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Laboratory evaluation of botanical, biopesticide and insecticides against the shoot and leaf webber, *Antigastra catalaunalis* duponchel (Pyraustidae: Lepidoptera) in sesame

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ABSTRACT

An investigation was carried out to assess the efficacy of insecticides by leaf disc bioassay method using various chemical components, neem oil and some other biopesticides against shoot and leaf webber, *Antigastra catalaunalis* during 2011-12 in Karaikal district, U.T. of Puducherry. In the leaf disc bioassay method against *A. catalaunalis*, it was found that the per cent larval mortality in the treatment with lambda cyhalothrin 5 EC @ 25 g a.i./ha was high after 6,12,18 and 24 hours (13.33, 40.00, 73.33 99.99%) followed by spinosad 45 SC @ 33.75 g a.i./ha (13.33, 33.33, 60.00 and 99.99%), *Bacillus thuringiensis* var. *kurstaki* @ 50 g a.i./ha (6.66, 26.66, 53.33, 66.67,76.67%) over the untreated check.

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Key words: Sesame, leaf disc bioassay, *Antigastra catalaunalis*

INTRODUCTION

Sesame is one of the important oilseed crops. It is described as the "Queen of Oil Crop" because of its high oil content (38 to 54%). Although sesame is widely used for different purposes, the productivity has been miserably low compared to other oilseed crops (Yoll *et al*., 2010). Sesame originated from tropical Africa and is usually grown in arid and semi-arid regions. It is a high value food crop with high oil content, roughly about 50 per cent of seed weight which makes it a good source of edible oil. Sesame is one of the oldest oilseed crop, mostly cultivated by marginal farmers and utilized as a nutritious food (Grichar *et al*., 2001). India is the largest producer of sesame in the world. It also ranks first in the world in terms of sesame-growing area, 24% with about 1.8 million hectares with a total production of 0.76 million tonnes and productivity of 422 kg ha^{-1} (FAO, 2013). Among the 29 insect species, sesame shoot and leaf webber, *Antigastra catalaunalis* (Duponchel) is considered a serious pest. The shoot and leaf webber attacks all parts of sesame, except the roots. It feeds on the tender foliage by webbing the top leaves and also bores into the shoots and pods (Sharma and Reddy, 1983; Sankarnarayanan and Nadarajan, 2005).

Among the various methods of pest management, the use of insecticides forms the first line of defence against the insect pests. Newer insecticide molecules may be a better alternative than the application of conventional synthetic insecticides in the context of environmentally benign management tactics so also in order to mitigate the adverse effect on the total environment. In many cases, alternate or eco-friendly method of insect pest management offers adequate level of pest control with less hazards and safe to non-target organisms. In the present study, the newer insecticides by leaf disc bioassay method were evaluated against *A. catalaunalis*and presented.

MATERIALS AND METHODS

Sesame leaf webber was mass reared in the Department of Entomology, Pandit Jawaharlal Nehru College of Agriculture and Research Institute (PAJANCOA & RI), Karaikal. The plants were raised as potted plants under protected condition. The field collected larvae were released in the potted plants and culture was maintained. Leaves from the potted sesame variety TMV 4 were taken for the study. Leaf disc of 3 cm diameter were cut covering either side of midrib from untreated sesame plants. The leaf discs were dipped in aqueous suspension of the insecticides (Tabashnik *et al*., 1991) for about 30 seconds. The treatments include profenofos 50 EC @ 500 g a.i./ha, triazophos 40 EC @ 200 g a.i./ha, lambda cyhalothrin 5 EC @ 25 g a.i./ha, spinosad 45 SC @

33.75 g a.i./ha, bifenthrin 10 EC @ 62.5 g a.i./ha, thiamethoxam 25 WG @ 31.25 g a.i./ha, imidacloprid 17.8 SL @ 22.2 g a.i./ha, azadirachtin @ 0.03%, *Bacillus thuringiensis* var. *kurstaki* @ 50 g a.i./ha along with untreated check and the treated leaf discs were dried in shade for 10 min before being transferred to petridish. The shade dried leaf discs are placed inside a petridish over a filter paper moistened by wet cotton kept beneath. Five larvae were introduced in each Petridis and the experiment was replicated three times. The larvae were pre-starved for an hour before the experiment. The mortality counts were made at an interval of 6, 12, 24 and 48 hours. Leaves treated with water alone were included as untreated check. The per cent mortality was worked out and data were subjected to analysis of variance and the means were separated by Duncan's Multiple Range Test (DMRT) (Gomez and Gomez, 1984).

Table 1. Effect of newer insecticides against the sesame shoot and leaf webber, *A. catalaunalis* by leaf disc bioassay method

Treatments	Dosage	Percent larval mortality Mean of 3 replications				
		6 hrs	12 hrs	18 hrs	24 hrs	48 hrs
Profenofos 50 EC	500 g a.i /ha	6.66	13.33	40.00	60.00	80.01
Triazophos 40 EC	200 g a.i/ha	6.66	6.66	33.33	63.33	73.33
Lambda cyhalothrin 5 EC	25 g a.i /ha	13.33	40.00	73.33	99.99	0.00
Spinosad 45 SC	33.75 g a.i /	13.33	33.33	60.00	99.99	0.00
Bifenthrin 10 EC	62.5 g a.i /	6.66	13.33	40.00	63.33	73.33
Thiamethoxam 25 WG	31.25 g a.i /	0.00	20.00	46.66	66.66	80.01
Imidacloprid 17.8 SL	22. 2 g a.i /	6.66	13.33	46.66	66.66	73.00
Azadirachtin	0.03 %	0.00	20.00	46.66	53.33	70.01
*B.thuringiensis*var.*kurstaki*	50 g a.i./ha	6.66	26.66	53.33	66.67	76.67
Untreated check	-	0.00	0.04	0.13	0.14	0.20
CD (P=0.05)	--	NS	11.577*	11.006**	0.137**	0.140 **

In a column mean followed by a common letter are not significantly different by DMRT (P=0.05); Not significant***,** Significant at P=0.05****,** Significant at P=0.01

RESULTS AND DISCUSSION

The results on the leaf disc bioassay method on *A. catalaunalis* in the variety TMV 4 are given in Table 1. The per cent larval mortality was observed from 6 hrs to 48 hrs. At 6 hours, the per cent larval mortality ranged from 0.00 to 13.33 per cent and there was no significant difference in percentage larval mortality irrespective of the treatments. At 12 hours, the per cent larval mortality ranged from 0.04 to 40.00 per cent. In the treatment with lambda cyhalothrin 5 EC @ 25 g a.i./ha, the per cent larval mortality was high followed by spinosad 45 SC @ 33.75 g a.i./ha, *B. thuringiensis* var. *kurstaki* @ 50 g a.i./ha compared to the other treatments. At 18 hours, the per cent larval mortality ranged from 0.13 to 73.33 per cent. In the treatment with lambda cyhalothrin 5 EC, the per cent larval mortality was high followed by spinosad 45 SC @ 33.75 g a.i./ha, *B. thuringiensis* var. *kurstaki* @ 50 g a.i./ha compared to the other treatments. At 24 hours, the per cent larval mortality ranged from 0.14 to 99.99 per cent and a higher per cent larval mortality was observed in the treatment with lambda cyhalothrin 5

EC and spinosad 45 SC, *B. thuringiensis* var. *kurstaki* compared to the other treatments. At 48 hours, the per cent larval mortality ranged from 0.20 to 80.01 per cent and a higher per cent larval mortality was observed in the treatment with profenofos 50 EC and thiamethoxam 25 WG, *B. thuringiensis* var. *kurstaki* @ 50 g a.i./ha compared to the other treatments. It was found that at 24 hours a higher per cent mortality of 99.99 per cent was observed in the treatments lambda cyhalothrin 5 EC, spinosad 45 SC and *B. thuringiensis* var. *kurstaki* @ 50 g a.i./ha were found superior to the other treatments. Afzal *et al.* (2002) stated that the reduction in pest population was the greatest in the treatment with karate 2.5 EC (96%) followed by sevin 10 SP (85%). Lalitha *et al*. (2012) stated that the *Bacillus thuringiensis* against *Helicoverpa armigera* larvae (second instar and third instar) were found treated with *B.t.* strains and recorded mortality in the range of 94.44 and 83.33 %. All the earlier findings are in conformity with the present findings.

It is concluded that the leaf disc bioassay method against *A. catalaunalis*, the per cent larval mortality in the treatments with lambda cyhalothrin 5 EC was high at 6, 12,18 and 24 hours followed by spinosad 45 SC, *Bacillus thuringiensis* var. *kurstaki* @ 50 g a.i./ha over the untreated check. It was concluded that the need based application of lambda cyhalothrin 5 EC @ 25 g a.i./ha, spinosad 45 SC @ 33.75 g a.i./ha and *B. thuringiensis* var. *kurstaki* @ 50 g a.i./ha could make significant contribution in managing of *A. catalaunalis* in sesame.

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