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EVALUATION OF SESAME VARIETIES FOR RESISTANCE TO SESAME LEAF ROLLER AND CAPSULE BORER, *Antigastra Catalaunalis* (DUP.)

AJAY KUMAR YADAV[1], AKHTER HUSSAIN[2], SANJU PIPLODA[3] AND SUMITRA CHOUDHARY[4]

Department of Entomology, SKN College of Agriculture (Sri Karan Narendra Agriculture University), Jobner 303 329, Rajasthan, India

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Abstract–Investigations on "Screening of sesame varieties for resistance against leaf roller and capsule borer" were conducted at Agronomy farm and Department of Entomology, S.K.N. College of Agriculture, Jobner during *Kharif*, 2018. Leaf roller and capsule borer, *Antigastra catalaunalis* were recorded as major insect pests of sesame during the year of study. The infestation of *A. catalaunalis* commenced in the second week of August and reached its peak in the last week of August during 2018. Out of 10 varieties of sesame screened against *A. catalaunalis* none was found immune. RT-346 and RT-54 were categorized as least susceptible, while, the varieties RT-46 and Pragati as highly susceptible against leaf roller and capsule borer. The moderately susceptible varieties reported were RT-125, RT-103, JTS-8, TKG-55, RT-127 and TKG-22. The morphological characters of these varieties *viz*., no. of leaves, no. of branches, no. of capsules and trichome density had a significant negative correlation with the population of *A. catalaunalis*.

INTRODUCTION

Sesame, S*esamum indicum* L. is the oldest oilseed crop of world cultivated throughout India and belongs to family Pedaliaceae and known as 'queen of oil seeds'. East Africa and India are considered to be the native home of sesame (Nayar and Mehra, 1970 and Bedigian, 1985). Its cultivation gained impetus because of high quality edible oil, rich source of carbohydrate, protein, calcium and phosphorus (Seegeler, 1983). As many as 67 insect pests of different groups are recorded damaging the sesame crop from germination to maturity. The important insect species attacking sesame crop, are leaf webber and capsule borer, *Antigastra catalaunalis* (Dup.), jassid, *Orosius albicinctus* (Distant), whitefly, *Bemisia tabaci* (Genn.), mirid bug, *Nesidiocoris tenuis* (Reuter), til hawk moth, *Acherontia styx* (Westwood) are considered to be key pests. The *A. catalaunalis* is the most important pest because this attack the crop in all the growth stages after about two weeks of emergence (Suliman *et al*., 2004). It starts to attack the crop from seedling stage, continues till maturity of capsule and almost damage all the plant parts (shoot, leaf, flower and capsule). Under severe attack at early stage of crop it may cause complete failure of crop especially in rainfed areas (Karuppaiah, 2014). The attack is more severe during dry seasons and after initiation of flowering. Cultivar resistance has been recognized as the most desirable and economic tactic in the management of *A. catalaunalis* and is the best alternative to synthetic insecticides, providing an eco-friendly, environmentally safe strategy for effective management of *A. catalaunalis* in sesame. There is need to identify the resistant varieties based on their preference/ non-preference to *A. catalaunalis*.

MATERIALS AND METHODS

The present experiment was laid out in simple randomized block design (RBD) with three replications. The plot size was kept 3.0 x 2.4 m^2 with row to row and plant to plant distance of 30 cm and 10 cm, respectively. The crop was sown on 11th July in year *Kharif*, 2018. The observations on sesame leaf roller and capsule borer population on different varieties of sesame were recorded on five randomly

selected and tagged plants in each plot. The observations were recorded at weekly interval right from appearance of the pest till harvesting of the crop. The morphological characters of plants, *viz*., (i) number of leaves per plant, (ii) number of capsules per plant, (iii) number of branches per plant, and (iv) trichome density of plant leaves, were recorded to find out the relationship between plant characters and insect pest, *A. catalaunalis* population. The data on sesame leaf roller and capsule borer population were transformed into $\Sigma X + 0.5$ (Gomez and Gomez, 1976) and were subjected to analysis of variance. The per cent damage of capsules done by *A. catalaunalis* were transformed into angular values (arc sin "P) and subjected to analysis of variance. The peak population of and damage caused by it on sesame was recorded during *kharif*, 2018 and categorized on the basis of formula $X \pm \sigma$.

Where,

X = Mean of peak population, and

σ = Standard deviation.

The categories were made as under:

Mean peak larval population/ 5 plants	Categories
Below X – s	Least susceptible
X – s to X + s	Moderately susceptible
Above X + s	Highly susceptible

RESULTS

During this field experiment, the analysis of data revealed that in the first observation of the study, the leaf roller and capsule borer population was observed on all the varieties (Table 1 and Fig.1). The maximum population was observed on RT-46 and Pragati and minimum on RT-346 and RT-54. The population increased gradually and reached to peak in the last week of August on all the varieties. During peak RT-346, RT-54 and RT-125 harboured minimum leaf roller and capsule borer population of 4.00, 4.33 and 4.67 per five plants, respectively and stood at par with each other in their degree of infestation and were regarded as least susceptible. Whereas, RT-46, Pragati and TKG-22 harboured maximum population of 8.00, 7.67 and 7.00 per five plants, respectively and remained statistically at par with each other and was regarded as highly susceptible. The other varieties, *viz.* RT-103, JTS-8, TKG-55 and RT-127 ranked in middle order of susceptibility. The ascending order of susceptibility in varieties was observed to be: RT-346 < RT-54 < RT-125 < RT-103 < JTS-8 < TKG-55 < RT-127 < TKG-22 < Pragati < RT-46.

The mean population of pest in the season ranged from 2.78 - 6.52 per five plants on different varieties. The minimum population was observed on RT-346 (2.78/ five plants), RT-54 (3.07/ five plants) and RT-125 (3.40/ five plants), these varieties were found statistically at par. The maximum population was observed on RT-46 (6.52/ five plants), Pragati (6.33/ five plants) and TKG-22 (5.52/ five plants) were found statistically at par with each other in their degree of infestation. The other varieties, *viz*., RT-103, JTS-8, TKG-55 and RT-127 were grouped in the middle order of infestation and the leaf roller and capsule borer population ranged from 4.10 - 4.96 per five plants. A gradual increase in population build up was noticed on all the Varieties, thereafter.

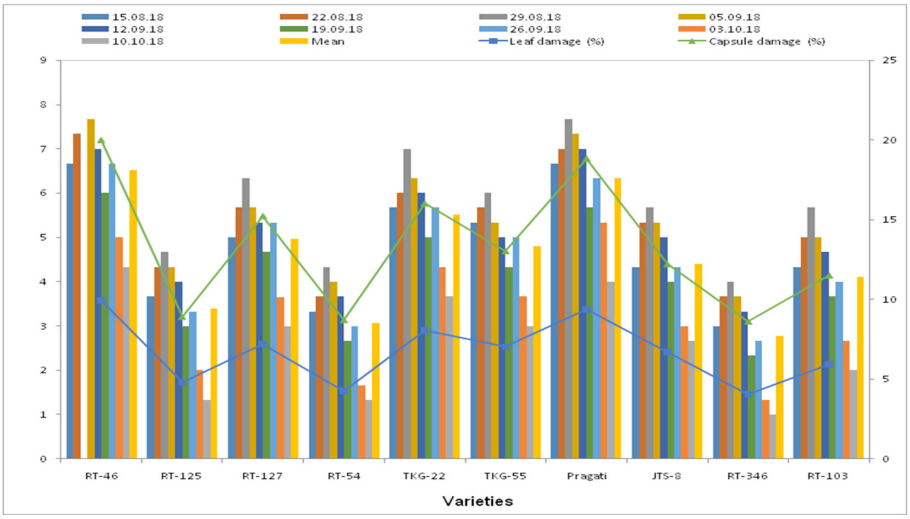

Fig. 1. Larval population and damage indices of *Antigastra catalaunalis* (Dup.) on different varieties of sesame

Table 1. Larval population and damage indices of *Antigastra catalaunalis* (Dup.) on different varieties of sesame

S. No.	Varieties	Larval population/ five plants*									Mean	Leaf damage (%) ***	Capsule damage (%) ***
		15.08.18	22.08.18	29.08.18	05.09.18	12.09.18	19.09.18	26.09.18	03.10.18	10.10.18			
1	RT-46	6.67	7.33	8.00**	7.67	7.00	6.00	6.67	5.00	4.33	6.52	9.95	19.99
		(2.68)	(2.80)	(2.92)	(2.86)	(2.74)	(2.55)	(2.68)	(2.35)	(2.20)	(2.64)	(18.39)	(26.56)
2	RT-125	3.67	4.33	4.67	4.33	4.00	3.00	3.33	2.00	1.33	3.40	4.80	8.90
		(2.04)	(2.20)	(2.27)	(2.20)	(2.12)	(1.87)	(1.96)	(1.58)	(1.35)	(1.97)	(12.66)	(17.36)
3	RT-127	5.00	5.67	6.33	5.67	5.33	4.67	5.33	3.66	3.00	4.96	7.20	15.23
		(2.35)	(2.48)	(2.61)	(2.48)	(2.41)	(2.27)	(2.41)	(2.04)	(1.87)	(2.34)	(15.56)	(22.97)
4	RT-54	3.33	3.67	4.33	4.00	3.67	2.67	3.00	1.67	1.33	3.07	4.25	8.70
		(1.96)	(2.04)	(2.20)	(2.12)	(2.04)	(1.78)	(1.87)	(1.47)	(1.35)	(1.89)	(11.89)	(17.24)
5	TKG-22	5.67	6.00	7.00	6.33	6.00	5.00	5.67	4.33	3.67	5.52	8.05	16.01
		(2.48)	(2.55)	(2.74)	(2.61)	(2.55)	(2.35)	(2.48)	(2.20)	(2.04)	(2.45)	(16.48)	(23.59)
6	TKG-55	5.33	5.67	6.00	5.33	5.00	4.33	5.00	3.67	3.00	4.81	7.03	13.02
		(2.42)	(2.48)	(2.55)	(2.42)	(2.35)	(2.20)	(2.35)	(2.04)	(1.87)	(2.30)	(15.38)	(21.15)
7	Pragati	6.67	7.00	7.67	7.33	7.00	5.67	6.33	5.33	4.00	6.33	9.40	18.83
		(2.68)	(2.74)	(2.86)	(2.80)	(2.74)	(2.48)	(2.61)	(2.42)	(2.12)	(2.61)	(17.85)	(25.72)
8	JTS-8	4.33	5.33	5.67	5.33	5.00	4.00	4.33	3.00	2.67	4.40	6.68	12.20
		(2.20)	(2.42)	(2.48)	(2.42)	(2.35)	(2.12)	(2.20)	(1.87)	(1.78)	(2.21)	(14.98)	(20.44)
9	RT-346	3.00	3.67	4.00	3.67	3.33	2.33	2.67	1.33	1.00	2.78	4.05	8.60
		(1.87)	(2.04)	(2.12)	(2.04)	(1.96)	(1.68)	(1.78)	(1.35)	(1.22)	(1.81)	(11.60)	(17.05)
10	RT-103	4.33	5.00	5.67	5.00	4.67	3.67	4.00	2.67	2.00	4.10	5.95	11.50
		(2.20)	(2.35)	(2.48)	(2.35)	(2.27)	(2.04)	(2.12)	(1.78)	(1.58)	(2.14)	(14.11)	(19.82)
	SEm±	0.07	0.08	0.09	0.08	0.07	0.07	0.08	0.08	0.07	0.07	0.73	0.88
	CD (%)	0.23	0.25	0.25	0.24	0.21	0.20	0.24	0.23	0.20	0.22	2.2	2.6

*Figures in the parentheses are $\sqrt{X+0.5}$ values

**Peak population

***Figures in the parentheses are angular transformation values

Leaf and capsule damage of *A. catalaunalis*

The leaf damage in different varieties of sesame presented in Table 2 was in the range of 4.05 - 9.95 per cent. The minimum leaf damage was recorded on varieties, RT-346 (4.05 %), RT-54 (4.25%) and RT-125 (4.80%). Rest of the varieties possessed high leaf damage. The capsule damage was in the range of 8.60 - 19.99 per cent, it was minimum in varieties RT-346 (8.60%), RT-54 (8.70%) and RT-125 (8.90%) was at par with each other, and found significantly superior over rest of the varieties.

Morphological parameters of plant and incidence of *A. catalaunalis*

The data presented in Table 2 showed that the number of leaves per plant borne by different sesame varieties varied from 120 (RT-46) to 235 (RT-346). The number of capsules per plant varied from 80 (RT-46) to 115 (RT-346). The branches per plant varied from 1 (RT-46) to 30 (RT-346). The trichome density varied (9.10/ mm^2) RT-46 to (23.33/ mm^2) RT-346. The number of leaves (r = -0.97), capsules per plant (r = -0.91), branches per plant (r = -0.97) and trichome desnity per mm^2 (r = 0.85) had significant negative correlation with that of *A. catalaunalis* population.

DISCUSSION

The variety RT-46 as highly susceptible and RT-346 as least susceptible of sesame

Table 2. Effect of morphological parameters of sesame varieties and their relationship with the incidence of leaf roller and capsule borer, *Antigastra catalaunalis* (Dup.)

S. No.	Varieties	No. of leaves/plant	No. of capsules/plant	No. of branches/ plant	No. of trichomes/ mm^2	Mean larval population of leaf roller and capsule borer/ 5 plants
1	RT-46	120	80	1	9.10	6.52
2	RT-125	190	96	23	13.46	3.40
3	RT-127	152	88	14	13.25	4.96
4	RT-54	212	102	24	18.46	3.07
5	TKG-22	146	85	11	11.25	5.52
6	TKG-55	164	89	16	15.85	4.81
7	Pragati	131	82	9	10.62	6.33
8	JTS-8	172	90	17	16.58	4.40
9	RT-346	235	115	30	23.33	2.78
10	RT-103	181	92	20	19.05	4.10
Correlation coefficient with larval population of leaf roller and capsule borer (r)		-0.97**	-0.91**	-0.97**	-0.85**	

** Significant at 1% level

leaf roller and capsule borer gets support from the finding of Anonymous, (2000); Choudhary, (2009) and Choudhary *et al*., (2018). Earlier various varieties of sesame were screened by Mahadevan, (1988); Padmaja and Savithri, (1993); Baskaran *et al*., (1994); Anand and Selvanarayan, (2005) and Kumar *et al*. (2012) who reported that rest of varieties were ranked in middle order of susceptibility. Choudhary *et al*. (2018); Karuppaiah and Nadarajan, (2011) and Choudhary, (2009) reported that the varieties TKG-22, RT-125, RT-103 and RT-127 were moderately susceptible to leaf roller and capsule borer infestation also corroborates the present findings.

Tiwari and Shaw (1988) and Mishra *et al.* (2016) who reported that the range of capsule damage 2.91-9.37 per cent and 0.25-15.0 per cent, respectively corroborate with present findings. Vijaykumar *et al.* (2018) reported that the leaf damage was varied between 30-40 per cent are also corroborate with present findings.

The present investigation are in fully agreement with that of Choudhary *et al.* (2018) who reported the leaf roller and capsule borer population had negative significant correlation with number of leaves/ plant, number of capsules/ plant, number of branches/ plant and number of trichomes/ mm^2.

CONCLUSION

Based on the statistical categorization, the variety RT-346, RT-54 and RT-125 were considered as least susceptible and RT-103, JTS-8, TKG-55 and RT-127 as moderately susceptible and RT-46, Pragati and TKG-22 as highly susceptible. Sesame leaf roller and capsule borer population had negative significant correlation with number of leaves/ plant, number of capsules/ plant, number of branches/ plant and number of trichomes/ mm^2.

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