

## Artificial screening of sesame germplasm against shoot webber and capsule borer

### ABSTRACT

Ten promising germplasm lines and three checks (VRI 1-Local check; TC-25 Susceptible check; SI-250 Resistance check) of sesame (*Sesamum indicum* L.) exhibiting different genetic and regional diversity were tested against shoot webber and capsule borer (*Antigastracatalaunalis* Duponchel) under net house condition during *rabi* season 2019-20. Those which were already found promising under open field condition at Regional Research Station, Vriddhachalam, Tamil Nadu. Among the entries tested, three entries viz. B-7-11, SI 2116, and GRT-83148 under conditions of artificial pest load as well as feeding preference study revealed that they had recorded less than 10 per cent plant damage and were classified as resistant.

**Key Words:** Shoot webber and capsule borer, Resistance, Screening, Sesame

### INTRODUCTION

Sesame (*Sesamum indicum* L.) is an important oilseed crop grown primarily for its oil-rich seeds that contain approximately 46 to 52% oil and 25% protein. Sesame is an excellent edible oil, food, biomedicine, and health care, and used in the manufacturing of soaps, insecticides, paints, pharmaceuticals, cosmetics and perfume industries. Sesame seeds are a rich source of protein and calcium, methionine, valine, and tryptophan. Bioactive components such as phenolics, vitamins, phytosterols, and polyunsaturated fatty acids are present in sesame seeds which provide health benefits to human. Sesamin, a lipid-soluble lignan has anticancer properties. Sesame seeds are rich source of phytates than soya beans (Sharma et al., 2020). Sesame is a short-duration crop grown throughout the year fits well with a variety of cropping systems.

Sesame is cultivated in every state of India. Nonetheless, the principal states are Andhra Pradesh, Tamil Nadu, Maharashtra, West Bengal, Gujarat, Rajasthan, Madhya Pradesh, and Uttar Pradesh. Sesame yields in India are low (421 kg/ha) and erratic. One of the main elements influencing sesame production, both in terms of quality and quantity, is insect pests. According to Ahuja and Kalyan (2002), the pest attack results in a significant loss of seed production, ranging from 25 to 90%. Sesame crop from seedling stage to maturity may be hampered by the shoot webber and capsule borer (*Antigastracatalaunalis* Dup.), despite the fact that other insect pests attack the plant. (Selvanarayanan and Baskaran, 1996; Choudhary et al., 1987). Sesame production in a nation like India is already far lower than anticipated, therefore *Antigastra*'s impact is undesired. Therefore, it is crucial to come up with ways to lessen the damage without having a negative impact on the agro-ecosystem. Using resistant/tolerant cultivars is one of the most successful eco-friendly management strategies that doesn't harm the ecosystem. Thus, choosing a resistant or tolerant cultivar is wise. Therefore sesame germplasm lines were assessed against shoot webber and capsule borer under net house condition to confirm the relative resistance.

### MATERIAL AND METHODS

The experiment to screen the germplasm against shoot webber and capsule borer was conducted at RRS, Vriddhachalam during *rabi* 2018 to 2019. Ten promising germplasm lines screened from 200 entries collected from different Geographical zones viz., Amreli in

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Gujarat, Mandor in Rajasthan, Jabalpur in Madhya Pradesh, Dharwad in Karnataka and Vriddhachalam in Tamil Nadu including Local check (VRI 1) resistant (SI-250) and susceptible check (TC-25) ~~were taken as treatment~~ to determine each genotype's relative resistance or susceptibility to *Antigastra*. ~~With a single row of 5 meters in length, row to row and plant to plant spacing of 30 and 10 centimeters, respectively, The seeds were sown in a single row of 5 meters length with a spacing of 30cm x 10cm. The~~ experiment was set up in a row-row fashion, screened in an artificial pest load environment by releasing 20 pupae of sesame shoot webber and capsule borer under net house condition. Fertilizer dosage recommendations (35:23:23 kg NPK/ha) together with other agronomic techniques (apart from pesticides) were followed. Random selection and tagging were done on ten plants from each genotype. Number of damaged and total leaves (30 DAS), flowers (45 DAS), and capsules (70 DAS) per plant ~~allowed for recording observations were recorded~~ at vegetative, blooming and capsule stages, respectively. Damage sustained by specific sesame germplasm lines at each of the three stages of plant growth was used to determine their resistance or susceptibility. The feeding preference of the sesame shoot webber cum capsule borer was carried out for the promising entries along with checks by releasing ten third instar ~~of~~ larvae of shoot webber in petri dishes along with sesame leaves under laboratory condition.

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## RESULTS AND DISCUSSION

Nonetheless, notable variations in the level of infection were noted amongst the genotypes. Damage ranged from 7.02 to 34.48 percent at the vegetative stage. Flower damage was varying from 9.08 to 16.45 per cent. while capsule damage was 3.63 to 16.36 per cent. Based on ~~how well performance of the~~ screened entries ~~performed~~ at various stages of plant growth, they were further divided into different (Resistant, Moderately Resistant, Moderately Susceptible, Susceptible) categories. According to the results, three entries viz., GRT-83148, SI 2116, and B-7-11 recorded less than 10 per cent plant damage during the vegetative stage and were classified as resistant; Entry B-7-11 recorded 9.08 per cent damage at flowering, and entry KMR-77 recorded 3.63 per cent at capsule stage and classified as resistant. In summary, the entry B-7-11 was found superior followed by SI-2116. The entries B-7-11, SI 2116, and GRT-83148 ~~in Toto-??~~ were classified as resistant under artificial pest load conditions, having the least amount of damage ~~reported~~ at all three plant growth stages. (Table 1). The per cent leaf area damage caused by the shoot webber cum capsule borer among the entries were varied from 4.80 to 15.66. The entries B-7-11, SI 2116, and GRT-83148 and SI-7192 registered the minimum leaf area damage (>10%) when compared with susceptible check, TC 25 (17.56%) (Table.2). *Antigastra* resistance in germplasm can be transferred to commercially viable sesame varieties. Cultivars that are only partially resistant may also be able to provide sufficient control with less insecticide application. By preventing the emergence of insect strains resistant to pesticides, it will contribute to extending the viable economic life of currently available insecticides. (Fig.1) Prior research by Murali Bhaskaran and Thangavelu (1990) also documented resistance in terms of capsule damage in other sesame germplasm lines with results that were largely comparable. Five entries viz., SI-241 (6.16%), NIC-8262 (6.42%), NIC-16359 (6.51%), JLT-8 (6.55%), and KMR-4 (6.83), were found promising with least susceptibility to *Antigastra* at capsule stage. Baskaran *et al.*, (1994) and Ahuja and Kalyan (2001) reported that three genotypes viz., SI-1146, EC-303454-A and TC-25 were considered as highly susceptible

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(>50%). The genotypes viz., KMR -14 and TKG- 22 were recorded as moderately resistant. (Ahuja and Kalyan (2001); Manisegaran, 2001; and Singh, 2002).

## CONCLUSION

Using resistant/tolerant cultivars is one of the most successful eco-friendly management strategies that doesn't harm the ecosystem. Thus, choosing a resistant or tolerant cultivar is wise. Furthermore, the response of three entries viz., B-7-11, SI 2116 and GRT-83148 under conditions of artificial pest load as well as feeding preference study revealed that they had recorded less than 10 per cent plant damage and were classified as resistant.

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**Table 1. Screening of promising entries against *Antigastra* under artificial pest load condition in net house**

S. No.	Entry	Per cent plant	Per cent flower	Per cent capsule	Total damage	Reaction
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		infestation	damage	damage		
1.	GRT-83148	<b>7.41</b>	12.07	9.44	28.92	MS
2.	EC-303445	18.57	12.94	8.15	39.66	S
3.	Kanpur local	34.48	12.87	10.63	57.98	HS
4.	KMR-77	19.63	10.21	3.63	33.47	S
5.	SI-2116	<b>8.25</b>	11.74	6.94	26.93	MS
6.	B-7-11	<b>7.02</b>	9.08	7.32	23.42	MS
7.	SI-2008	19.16	14.28	8.63	42.07	S
8.	SI-7192	21.05	11.94	12.95	45.94	S
9.	IC-14093	24.48	16.45	13.13	54.06	HS
10.	SI-3218	27.43	12.88	16.36	56.67	HS
11.	VRI 1 (LC)	21.52	19.16	10.84	51.52	HS
12.	TC-25	39.57	23.10	15.64	78.31	HS
13.	SI-250	20.72	12.62	6.98	40.31	S

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**Table.2. Feeding preference studies in promising lines of sesame against Antigastra**

S.No	Entries	Feeding Preference	
		No. 3 <sup>rd</sup> instar of larvae released (per replication)	% Leaf damage
1.	SI-2008	10	13.36(21.42)
2.	B-7-11	10	4.80(12.64)
3.	Kanpur local	10	13.48(21.54)
4.	SI-2116	10	5.96(14.13)
5.	KMR-77	10	11.34(19.68)
6.	EC-303445	10	15.66(23.32)
7.	GRT-83148	10	6.30(14.54)
8.	SI-7192	10	7.40(15.78)
9.	IC-14093	10	14.20(22.13)
10.	SI-3218	10	16.46(23.94)
11.	VRI 1 (LC)	10	13.48(21.54)
12.	TC-25(SC)	10	11.80(20.09)
13.	SI-250 RC)	10	17.56(23.32)
SEd			1.81

CD (0.05%)	3.80
CV	7.52

**Fig .1. Screening of promising entries against *Antigastra* under artificial pest load condition**

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