AI	8.5a	0.7c	0.3de	1.2c	0.0c	2.7d	0.0b	7.8b	1.0bc
BAS 320 280 g AI	9.7a	0.0c	0.3de	0.2c	0.2c	1.3de	0.0b	9.2.ab	1.0bc
Xentari 1.1 kg prod	10.0a	0.0c	9.7a	0.3c	2.5b	5.8c	0.0b	8.7ab	3.0a
Untreated check	9.8a	0.2 c	9.8a	0.2c	9.5a	0.5e	9.5a	0.5c	3.0a

Means (maximum values: 3 for diet and leaf, 2 for topical) within columns followed by the same letter are not significantly different, LSD ($P<0.05$).

Table 2. Experiment beginning with 3rd instar beet armyworm larvae.

Insecticide Treatment (lb AI/a)	Live - 24 h	Dead - 24 h	Live - 48 h	Dead - 48 h	Live - 96 h	Dead - 96 h	Live - 120 h	Dead - 120 h	Leaf Damage
Xentari 1.1 kg prod + Tesoro 0.35 l prod	7.3b	1.7bc	0.2d	9.8a	0.0d	10.0a	0.0b	10.0a	0.0d
Tesoro 0.35 l prod	2.5c	7.0a	0.0d	10.0a	0.0d	10.0a	0.0b	10.0a	0.0d
BAS 320 280 g AI + Asana XL 56 g AI	7.5ab	1.2bcd	1.0d	1.0cde	0.2d	6.3bc	0.0b	7.8bc	0.3cd
Spintor 2SC 88 g + Asana XL 56 g AI	7.3b	2.5b	4.8b	1.5bcd	1.7c	3.7de	0.0b	7.0bc	0.3cd
BAS 320 200 g AI + Asana XL 56 g AI	7.3b	2.3b	2.3c	2.2bc	0.3d	4.8cd	0.0b	8.2abc	0.6c
BAS 320 240 g AI	9.5ab	0.0d	0.3d	2.5b	0.0d	6.8b	0.0b	8.8ab	0.3b
BAS 320 200 g AI	7.2b	0.0d	0.0d	0.0e	0.0d	2.5e	0.0b	6.7c	1.5b
BAS 320 280 g AI	9.2ab	0.3cd	0.0d	0.7de	0.0d	10.0a	0.0b	10.0a	1.5b
Xentari 1.1 kg prod	10.0a	0.0d	10.0a	0.0e	4.5b	2.0e	0.0b	3.8d	2.6a
Untreated check	10.0a	0.0d	10.0a	0.0e	10.0a	0.0f	10.0a	0.0e	3.0a

Means (maximum values: 3 for diet and leaf, 2 for topical) within columns followed by the same letter are not significantly different, LSD ($P<0.05$).