

COLLARDS: *Brassica oleracea* L., 'Champion'

Bioassay Evaluation of IKI-3106 (Cyclaniliprole) for Control of Brown Marmorated Stink Bug and Harlequin Bug, 2014*

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Kale / Collard greens | *Brassica oleracea* var. *acephala*

brown marmorated stink bug | *Halyomorpha halys*

Yellow squash fruit | *Cucurbita pepo*

harlequin bug | *Murgantia histrionica*

2',3-dibromo-4'-chloro-1-(3-chloro-2-pyridyl)-6'-[[{(1RS)-1-cyclopropylethyl]carbonyl]pyrazole-5-carboxanilide; 3-Bromo-N-[4-chloro-2-methyl-6-[(methylamino)carbonyl]phenyl]-1-(3-chloro-2-pyridinyl)-1H-pyrazole-5-carboxamide

The purpose of this experiment was to evaluate the efficacy of a new diamide insecticide, IKI-3106 50SL (cyclaniliprole), against BMSB and HB in laboratory bioassays. To our knowledge, the activity of this insecticide on pentatomids is not known. BMSB adults and nymphs were collected during the summer and fall of 2014 from wild trees near Blacksburg, VA. Harlequin bug eggs, nymphs and adults were collected from untreated collards planted at Kentland Research Farm near Blacksburg, VA. Insects were brought back to the laboratory and maintained in cages for ~24 h prior to being used for these bioassays. Three concentrations of IKI-3106 50SL were prepared at 0.127 (low), 0.190 (medium), and 0.254 (high) g AI/liter. In addition, we tested another anthranilic diamide, chlorantraniliprole (Coragen 1.67SC), mixed at 0.244 g AI/liter for comparison, as well as an untreated check. For BMSB, untreated yellow squash fruit 'Lioness' was collected from field-grown plants and disc shaped sections were cut from the fruit, dipped in treatment solutions for 4 s each and allowed to dry under a fume hood. The same process was done for HB using collard leaves instead of squash. For each treatment, there were four replications, with each dish being a replicate. After drying, squash discs or collard leaves were placed in a 9 cm Petri dish and five nymphs (second to fourth instars) or five adults were placed in each dish for a total of

20 insects per treatment. All treatments were then placed in a temperature chamber held at $25 \pm 3^\circ\text{C}$ and a photoperiod of 16:8 (L:D) h ratio. Mortality was assessed after 2 DAT for harlequin bug and 3 DAT for BMSB by recording the number of live, dead, and moribund (unable to right itself or walk when touched). For harlequin bug egg bioassays, fresh and hardened egg masses were collected from a lab colony and dipped directly into the solutions for 5 s and were held for 2 wk or until all eggs hatched. Data were analyzed using ANOVA and means were separated using Fisher's LSD.

For BMSB, the medium and high rates of IKI-3106 50SL killed 95% and 100% of nymphs, respectively, which was significantly higher than the low rate of IKI-3106 50SL, which was significantly higher than Coragen and the untreated check (Table 1). IKI-3106 50SL was less efficacious on BMSB adults killing only 45% at the highest rate, but was still significantly higher than Coragen or the untreated check (Table 1). For HB, the medium and high rates of IKI-3106 50SL killed 100% of nymphs, which was significantly higher than IKI-3106 50SL, Coragen, and the untreated check (Table 2). All rates of IKI-3106 50SL also caused significantly higher mortality of adults than Coragen or the untreated check. In addition, the high rate of IKI-3106 50SL reduced HB egg hatch by >50%.

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Table 1

Treatment/formulation	Rate amt/acre	Concentration (g AI/liter)	% BMSB Mortality	
			Nymphs (<i>n</i> = 20)	Adults (<i>n</i> = 20)
Untreated check	n/a	0	10.0c	5.0b
IKI-3106 50SL	11.0	0.127	70.0b	30.0ab
IKI-3106 50SL	16.4	0.190	95.0a	45.0a
IKI-3106 50SL	22.0	0.254	100.0a	40.0a
Coragen 1.67 SC	5.0	0.244	25.0c	10.0b

Means within columns followed by same letter are not statistically different (Fisher's Protected LSD, $P > 0.05$).

Table 2

Treatment/formulation	Rate amt/acre	Concentration (g AI/liter)	% HB Mortality		
			Eggs (% hatch) (<i>n</i> = 48)	Nymphs (<i>n</i> = 20)	Adults (<i>n</i> = 20)
Untreated check	n/a	0	83.3	10.0c	5.0b
IKI-3106 50SL	11.0 fl oz	0.127	85.4	63.8b	95.0a
IKI-3106 50SL	16.4 fl oz	0.190	85.4	100.0a	90.0a
IKI-3106 50SL	22.0 fl oz	0.254	29.2	100.0a	80.0a
Coragen 1.67 SC	5.0 fl oz	0.244	54.2	30.0c	4.2b

Means within columns followed by same letter are not statistically different (Fisher's Protected LSD, $P > 0.05$).