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Field Screening of Sesame Accessions against Leaf Roller and Capsule Borer (*Antigastra catalaunalis* Dup.)

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One hundred accessions of sesame with susceptible (TC-25) and resistant check (SI-250) were screened under natural conditions during two consecutive seasons of 2013 and 2014 to identify sources of resistance against leaf roller and capsule borer (*Antigastra catalaunalis* Dup.) at AICRP (Sesame) centre of College of Agriculture, JNKVV, Tikamgarh (M.P.). The accessions were categorized based on 0 to 9 scoring methodology. In pooled analysis, flower damage ranged from 1.0 to 65.0 against 42.6 and 8.5% on susceptible and resistant checks, respectively, while capsules damage ranged from 0.25 to 15.0% against 9.0 and 2.0% on susceptible and resistant checks, respectively. In pooled analysis none of the accessions were found free from infestation of *A. catalaunalis*. Based on the cumulative scoring, thirteen accessions namely IS-355, IS-413-A, RJS-56-A, IS-58-2-A, NIC-16401-A, OLT-44, IS-425-C, SI-2670, SP-1162-B, IS-178-C, IC-14160-1, ES-110-C and resistant check SI-250 (RC) were rated as resistant. These could be a possible source of resistant and used in breeding programmes to develop resistant varieties.

Key Words: Sesame, *Antigastra catalaunalis* (Dup.), Screening, Accession

Introduction

Sesame (*Sesamum indicum* L.) is an ancient oilseed crop also known in India as til, ellu, beniseed, simsim and is a rich source of edible oil. In India, it is grown on 1.82 million ha with a total production of 0.68 million tonnes. The crop has very poor productivity of 376 kg/ha as compared to the world average productivity of 558 kg/ha (FAOSTAT, 2012). In India, sesame is cultivated in Rajasthan, Maharashtra, Gujarat, Madhya Pradesh, Andhra Pradesh, Karnataka, Uttar Pradesh, West Bengal, Odisha, Punjab and Tamil Nadu (Sankar Narayanan and Nadarajan, 2005). Damage due to insect pests is one of the major factors causing low productivity. The crop is attacked by 29 species of insect pests in different stages of its growth (Biswas *et al*., 2001). Among these, leaf roller/capsule borer (*Antigastra catalaunalis* Dup.) is one of the major pests of sesame. It damages the crop during vegetative, flowering and maturity stages of growth. Larvae feed on the tender shoots of the host plants; roll the leaves and make nest by webbing of the leaves together, whereas at flowering stage it feeds on the flowers and at capsule stage it bores into the capsules. It causes economic loss to an extent of 43.1% (Gupta *et al.,* 2002). Chemical insecticides are widely used for the management of this pest but it is not environment friendly. Development of resistant variety is a cheap, viable and environment friendly approach to overcome this problem. Considering this, evaluation studies of the sesame accessions to identify the resistant line against *A. catalaunalis* were carried out.

Materials and Methods

One hundred accessions of sesame with susceptible (TC-25) and resistant check (SI-250) were screened under natural conditions against *A. catalaunalis* at AICRP (Sesame) centre of College of Agriculture, JNKVV, Tikamgarh (M.P.). Sesame accessions were provided by the Project Coordinating unit AICRP (Sesame & Niger), Jabalpur (M.P.). The experiment was conducted during two consecutive seasons of 2013 and 2014. The accession lines were sown in the first fortnight of July during each season with recommended agronomic practices except plant protection. Two rows of each accession were grown in 5 m row length with spacing of 45 cm between rows and 10 cm between plants. Two lines of susceptible checks (TC-25) were grown across the periphery of accessions lines as well as after every ten accession lines to create favorable environment for *A. catalaunalis* infestation. Observations on damage caused by *A. catalaunalis* were recorded at flowering (45 DAS) and capsule stage (70 DAS) on ten randomly

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selected plants of each genotype. The per cent damage was calculated according to the equation.

$$\text{Per cent damage (Flower or capsule)} = \frac{\text{Number of damaged flowers or capsules)}}{\text{Total number of flowers or capsules}} \times 100$$

Per cent flower and capsule damage of two seasons were pooled. Range of damage per cent of each reaction was taken according to AICRP on Sesame and Niger (Anonymous, 2014) presented in Table 1. According to reaction, first the accessions were categorized 0-9 score chart formulated by Sridhar and Gopalan (2002), but with modification of range of per cent of damage. According to cumulative score, allotted a grade and resistant rating of each accession.

Results and Discussion

In the first year of field screening of accessions, flowers damage were ranged from 2.7 to 85.0% against 56.0 and 12.0% on susceptible and resistant checks, respectively. In the second year of field screening, it ranged from 0.0 to 73.3% against 29.2 and 4.9% on susceptible and resistant checks, respectively. Pooled analysis of flowers damage ranged from 1.0 to 65.0 against 42.6 and 8.5% on susceptible and resistant checks, respectively. Our results are in parallel with those of Shrivastava *et al.* (2002), who reported flower damage by *A. catalaunalis* up to 75.0%.

Capsules damage varied from 0.0 to 17.2% against 10.6 and 3.1% on susceptible and resistant checks, respectively, during the first year of field screening, while it was varied from 0.0 to 12.5% against 7.3 and 0.8% on susceptible and resistant checks, respectively during second year of field screening. Pooled analysis of capsule damage ranged from 0.25 to 15.0% against 9.0 and 2.0% on susceptible and resistant checks, respectively. In pooled analysis none of the accessions were found free from infestation of *A. catalaunalis*. Parallel finding was also reported by Gupta (2004) and Kumar *et al.* (2010). In the present study, flowers and capsules were damaged maximally in almost all the accessions of first year of field screening; it was directly related to the incidence of *A. catalaunalis*. Comparable finding was also reported by Balaji and Selvanarayanan (2009).

Based on the cumulative scoring of accessions, thirteen accessions namely IS-355, IS-413-A, RJS-56-A, IS-58-2-A, NIC-16401-A, OLT-44, IS-425-C, SI-2670, SP-1162-B, IS-178-C, IC-14160-1, ES-110-C and resistant check SI-250 (RC) were rated resistant, 46, 40 and 3 accessions were rated moderately resistant, moderately susceptible and susceptible, respectively (Table 2). Results of field screening revealed that most of the accessions were rated moderately resistant and moderately susceptible, while none of the accessions were found highly susceptible. Gupta (2004), Balaji and Selvanarayanan (2009) also reported that none of the accessions were found highly susceptible. It is concluded, that the accessions IS-355, IS-413-A, RJS-56-A, IS-58-2-A, NIC-16401-A, OLT-44, IS-425-C,

Table 1. Scoring and grading methodology of sesame accessions for resistant against *A. catalaunalis*

Per cent damage		Score	Cumulative score	Grade	Degree of resistance
Flower	Capsule				
Up to 10	Up to 5	**1**	0-1	1	Resistant (R)
11-20	6-10	3	1.1 – 3	3	Moderately resistant (MR)
21-30	11-15	5	3.1-5	5	Moderately susceptible (MS)
31-50	16-25	7	5.1-7	7	Susceptible (S)
Above 50	Above 25	9	7.1-9	9	Highly susceptible (HS)

Table 2. Number of accessions under different category

Degree of resistance	Number of accessions	Name of accessions
Resistant (R)	13	IS-355,IS-413-A, RJS-56-A, IS-58-2-A, NIC-16401-A, OLT-44, IS-425-C, SI-2670, SP-1162-B, IS-178-C, IC-14160-1, ES-110-C, SI-250 (RC)
Moderately resistant (MR)	46	GSM-22, EC-310421, NIC-8526, SI-2973, NIC-8984, KMR-77-1, S-0429-A, GRT-00115-A, SI-1665, OLT-61-A, IS-353-A, NIC-17335-A, IS-280-A, IS-296-A, IS-607-A, NIC-16095-A, DSK-1-A, S-0062-A, SI-1016, IS-481, IS-52, IS-552, IS-56-1, IS-8480-B, IS-607-1-84,ES-35-B,ES-72-C-B, SI-7818-B,SI-2182-B ,NIC-10645,SI-953-B,IC-204962,EC-303417,IS-152,IS-1804-A ,SI-1074-1, NIC-16124-A ,EC-303454-A, NIC-16114-A, IC-204139, IC-43177-A , SI-3279-1, S-0185, IC-205649,NIC-9627, IC-14146-C
Moderately susceptible (MS)	40	IC-14093, SI-2116, GRT-83135, MT-6725, NIC-16328, NIC-16275, GRT-83125, NAL/28/27/31/4, IS-52359-A, SI-3178-1, SI-318, NIC-16236, IS-722, ES-165-B, SI-255-1, IS-104, RJS-738-1-84, IS-319-1, IS-3100, IS-1848, SI-1667-2, IS-17-1, ES-234-1-84, NIC-8252, SI-788, S-0025-1, IS-250, IS-615, KMR-71, ES-127-B, NIC-16237, ES-3196, SI-75, IS-74, SP-3267,RME-111, NIC-8224-A, SI-3315-16, SI-1188-1, TC-25 (SC)
Susceptible (S)	3	IS-65, NIC-16227-A, IC-1025-A

SI-2670, SP-1162-B, IS-178-C, IC-14160-1, ES-110-C and SI-250 could be a possible source of resistant and it could be used in breeding programme to develop resistant varieties.

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