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Effect of newer insecticides on population of predators of insect pests of sesamum

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Abstract
The present experiment was carried out on effect of newer insecticides on population of predators of insect pests of sesamum at the field of Department of Entomology, Dr. PDKV, Akola, during *kharif* 2014. Two sprays of newer insecticides were taken against major pests of sesamum. Results revealed that the predators population on sesamum at 3, 7, 10 and 14 day after first and second spraying were found statistically non-significant also relatively safer to the natural enemies.

Keywords: Sesamum, lady beetle, spider, crysopa, newer insecticides etc.

Introduction
Sesamum (*Sesamum indicum* L.) is considered to be oldest of the oilseed plant and is under cultivation in Asia from ancient times. In India, the antiquity of sesamum is known from the use of its seeds in the religious ceremonies and its mention in the old Hindu literature including Athervaved, Vishnu Puran, Kuatilay's Arthashashtra (Arora and Reley, 1994) [5]. Sesamum is called as "Queen of Oilseeds" in the view of oil content and protein of very high quality and it has tremendous potential for export (Anon., 2003) [4].

Sesamum is growing in 24 percent area with about 1.8 million ha in the world with annual production of 4.76 million metric tonnes (FAI, 2014) [6]. Sesamum grown in 2012-13 in India in the area of 1.7 lakh ha with productivity of 402 kg/ha and production of 7.15 lakh tones (Anon., 2014a) [2]. In Maharashtra in 2012- 13 sesamum grown with area of 0.40 lakh ha with productivity of 300 kg/ha and production of 0.12 lakh tones (Anon., 2014b) [3].

Sesamum is attacked by about 65 species of insect pests in different stages of plant growth. Amongst all, sesamum leaf webber and capsule borer (*Antigastra catalaunalis* Duponchel) Lepidoptera: Pyraustidae was considered to be most destructive pest, throughout India. Fletcher (1914) [7] for the first time reported the occurrence of this pest on sesamum plants from South India.

For management of pests of sesamum chemical control is mostly prefer by farmers. Due to this indiscriminate use of the pesticides has resulted into numerous problems. There is development of resistance in target and non target pests against insecticides, disrupting natural balance of the pest and its enemies, resurgence of the minor pest into major ones and adding population to ecosystems and causing hazard to human health. Thus it is the need of the hour to evolve the new insecticides superior to existing one and safer to non target insect. Hence the present investigation was done to know the effect of newer insecticides on population of predators of insect pests of sesamum.

Material and Methods

Experimental Details

Design of experiment	:	Randomized Block Design (RBD)
Treatments	:	Seven
Replications	:	Three
Season	:	*Kharif* 2014
Crop	:	Sesamum
Variety	:	AKT – 64
Spacing	:	45 cm X 10 cm
Marginal spacing	:	a) Between replications – 1.0 m
	:	b) Between treatments – 0.5 m
Plot size	:	Gross – 4.5 X 3 m^2
	:	Net – 3.6 X 2.8 m^2
Seed rate	:	1.5 – 2 Kg/ha
Fertilizer Dose	:	25:25:0 NPK Kg/ha
Date of sowing	:	28th July, 2014

Treatment Details

Tr. No.	Insecticide	Dose/ lit	Conc. (%)	a.i./ha
T_1	Flubendamide 20% WG	0.3g	0.006	30
T_2	Flubendamide 39.35% SC	0.25ml	0.01	49
T_3	Novaluron 5.25% + Indoxacarb 4.5% SC	1.5 ml	0.014	69
T_4	Fenvalerate 20% EC	0.6ml	0.012	60
T_5	Chlorantraniliprole 18.5% SC	0.3 ml	0.006	28
T_6	Triazophos 40 EC	1.5 ml	0.06	300
T_7	Untreated Control	-	-	-

Method of recording observation

Two sprays of newer insecticides were taken against major pests of sesamum when initiation noticed. The population of the beneficial insect like lady beetle, *Chrysoperla,* spider etc. were recorded after 3, 7, 10, and 14 days after first and second spraying from treated and untreated plot. The data on number of beneficial insect like lady beetle, *Chrysoperla,* spider etc. were subjected to $\sqrt{n+0.5}$ transformation and analysed statistically.

Results and Discussion

Effect of newer insecticides on population of predators

The data pertaining to the effect of different newer insecticides on population of predators *viz.*, Lady beetle, Spider and Chrysopa per plant was recorded after each insecticidal application. The results are presented in Table 1, 2 and 3.

Effect of various newer insecticides on population of lady beetle

Results were revealed from table 1 that the data pertaining of predator population of lady beetle on sesamum at 3,7,10 and 14 DAS were found statistically non-significant.

After the first foliar application, the population of lady beetle ranged from 0.13 to 0.67 per plant at 3, 7, 10 and 14 DAS. Population of lady beetle observed in the insecticides treatments was ranged from 0.13 to 47 per plant where as in untreated control, population was observed in the ranged from 0.53 to 0.67 per plant at 3,7,10 and 14 DAS. After the second foliar application, population of lady beetle observed in the insecticides treatments was ranged from 0.13 to 0.40 per plant, where as population observed in the untreated check was ranged from 0.67 to 0.73 per plant at 3, 7, and 14 DAS. However there were no significant differences among the treatments and untreated control.

Effect of various newer insecticides on population of spider

The data was revealed from Table 2 the predator population of spider on sesamum at 3,7,10 and 14 DAS were found statistically non-significant.

After the first foliar application, the population of spider ranged from 0.20 to 0.60/ plant at 3,7,10 and 14 DAS. Population of spider noticed in the insecticides treatments ranged from 0.20 to 40 per plant where as maximum population was observed in the untreated control which was ranged from 0.47 to 0.60 per plant at 3,7,10 and 14 DAS. After the second foliar application population of spider observed in the insecticides treatments was ranged from 0.20 to 0.47 per plant where as higher population was observed in the untreated control, which ranged from 0.53 to 0.60 per plant at 3, 7, and 14 DAS.

Effect of various newer insecticides on population of Chrysopa

It was revealed from Table 3 that the data pertaining of population of chrysopids on sesamum at 3, 7, 10 and 14 DAS were found statistically non-significant.

After the first foliar application, the population of chrysopa ranged from 0.00 to 0.33 per plant at 3,7,10 and 14 DAS. Population of chrysopa noticed in the insecticidal treatments was ranged from 0.00 to 0.27 per plant where as higher population was observed in the untreated control which was ranged from 0.00 to 0.33 per plant at 3,7,10 and 14 DAS. After the second foliar application population of chrysopa observed in the insecticidal treatments was ranged from 0.13 to 0.40 per plant while a higher population was observed in the untreated check which ranged from 0.33 to 0.53 per plant at 3, 7, and 14 DAS.

The results of the present investigation are similar with the findings of Priyadarshini *et al*. (2013) [10] they also reported that the flubendiamide and fenvalerate were did not affected the natural enemies. Singh and Kumar (2011) [11] also reported

that flubendiamide and quinalphos were found to be safer and eco- friendly insecticides. Ameta *et al*. (2011) [1] also observed that flubendiamide 480 SC at 50, 75 and 100 ml /ha, that did not adverse affected on the population of natural enemies in pigeon pea.

Mishra (2008) [9] also reported that the newer insecticides like rynaxypyr 20 EC and flubendiamide 48 SC were found to be safe to natural enemies.

Latif e*t al*. (2009) [8] reported that, spiders and lady bird beetles were non significantly affected by application of flubendiamide and nimbicidine for controlling brinjal shoot and fruit borer in the field. Flubendiamide and nimbicidine were comparatively safe for natural enemies and might be fit well into the integrated pest management (IPM) programs for brinjal.

Table 1: Effect of various newer insecticides on population of Lady beetle

Tr. No.	Treatments	No. of Lady beetle Per Plants							
		First spraying				Second spraying			
		3 DAS	7 DAS	10 DAS	14 DAS	3 DAS	7 DAS	10 DAS	14 DAS
T_1	Flubendiamide 20% WG @ 0.006%	0.27 (0.87)	0.33 (0.91)	0.27 (0.87)	0.33 (0.91)	0.33 (0.94)	0.33 (0.90)	0.27 (0.87)	0.33 (0.91)
T_2	Flubendiamide 39.35% SC @ 0.01%	0.33 (0.91)	0.20 (0.83)	0.20 (0.83)	0.20 (0.83)	0.20 (0.83)	0.27 (0.86)	0.33 (0.91)	0.27 (0.87)
T_3	Novaluron 5.25% + Indoxacarb 4.5% SC @ 0.014%	0.27 (0.87)	0.27 (0.87)	0.27 (0.87)	0.33 (0.91)	0.27 (0.87)	0.20 (0.83)	0.20 (0.83)	0.33 (0.91)
T_4	Fenvalerate 20% EC @ 0.012%	0.27 (0.87)	0.20 (0.83)	0.20 (0.83)	0.27 (0.87)	0.27 (0.87)	0.27 (0.87)	0.20 (0.83)	0.27 (0.87)
T_5	Chlorantaniliprole 18.5% SC @ 0.006%	0.20 (0.83)	0.27 (0.87)	0.13 (0.79)	0.20 (0.83)	0.20 (0.79)	0.20 (0.83)	0.13 (0.79)	0.20 (0.83)
T_6	Triazophos 40 EC @ 0.06%	0.33 (0.90)	0.40 (0.94)	0.40 (0.94)	0.47 (0.98)	0.40 (0.94)	0.33 (0.91)	0.33 (0.91)	0.40 (0.94)
T_7	Untreated control	0.53 (1.02)	0.60 (1.05)	0.60 (1.05)	0.67 (1.08)	0.67 (1.14)	0.67 (1.08)	0.73 (1.10)	0.67 (1.08)
	'F' test	NS	NS	NS	NS	NS	NS	NS	NS
	SE (m) ±	0.06	0.07	0.06	0.06	0.06	0.08	0.07	0.07

(Figures in parenthesis are corresponding square root of (x + 0.5) transformed value)

Table 2: Effect of various newer insecticides on population of spider

Tr. No.	Treatments	No. of Spider Per Plants							
		First spraying				Second spraying			
		3 DAS	7 DAS	10 DAS	14 DAS	3 DAS	7 DAS	10 DAS	14 DAS
T_1	Flubendiamide 20% WG @ 0.006%	0.33 (0.91)	0.27 (0.87)	0.33 (0.91)	0.40 (0.95)	0.33 (0.91)	0.27 (0.87)	0.33 (0.91)	0.40 (0.95)
T_2	Flubendiamide 39.35% SC @ 0.01%	0.27 (0.86)	0.33 (0.91)	0.33 (0.91)	0.33 (0.91)	0.27 (0.87)	0.33 (0.91)	0.33 (0.91)	0.33 (0.91)
T_3	Novaluron 5.25% + Indoxacarb 4.5% SC @ 0.014%	0.27 (0.87)	0.27 (0.87)	0.27 (0.87)	0.33 (0.91)	0.27 (0.87)	0.20 (0.83)	0.27 (0.87)	0.27 (0.87)
T_4	Fenvalerate 20% EC @ 0.012%	0.20 (0.84)	0.20 (0.84)	0.20 (0.84)	0.27 (0.87)	0.20 (0.84)	0.20 (0.84)	0.20 (0.84)	0.20 (0.84)
T_5	Chlorantaniliprole 18.5% SC @ 0.006%	0.20 (0.83)	0.27 (0.87)	0.20 (0.83)	0.27 (0.87)	0.27 (0.87)	0.27 (0.87)	0.27 (0.87)	0.33 (0.91)
T_6	Triazophos 40 EC @ 0.06%	0.33 (0.91)	0.33 (0.91)	0.40 (0.95)	0.33 (0.91)	0.33 (0.91)	0.33 (0.91)	0.40 (0.95)	0.47 (0.98)
T_7	Untreated control	0.47 (0.98)	0.53 (1.02)	0.53 (1.02)	0.60 (1.05)	0.53 (1.01)	0.60 (1.04)	0.53 (1.02)	0.60 (1.05)
	F test	NS	NS	NS	NS	NS	NS	NS	NS
	SE (m) ±	0.06	0.05	0.04	0.05	0.06	0.07	0.05	0.05

(Figures in parenthesis are corresponding square root of (x + 0.5) transformed value)

Table 3: Effect of various newer insecticides on population of Chrysopa

Tr. No.	Treatments	No. of Chrysopa Per Plants							
		First spraying				Second spraying			
		3 DAS	7 DAS	10 DAS	14 DAS	3 DAS	7 DAS	10 DAS	14 DAS
T_1	Flubendiamide 20% WG @ 0.006%	0.00 (0.71)	0.00 (0.71)	0.00 (0.71)	0.20 (0.84)	0.13 (0.79)	0.13 (0.79)	0.27 (0.87)	0.33 (0.91)
T_2	Flubendiamide 39.35% SC @ 0.01%	0.00 (0.71)	0.00 (0.71)	0.00 (0.71)	0.27 (0.87)	0.20 (0.83)	0.27 (0.87)	0.20 (0.83)	0.27 (0.87)
T_3	Novaluron 5.25% + Indoxacarb 4.5% SC @ 0.014%	0.00 (0.71)	0.00 (0.71)	0.00 (0.71)	0.20 (0.83)	0.20 (0.83)	0.27 (0.87)	0.27 (0.87)	0.27 (0.87)
T_4	Fenvalerate 20% EC @ 0.012%	0.00 (0.71)	0.00 (0.71)	0.00 (0.71)	0.13 (0.79)	0.13 (0.79)	0.13 (0.79)	0.13 (0.79)	0.20 (0.84)
T_5	Chlorantaniliprole 18.5% SC	0.00	0.00	0.00	0.13	0.13	0.20	0.20	0.20

	@ 0.006%	(0.71)	(0.71)	(0.71)	(0.79)	(0.79)	(0.83)	(0.83)	(0.83)
T_6	Triazophos 40 EC @ 0.06%	0.00 (0.71)	0.00 (0.71)	0.00 (0.71)	0.27 (0.87)	0.27 (0.87)	0.27 (0.87)	0.33 (0.91)	0.40 (0.95)
T_7	Untreated control	0.00 (0.71)	0.00 (0.71)	0.00 (0.71)	0.33 (0.90)	0.33 (0.90)	0.33 (0.91)	0.40 (0.94)	0.53 (1.02)
	F test	NS	NS	NS	NS	NS	NS	NS	NS
	SE (m) ±	0.000	0.000	0.000	0.06	0.07	0.07	0.06	0.04

(Figures in parenthesis are corresponding square root of (x + 0.5) transformed value)

Conclusion

From the present investigation it can be concluded that the all newer insecticide tested in this experiment was relatively safer to natural enemies i.e. lady beetle, spiders, chrysopa *etc*.

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