Laboratory evaluation of different chemical insecticides and biopesticides against larvae of teak skeletonizer, *Eutectona machaeralis* (Walker)

S. M. Chavan[1]*, K. H. Kabade[2] and Sushil kumar[3]

ABSTRACT

Studies were carried out during 2010-2011 to evaluate toxicity levels of different insecticides and bio-pesticides against larvae of teak skeletonizer, *Eutectona machaeralis* (Walker) which is the most pernicious insect-pest of teak. Endosulfan (35 EC 0.07 %), Chlorpyriphos (20 EC 0.05 %), Lambdacyhalothrin (5 EC 0.003 %), Thiamethoxam (25 WG 0.0084 %), *Bacillus thuringiensis* (*Btk*) (2 gm/L), *Btk* (3 gm/L), *Beuveria bassiana* (2 gm/L), *B. bassiana* (3 gm/lit) *Metarrizium anisopliae* (2 gm/L), *M. anisopliae* (2 gm/L), NSKE (5 %) were tested under laboratory conditions apart from water spray (control) using Completely Randomized Design with three replications each on third instar larvae of *E. machaeralis*. Observations on mortality of the larvae were recorded at 12 hrs 1, 3 and 7 days after treatment. Among different treatment tested, lambdacyhalothrin recorded cent percent mortality within 24 hrs after application. Chlorpyriphos and endosulfan were found to be the next best treatments for their knock down toxicity within 24 hrs after application. Considering environment safety control measures for conserving natural enemies the biopesticides *B. thuringiensis (Btk), B. bassiana, M. anisopliae* each with 3 gm/L found to be the best treatment causing 50.77 to 68.07% percent mortality followed by chemical insecticides. The treatments thiamethoxam, *B. thuringiensis, B. bassiana, M. anisopliae* each with 2 gm/L found to be less effective.

Key words: Bioefficacy, *Eutectona machaeralis*, insecticides, teak

INTRODUCTION

Teak (*Tectona grandis* L.f.) (Verbenaceae) is a most valuable and undisputed global leader of high quality tropical timber (Tewari, 1992). It is attacked by important lepidopteron insect pests. Leaf skeletonizer, *Eutectena machaeralis* (Walker), [syn.*Pyrausta machoeralis* (Hampson,1894), *Hapalia machaeralis* (Beeson, 1941) are the most pernicious pests of teak responsible for epidemic defoliation regularly in nurseries, plantations and natural forests of all teak growing areas (Beeson, 1941). The larvae of this insect feed only on the fleshy leaf tissue, leaving all the veins intact, thus it affects adversely the growth and vigour, besides causing certain abnormalities, resulting in both qualitative and quantitative loss in timber production (Beeson, 1941). Therefore use of different insecticides and biopesticides are immense importance in forest insect pest control which has reached at peak level of infestation within a short period of time. Keeping the facts into consideration the present study was undertaken and the results were summarized.

MATERIALS AND METHODS

Toxicity studies of different insecticides/biopesticides were carried out in Entomology Laboratory of ASPEE college of Horticulture and Forestry, Navsari Agricultural University, Gujarat during 2010-2011. In this investigation, endosulfan 35 EC 0.07 %, chlorpyriphos (20 EC 0.05 %), lambdacyhalothrin (5 EC 0.003 %), thiamethoxam (25 WG 0.0084 %), *Bacillus thuringiensis* (*Btk*) (2 gm/L, *and* 3 gm/L), *Beuveria bassiana* (2 gm/L and 3 gm/L), *Metarrizium anisopliae* (2 gm/L and 3 gm/L), NSKE (5 %) and water (control) were tested under laboratory conditions using Completely Randomized Design (CRD) with three replications of each on third instar larvae of teak Skeletonizer, *Eutectona machaeralis* (Walker). Third instar larvae were collected from Dangs forest area and used for toxicity test.

To find out the toxicity of each insecticide/bio-pesticides on the larvae *E. machaeralis* the stock solutions of above said insecticide/bio-pesticides were prepared in water and directly sprayed in each Petri dish of the respective treatment. The Petri dishes were allowed to dry for 15 minutes so as to form a

thin film of the toxicant. Thereafter, five larvae were released in each Petri dish for 30 minutes. Thereafter, larvae were removed from each Petri dish and released further to the teak leaves for feeding. In each treatment observation on mortality of the larvae were recorded at 12 hrs 1, 3 and 7 days after treatment and per cent mortality were worked out. In control, only water spray was given.

RESULTS AND DISCUSSION

The data on per cent mortality of the larvae of the teak skeletonizer mentioned in Table1 indicated that all the treatments during different observation period showed significant results over control.

Twelve hours after exposure of application, all the treatment showed significant result over control and also were at par to each other. The treatment lamdacyhalothrin gave best result as it shows quick knock down effect, whereas lowest mortality was observed in the treatments *B. bassiana* 2 g/L and *M. anisopliae* 2 g/L. Twenty-four hrs after application, the observations indicated that lamdacyhalothrin found to be superior to all other treatments followed by endosulfan and Chlorpyriphos. The next best treatments were Thiamethoxam, *Bacillus thuringiensis* (*Btk*) 3 and 2 g/Lit which were also at par with each other. The other treatments were given less percent mortality but were superior to control. Treatments lambdacyhalothrin, endosulfan and chlorpyriphos showed cent percent mortality after three days of exposure of application followed by thiamethoxam, *Bacillus thuringiensis* (*Btk*) 3 g/L. The treatment *Beauveria bassiana* 2 g/L was superior to control and was at par to other treatments but inferior to chlorpyriphos.

The data on percent mortality after seven days of exposure showed that the chemical pesticide showed not only significant but superior results over other biopesticides and control. Therefore it is suggested that the population of teak skeletonizer larvae can be checked by spraying chemical insecticides *viz.*, lambdacyhalothrin, endosulfan and chlorpyriphos. The biopesticides, *Bacillus thuringiensis (Btk), Beauveria bassiana, Metarrhizium anisopliae* each with 3 gm/lit found to be the best treatment followed by chemical insecticides. The present findings are in conformity

Table 1. Bio-efficacy of insecticides and bio-pesticides against larvae of teak skeletonizer, *Eutectona machaeralis* (Walker)

Treatment	Average Per cent Mortality After			
	12 hrs	24 hrs	3 DAS	7 DAS
Endosulfan (35 EC 0.07 %)	46.92^{a}	59.21^{b}	90.00^{a}	90.00^{a}
Chlorpyriphos (20 EC 0.05 %)	35.01^{a}	51.14^{bc}	90.00^{a}	90.00^{a}
Lambdacyhalothrin (5 EC 0.003 %)	81.14^{a}	90.00^{a}	90.00^{a}	90.00^{a}
Thiamethoxam (25 WG 0.0084 %)	30.79^{a}	46.92^{c}	54.99^{b}	72.29^{b}
Bacillus thuringiensis (*Btk*) (2 g/lit.)	30.79^{a}	35.01^{d}	43.08^{d}	50.77^{c}
Bacillus thuringiensis (*Btk*) (3 g/lit.)	35.01^{a}	46.92^{c}	50.77^{bc}	68.07^{b}
Beauveria bassiana (2 g/lit.)	17.71^{a}	35.01^{d}	43.08^{d}	46.92^{c}
Beauveria bassiana (3 g/lit.)	30.79^{a}	35.01^{d}	46.92^{cd}	50.77^{c}
Metarrhizium anisopliae (2 g/lit.)	17.71^{a}	35.01^{d}	46.92^{cd}	46.92^{c}
Metarrhizium anisopliae (3 g/lit.)	30.79^{a}	38.86^{d}	51.14^{bc}	68.07^{b}
NSKE (5%)	26.57^{a}	35.01^{d}	43.08^{d}	43.08^{c}
Control (Water spray)	0.00^{b}	8.86^{e}	26.57^{e}	26.57^{d}
SEM	**1.00**	**2.43**	**1.61**	**2.79**
CD	**72.11**	**7.07**	**4.68**	**8.13**
CV %	**6.82**	**19.54**	**9.88**	**15.62**

Figures followed by same alphabet are not differing significantly.

with the reports of Khan and Bhandari (2001) suggested endosulfan against the defoliating insects in nursery.

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S. M. Chavan[1]*, K. H. Kabade[2] and Sushil kumar[3]
Department of Entomology, ASPEE College of Horticulture and Forestry, Navsari Agricultural University, Navsari-396 450, Gujarat, India.
*E-mail: sachinento@gmail.com

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