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Research Note

Field evaluation of sesame lines against phyllody

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Abstract
In the integrated management of phyllody disease of sesame, host plant resistance plays an important role. Use of resistant genotype is one of the most viable options for the management of the sesame phyllody. Screening of material is essential to identify the real source of resistance. Sesame lines were screened against sesame phyllody during *kharif* 2015. In the IVT entries screened against sesame phyllody the disease incidence ranged from 4.61 to 28.49 per cent, while in AVT entries it ranged from 13.95 to 30.53 per cent. In the germplasm lines (25) the incidence of phyllody ranged from 4.60 to 28.19 per cent. Among the sesame lines screened against phyllody disease under field conditions, three genotypes *viz.*, KAU-05-2-12, PC-14-2 and Kanakapura local showed resistant reaction, 27 lines *viz.*, DS-28, RT-363, CUHY-57, AT-255, DS-23, DS-10, NIC-16236, AKT 101, RT-54, Amrit, AKT-64, RT-125, TMV-3, TKG 306, ST-9-2, ES-48, Chandana, ES- 8779-4, IS 294, E-8, DS-1, GT-1, DS-9, K-15284, RT-11, EC-303419 and Gulbarga showed moderately resistant reaction, 13 lines *viz.*, JCS-2464, AT-249, PC-14-1, TKG-22, AT-282, GT-10, DS-19, CUMS-17, JLS-301-24, AT-231, DS-5, Local variety (black) and DSS-9 showed susceptible reaction.

Key words
Sesame, Phyllody, incidence, Elite lines, Coordinated entries

Sesame (*Sesamum indicum* L.) is found to be affected by a number of diseases, most important of them are powdery mildew caused by *Erysiphe cichoracearum*, *Alternaria* leaf spot caused by *Alternaria sesami*, *Cercospora* leaf spot, *Fusarium* wilt, bacterial blight and phyllody caused by phytoplasma (Natarajan *et al*., 1983). Among these, phyllody caused by phytoplasma is an important disease causing considerable yield loss. Phyllody disease is one of the major biotic constraints in the successful production of sesame.

Sesame phyllody phytoplasma causes disease in 91 plant species belonging to 36 genera distributed in 12 families including important crop plants like Egyptian clover, Bengal gram, carrot, Indian mustard, Lucerne, radish, sunhemp and Indian rape (Sahambi, 1970).Insect vectors have a great role in the transmission of MLOs. Vasudeva and Sahambi (1955) reported that the vector of sesame phyllody was *Deltocephalus* sp. and Ghauri (1966) identified the same vector as *Orosius albicinctus* Dist.. Prasad and Sahambi (1982) confirmed the nature of transmission of sesame phyllody phytoplasma by leafhopper, *Orosius albicinctus*.

Sesame phyllody could be managed either by using resistant cultivars or by using insecticides against leafhopper vectors. Crop hygiene practices which help to reduce phyllody incidence in sesame are early rouging of symptomatic plants, restrictions on growing susceptible varieties and control of host plants of the leafhopper vectors. Some of the cultural methods, particularly rotation management, sowing dates could also be fruitfully applied (Beech, 1981). Hence an attempt was made to identify sesame lines resistant to phyllody disease through field screening of available sesame lines.

Screening of coordinated entries to sesamum phyllody: Screening of sesame lines against phyllody caused by phytoplasma was carried out to identify the source or sources of resistance. Coordinated entries of sesame IVT, AVT supplied by Indian Institute of Oilseed Research, Hyderabad and 25 germplasm lines maintained at Oilseeds Section, ZARS, UAS, GKVK were screened under field conditions. Navile-1 was used as susceptible check.

The germplasm and coordinated entries were sown on 7th of May 2015 at Krishi Vignan Kendra (KVK), Konehally, Tiptur in two replications in single line of 4m length with spacing of 30cm between rows in a randomized complete block design (RCBD). All the recommended package of practices was followed in raising the crop under rainfed condition.

Coordinated entries were sown on 10th of June 2015 at Zonal Agricultural Research Station (ZARS), Bengaluru with three replications by maintaining spacing of 30cm between rows and 15cm between plants in a randomized complete block design (RCBD). Recommended package of practices were followed in raising the crop under irrigated condition.

Observations were made at 75 DAS with respect to phyllody disease incidence by counting the number of infected plants out of total number of plants and the per cent disease incidence was calculated. The genotypes were further grouped into 6 categories

based on reaction type as per the scale given by Mayee and Datar (1986) for chickpea stunt disease and the same was adopted for assessing the resistance of sesame genotypes against phyllody disease.

*Identification of leaf hoppers:*To identify the leaf hoppers associated with sesame phyllody, yellow sticky traps were tied above the crop canopy to poles at three to four random sites in the field. The traps were removed five days after installation and the leaf hoppers were collected and identified at Department of Entomology, GKVK, University of Agricultural Sciences, and Bengaluru.

Key for scoring of incidence of sesamum phyllody:

Rating	Per cent disease incidence (PDI)	Reaction
0	No symptoms on any plant	Immune
3	1-5	Resistant
5	6-20	Moderately resistant
7	21-50	Susceptible
9	50 or more	Highly susceptible

The leaf hoppers submitted to the Department of Agricultural Entomology, University of Agricultural Sciences, GKVK, Bengaluru were taxonomically identified as *Orosius albicinctus* and *Hishimonus phycitis* belongs to the family Cicadellidae.

Screening of sesame genotypes to phyllody: Nine IVT, nine AVT entries and twenty five germplasm lines were screened against phyllody under field condition at Krishi Vignan Kendra (KVK), Konehally, Tiptur. Navile-1 was used as susceptible check.In the nine IVT entries screened, the incidence of phyllody ranged from 4.61 to 27.42 per cent. Entries KAU-05-2-12 and PC-14-2 with disease incidence of 4.61 and 5.39 per cent respectively were found resistant. Entry DS-28 with disease incidence of 8.78 per cent was found moderately resistant (Table 1).

In the nine AVT entries screened, the incidence of phyllody ranged from 15.57 to 24.74 per cent. In five entries *viz.*, RT-363, CUHY-57, AT-255, DS-23 and DS-10, the incidence of phyllody was less than 20 per cent and were found moderately resistant to phyllody.

The coordinated entries, nine IVT and nine AVT entries were screened under field condition at Zonal Agricultural Research Station (ZARS), GKVK, Bengaluru to confirm the reaction of the entries.

The incidence of phyllody in the nine IVT entries ranged from 5.58 to 28.49 per cent. Entries KAU-05-2-12, DS-28 and PC-14-2 with disease incidence of 8.62, 18.69 and 5.58 per cent respectively were found moderately resistant to phyllody.

In nine AVT entries screened, the incidence of phyllody ranged from 13.95 to 30.53 per cent. Five entries *viz.*, RT-363, CUHY-57, AT-255, DS-23 and DS-10 with disease incidence of less than 20 per cent were found moderately resistant to phyllody.

At both the locations IVT entry, DS-28 and AVT entries RT-363, CUHY-57, AT-255 and DS-10 showed moderately resistant reaction. Whereas, KAU-05-2-12 and PC-14-2 were resistant at KVK, Konehally, Tiptur but moderately resistant at Zonal Agricultural Research Station (ZARS), GKVK, Bengaluru.

In the 25 germplasm lines screened, the incidence of phyllody ranged from 4.60 to 28.19 per cent. Entry Kanakapura local showed resistant reaction and twenty one genotypes *viz*., NIC-16236, AKT 101, RT-54, K-15284, RT-11, EC303419, Amrit, AKT-64, RT-125, TMV-3, TKG-306, ST-9-2, ES-48, Chandana, ES- 8779-4, IS 294, E-8, DS-1, GT-1, DS-9 and Gulbarga with disease incidence of less than 20 per cent were found moderately resistant to phyllody. Three genotypes *viz.*, DS-5, Local variety (Black) and DSS-9 showed susceptible reaction (Table 2).

Several workers had previously reported about the resistance sources against phyllody of sesame. Palanna *et al*. (2015) reported GT-1 and DS-9 as resistant to phyllody and Manjunatha (2010) reported that IVT-09-1, IVT-09-2, IVT-09-14, IVT-09-19 and Kanakapura-1(local variety) showed resistant reaction. Similarly, 42 sesame genotypes were categorised for their reaction to phyllody by Gopal *et al.*(1998) and reported that six genotypes showed resistance reaction *viz*., AT66, AT69, BT892, RT108, TC359 and TNAU12.

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Table 1. Reaction of IVT and AVT entries of sesamum to phyllody disease under field conditions

Sl. No.	Entries	Phyllody Disease incidence (%) /Reaction	
IVT entries		**Konehally**	**GKVK**
1	JCS-2464	22.78 (S)	23.03 (S)
2	KAU-05-2-12	4.61 (R)	8.62 (MR)
3	AT-249	22.10 (S)	25.13 (S)
4	DS-28	8.78 (MR)	18.69 (MR)
5	PC-14-1	22.45 (S)	26.53 (S)
6	TKG-22	26.70 (S)	26.75 (S)
7	AT-282	23.47 (S)	28.49 (S)
8	PC-14-2	5.39 (R)	5.58 (MR)
9	GT-10	27.42 (S)	26.97 (S)
AVT entries			
1	RT-363	15.73 (MR)	18.47 (MR)
2	CUHY-57	15.57 (MR)	15.89 (MR)
3	DS-19	21.34 (S)	21.96 (S)
4	AT-255	17.49 (MR)	18.07 (MR)
5	CUMS-17	24.74 (S)	30.53 (S)
6	DS-23	19.52 (MR)	17.61 (MR)
7	JLS-301-24	21.43 (S)	23.64 (S)
8	DS-10	19.89 (MR)	13.95 (MR)
9	AT-231	21.02 (S)	21.33 (S)
10	Navile-1(Check)	32.55	31.60

*Note: R- resistant, MR- moderately resistant, S- susceptible

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Table 2. Reaction of sesame genotypes to phyllody disease under field conditions

Sl. No.	Genotypes	Phyllody % Disease incidence	Reaction
1	NIC-16236	13.09	MR
2	Kanakapura local	4.60	R
3	AKT 101	9.12	MR
4	RT-54	13.47	MR
5	K-15284	7.10	MR
6	RT-11	7.56	MR
7	EC303419	5.92	MR
8	Amrit	9.76	MR
9	AKT-64	10.73	MR
10	RT-125	9.41	MR
11	TMV-3	11.43	MR
12	TKG 306	16.58	MR
13	ST-9-2	14.34	MR
14	ES-48	14.52	MR
15	Chandana	13.22	MR
16	ES- 8779-4	14.47	MR
17	IS 294	18.40	MR
18	E-8	13.48	MR
19	DS-1	17.76	MR
20	GT-1	16.96	MR
21	DS-9	18.98	MR
22	DS-5	24.52	S
23	Local variety (Black)	25.22	S
24	DSS-9	28.19	S
25	Gulbarga	9.20	MR
26	Navile-1	32.55	S

*Note: R- resistant, MR- moderately resistant, S- susceptible