

Original Research Article

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## Screening of Sesame Varieties, Cultivars, Germplasm Lines and Elite Lines against *Alternaria sesami*

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### ABSTRACT

Sesame, (*Sesamum indicum* L.), is one of the world's ancient important oilseed crop cultivated in more than 55 countries of the world belonging to the family Pedaliaceae and native of India. Sesame cultivars / varieties presently under cultivation do not possess proven field resistance or tolerance and majority of them are more or less prone to the leaf blight disease (*A. sesami*). Thus, the present study was undertaken with an aim to identify the resistance sources in the cultivars for further exploitation in resistance breeding programme. None of the sesame entry was found immune or resistant or highly susceptible to the disease. However, the eight entries viz., MT-11-1-13, RT-369, JLS-606-7-2, DS-7, RT-370, TKG-22(NC), DS-26 and DS-334 during *Kharif* 2014-15 and during *Kharif* 2016-17 fifteen entries DS-44, TKG-478, RT-379, MT-2014-57, DS-45, JLS-710, DS-46, AT-338, GT-10(NC), VS-10-99, MT-2014-12, AT-345, MT-2014-14, RT-378 and MT-35(ZC-1) were found tolerant to the disease and rest of the test entries showed susceptible to highly susceptible reactions.

#### Keywords

Sesame, Screening,  
*Alternaria sesami*,  
Varieties, Cultivars

#### Article Info

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### Introduction

India is among the largest vegetable oil economies in the world and it ranks first in area and production among the sesame growing countries (Ashri, 1998). Sesame is extensively cultivated in India, China, Myanmar, Sudan, Nigeria, Mexico, Philippines, Korea, Thailand, Srilanka,

Pakistan, Egypt, East Africa and to a smaller extent to Ethiopia, Uganda, Venezuela, Turkey, Kenya, Tanzania, Somalia, Nigeria, USA, and Australia (Balasubramanian and Palemiappan, 2000). The area, production and productivity of sesame has been reported to be 74.40 and 19.01 lakh hectares, 33.40 and 8.10 lakh tons and 518 and 426 kg/ha, respectively, in the World and India (Anonymous, 2015).

Major sesame growing states in India are: Rajasthan, Uttar Pradesh, Madhya Pradesh, Gujarat, Andhra Pradesh, Orissa, West Bengal, Karnataka, Maharashtra, Tamil Nadu, Bihar and Assam. However, crop is grown in all the states of country. The total area in Maharashtra under sesame was 0.52 lakh hectares, with production 0.08 metric tones and productivity of 300 kg/ha (Anonymous, 2015). In Maharashtra, popularly grown sesame varieties/cultivars are: JLT-26 (Padma), Phule-til-1, JLT-7 (Tapi), AKT-64, AKT-101, PKV-NT-11, JLT-408, N-8, Gujrat til-3.

Among the major factors responsible for lower yields, diseases play an important role. Sesame is also affected by many biotic and abiotic stresses. Among the biotic agents, fungi cause major diseases, followed by bacteria, viruses and nematodes. Among these diseases, at present leaf spot / blight caused by *Alternaria sesame* (Kawamura) is widespread and have continued to be the major constraints in the production and productivity of sesame all over the country in general as well as in the state of Maharashtra particularly. The disease was first reported by Dey (1948) from Uttar Pradesh, which later spread in sesame growing region of the country (Dolle, 1981; Kolte, 1985; Narute and Utikar, 1994; Tripathi *et al.*, 2005). The disease (*A. sesame*) has been reported to cause 20 to 40 per cent yield losses all over India (Kumar and Mishra, 1992; Prasad and Reddy, 1997).

The disease appears from seedling stage to harvesting of crop. The infection remain continues even after harvesting of crop due to dew deposition on stem and pod during early morning. The fungus is known to cause seed rot, pre and post- emergence death of seedlings and infect all the above ground parts resulting in considerable loss in yield both quantitatively and qualitatively. Cultivation of resistant varieties is the most effective, cheap

and ecofriendly method of combat the disease, so screening of genotype was carried out at the research farm of AICRP (Safflower) VNMKV, Parbhani.

### Materials and Methods

The field experiments were conducted at the research farm of AICRP (Safflower), Vasantao Naik Marathwada Krishi Vidyapeeth, Parbhani during two *Kharif* seasons of 2014-15 and 2016-17, to assess the reactions of sesame varieties, cultivars, germplasm lines and elite lines, against *A. sesame*, under natural epiphytotics. A total of 13 and 30 entries during *Kharif*, 2014-15 and 2016-17 were sown at 30 X 10 cm spacing. The test entries were replicated thrice during both the years. Observations on *Alternaria* blight disease intensity were recorded on five randomly selected plants, applying 0-9 grade disease rating scale (Mayee and Datar, 1986), as detailed in Table 1 at 15 days interval starting first observation at initiation of the disease and last at 15 days before harvest of the crop.

The data was averaged and per cent *Alternaria* blight disease intensity was worked out by applying following formula (McKinney, 1923).

$$\text{PDI} = \frac{\text{Summation of numerical ratings observed}}{\text{No. of leaves / plants observed} \times \text{maximum grade}} \times 100$$

Based on average per cent disease intensity, the test sesame entries were categorized as follows.

### Statistical analysis

The data recorded in the experiment was statistically analyzed (Panse and Sukhatme,

1978) using VNMAU-STAT statistical programme, at Central Computer Laboratory, Vasant Rao Naik Marathwada Krishi Vidyapeeth, Parbhani.

## Results and Discussion

### Disease reactions of sesame entries

Results (Table 2 and Plate 1) revealed that during *Kharif*, 2015-16, natural epiphytotics of *A. sesami*, all 13 test entries of sesame exhibited different reactions against *A. sesami*. However, eight entries *viz.*, MT-11-1-13, RT-369, JLS-606-7-2, DS-7 RT-370, TKG-22(NC), DS-26 and DS-334 showed tolerant reaction with mean blight intensity in the range of 10.56 to 24.45 per cent; four entries *viz.*, GT-10(NC), RT-371, ZONAL CHECK and LT-210 showed susceptible reaction with moderate mean blight intensity in the range of 26.67 to 33.34 per cent and one entry *viz.*, TKG-501 exhibited moderately resistant reaction with mean blight intensity of 8.89 per cent. None of the sesame entry was found immune or resistant or highly susceptible to the disease. Results (Table 3 and Plate 2) revealed that during *Kharif*, 2016-17, under natural epiphytotics of *A. sesami*, all 30 test

entries of sesame exhibited different reactions against *A. sesami*. However, fifteen entries *viz.* DS-44, TKG-478, RT-379, MT-2014-57, DS-45, JLS-710, DS-46, AT-338, GT-10(NC), VS-10-99, MT-2014-12, AT-345, MT-2014-14, RT-378 and MT-35(ZC-1) showed tolerant reaction with mean blight intensity in the range of 14.07 to 25.18 per cent; ten entries *viz.*, RT-376, AT-312, SVT-222, AT-334, RT-377, COS-13006, TKG-511, ZONAL CHECK, JTS-8(ZC-2) and NIRMAL(ZC-3) showed susceptible reaction with moderate mean blight intensity in the range of 26.67 to 42.22 per cent; three entries *viz.*, TKG-15-02, TKG-15-06 and AT-314 exhibited highly susceptible reaction with higher mean blight intensity in the range of 51.11 to 59.27 per cent and two entries *viz.*, JLT-709 and TKG-22(NC), showed moderately resistant reaction with blight intensity in the range of 8.89 to 10.37 per cent. None of the sesame entry was found immune or resistant to the disease. These results are in conformity most of the entries / varieties with the findings of those reported earlier by several workers against, *Alternaria sesami* of sesame (Samuel *et al.*, 1972; Dolle 1981; Marri *et al.*, 2012) (Table 4).

**Table.1** *Alternaria* blight disease rating scale

Rating scale	Description
0	No symptoms on the leaf.
1	Small, irregular brown spots covering 1 per cent or less of the leaf area.
3	Small, round to irregular brown spots with concentric rings covering 1-10 per cent of the leaf area.
5	Round to irregular brown lesions enlarging, with concentric rings covering 11-25 per cent of the leaf area.
7	Lesions enlarging and coalescing to form irregular brown patches with concentric rings and covering 26-50 per cent of the leaf area. Lesions also appeared on stem petioles and pods.
9	Lesions enlarged coalesced to forming irregular, dark brown patches with concentric rings covering 51 per cent or more of the leaf area. Lesions on stem petioles and pods.



**Plate.1** Screening of sesame cultivars, germplasm lines against *Alternaria* blight disease during Kharif, 2014-15





**Plate.2** Screening of sesame cultivars, germplasm lines against *Alternaria* blight disease during *Kharif*, 2016-17



**Table.2**

Disease Rating	Area affected (%)	Disease reactions
0	No disease	Immune (I)
1	< 1	Resistant (R)
3	01 to 10	Moderately resistant (MR)
5	11 to 25	Tolerant (T)
7	26 to 50	Susceptible (S)
9	51 and above	Highly susceptible (HS)

**Table.3** Reactions of sesame cultivars, germplasm lines against *Alternaria* blight disease during *Kharif*, 2014-15

Sr. No.	Entries	Av. PDI (%)	Reactions
1	MT-11-1-13	24.45	T
2	RT-369	19.45	T
3	JLS-606-7-2	21.67	T
4	IVT-14-4	33.34	S
5	DS-7	13.34	T
6	RT-370	11.11	T
7	TKG-22(NC)	18.33	T
8	DS-26	17.22	T
9	TKG-501	8.89	MR
10	RT-371	29.44	S
11	ZONAL CHECK	26.67	S
12	LT-210	28.89	S
13	DS-334	10.56	T
SE±			1.43
CD (P = 0.05)			4.12
CV			10.91

**Table.4** Reactions of sesame cultivars, germplasm lines against *Alternaria* blight disease during *Kharif*, 2016-17

Sr. No.	Entries	Av. PDI (%)	Reactions
1	TKG-15-02	51.11	HS
2	DS-44	21.48	T
3	JLT-709	10.37	MR
4	TKG-478	17.78	T
5	TKG-22(NC)	8.89	MR
6	RT-379	17.04	T
7	MT-2014-57	19.26	T
8	DS-45	24.44	T
9	RT-376	42.22	S
10	JLS-710	15.56	T
11	AT-312	30.37	S
12	DS-46	21.48	T
13	SVT-222	31.11	S

14	AT-338	16.30	T
15	TKG-15-06	53.33	HS
16	AT-334	28.89	S
17	GT-10(NC)	20.00	T
18	VS-10-99	18.52	T
19	MT-2014-12	15.56	T
20	RT-377	36.30	S
21	AT-345	22.22	T
22	MT-2014-14	12.59	T
23	COS-13006	26.67	S
24	RT-378	14.07	T
25	TKG-511	36.30	S
26	AT-314	59.27	HS
27	ZONAL CHECK	28.89	S
28	MT-35(ZC-1)	25.18	T
29	JTS-8(ZC-2)	33.33	S
30	NIRMAL(ZC-3)	26.67	S
--	<b>SE±</b>	--	<b>1.94</b>
--	<b>CD (P = 0.05)</b>	--	<b>5.50</b>
--	<b>CV</b>	--	<b>12.83</b>

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