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Screening of sesame germplasm against sesame pod bugs (*Elasmolomus sordidus* Fabricius) for resistance

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Abstract : Two hundred and thirty nine sesame germplasm lines were screened to develop methodology and to identify resistance to the sesame pod bug, *Elasmolomus sordidus* under natural field condition during 1995 (Trial I) and a trial of 81 entries including seven resistant cultures of first trial, eight pre release cultures and 34 advanced breeding materials and eight multi location cultures were also screened for their reaction to SPB during *Kharif* 1996 (Trial II) at Agricultural Research Station, Virinjipuram. The screening was done based on the bug population and per cent pod damage. But the pod damage due to SPB was given more weightage than to bug population, since the damage to reproductive part is reflected more on yield. In the Trial I, of the 239 germplasm evaluated, only seven were grouped as resistant, while another 24 were classified as moderately resistant and the rest were susceptible. In the Trial II none of the entries including seven resistant and 24 moderately resistant lines of Trial I was categorised as either resistant or moderately resistant . In general absolute resistance source was not found in any of them.

Keywords: Sesame, Elasmolomus sordidus, Germplasm, Screening, Resistance.

Introduction

The sesame pod bug(SPB), *Elasmolomus sordidus* Fabricius is a serious pest causing extensive damage to sesame. This lygaeid bug is commonly known as "Ekkadayan or Yelkudayan" in Tamil, since it sucks the oil from the seeds of sesame and caused reduction in seed weight and oil content (Mohanasundaram and Sundara Babu, 1987). It was reported as a post- harvest pest of sesame occurring in large numbers on the harvested sesame plants which were heaped for curing in the threshing floor. It was also observed that bugs in all stages of development were feeding on the green pods of sesame in the field (Mohanasundaram *et al.* 1980; Mohanasundaram and Sundara Babu, 1987).

Since the sesame is grown mostly as a dry crop and income from unit area is usually low, the farmers can not afford to take up costly methods of pest control against pod bug. Growing resistant varieties will not only alleviate the pest problem but can also reduce the cost of plant protection against the pest. With this view the available germplasm was screened to identify the resistant sources. Reports on the screening of sesame germplasm against SPB are lacking. In the present study, pod damage was given more weightage, since the damage to reproductive part is reflected more on yield, than to the bug population.

Materials and Methods

Two hundred and thirty nine germplasm entries of sesame collected from Regional Research Station, Vridhachalam were screened in the field at Agricultural Research Station, Virinjipuram during *Kharif*, 1995. The entries were sown in plots of 5 x 3 m^2 with a spacing of 30 cm x 30 cm. In each plot, first and 10^{th} rows were sown with TMV 3 as susceptible check and other rows, namely, second to nine with the test accessions. The recommended package of practices except plant protection were followed.

The entries were screened against the SPB from tender to pod maturation stage and the observations were made during night hours using torch lights on ten randomly selected plants in each entry on 65,75 and 85 DAS. The per cent pod damage was also worked out for each entry by counting the total number of pods and affected pods. The highest bug population among the three different stages (65,75 and 85 DAS) and highest per cent pod damage among the two stages (80 and 90 DAS) were converted to 1 to 9 grade by referring to score chart formulated based on the bug population and per cent pod damage. Grading was done for each entry using a scale of 1-9 which was standardized based on earlier works on other insects (Heinrich *et al.* 1985; Philip Sridhar, 1990). Based on the grade, the entries were categorised.

Methodology followed for grading the germplasm entries for SPB resistance is as follows.

Table 1a. Categorisation of sesame entries based on bug population score chart

Bug population	Grade	Category
0	0	Highly resistant (HR)
1-5	1	Resistant (R)
6 - 10	3	Moderately resistant (MR)
11 - 25	5	Moderately susceptible (MS)
26 - 50	7	Susceptible (S)
> 50	9	Highly susceptible (HS)

Table 1b. Categorisation of sesame entries based on pod damage score chart

Pod damage (%)	Grade	Category
0	0	Highly resistant (HR)
0.1 - 5	1	Resistant (R)
5.1 - 10	3	Moderately resistant
10.1 - 25	5	Moderately susceptible (MS)
25.1 - 50	7	Susceptible (S)
> 50	9	Highly susceptible (HS)

In the second trial, a total of 81 entries which included seven resistant and 24 moderately resistant cultures from the first trial, eight pre-release cultures, 34 advanced breeding materials of AVT and IVT and eight multi location cultivars were screened for their reaction to SPB under field condition during *Kharif*, 1996. Each entry was sown in a five metre row with a spacing of 30 cm x 30 cm in plots of 5 m x 2.7 m. In each plot, first and ninth rows were sown with TMV 3 as susceptible check, fifth row was sown with a determinant type DT. 9-3-1-42-2 as resistant check and other rows were sown with the test entries. The methodology followed was the same as in previous trial.

Results and Discussion

Out of 239 germplasm entries screened based on the bug population, 29 entries were rated as resistant (R) (grade 1), which recorded 1 to 5 bugs/5 plants. Eighty entries that recorded a bug population of 6 to 10 bugs were rated as moderately resistant (MR) (grade 3). Another 95 entries were categorised as moderately susceptible (MS) (grade 5) with 11 to 25 bugs. A total of thirty one entries were rated as susceptible(S) (grade 7) with 26 to 50 bugs and the remaining four entries as highly susceptible (HS) (grade 9) with > 50. (Table 2a)

Based on the pod damage, out of 239 germplasm entries only seven entries, namely, SI-1665, Dt 9-6-3-30-31, Dt-9-6-3-30-30, Dt-9-3-1-42-3, Dt-9-20-2-34-8, S143 and SI 173 were rated as resistant (R) (grade 1) with, 0.1 to 5.0 per cent pod damage and twenty four entries with 5.1 to 10.0 per cent pod damage were rated as moderately resistant (MR) (grade 3). A total of 156 entries were rated as moderately susceptible (MS) (grade 5) with 10.1 to 25.0 per cent pod damage. Susceptible (S) (grade 7) category included 49 entries with 25.1 to 50.0 per cent pod damage and three entries were rated as highly susceptible (HS) (grade 9) with > over 50 per cent pod damage. (Table 2b).

Of the 81 entries screened, based on the bug population, 63 entries were classified as moderately susceptible (MS) (grade 5) and 18 entries were rated as susceptible (S) (grade 7) with a population range of 11-25 and 26-50 bugs/5 plants, respectively (Table 3a).

Going by pod damage, twelve entries in which the per cent pod damage ranged from 10.1 to 25.0 were grouped under moderately susceptible (MS) (grade 5), 48 entries with 25.1 to 50.0 per cent pod damage were rated as susceptible (S) (grade 7) and 21 entries with > 50 per cent pod damage were put under the category highly susceptible (HS) (grade 9) (Table 3b).

In the first trial, of the 239 germplasm lines evaluated, only seven were grouped as resistant (R) while another 24 were classified as moderately resistant (MR) and the rest were susceptible. In the second trial, none of the entries including seven resistant and 24 moderately resistant accessions of the first trial were categorised as either resistant or moderately resistant. This clearly indicated that the entries which were classified as resistant and moderately resistant in the first trial might have actually escaped the bug attack. In general, it can be concluded that resistant sources are rare, for the pod bug, among the sesame accessions evaluated and none of them merit exploitation through breeding programmes.

Table 2a. Screening of sesame germplasm against *E sordidus* (Based on bug population)

Number of entries	Range of bug population (No.)	Grade	Category
29	1 to 5	1	Resistant (R)
80	6 to 10	3	Moderately resistant (MR)
95	11 to 25	5	Moderately susceptible (MS)
31	26 to 48	7	Susceptible (S)
4	52 to 61	9	Highly susceptible (HS)

Table 2b. Screening of sesame germplasm against *E. sordidus* (Based on per cent pod damage)

Number of entries	Range of bug population (No.)	Grade	Category
7	2.9 to 5	1	Resistant (R)
24	6 to 9.9	3	Moderately resistant (MR)
156	10.4 to 25	5	Moderately susceptible (MS)
49	25.2 to 45.3	7	Susceptible (S)
3	50.8 to 68	9	Highly susceptible (HS)

Table 3a. Screening of advanced breeding materials against *E. sordidus* (Based on bug population)

Number of entries	Range of bug population (No.)	Grade	Category
63	15 to 25	5	Moderately susceptible (MS)
18	26 to 41	7	Susceptible (S)

Table 3b. Screening of advanced breeding materials against *E. sordidus* (Based on pod damage)

Number of entries	Range of bug population (No.)	Grade	Category
12	15.6 to 24.9	5	Moderately susceptible (MS)
48	26.4 to 49.7	7	Susceptible (S)
21	54.2 to 64.5	9	Highly susceptible (HS)

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