Evaluation of Sesame Germplasm for Resistance against Leaf webber, *Antigastra catalaunalis* (Duponchel)

ABSTRACT

Antigastra catalaunalis Duponchel (Lepidoptera: Crambidae), known as the sesame leaf webber is an important and specific pest of sesame, exerting a considerable yield loss of up to 72%. The objective of this study was to assess various sesame germplasm for their resistance against *A. catalaunalis*. The present study was carried out at ICAR-Indian Institute of Oilseeds Research, Rajendranagar, Hyderabad, Telangana, India. A total of 280 germplasm were evaluated for their resistance against Sesame leaf webber, together with a resistant check (Swetha) and a susceptible check (Prachi). The experiment was conducted using Randomized Block design for two seasons (2023 and 2024). Incidence of leaf webber was observed on 10 randomly selected plants on each germplasm at weekly intervals. Percent Leaf damage was calculated for all the 280 germplasm along with a resistant check and a susceptible check. The data on percentage of leaf damage for both the seasons were also subjected to statistical analysis using a one-way analysis of variance (ANOVA). The performance of the germplasm were evaluated using 1-9 scoring methodology, categorizing them as highly resistant, resistant, moderately resistant, susceptible or highly susceptible based on scores. In season 1, germplasm, B 203, DSK-1-A, EC-511212, EVC-101, IC-205201, IC-205629, IC-205775, IC-413205, IC-500343, IS-17, and SL-11 were found to be completely free from the incidence of *A. catalaunalis*. The germplasm were categorized as highly resistant (56), resistant (62), moderately resistant (57), susceptible (74), and highly susceptible (31). In season 2, none of the germplasm exhibited complete resistance. The germplasm were categorized as follows: highly resistant (47), resistant (51), moderately resistant (70), susceptible (57), and highly susceptible (55). The incidence of the pest on the resistant check, Swetha, was 4.46% in season 1 and 5.94% in season 2, while the percent pest incidence on the susceptible check, Prachi, was 76.69% in season 1 and 69.18% in season 2. Forty seven germplasm were observed to be highly resistant to *Antigastra catalaunalis* across both the seasons and

also based on the combined mean percent leaf damage analysis .Thus, these germplasm can be used as donors in future breeding programmes.

Keywords: Germplasm, leaf webber, incidence, population, resistance, sesame, India

1. INTRODUCTION

Sesame (*Sesamum indicum* L.) is an important oilseed crop, belonging to the Pedaliaceae family. Widely cultivated in tropical and subtropical regions, it earns the title 'Queen of Oilseeds' because of its high-quality polyunsaturated fatty acids, with origins traced to East Africa and India [1]. Major sesame-producing countries include Sudan, India, Burma, Tanzania, Nigeria, China, Burkina Faso, Chad, Central African Republic, and Ethiopia, with cultivation concentrated in Indian states like Madhya Pradesh, Rajasthan, Uttar Pradesh, Andhra Pradesh, Orissa, Gujarat, Tamil Nadu and Karnataka. Environmental threats (biotic and abiotic stresses) affect sesame production and yield including the crop's oil content [2]. Among the various biotic factors, insect pests are of prime importance and are responsible for both qualitative and quantitative yield losses of the crop. Approximately 29 species of insect pests attack sesame in different stages of the crop growth.

Among these, the leaf webber, *Antigastra catalaunalis* (Duponchel), is a significant pest of sesame. The pest induces 10-70% leaf infestation, 34-62% damage to flower buds/flowers and 10-44% capsule infestation, ultimately causing a potential yield loss of up to 72% [3]. Successful insecticide treatments for the management of leaf webber include Chlorantraniliprole 18.5% SC @ 0.006%, Fenvalerate 20% EC @ 0.012%, and Novaluron 5.25% + Indoxacarb 4.5% SC @ 0.014% [4]. Insecticides are used worldwide to boost the yield of crops used for food and fiber [5]. Although pesticides offer certain advantages like boosting crop yields, their excessive use can result in adverse impacts on both the environment and public health [6]. Hence, researchers are working on more eco-friendly pest management methods, such as host plant resistance (HPR). HPR can be a suitable method for pest control within integrated pest management strategies. The most alluring aspect of HPR is that resource-poor farmers practically do not need any expertise in application procedures. The identification and development of agricultural cultivars resistant to

the major pests in various crops has advanced significantly. In addition to considerably reducing the usage of pesticides and slowing the rate at which insect populations gain resistance to them, HPR will also increase the activity of beneficial organisms and reduce the amount of pesticide residues in food and food products [7]. Thus, the experiment was carried out to identify sources of resistance to leaf webber, and execute screening of sesame germplasm for their resistance against leaf webber in open field conditions.

2. MATERIAL AND METHODS

2.1 Germplasm

A total of 280 germplasm together with a resistant check (Swetha) and a susceptible check (Prachi) were collected from ICAR-Indian Institute of Oilseeds Research. The objective was to conduct field screening of sesame germplasm for leaf webber resistance under open field conditions and to identify the resistant sources against leaf webber.

2.2 Field experiments

The present study was carried out in the research farm of ICAR-Indian Institute of Oilseeds Research, Rajendranagar, Hyderabad, Telangana, India. It is located at an altitude of 540 m, 17º 19'17" N latitude and 78º 24'51" E longitude and the location has a tropical agro-climate. Field experiments were conducted in Randomized Block Design for season 1 (2023) and season 2 (2024). The net plot size was 2×5 m and the spacing maintained between row to row and plant to plant was 40×15 cm. The crop was raised in accordance with all the recommended agricultural practices. Throughout the crop season, no plant protection measures were taken.

2.3 Observations on the incidence of leaf webber

Observations on the incidence of leaf webber were recorded at weekly intervals beginning from third week of Augustto third week of October in season 1 (2023) and from third week of December to third week of

February in season 2 (2024). Number of infested leaves were observed from 10 randomly selected plants per plot. In the early vegetative stage of the crop, Larva webs the top leaves together and bore the tender shoots. Number of leaves webbed together were counted and the percent damage was determined (number of damaged leaves/total number of leaves ×100). The performance of all the germplasm against Leaf webber was determined by using 1-9 scoring methodology as mentioned in Table 1. Based on the scores, the germplasm were categorized [8].

2.4 Statistical Analysis

Data were statistically analyzed to compare the germplasm for their reaction against leaf webber using a Randomized Block Design (RBD). Data on percentage of leaf damage were analyzed for different germplasm using a one-way analysis of variance (ANOVA), which was calculated on the original values of both the seasons (2023, 2024) using SPSS software (Version 26.0, IBM Corporation, Armonk, NY, USA)

3. RESULTS

The incidence of leaf webber (Fig. 1) was observed during both the seasons and the percentage leaf damage was calculated. The sesame germplasm (n=280) were screened for analyzing their reaction to leaf webber together with resistant check, Swetha and susceptible check, Prachi. Germplasm were categorized based on the percentage leaf damage. The combined mean values of the percentage leaf damage by the pest during both the seasons were also calculated and the germplasm were categorized.

3.1 Categorization of sesame germplasm based on the incidence of *Antigastra catalaunalis* in Season 1, 2023

In season 1, the leaf webber incidence varied from 0 to 96.77 % (Table 2). Germplasm namely, B 203, DSK-1-A, EC-511212, EVC-101, IC-205201, IC-205629, IC-205775, IC-413205, IC-500343, IS-17, and SL-11 were found to be completely free from the pest incidence. The highest percentage incidence of *A. catalaunalis* was noted in SI-43-A (96.77 %). Based on the percent damage, the germplasm (n=280) were graded (Table 3). Followed by that, the germplasm were then categorized as highly resistant (56

germplasm), resistant (62 germplasm), moderately resistant (57 germplasm), susceptible (74 germplasm) and highly susceptible (31 germplasm) (F = 5.927, df = 564, P= <0.001). The resistant check, Swetha had an incidence of 4.46 % and the susceptible check, Prachi had an incidence of 76.69 %.

3.2 Categorization of sesame germplasm based on the incidence of *Antigastra catalaunalis* in Season 2, 2024

In season 2, leaf webber incidence ranged between 1.96 and 82.16 % (Table 2). None of the germplasm were observed to be free from the incidence of leaf webber. The lowest incidence of leaf webber was observed in S-11 (1.96 %) and the highest pest incidence was recorded in NIC-71301 (82.16 %). The sesame germplasm (n=280) were graded based on the percentage of infestation by leaf webber (Table 4). The germplasm were then categorized based on the grades as follows: highly resistant (47 germplasm), resistant (51 germplasm), moderately resistant (70 germplasm), susceptible (57 germplasm), and highly susceptible (55 germplasm) (F = 3.581, df = 564, P = <0.01). In season 2, the resistant check had a percentage incidence of 5.94% and the susceptible check had a percentage incidence of 69.18%.

3.3 Categorization of sesame germplasm based on combined mean of percentage leaf damage (season 1 and season 2)

Combined mean performance of the germplasm for their leaf webber resistance was analysed (Table 2). Percentage leaf damage value ranged between 0.98% and 78.58%. Lowest damage of 0.98% was observed in SL-11 and the highest percentage leaf damage was recorded in NIC - 71301. The germplasm were also categorised based on the combined mean values (Table 5). The combined mean value of percent leaf damage in the resistant check, Swetha was 5.20 and the susceptible check, Prachi had a combined mean percentage leaf damage of 73.34. The germplasm were categorised as follows: highly resistant (47 germplasm), resistant (63 germplasm), moderately resistant (62 germplasm), susceptible (45 germplasm), and highly susceptible (63 germplasm).

4. DISCUSSION

In the present investigation, The following germplasm exhibited consistent high resistance across both the seasons and also based on the combined mean percent leaf damage analysis : DSK-1-A, EC-511212, EVC-101, I-15, IC-205201, IC-205520, IC-205630, IC-205775, IC- 43177, IC-500343, IC-500355, IC-500366, IC-500384, IC-500542, IC-511130, IS-17, IS-248-A, KMR-84, NIC-8352, S-0528, TKG-87, BLSG-9, IC-14146-G, IC-17477, IC-500352, IC-500378, IC-500399, IC-500476, IC-500490, IC-500531, IC-51692, IC-546216, IS-74, IS-350, IS-673, JLS-191-8, KMR-4-259-A, KMR-18, KMS-5-367, NIC-528, NIC-8578, NIC-16368, NIC-17890-A, SI-43-A, S-366, SI-1930, SL-11.Resistance in these germplasm against *A. catalaunalis* may be due to antixenosis or antibiosis mechanism of resistance. Antixenosis refers to undesirability (non-preference), whereas, antibiosis refers to unsuitability. Several phenotypic traits such as trichome density, specific leaf weight, relative water content of sesame leaves, presence of defense enzymes and other biochemical components can influence resistance against leaf webber in those germplasm which were categorized under HR category.

This result is in accordance with the study conducted earlier in which the same germplasm (KMR-4-259-A) was categorized as highly resistant based on percent plant damage and percent flower damage [9]. Earlier, the genotype NIC-8352 was highly resistant based on percent capsule damage in field trial 1 and the same genotype was categorized as moderately resistant based on percent capsule damage in field trial 2 [10]. DSK-1-A was categorized as moderately resistant based on the cumulative score obtained from percent flower damage and percent capsule damage by *A. catalaunalis* [11]. This result is in contrast with the observations made from the present study where DSK-1-A was categorized as highly resistant based on percent leaf infestation. The genotype IS-17 was categorized as highly resistant in the present investigation. Similarly, the mean larval population on the genotype IS-17 was recorded as 0.97 larvae/plant. IS-74 was categorized as highly resistant based on percent leaf damage in both the seasons [12].

The following germplasm were observed to be resistant in both the seasons: CT-57, EC-334988, EC-108936, IC-204127, IC-204843, IC-205561, IC-205784, IC-262099, IC-381875, IC-500337, IC-500339, IC-500379, IC-500408, IC-500427, IC-500497, IC-500547, IC-500623, IC-510995, IC-511044, IC-8261, IC-96235, 15-345-17, IS-262-1, IS-49-1-A, IS-613, NIC-16289, S-772, SP-1162-B, SB-1248-B, VCR-81-NO-

NS EC-30423, EVC-122, IC-204175, IC-205718, IC-500385, IC-500435, IC-500441, IC-500523, IC-500779, IC-540348, KMR-11, KMS-50, KMS-5-396, NIC-8225, NIC-16208, RJR-170, RJS-194, S-0265, SI-982, SI-3315, X-99-98. The genotype, NIC-16289 was categorized as susceptible based on percent plant damage and the same genotype was categorized as highly susceptible based on percent capsule damage [9].

All the germplasm which were moderately resistant in season 1 were also observed to be moderately resistant in season 2. In addition to those, B-203, CT-35, CT-50, IC-413205, CT-51, GRT-83124, GRT-8368, GRT-8600-A, IC-500437, IC-500445, IC-52887, IS-16-A, IS-35-1, IS-201, KMS-4-254 were also categorized under moderately resistant category. This result is in conformity with the results of the studies conducted earlier wherein, TKG 22 was observed to be moderately resistant with grade 5 [13, 14]. But, TKG 22 was categorized as highly resistant to leaf webber [15].

The following germplasm were categorized under susceptible category in both the seasons: CT-23, DOC-8357, EC-110-A, EC-303431, H-33, IC-204158, IC-205-1, IC-205490, IC-395814, IC-500331, IS-IS-8-3-84, RJS-195, SI-114, S-0182, S-0253-A, S-711, SI-3279-1-B, SI-3274, S-040913, SI-331514, TC-26, IC-511044, IS-23, IS-116-13, IS-264-B-1, IS-646-B-1, IS-1483-1, KANAK, N-32, NIC-8057, NIC-16120, S-0022, S-0291, SI-2039-A, SI-7618-A, TC-45. Earlier, the genotype SI-3274 was observed to be moderately resistant based on percentage of flower damage and was categorized as moderately resistant based on percentage of capsule damage [9]. The germplasm, IC-268-B, IC-500342, IC-500536, IC-500543, IC-511102, IS-482-B, KMR-47-A, NIC-1606-A, NIC-8337-A, NIC-8385, NIC-13598, NIC-71301, OMT-4, RMT-33, S-78, SI-43-A were reported to be highly susceptible in both the seasons. Also, these germplasm were indeed categorized under highly susceptible category based on combined mean percentage leaf damage analysis.

5. CONCLUSION

To summarize, a total of 47 germplasm consistently demonstrated as highly resistant to *A. catalaunalis* across multiple seasons. This suggests their potential as valuable contributors in future breeding projects. However, further research is recommended to identify DNA markers linked to this resistance, perform

mapping and QTL analysis and enable the transfer of resistant genes or genetic segments through backcross breeding combined with marker-assisted selection. Additionally, exploring the genetic inheritance patterns of this resistance trait is also essential.

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(a) (b) (c) (d)

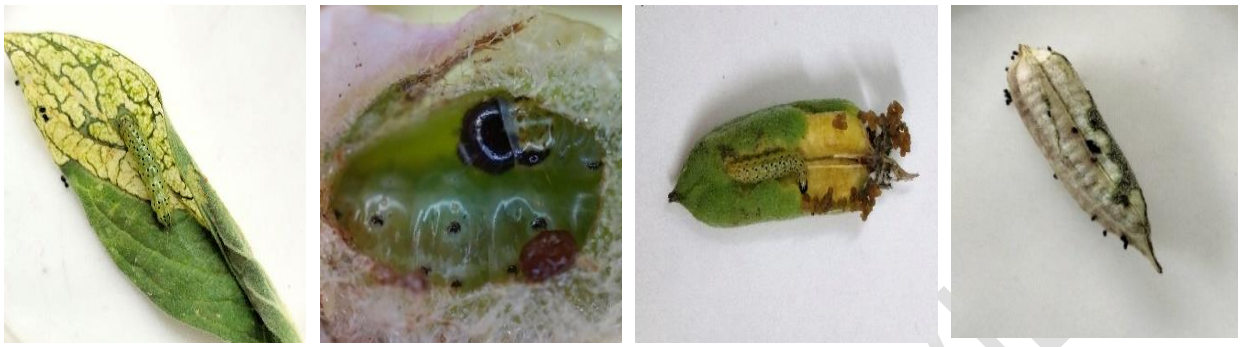

Fig. 1. Leaf webber, *Antigastra catalaunalis* and its damage symptoms. (a) larva feeding on sesame leaf, (b) larva feeding inside sesame flower by making a bore hole, (c) larva feeding on capsule, (d) damage caused by *Antigastra catalaunalis* on capsule.

Table 1. Methodology for categorizing sesame germplasm based on percent leaf damage by sesame leaf webber

Leaf damage (%)	Grade	Category
0-10	1	Highly resistant
11-20	3	Resistant
21-30	5	Moderately resistant
31-40	7	Susceptible
>40	9	Highly Susceptible

Table 2. Incidence of leaf webber on sesame germplasm under open condition during 2023 and 2024

Germplasm	Percent leaf Incidence (%)		
	Season 1 (2023)	Season 2 (2024)	Combined mean
B 203	0	26.47	13.24
CS 16 A	26.83	26.53	26.68
CT - 23	33.33	33.38	33.36
CT - 35	12.24	26.19	19.22
CT - 50	15.54	24.13	19.84
CT - 57	12.2	16.67	14.44
DOC - 8357	31.99	39.03	35.51
DSK - 1 - A	0	6.78	3.39
EC - 110 - A	33.33	37.81	35.57
EC - 303304 - A	26.53	29.75	28.14
EC - 310450	44.41	38.04	41.23
EC - 303431	35.79	34.98	35.39
EC - 334988	15.88	19.51	17.70
EC - 334997	51.28	39.02	45.15
EC - 511212	0	9.75	4.88
EC - 108936	17.84	14.9	16.37
ES - 2010862	28.2	22.45	25.33
EVC - 101	0	6.82	3.41
GRT - 8245	49.99	33.33	41.66
H - 33	35	37.5	36.25
I-15	8.11	7.51	7.81
IC - 204080	65.52	38.09	51.81
IC - 204127	19.62	16.24	17.93
IC - 204142	56.1	32.51	44.31
IC - 204151	73	35.8	54.40
IC - 204158	39.89	39.54	39.72
IC - 204843	17.36	12.5	14.93
IC - 204706	51.21	32.72	41.97
IC - 205-1	34.06	35.29	34.68
IC - 205201	0	4.18	2.09
IC - 205490	33.33	34.17	33.75
IC- 205520	3.23	7.69	5.46
IC- 205522	58.97	35.14	47.06
IC- 205561	12.24	11.98	12.11
IC- 205628	6.98	38.55	22.77
IC- 205629	0	35.13	17.57
IC- 205630	2.08	4.35	3.22
IC- 206715	29.04	23.69	26.37

IC- 205732	22.5	24.39	23.45
IC- 205746	34.15	42.56	38.36
IC- 205775	0	2.46	1.23
IC- 205781	61.96	31.15	46.56
IC-205784	16.22	19.33	17.78
IC- 205793	32.41	61.83	47.12
IC 268 B	73.81	79.05	76.43
IC 262099	16.28	13.61	14.95
IC 32 C	22.93	29.41	26.17
IC - 381875	15.75	18.41	17.08
IC 395814	32.69	38.89	35.79
IC - 413205	0	28.21	14.11
IC - 43177	2.56	7.5	5.03
IC - 500329	21.31	27.58	24.45
IC - 500331	32.26	38.71	35.49
IC - 500337	17.64	16.13	16.89
IC - 500339	18.61	16.22	17.42
IC - 500342	83.79	66.66	75.23
IC - 500349	28.29	21.92	25.11
IC - 500347	70	33.33	51.67
IC - 500343	0	2.25	1.13
IC - 500355	6.44	9.23	7.84
IC - 500366	9.44	5.82	7.63
IC - 500379	17.07	18.68	17.88
IC - 500384	5.12	6.39	5.76
IC - 500398	31.03	57.08	44.06
IC - 500408	19.36	17.65	18.51
IC - 500415	29.03	29.73	29.38
IC - 500405	24.33	24.39	24.36
IC - 500422	33.33	66.66	50.00
IC - 500427	17.07	17.76	17.42
IC - 500433	65.63	33.33	49.48
IC - 500436	23.08	28.2	25.64
IC - 500497	11.91	16.33	14.12
IC - 500536	57.73	67.44	62.59
IC - 500541	25.58	29.19	27.39
IC - 500542	2.58	7.84	5.21
IC - 500543	68.42	51.3	59.86
IC - 500547	14.82	16.78	15.80
IC - 500623	18.92	17.95	18.44
IC - 54032	26.84	22.03	24.44

IC - 510983	54.8	35.49	45.15
IC - 510995	13.32	17.65	15.49
IC - 511004	31.37	51.22	41.30
IC - 511044	17.95	17.65	17.80
IC - 511102	63.26	57.14	60.20
IC - 511130	4.35	5.56	4.96
IC - 0750-1-84	22.22	24.33	23.28
IC - 8261	14.64	15.74	15.19
IC - 96235	18.41	17.14	17.78
IC A 1411	21.42	25.68	23.55
IS IS 8 3 84	33.24	37.93	35.59
IS 17	0	9.3	4.65
IS 1052	13.68	68.23	40.96
15-345 -17	14.82	12.91	13.87
IS-248-A	3.85	6	4.93
IS-2621694	35.11	58.67	46.89
IS - 262-1	20	17.5	18.75
IS-49-1 - A	12.9	13.32	13.11
IS-482 - B	65.85	65.96	65.91
IS-613	16.24	18.92	17.58
IS - 644 - A	35.29	52.78	44.04
IS - 670	56.1	31.71	43.91
IS-722-1	32.35	68.96	50.66
KMR - 14 - A	25.69	25.81	25.75
KMR - 47 - A	64.87	66.67	65.77
KMR - 61	21.31	23.46	22.39
KMR - 84	2.32	7.31	4.82
KIS - 357	62.25	33.42	47.84
JCS - 191-8	37.5	78.3	57.90
Julang sesame	25.69	28.17	26.93
NIC - 1606 - A	71.46	59.18	65.32
NIC - 7832	24.23	26.64	25.44
NIC - 8337 - A	77.42	44.68	61.05
NIC - 8352	9.09	5.13	7.11
NIC - 8385	72.42	59.37	65.90
NIC - 9836 - A	29.73	27.78	28.76
NIC - 13598	68.89	62.16	65.53
NIC - 16289	14.89	17.07	15.98
NIC - 16439	29.73	25.58	27.66
NIC - 71301	75	82.16	78.58
NP - 6-1	26.83	25.53	26.18

OLT - TR - 4	82.77	31.96	57.37
OMT - 4	96.78	59.65	78.22
RJS - 194	35.53	37.23	36.38
RMT - 33	82.92	62.01	72.47
S - 78	95.42	53.85	74.64
SI - 43 - A	96.77	51.28	74.03
S - 0108 - B	27.51	29.26	28.39
SI - 114	37.43	36.67	37.05
S - 0182	35.9	38.24	37.07
S - 0253 - A	31.71	38.89	35.30
S - 0528	5.56	7.32	6.44
S - 0429 - A	37.78	60.78	49.28
S - 0440	34.04	48.84	41.44
S-0018-B	25.53	25.49	25.51
S-0486	37.5	35.13	36.32
S- 711	36.12	33.33	34.73
s- 772	13.59	15.98	14.79
SI 3279 -1-B	36.67	31.3	33.99
SP-1162 -B	16.27	16.33	16.30
SB 1248- B	13.4	19.46	16.43
SI.1499	36.22	56.71	46.47
SI 1667-2	27.66	28.93	28.30
SI-3274	32.76	34.14	33.45
S-040913	37.25	35.53	36.39
SI-331514	32.43	36.17	34.30
TC-26	33.34	36.96	35.15
TKG-87	7.69	8.16	7.93
Thilothamma	24.39	27.58	25.99
VCR-81-NO-NS	16.78	17.07	16.93
SI-78-326	38.24	53.49	45.87
B-201	25	29.54	27.27
BLSG-9	2.7	7.85	5.28
CT-46	27.6	24.37	25.99
CT-51	17.08	27.83	22.46
CT-55	27.89	28.94	28.42
EC-30423	11.44	14.96	13.20
ES-123-3-84	34.09	48.83	41.46
EVC-122	17.95	13.47	15.71
GRT-389-A	28.23	25.5	26.87
GRT-83124	6.52	23.92	15.22
GRT-8368	9.52	28.57	19.05

GRT-8600-A	2.04	28.21	15.13
GTG-30	23.08	23.08	23.08
IC-14146-G	2.5	7.5	5.00
IC-17477	6.25	8.34	7.30
IC-203988	31.37	47.06	39.22
IC-2041-2	34.97	44.19	39.58
IC-204175	14.28	16.66	15.47
IC-204178	35.1	54.01	44.56
IC-204622	37.26	45.1	41.18
IC-205500	25.08	29.62	27.35
IC-205501	27.01	25.01	26.01
IC-205514	32.72	42.86	37.79
IC-205697	38.6	61.28	49.94
IC-205698	37.8	51.4	44.60
IC-205718	18.41	15.77	17.09
IC-205750	36.66	63.42	50.04
IC-205761	33.38	53.3	43.34
IC- 205806	25.54	27.66	26.60
IC- 413198	32.61	67.39	50.00
IC 500337	26.54	27.91	27.23
IC- 500338	34.88	53.84	44.36
IC- 500341	14.64	36.67	25.66
IC-500352	4.76	7.85	6.31
IC-500377	28.29	27.63	27.96
IC-500378	7.89	9.09	8.49
IC-500385	13.61	15.91	14.76
IC-500393	38.76	45.62	42.19
IC-500399	9.23	5.55	7.39
IC-500413	14.63	52.27	33.45
IC-500417	37.21	75	56.11
IC-500416	3.71	35.9	19.81
IC-500419	25	29.27	27.14
IC-500418	15.72	39.53	27.63
IC-500425	33.33	59.57	46.45
IC-500435	17.08	14.29	15.69
IC-500437	5.41	29.8	17.61
IC-500440	33.33	66.66	50.00
IC-500441	12.77	17.65	15.21
IC-500445	27.09	28.94	28.02
IC-500476	7.49	9.66	8.58
IC-500490	6.35	5.79	6.07

IC-500492	35.8	54.84	45.32
IC-500495	23.27	27.94	25.61
IC-500512	33.38	51	42.19
IC-500521	33.3	54.12	43.71
IC-500520	32.63	57.1	44.87
IC-500523	14.9	18.68	16.79
IC-500526	23.91	28.87	26.39
IC-500528	34.38	44.68	39.53
IC-500531	2.32	7.84	5.08
IC-500614	33.33	69.23	51.28
IC-500779	12.51	18.74	15.63
IC-500784	27.27	27.27	27.27
IC-511044	38.88	38.88	38.88
IC-51692	9.76	9.53	9.65
IC-52887	11.71	23.53	17.62
IC-540348	15.22	16.22	15.72
IC-546216	5.94	6.45	6.20
IS-16-A	14.04	23.68	18.86
IS- 23	35.6	36.67	36.14
IS-35-1	23.41	28.26	25.84
IS -74	9.1	8.11	8.61
IS-116 13	39.02	37.21	38.12
IS-201	28.57	21.43	25.00
IS- 264- B- 1	34.16	37.75	35.96
IS-491- A	27.66	28.2	27.93
IS-350	5.56	4.76	5.16
IS-646 -B- 1	35.41	36.12	35.77
IS-673	7.7	8.34	8.02
IS-1483 1	32.69	35	33.85
IS-500551	29.79	27.9	28.85
JLS-191-8	7.14	5.88	6.51
KANAK	37.75	34.7	36.23
KMR-4-259.A	4.88	5.41	5.15
KIC-357	31.96	51.22	41.59
KMR-11	16.67	14.37	15.52
KMR-18	7.5	4.91	6.21
KMR-60	25.59	28.96	27.28
KMS-4-254	19.14	27.03	23.09
KMS-50	15	17.65	16.33
KMS-5-367	4.65	6.25	5.45
KMS-5-368	23.53	25.49	24.51

KMS-5-396	17.14	19.79	18.47
MLC-17274-B	24.53	24.53	24.53
N-32	34.88	37.2	36.04
NIC-528	5.55	5.71	5.63
NIC-7800	23.07	25.49	24.28
NIC-8057	35.27	34.25	34.76
NIC- 8225	14	15.16	14.58
NIC-8485	22.52	25.64	24.08
NIC-8578	5.41	3.04	4.23
NIC-9853	29.27	26.5	27.89
NIC-16120	34.96	33.34	34.15
NIC-16208	11.99	18.51	15.25
NIC-16368	1.97	5.31	3.64
NIC-17890-A	5.26	7.84	6.55
R-16-16	31.71	29.27	30.49
R-127	17.02	48.94	32.98
RJS-147	23.91	23.91	23.91
RJR-170	16.27	11.71	13.99
RJS-194	12.2	17.07	14.64
S-0022	36.84	39.57	38.21
S-0118-B	24.33	24.33	24.33
S-0265	19.53	16.66	18.10
S-0291	34.14	39.03	36.59
SI-43-A	5.42	6.46	5.94
S-366	6.72	3.93	5.33
SI-982	18.62	16.33	17.48
SI-1036	26.22	23.41	24.82
SI-1930	6.26	5.88	6.07
SI-2039-A	36.67	34.15	35.41
SI-3315	13.32	17.76	15.54
SI-2225	21.28	27.66	24.47
SI-7618-A	33.33	33.33	33.33
s-0448	23.08	28.57	25.83
TC-45	38.55	38.71	38.63
TKG-22	26.19	26.19	26.19
X-99-99-8	13.96	18.61	16.29
SL-11	0	1.96	0.98
Swetha (resistant check)	4.46	5.94	5.20
Prachi (susceptible check)	76.69	69.98	73.34

Table 3. Categorization of sesame germplasm based on their reaction against leaf webber under open field conditions during season 1 (2023)

Category	Leaf webber incidence (%)	Number of sesame germplasm	Name of the germplasm
Highly Resistant	0-10	56	B-203, DSK-1-A, EC-511212, EVC-101, I-15, IC-205201, IC-205520, IC-205628, IC-205629, IC-205630, IC-205775, IC-413205, IC-43177, IC-500343, IC-500355, IC-500366, IC-500384, IC-500542, IC-511130, IS-17, IS-248-A, KMR-84, NIC-8352, S-0528, TKG-87, BLSG-9, GRT-83124, GRT-8368, GRT-8600-A, IC-14146-G, IC-17477, IC-500352, IC-500378, IC-500399, IC-500416, IC-500437, IC-500476, IC-500490, IC-500531, IC-51692, IC-546216, IS-74, IS-350, IS-673, JLS-191-8, KMR-4-259.A, KMR-18, KMS-5-367, NIC-528, NIC-8578, NIC-16368, NIC-17890-A, SI-43-A, S-366, SI-1930, SL-11
Resistant	11-20	62	CT-35, CT-50, CT-57, EC-334988, EC-108936, IC-204127, IC-204843, IC-205561, IC-205784, IC-262099, IC-381875, IC-500337, IC-500339, IC-500379, IC-500408, IC-500427, IC-500497, IC-500547, IC-500623, IC-510995, IC-511044, IC-8261, IC-96235, IS-1052, 15-345-17, IS-262-1, IS-49-1-A, IS-613, NIC-16289, S-772, SP-1162-B, SB-1248-B, VCR-81-NO-NS, CT-51, EC-30423, EVC-122, IC-204175, IC-205718, IC-500341, IC-500385, IC-500413, IC-500418, IC-500435, IC-500441, IC-500523, IC-500779, IC-52887, IC-540348, IS-16-A, KMR-11, KMS-4-254, KMS-50, KMS-5-396, NIC-8225, NIC-16208, R-127, RJR-170, RJS-194, S-0265, SI-982, SI-3315, X-99-998
Moderately Resistant	21-30	57	CS-16-A, EC-303304-A, ES-2010862, IC-206715, IC-205732, IC-32-C, IC-500329, IC-500349, IC-500415, IC-500405, IC-500436, IC-500541, IC-54032, IC-0750-1-84, IC-A-1411, KMR-14-A, KMR-61, Julang Sesame, NIC-7832, NIC-9836-A, NIC-16439, NP-6-1, S-0108-B, S-0018-B, SI-1667-2, Thilothamma, B-201, CT-46, CT-55, GRT-389-A, GTG-30, IC-205500, IC-205501, IC-205806, IC-500337, IC-500377, IC-500419, IC-500445, IC-500495, IC-500526, IC-500784, IS-35-1, IS-201, IS-491-A, IS-500551, KMR-60, KMS-5-368, MLC-17274-B, NIC-7800, NIC-8485, NIC-9853, RJS-147, S-0118-B, SI-1036, SI-2225, S-0448, TKG-22
Susceptible	31-40	74	CT-23, DOC-8357, EC-110-A, EC-303431, H-33, IC-204158, IC-205-1, IC-205490, IC-205746, IC-205793, IC-395814, IC-500331, IC-500398, IC-500422, IC-511004, IS-IS-8384, IS-2621694, IS-644-A, IS-722-1, JCS-191-8, RJS-195, S-114, S-0182, S-0253-A, S-0429-A, S-0440, S-0486, S-711, SI-3279-1-B, SI-1499, SI-3274, S-040913, SI-331514, TC-26, SI-78-326, ES-123-3-84, IC-203988, IC-2041-2, IC-204178, IC-204622, IC-205514, IC-205697, IC-205698, IC-205750, IC-205761, IC-413198, IC-500338, IC-500393, IC-500417, IC-500425, IC-500440, IC-500492, IC-500512, IC-500521, IC-500520, IC-500528, IC-500614, IC-511044, IS-23, IS-116-13, IS-264-B-1, IS-646-B-1, IS-1483-1, KANAK, KIC-357, N-32, NIC-8057, NIC-16120, R-16-16, S-0022, S-0291, SI-2039-A, SI-7618-A, TC-45
Highly Susceptible	>40	31	EC-310450, EC-334997, GRT-8245, IC-204080, IC-204142, IC-204151, IC-204706, IC-205522, IC-205781, IC-268-B, IC-500342, IC-500347, IC-500433, IC-500536, IC-500543, IC-510983, IC-511102, IS-482-B, IS-670, KMR-47-A, KIS-357, NIC-1606-A, NIC-8337-A, NIC-8385, NIC-13598, NIC-71301, OLT-TR-4, OMT-4, RMT-33, S-78, SI-43-A

Table 4. Categorization of sesame germplasm based on their reaction against leaf webber under open field conditions during season 2 (2024)

Category	Leaf webber incidence (%)	Number of sesame germplasm	Name of the germplasm
Highly Resistant	0-10	47	DSK-1-A, EC-511212, EVC-101, I-15, IC-205201, IC-205520, IC-205630, IC-205775, IC-43177, IC-500343, IC-500355, IC-500366, IC-500384, IC-500542, IC-511130, IS-17, IS-248-A, KMR-84, NIC-8352, S-0528, TKG-87, BLSG-9, IC-14146-G, IC-17477, IC-500352, IC-500378, IC-500399, IC-500476, IC-500490, IC-500531, IC-51692, IC-546216, IS-74, IS-350, IS-673, JLS-191-8, KMR-4-259-A, KMR-18, KMS-5-367, NIC-528, NIC-8578, NIC-16368, NIC-17890-A, SI-43-A, S-366, SI-1930, SL 11
Resistant	11-20	51	CT-57, EC-334988, EC-108936, IC-204127, IC-204843, IC-205561, IC-205874, IC-262099, IC-381875,IC-500337, IC-500339, IC-500379, IC-500408, IC-500427, IC-500497, IC-500547, IC-500623, IC-510995, IC-511044, IC-8261, IC-96235, 15-345-17, IS-262-1, IS-49-1-A, IS-613, NIC-16289, S-772, SP-1162-B, SB-1248-B, VCR-81-NO-NS, EC-30423, EVC-122, IC-204175, IC-205718, IC-500385, IC-500435, IC-500441, IC-500523, IC-500779, IC-540348, KMR-11, KMS-50, KMS-5-396, NIC-8225, NIC-16208, RJR-170, RJS-194, S-0265, SI-982, SI-3315, X-99-99-8.
Moderately Resistant	21-30	70	B-203, CS-16-A, CT-35, CT-50, EC-303304-A, ES-2010862, IC-206715, IC-205732, IC-32-C, IC-413205, IC-500329, IC-500349, IC-500415, IC-500405, IC-500436, IC-500541, IC-54032, IC-0750-1-84, IC-A-1411, KMR-14-A, KMR-61, Julang sesame, NIC-7832, NIC-9836-A, NIC-16439, NP-6-1, S-0108-B, S-0018-B, SI-1667-2, Thilothamma, B-201, CT-46, CT-51, CT-55, GRT-389-A, GRT-83124, GRT-8368, GRT-8600-A, GTG-30, IC-205500, IC-205501, IC-205806, IC-500337, IC-500377, IC-500419, IC-500437, IC-500445, IC-500495, IC-500526, IC-500784, IC-52887, IS-16-A, IS-35-1, IS-201, IS-491-A, IS-500551, KMR-60, KMS-4-254, KMS-5-368, MLC-17274-B, NIC-7800, NIC-8485, NIC-9853, R-16-16, RJS-147, S-0118-B, SI-1036, SI-2225, S-0448, TKG-22.
Susceptible	31-40	57	CT-23, DOC-8357, EC-110-A, EC-310450, EC-303431, EC-334997, GRT-8245, H-33, IC-204080, IC-204142, IC-204151, IC-204158, IC-204706, IC-205-1, IC-205490, IC-205522, IC-205628, IC-205629, IC-205781, IC-395814, IC-500331, IC-500347, IC-500433, IC-510983, IS-IS-8-3-84, IS-670, KIS-357, OLT-TR-4, RJS-195, SI-114, S-0182, S-0253-A, S-0486, S-711, SI-3279-1-B, SI-3274, S-040913, SI-331514, TC-26, IC-500341, IC-500418, IC-500416, IC-511044, IS-23, IS-116-13, IS-264-B-1, IS-646-B-1, IS-1483-1, KANAK, N-32, NIC-8057, NIC-16120, S-0022, S-0291, SI-2039-A, SI-7618-A, TC-45.
Highly Susceptible	>40	55	IC-205746, IC-205793, IC-268 B, IC-500342, IC-500398, IC-500422, IC-500536, IC-500543, IC-511004, IC-511102, IS-1052, IS-2621694, IS-482-B, IS-644-A, IS-722-1, KMR-47-A, JCS-191-8, NIC-1606-A, NIC-8337-A, NIC-8385, NIC-13598, NIC-71301, OMT-4, RMT-33, S-78, SI-43-A, S-0429-A, S-0440, SI-1499, SI-78-326, ES-123-3-84, IC-203988, IC-2041-2, IC-204178, IC-204622, IC-205514, IC-205697, IC-205698, IC-205750, IC-205761, IC-413198, IC-500338, IC-500393, IC-500413, IC-500417, IC-500425, IC-500440, IC-500492, IC-500512, IC-500521, IC-500520, IC-500528, IC-500614, KIC-357, R-127.

Table 5. Categorization of sesame germplasm based on their reaction against leaf webber under based on combined mean value

Category	Leaf webber incidence (%)	Number of sesame germplasm	Name of the germplasm
Highly Resistant	0-10	47	DSK - 1 – A, EC – 511212, EVC - 101, I-15, IC - 205201, IC- 205520, IC-205630, IC- 205775, IC - 43177, IC - 500343, IC - 500355, IC - 500366, IC - 500384, IC - 500542, IC - 511130, IS 17, IS-248-A, KMR - 84, NIC - 8352, S - 0528, TKG-87, BLSG-9, IC-14146-G, IC-17477, IC-500352, IC-500378, IC-500399, IC-500476, IC-500490, IC-500531, IC-51692, IC-546216, IS -74, IS-350, IS-673, JLS-191-8, KMR-4-259.A, KMR-18, KMS-5-367, NIC-528, NIC-8578, NIC-16368, NIC-17890-A, SI-43-A, S-366, SI-1930, SL-11.
Resistant	11-20	63	B 203, CT - 35, CT - 50, CT - 57, EC - 334988, EC - 108936, IC - 204127, IC - 204843, IC- 205561, IC- 205629, IC-205784, IC 262099, IC - 381875, IC - 413205, IC - 500337, IC - 500339, IC - 500379, IC - 500408, IC - 500427, IC - 500497, IC - 500547, IC - 500623, IC - 510995, IC - 511044, IC - 8261, IC - 96235, 15-345 -17, IS - 262-1, IS-49-1 - A, IS-613, NIC - 16289, s- 772, SP-1162 -B, SB 1248- B, VCR-81-NO-NS, EC-30423, EVC-122, GRT-83124, GRT-8368, GRT-8600-A, IC-204175, IC-205718, IC-500385, IC-500416, IC-500435, IC-500437, IC-500441, IC-500523, IC-500779, IC-52887, IC-540348, IS-16-A, KMR-11, KMS-50, KMS-5-396, NIC- 8225, NIC-16208, RJR-170, RJS-194, S-0265, SI-982, SI-3315, X-99-99-8.
Moderately Resistant	21-30	62	CS 16 A, EC - 303304 - A, ES - 2010862, IC- 205628, IC- 206715, IC-205732, IC 32 C, IC - 500329, IC - 500349, IC - 500415, IC - 500405, IC - 500436, IC - 500541, IC - 54032, IC - 0750-1-84, IC A 1411, KMR - 14 - A, KMR - 61, Julang sesame, NIC - 7832, NIC - 9836 - A, NIC - 16439, NP - 6-1, S - 0108 - B, S-0018-B, SI 1667-2, Thilothamma, B-201, CT-46, CT-51, CT-55, GRT-389-A, GTG-30, IC-205500, IC-205501, IC-205806, IC 500337, IC- 500341, IC-500377, IC-500419, IC-500418, IC-500445, IC-500495, IC-500526, IC-500784, IS-35-1, IS-201, IS-491- A, IS-500551, KMR-60, KMS-4-254, KMS-5-368, MLC-17274-B, NIC-7800, NIC-8485, NIC-9853, RJS-147, S-0118-B, SI-1036, SI-2225, s-0448, TKG-22.
Susceptible	31-40	45	CT - 23, DOC - 8357, EC - 110 - A, EC - 303431, H - 33, IC - 204158, IC - 205-1, IC - 205490, IC- 205746, IC 395814, IC - 500331, IS IS 8 3 84, RJS - 194, SI - 114, S - 0182, S - 0253 - A, S-0486, S- 711, SI 3279 -1-B, SI-3274, S-040913, SI-331514, TC-26, IC-203988, IC-2041-2, IC-205514, IC-500413, IC-500528, IC-511044, IS- 23, IS-116 13, IS- 264-B- 1, IS-646 -B- 1, IS-1483 1, KANAK, N-32, NIC-8057, NIC-16120, R-16-16, R-127, S-0022, S-0291, SI-2039-A, SI-7618-A, TC-45.
Highly Susceptible	>40	63	EC - 310450, EC – 334997, GRT - 8245, IC – 204080, IC - 204080, IC - 204142, IC - 204151, IC - 204706, IC- 205522, IC- 205781, IC- 205793, IC 268 B, IC - 500342, IC - 500347, IC - 500398, IC - 500422, IC - 500433, IC - 500543, IC - 510983, IC - 511004, IC - 511102, IS 1052, IS-2621694, IS-482 - B, IS - 644 - A, IS - 670, IS-722-1, KMR - 47 - A, KIS - 357, JCS - 191-8, NIC - 1606 - A, NIC - 8337 - A, NIC - 8385, NIC - 13598, NIC - 71301, OLT - TR - 4, OMT - 4, RMT - 33, S - 78, SI - 43 - A, S - 0429 - A, S - 0440, SI.1499, SI-78-326, ES-123-3-84, IC-204178, IC-204622, IC-205697, IC-205698, IC-205750, IC-205761, IC- 413198, IC- 500338, IC-500393, IC-500417, IC-500425, IC-500440, IC-500492, IC-500512, IC-500521, IC-500520, IC-500614, KIC-357.