

Bioefficacy of new generation insecticides



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BIOEFFICACY OF NEW GENERATION INSECTICIDES ON *Spodoptera litura*
(Lepidoptera: Noctuidae) IN AMARANTH

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ABSTRACT: *Spodoptera litura* major pest on vegetable amaranth. New generation insecticides such as Chlorantraniliprole 18.5 % SC - 0.006 %, Novaluron 10 % EC - 0.015 %, Flubendiamide 39.35 % SC - 0.0096 %, Spinosad 45% SC - 0.015 %, Emamectin benzoate 1 % WG - 0.002 %, Indoxacarb 14.5 % SC - 0.015 %, Thiacloprid 21.7 % SC - 0.036 %, and Fipronil 5 % SC - 0.01 % were evaluated. Based on laboratory evaluation in leaf disc method fipronil, indoxacarb, thiacloprid, emamectin benzoate, chlorantraniliprole, flubendiamide were found to be effective in new generation insecticides. Whereas 100% mortality observed first in fipronil treated leaves followed by indoxacarb, thiacloprid, emamectin benzoate. Comparatively chlorantraniliprole, flubendiamide showed slow mortality but the treated insects stopped their feeding within 6 hours after spraying.

KEY WORDS: *Spodoptera litura*, new generation insecticides, bio efficacy, leaf disc method, amaranth.

INTRODUCTION

Amaranthus spp. are one of the major tropical vegetables cultivated in India, Malaysia, Myanmar, Taiwan, South Pacific Islands, tropical Africa, the Caribbean, Central and South America (Tindall, 1983). Amaranthus or Indian spinach leaves are a bountiful source of calcium, potassium, vitamin A, ascorbic acid and iron. In India, it is cultivated largely in the southern states.

In Kerala, amaranthus is raised round the year in the erstwhile paddy lowlands, garden lands and homesteads.

One of the major factors, which hamper the productivity and yield of amaranthus is the infestation by insect pests. Insects like leaf webbers, green grasshopper and tobacco caterpillar infest and devour the leaves of amaranthus (Nair, 1975). *S. litura* was present in the field throughout the year except during September to October (Butani , 1977). Hitherto, plant protection measures against the pests especially in the market oriented cultivation of amaranthus has largely been chemical pesticide based. The effect of new generation insecticides in controlling of *Spodoptera litura* discussed here.

MATERIALS AND METHODS

Seven new generation insecticides were evaluated for their efficacy against the *S. litura* in amaranth. The experiments were laid out in completely randomized block design with three replications and an untreated check. The treatments are detailed in Table .

No	Common Name	Trade Name	Dosage	Manufacturer
1	Chlorantraniliprole 18.5 % SC	Coragen	30 gm a. i ha ⁻¹	Dupont India pvt. ltd
2	Novaluron 10 % EC	Rimon		Indofil Indus Ltd

			i ha ⁻¹	
3	Flubendiamide 39.35 % SC	Fame 480 SC	48 gm a. i ha ⁻¹	Bayer crop science India
4	Emamectin benzoate 5% SG	Proclaim	11 gm a. i ha ⁻¹	Syngenta India
5	Indoxacarb 14.5 % SC	Avaunt	75 gm a. i ha ⁻¹	Dupont India
6	Thiacloprid 21.7 % SC	Alanto	24 gm a. i ha ⁻¹	Dupont India
7	Fipronil 5% SC	Regent	50 gm a. i ha ⁻¹	Bayer crop science India

List of the insecticides evaluated for their bio-efficacy against *S. litura*

Raising of test plants

The seeds of amaranth *Amaranthus tricolor* L. were procured from Olericulture Department, College of Agriculture, Kerala Agricultural University, vellayani. Seeds were sown in earthen pots and 15 days old seedlings were transplanted to grow bags and earthen pots for conducting different experiments.

REARING OF *S. litura* :

Different instar larvae were collected from fields of the instructional farm, Vellayani. These larvae were reared in trough up to adult stage. The adults were released in a cage having size 1.6 X 1.0 X 1.18 m³ with two windows at each side to release adults and one door at two sides to introduce plants and for taking out the infested leaves. The entire cage was covered with iron mesh for easy observing. Inside the cage four amaranthus plants at the stage of 20-25 days after sowing were kept along with pots to create natural climate for adult growth and fed with 5% diluted honey solution (Shirai, 2006). Honey was fed by immersing cotton buds in 5% honey solution and that cotton buds were hanged to the roof of cage @ 10 per cage. The plants were monitored frequently for first instar larvae. The leaves with first instar larvae of *S. litura* were taken out from the cage and reared in insect troughs upto second instar stage.

Evaluation against spodoptera using leaf disc method

Different insecticidal treatments were given on leaves in petri plates using hand sprayers. Second instar larvae were released @ six larvae per petri plate on treated leaves at six hours after spraying. Observations were recorded upto 3 days after spraying (DAS). Observations were started to take 6 hours after spraying. The percentage mortality was recorded using Abbot's formula (Abbot, 1925).

RESULTS AND DISCUSSION

Lowest population of *S. litura* was observed in petri plates sprayed with insecticides than in control petri plate. The percentage of mortality varied for different treatments at different intervals. Among the all treatments in this <https://assignbuster.com/bioefficacy-of-new-generation-insecticides/>

experiment 100% mortality observed in Emamectin benzoate treated leaves at 12 hours interval after spraying followed by flubendamide, chlorantraniliprole, indoxacarb, fipronil. Less percentage of mortality observed in novaluron and thiachlopid. In thiachlopid treated leaves the larvae were dead very slowly compare to other treatments.

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Percent
mortali
ty
observ
ed at

differe
nt
interval
s after
treatm
ent
(hours)

TREATMENTS	Dosage (per 6 Lt)	12 HAS	18 HAS	24 HAS	30 HAS	36 HAS	42 HAS	48 HAS
Chlorantraniliprole 18.5% SC	0.3 ml	22.0	33.0	38.0	66.0	100	100	100
	0.3 ml	(1.170)	(27.814)	(35.263)	(38.508)	(55.213)	(88.830)	(88.830)
Novaluron 10% EC	1.5 ml	27.773	33.333	107	61.61	110	110	77.44
	1.5 ml	(31.538)	(35.263)	(51.488)	(51.488)	(51.488)	(62.179)	(77.464)
Flubendiamide 39.35% SC	0.13 ml	0.0	22.0	44.0	77.0	94.0	100	100

			22	44	779	443			
							(88.	(88.	
		(1.	(27.	(41.	(62.	(81.	830	830	(88.
		170)	814	752	179	188	)	)	830)
))))			
			100	100	100	100	100	100	
Emamectin		72.	217						100
	0.4						(88.	(88.	(88.
benzoate 1 %		(58.					(88.	(88.	(88.
	gm		830	830	830	830	830	830	
WG		455)	)	)	)	)	)	)	830)
			50	83.	83.	83.	94.		
		27.	773	33	33	33	44	100	100
Indoxacarb 14.	1.034	(45.						(88.	
5 % SC	ml	(31.	000	(65.	(65.	(65.	(81.	830	(88.
		538)	)	903	903	903	188	)	830)
))))		
			16.	16.	27.	27.	44.		
		0.	00	66	66	773	773	44	50
Thiacloprid 21.								(45.	66.
7 % SC	1 ml	(1.	(24.	(24.	(31.	(31.	(41.	000	66
		170)	090	090	538	538	754)	
)))))		
Fipronil 5 % SC	2 ml	11.	106	61.	61.	66.	72.	88.	100
		(16.	106	106	663	225	887	(88.	(88.
		450)	(51.	(51.	(55.	(58.	(77.	830	830)
			488	488	211	935	464		

))))))
	0.	0.	5.	11.	11.	11.
	00	00	553	106	010	010
Control					6	6
(water)	(1.	(1.	(1.	(8.	(16.	6
	170)	170	170	810	450	(16.
	)	)	)	)	450	450
					)	450)
))