

SHORT COMMUNICATION

Crop Loss Estimation of Insect Pests Attack on Sesame

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Abstract

Studies were carried out to estimate crop loss caused by insect pests on sesame at the main research station, Gandhi Krishi Vignana Kendra (GKVK), University of Agricultural Sciences (UAS), Bangalore, India in 1997 and 1998. The results of the study indicated that, there is no significant effects of insects on plant height, number of branches and capsules of sesame. The direct attack of insects by boring into the capsules and feeding on the seed caused 15.63 and 21.43 per cent seed yield reduction during 1997 and 1998, respectively. The major insect pests causing such loss is the sesame shoot webber capsule borer, *Antigastra catalaunalis* (Duponchel)

Introduction

Sesame, *Sesamum indicum* L., is perhaps the oldest oil seed crop known to man. It plays an important role in agricultural economy of developing countries, like India. In India it is grown in 2 million ha of land contributing 0.7 million tonnes to the country's total oil seed production. The share of India to the total world's sesame production is 32 percent. Yet, the national average yield is very low (2 q/ha) (Ano, 1994). This low level yield is due to a number of factors among which insect pests constitute one of the major bottleneck in the successful production and productivity of this crop (Singh and Yadav 1984).

Many insect pests can attack sesame. The number and importance of these insect pests vary from place to place, time to time, season to season and variety grown. It is attacked by more than 38 insect pests at various stages of its growth (Nayar *et. al* 1966; Rai 1976 and Weiss 1983). Of these, sesame shoot webber and capsule borer, *Antigastra catalaunalis* (Duponchel) (Pyralidae: Lepidoptera),

is the most serious pest. It causes 51 (Cheema and Singh, 1987), 74 (Kumar, 1992) and up to 100 (Rai, 1976) percent loss in seed yield. Capsules and shoots infestation was found to the extent of 40 and 71 (Rohilla and Singh, 1992), 44 and 58 (Abraham *et. al.*, 1977) percent, respectively. According to Menon *et al.* (1960) this pest was observed to cause 10-70, 1-44 and 9-72 percent plant infestation, capsule infestation and seed yield loss, respectively. The objective of this study was to estimate crop loss caused to sesame due to attack of insect pests.

Material and Methods

The study was conducted at the Main Research Station, Gandhi Krishi Vignana Kendra (GKVK), University of Agricultural Sciences, Bangalore in 1997 and 1998. This research station is located at 12°59' North latitude, 77°35' East longitude, 930 m above mean sea level.

To quantify the amount of avoidable yield loss inflicted on sesame by insect pests, sesame variety Kanakapura local was raised following paired plot technique as suggested by Leclarg *et al* (1971). The experiment was conducted for two seasons (October 1997 to January 1998 and February to May 1998). A plot size of 3 x 4 m was used with 15 x 30 cm distance between plants and rows, respectively. Besides, all recommended agronomic practices were followed. However, in the treated plots, a broad spectrum insecticide, carbaryl 50% WP at a dose of 2500 a.i./ha was sprayed. Spraying was done with hand-operated knapsack sprayer whenever insects were observed to make the plots free of insect infestation as much as possible. Four sprays were made to the protected plots. Observations were carried out on Plant characters viz., plant height, number of branches, total number of capsules, total number of capsules bored and webbed shoots per plant on five selected plants one week before harvest. Extent of damage was calculated and means were compared using T-test. Yield data were subjected to statistical analysis using T-test from which percentage yield loss was estimated.

Results and Discussion

Crop - I (1997)

The reduction in plant height (cm), number of capsules and shoots per plant because of insect pests in unprotected plots did not vary significantly from protected plots. On an average 7.01, 12.46 and 2.26 percent reductions in plant height, number of branches and capsules per plant due to insect pests' attack were caused on sesame, respectively (Table 1). The attack caused by insect pests on sesame did not significantly reduce plant height, number of branches and capsules per plant. This is because, the insect pests load was much more after the vegetative phase of the crop. An increase in the number of sucking insect pests was also noticed after the crop has attained full height and produced all the branches and capsules. Thus, the effect of insect pests on growth parameters of sesame at GKVK appears not so important as evidenced from absence of significant differences between mean plant height, number of branches and capsules of plants in protected and unprotected plots.

Infestation of shoots varied from zero to 8.33 percent per plant with an average of 4.83 percent in protected plots. On the other hand, it varied from 12.50 to 28.57 percent with an average of 20.56 percent in unprotected plots. The average increases of infestation of shoots, over protected plots, in unprotected plots were computed to be 23.44 percent.

The average number of bored capsules per plant varied from 0.6 to 1.20 with an average of 0.83 in protected plots, which was significantly different from unprotected plots. In unprotected plots, the number of capsules bored per plant varied from 1.20 to 3.00 with an average of 2.03. Percentage of bored capsules in protected plots ranged from 3.33 to 8.00 percent, the average being 4.94 percent. However, in unprotected plots, it ranged from 8.98 to 17.19 percent with an average of 13.46 percent. The average increase of bored capsules in unprotected plots over protected plots due to insect pests attack was 36.70 percent. However, all these pods may not totally constitute loss, as seeds can be recovered even from bored capsules. Seed yield loss was estimated to be about 15.63 percent. This indicates that, the direct effect of insects on the capsules and seeds resulting from boring into capsules and feeding on the seeds is important as evident from significant differences between percent bored pods and seed yield in protected and unprotected plots. Thus, the insect pests attack is more pronounced during the capsule setting stage of the crop. Hence, effective management of the insect pests should be taken up during the reproductive phase of the crop for better economic return.

Crop- II (1998)

The data regarding plant height, number of shoots and capsules per plant in protected and unprotected plots during 1998 are given in Table 1. Similar to 1997, there was no significant difference in plant height, number of shoots and capsules per plant between protected and unprotected plots indicating that infestation of shoots does not affect growth, number of branches and capsules. However, there was significant difference with respect to webbed shoots, bored capsules and seed yield between protected and unprotected plots. The average webbed shoots were 2.39 and 20.44 in protected and unprotected plots, respectively. The average percentage of bored capsules was 2.36 and 18.51 in protected and unprotected plots, respectively.

Seed yield loss caused due to the attack of insect pests alone was 21.43 percent. Almost similar findings were reported by many workers (Jakhmola and Yadav, 1990; Abraham *et. al.*, 1977; Yadav and Lal, 1978; Rohilla and Singh, 1992; Desai and Patel, 1965; Vittal and Saroja, 1966 and Weiss, 1983).

Table 1. Effect of insect pests on growth parameters, yield components, and yield of sesame

A. On growth parameters

Paired plots	Plant height (cm)				Capsule/plant*				Shoot/plant*			
	1997		1998		1997		1998		1997		1998	
	P	UP	P	UP	P	UP	P	UP	P	UP	P	UP
Mean	56.6	53.0	117.7	104.3	17.2	15.0	102.1	88.6	3.1	3.0	8.4	7.8
SD	5.3		11.5		1.6		25.7		0.6		1.6	

B. On Yield, capsule and shoot

Paired plots	Yield (kg/ha)				Capsule (%)**				Shoot (%)**			
	1997		1998		1997		1998		1997		1998	
	P	UP	P	UP	P	UP	P	UP	P	UP	P	UP
Mean	187.8	158.4	963.1	757.4	4.7	13.5	2.4	18.5	4.8	20.6	2.4	20.4
SD	6.9		16.7		3.5		1.8		9.2		2.9	

*non significant at $P=0.05$, **significant at $P=0.01$, P=Protected, UP=unprotected

Conclusion

Investigations of this study revealed that, the attack of sesame by insect pests does not significantly reduced plant height, number of branches and capsules per plant as evident from non-significant differences between protected and unprotected plots in both the years. However, infestation of shoots and capsules is significantly different between protected and unprotected plots, which resulted to seed yield reduction of 15.63 and 21.43 percent in unprotected plots during 1997 and 1998, respectively. Thus, effective management should be taken up during a reproductive phase of the crop for better economic return.

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