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Efficacy of *Beauveria bassiana* (Bals.) Vuill. against *Helopeltis theivora* Waterhouse in tea

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Abstract

Experiment was conducted against tea mosquito bug (TMB), *Helopeltis theivora* Waterhouse (Hemiptera: Miridae) at Kachagaral, Jorhat, Assam during 2015-16 and 2016-17 to compare the efficacy of the IIHR strain of *Beauveria bassiana* (Bals.) Vuill. @ 2.5 ltr/ha with commercial formulation of *B. bassiana* (@ 2.5 lit/ha), Azadirachtin 1000 ppm (@ 2.5ltr/ha) and a conventional insecticide thiamethoxam WG (30g ai/ha). Out of different treatments, results showed that IIHR strain of *B. bassiana* was recorded minimum adults (15.76 and 18.60) as compared to untreated control (26.75 and 53.00) but was at par with Azadirachtin 1000 ppm (16.25 and 20.30) and commercial formulation *B. bassiana* (17.25 and 25.40) per 10 plants during 2015-16 and 2016-17, respectively.

Keywords: Tea, tea mosquito bug (TMB), *Beauveria bassiana*, azadirachtin

1. Introduction

Tea (*Camellia sinensis* L. O. Kuntze) is an industry oriented plantation crops of Assam. The TMB, *Helopeltis theivora* Waterhouse (Hemiptera: Miridae) has become one of the major pest in West Bengal and Assam^[1, 6, 7] and causes crop loss up to 25%^[2, 5, 9]. Both nymph and adult TMB attack tea by sucking the sap from tender leaves as well as lay their eggs in the leaves and cause severe damage⁽³⁾. Since the heavy uses of synthetic pesticides causes environmental pollution and health hazard to tea worker during application process and finally the end consumers. On the other hand, biocontrol agents especially entomopathogens are the important player for management of TMB in an eco-friendly way. Therefore, the present study was taken up in order to assess the efficacy of two strains of entomopathogen and one botanical along with a conventional insecticide thiamethoxam for comparison in Assam situation.

2. Materials and Methods

A field trial was conducted with an area of 1 ha at Kachagaral area of Jorhat to evaluate the *B. bassiana* (IIHR strain @ 2.5 lit/ha), *B. bassiana* (Commercial product@ 2.5 lit/ha) and botanical insecticides (Azadirachtin 1000 ppm@ 5ml/l) against TMB during 2015-16 and 2016-17. For spraying thiamethoxam WG @ 30g ai/ha against TMB, a separate area of 0.2 ha was also selected at an isolated distance about 1 km away from Kachagaral. The experimental plot was subdivided into eight subplot and each subplot was considered as individual replication. Two rounds of sprays were given at an interval of 30 days. First spray schedule was taken up in August on the initial occurrence of TMB and the second was in September. The spray was given based on maximum abundance of insect.

Observations of nymphs and adults per 10 plants on pre and post treatment count were recorded randomly from each replication.

3. Results and Discussions

The result (Table 1) indicated that among the different treatments against *H. theivora* in tea, thiamethoxam @30 gm ai/ha was found superior to all other treatments in reducing the TMB population with 6.40 and 8.90 per 10 plants after 30days of second spray. However, the second best treatment was *B. bassiana* IIHR strain (15.75 and 18.60/10plants) after 30 days of second spray, during 2015-16 and 2016-17, respectively. No significant difference was noticed in reducing the *H. theivora* population with *B. Bassiana* IIHR strain(15.75 & 18.60), Azadirachtin 1000 ppm(16.25 and 20.30) and *B. Bassiana* of Commercial formulation with 17.25 and 25.40 population of *H. Theivora* / 10 plants at 30 days after the second spraying during 2015-16 and 2016-17, respectively.

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The highest population of 26.75 and 53.00 adults /10 plants was recorded in untreated control plot.

The present findings were in accordance with that of Navik *et al.* [4] who have found that the entomopathogenic fungus, *B. Bassiana* was the most effective against tea mosquito bug, *H. antonii* and recorded 91.67% nymphal mortality after 10 days

of application. However, the present findings are also in agreement with the findings of Srikumar *et al.* [8] who have reported that the thiomethoxam, a neonectinoid insecticide was the most common and effective insecticide used in tea plantation against TMB.

Table 1: Efficacy of *Beauveria bassiana* (IIHR strain) on *Helopeltis theivora* in tea (2015-16 and 2016-17)

Treatments	Pre-treatment count *		Post treatment count*							
			15 days after Ist spray		30 days after Ist spray		15 days after IInd spray		30 days after IInd spray	
	2015-16	2016-17	2015-16	2016-17	2015-16	2016-17	2015-16	2016-17	2015-16	2016-17
Thiamethoxam @ 30g ai/ha	30.5	46.90	15.75 ^a	28.80 ^a	10.50 ^a	19.60 ^a	8.25 ^a	11.40 ^a	6.4 ^a	8.90 ^a
Azadirachtin 1000 ppm	27.25	44.40	24.0 ^c	33.90 ^a	20.0 ^b	29.00 ^c	18.0 ^b	24.60 ^{bc}	16.25 ^b	20.30 ^{bc}
<i>Beauveria bassiana</i> (Commercial formulation)	26.25	45.80	20.06 ^b	34.50 ^a	18.75 ^b	30.50 ^c	19.75 ^c	27.60 ^c	17.25 ^b	25.40 ^c
B.b (IIHR strain)	29.25	50.20	18.75 ^b	31.60 ^a	17.75 ^b	24.90 ^b	17.25 ^b	22.70 ^b	15.75 ^b	18.60 ^b
Control	26.75	48.50	29.5 ^d	49.80 ^b	31.5 ^c	50.90 ^d	33.0 ^d	50.60 ^d	26.75 ^c	53.00 ^d
CV %		--	8.07	10.86	14.81	13.38	8.00	8.78	19.88	11.83
CD (=0.05)	NS	NS	1.89	3.52	3.11	3.76	1.67	2.18	3.54	2.71

* Adults/ 10 plants)

Means followed by the same letter in a column are not significantly different

4. Conclusions

During the present study, except synthetic pesticides, lowest number of TMB was recorded in the plots treated with IIHR strain of *B. bassiana* (15.76 and 18.60) as compared to untreated control (26.75 and 53.00) but was at par with Azadirachtin 1000 ppm and commercial formulation *B. bassiana* per 10 plants. To increase the income of farmers they must have to shift from inorganic to organic farming of tea plantation and in case of organic practice entomopathogens have a greater role to combat with insect pests mainly TMB.

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