

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

## Evaluation of at-Plant versus Foliar Applications of Insecticides for Control of *Bagrada hilaris* on Broccoli, 2014

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Broccoli | *Brassica oleracea* var. *italica*

Bagrada bug | *Bagrada hilaris* (Burmeister)

The objective of this study was to evaluate the efficacy of insecticides applied at-plant versus foliar against *Bagrada hilaris* in broccoli in the Salinas Valley of California. On 25 October 2014, broccoli ('Marathon') was direct seeded in two seed lines on 40 inch beds. The field was sprinkler irrigated on 27 October. A plot was two beds wide × 25 feet long. Four insecticide treatments were applied at-plant (before sprinkler irrigation) in a 6 inch narrow-band along the seed line. The rest of the insecticide treatments were applied two times, on 3 November and four days later, on 8 November. All the insecticides were applied using CO<sub>2</sub> powered two-nozzle sprayer at 30 psi. The treatments were arranged in RCBD with four replications. The water volume for the at-plant and foliar applications was 100 and 40 gal/acre, respectively. An adjuvant, Dyne-Amic (Helena Chemical Co.), was applied at 0.25% vol/vol to all the treatments. Ten plants were randomly sampled from each plot at 2 (10 November), ~3 (15 November), and 4 (24 November) weeks after first irrigation (WAI). The plants were evaluated for the number of fresh *B. hilaris* feeding injury sites on

the leaves (on cotyledon leaves at 2 WAI, and on true leaves at ~3 and 4 WAI). *B. hilaris* feeding injury symptom on broccoli leaves appear as "starburst"; however, because the shape of starburst vary and eventually coalesce, individual fresh discolored (chlorotic) feeding injury sites were quantified. The data were subjected to ANOVA and means were separated using LSD ( $P < 0.05$ ).

After 2 WAI, number of feeding sites was significantly lower in Venom (at-plant only), Platinum (at-plant only) as well as Venom (at-emergence), Warrior II, and IKI-3106 treatments than in untreated check (Table 1). At ~3 WAI, all the treatments except Admire Pro (at-plant only) and Platinum (at-plant only) had significantly lower number of feeding sites than in untreated check. There was no difference in feeding injury sites among all insecticide treatments except Admire Pro. A week later, all the treatments had significantly lower number of feeding injury sites than in untreated check.

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Table 1.

| Product    | Rate amt/acre | Application timing    | No. application | No. feeding injury sites per 10 plants |                    |                    |
|------------|---------------|-----------------------|-----------------|--|--------------------|--------------------|
|            |               |                       |                 | 2-WAI <sup>3</sup>                     | 3-WAI <sup>4</sup> | 4-WAI <sup>4</sup> |
| Belay      | 12 fl oz      | At-plant <sup>1</sup> | 1               | 14.5 a-c                               | 5.0 c              | 5.8 b              |
| Venom      | 6 oz          | At-plant              | 1               | 12.3 b-d                               | 5.3 c              | 10.5 b             |
| Admire pro | 10.5 fl oz    | At-plant              | 1               | 22.3 a-c                               | 12.8 ab            | 6.0 b              |
| Platinum   | 3.67 oz       | At-plant              | 1               | 11.0 cd                                | 7.3 bc             | 12.0 b             |
| Venom      | 4 oz          | Plt emer <sup>2</sup> | 2               | 7.7 d                                  | 0.8 c              | 4.8 b              |
| Beleaf     | 2.85 oz       | Plt emer              | 2               | 26.5 a                                 | 3.8 c              | 5.8 b              |
| IKI-3106   | 22 fl oz      | Plt emer              | 2               | 10.3 cd                                | 2.5 c              | 5.0 b              |
| Warrior II | 1.92 fl oz    | Plt emer              | 2               | 12.8 b-d                               | 2.3 c              | 2.8 b              |
| EndigoZC   | 4.5 fl oz     | Plt emer              | 2               | 23.8 a-c                               | 1.3 c              | 7.5 b              |
| EndigoZCX  | 4.5 fl oz     | Plt emer              | 2               | 12.0 ab                                | 1.5 c              | 2.8 b              |
| UTC        | –             | –                     | –               | 25.0 a                                 | 17.8 a             | 40.8 a             |
|            |               |                       | <i>F</i> value  | 2.22                                   | 4.26               | 5.71               |
|            |               |                       | <i>P</i>        | 0.049                                  | 0.001              | <0.001             |

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

<sup>1</sup>applied once immediately after planting the seeds.

<sup>2</sup>Applied twice 1) on a WAI then 2) four days later.

<sup>3</sup>Injury on cotyledon leaves only.

<sup>4</sup>Injury on the true leaves only.