

(E)

BROCCOLI: *Brassica oleracea* L. var. *italica* Plenck, 'Emerald Crown'

## EVALUATION OF CONVENTIONAL INSECTICIDES FOR CONTROL OF *BAGRADA HILARIS* ON BROCCOLI, 2012

John C. Palumbo  
University of Arizona  
Department of Entomology  
Yuma Agricultural Center  
Yuma, Arizona 85364  
Phone: (928) 782-3836  
E-mail: [jpalumbo@cals.arizona.edu](mailto:jpalumbo@cals.arizona.edu)

Ta-I Huang  
University of Arizona  
E-mail: [huang@cals.arizona.edu](mailto:huang@cals.arizona.edu)

*Bagrada hilaris* Burmeister

The objective of this study was to evaluate the efficacy of several conventional insecticides against a new invasive pest, *Bagrada hilaris*, in broccoli under desert growing conditions. Broccoli 'Emerald Crown' was direct seeded into double row beds on 42 inch centers on 6 Sep 2012. Plots were two beds wide by 35 ft long and bordered by a single untreated bed. Stand establishment was achieved using overhead sprinkler irrigation, and irrigated with furrow irrigation thereafter. Four replications of each treatment were arranged in a RCB design. Formulations and rates for each compound are provided in the tables. Two foliar sprays were applied on 26 Sep and 2 Oct as broadcast applications delivered through 2 TXVS-18 ConeJet nozzles at 25 gpa and 40 psi. An adjuvant, Dyne-Amic (Helena Chemical Co.), was applied at 0.25% vol/vol to all treatments. Evaluations of *B. hilaris* control was estimated by carefully examining whole plants (20 per replicate) for the presence of live adults on leaves, petioles and stems, as well as on the soil surface beneath each plant at 1, 3 and 5 days after treatment (DAT). In addition, the number of plants in each sampled replicate that showed signs of recent feeding were recorded by inspecting the terminal growth and young leaves on each plant for fresh feeding signs that appeared as pale, starburst-shaped lesions on foliage where *B. hilaris* adults prefer to feed. Insect and feeding data were subjected to ANOVA and means were separated using a *F*-protected LSD ( $P \leq 0.05$ ).

The *B. hilaris* population was moderate-high during the trial, and based on local experience, considered to be at economic injury levels. Plants were at the 2-leaf node stage when the first application was made. One day prior to the first application, pre-treatment counts estimated that plots were infested with an average of 7.0 adults per 20 plants. At 1-DAT1, all spray treatments

significantly reduced adult numbers compared to the untreated check (Table 1). At 3-DAT1, differences in adult numbers varied among the spray treatments where numbers in the Belay and Orthene treatments did not differ from the untreated check. By 5-DAT1, adult numbers had increased in all the spray treatments and did not differ from the untreated check except for the Brigade treatment. Following the second application, *B. hilaris* numbers were significantly reduced in all spray treatments at 1-DAT2. By 3-DAT2, adult numbers in the Lorsban and Belay treatments were not significantly different from the untreated check, and by 5-DAT2 differences in adult numbers were not detected among spray treatments and the untreated check. Averaged across samples, Brigade and Lannate provide the most consistent control among spray treatments. Similarly, evaluation of feeding signs following each application suggested that Brigade, Lannate, Orthene and Venom provided the most consistent plant protection (Table 2). No phytotoxicity symptoms were observed following any of the insecticide treatments. This research was supported by a grants from by a Specialty Crops Research Block Grant, USDA-AMS, administered by the Arizona Department of Agriculture under the award number SCRBP 11-02.

**Table 1. Adult Control**

Treatment/formulation	Rate amt product/acre	Mean Adults / 20 plants						
		1-DAT1	3-DAT1	5-DAT1	1-DAT2	3-DAT2	5-DAT2	Avg
Brigade 2EC	6.2 oz	0.0b	0.5d	2.3b	0.0b	1.3bc	1.5a	0.9d
Lannate SP	1.0 lb	1.8b	2.5bcd	4.0ab	0.0b	1.0c	4.0a	2.2c
Lorsban 50W	1.33 lb	1.5b	1.5cd	3.0ab	0.8b	5.0ab	4.0a	2.6bc
Belay 2.13SC	4 oz	0.5b	4.0ab	5.0a	0.8b	4.3abc	5.5a	3.5b
Venom 70WG	4 oz	0.5b	2.0bcd	6.8a	0.3b	1.3bc	4.0a	2.5bc
Orthene 97SG	1 lb	0.5b	3.5abc	4.0ab	0.8b	1.5bc	5.5a	2.6bc
Untreated control	-	7.3a	5.8a	6.8a	5.0a	6.8a	6.5a	6.3a

Means in a column followed by the same letter are not significantly different ( $P > 0.05$ ,  $F$ -protected LSD).

**Table 2. Feeding Damage**

Treatment/formulation	Rate amt product/acre	Mean Plants with fresh feeding signs						
		1-DAT1	3-DAT1	5-DAT1	1-DAT2	3-DAT2	5-DAT2	Avg
Brigade 2EC	6.2 oz	0.3cd	0.0d	3.8c	0.3b	2.3c	1.5c	1.3d
Lannate SP	1.0 lb	0.3cd	2.5bc	6.5bc	0.5c	3.0c	4.8ab	2.9c
Lorsban 75WG	1.33 lb	1.0bc	1.5c	6.5bc	2.0b	7.0b	5.5a	3.9bc
Belay 2.13SC	4 oz	1.8b	3.3b	8.3ab	1.0bc	6.8b	6.0a	4.5b
Venom 70WG	4 oz	0.0d	2.3bc	9.0ab	1.0bc	3.0c	3.3b	3.1c
Orthene 97SG	1 lb	0.5cd	2.8bc	6.8bc	0.8bc	3.3c	5.0ab	3.2c
Untreated control	-	5.8a	6.5a	11.3a	6.3a	12.3a	6.5a	8.1a

Means in a column followed by the same letter are not significantly different ( $P > 0.05$ ,  $F$ -protected LSD)