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EVALUATION OF TOMATO GENOTYPES AGAINST FRUIT BORER *HELICOVERPA ARMIGERA*

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ABSTRACT

Screening of 21 tomato genotypes for their susceptibility to the fruit borer *Helicoverpa armigera* under revealed that all genotypes are susceptible. However, the genotype SK-TVAR 1093 gave maximum fruit yield of 350.46 q/ ha with damage of 6.35 and 7.64% on number and weight basis, respectively. The least fruit yield of 267.96 q/ha with damage of 33.52 and 32.64% (on number and weigh basis, respectively) was in the genotype SK-TVAR 1107. Among the commercial cultivars, maximum yield was obtained (311.19 q/ ha) in Punjab Chuhura (damage being 12.79 and 12.10%, on number and weight basis, respectively; *Arka Vikas* (284.47 q/ ha) revealed the least yield (with 30.76 and 32.62%, respectively). Genotypes SK-TVAR-1048, SK-TVAR-1093, SK-TVAR-1142, SK-TVAR-1181 and H-86 with < 10.0% damage could be categorized as resistant; and the maximum damage of 30.1- 40.0% was in the genotypes SK-TVAR-1018, SK-TVAR-1107, SK-TVAR-1121 and *Arka Vikas*, thus categorized as susceptible.

Key words: Fruit borer, resistance, susceptibility, tomato genotypes, fruit damage, number, weight, Punjab Chuhura,

About 200 insect pests are known to infest tomato, of these the fruit borer, *Helicoverpa armigera* (Hubner) (Lepidoptera: Noctuidae) is the serious one (Fery and Cuthbert, 1974; Cosenza and Green, 1979; Lange and Bronson, 1981; Jayaraj, 1982; Sachan,1992). Indiscriminate use of insecticides against this pest has resulted in the development of resistance in certain parts of the country (Singh, 1990). Among the IPM components, host plant resistance is the one that is compatible with insecticides. Cultivation of *Helicoverpa*-resistant tomato cultivars is limited due to a lack of data on potential genetic sources and plant mechanisms (antixenosis) of resistance. Keeping these in view, the present study evaluates some tomato genotypes for their resistance to the fruit borer, *H. armigera.*

MATERIALS AND METHODS

A field experiment was laid out during kharif, 2016 with the seedlings of tomato genotypes procured from the Vegetable Nursery, Division of Vegetable Science, SKUAST-Kashmir, Shalimar and raised at Experimental Farm, Entomology, Faculty of Agriculture, Wadura. The seedlings were transplanted on 4th May, 2016 in Randomized Block Design with three replications each in row to row and plant to plant spacing of 60 x 60 cm in plot size of 3 x 2.5 m. The crop was raised as per agronomical package of practices of SKUAST-Kashmir (Anonymous, 2015). The fruit infestation was recorded from five randomly selected and tagged plants, at three weeks after transplanting. After each picking, weight and number of tomato fruits were observed for each genotype/ plot. The damaged fruits (presence of holes/ or any other damage symptom) were separated from the healthy fruits. The weight of healthy fruits in each picking was observed and the total yield calculated per ha basis. A rating system for fruit damage (Kashyap and Verma, 1986) was followed as given herein: No damage- Highly Resistant; 0 to 10.0%fruits damage – Resistant; 10.1 to 20.0%damage - Moderately resistant; 20.1 to 30.0%damage- Moderately susceptible; 30.1-40.0%damage- Susceptible; and 40.1%and above damage - Highly susceptible.

RESULTS AND DISCUSSION

The tomato genotypes were field screened for their relative susceptibility/resistance to infestation by *H. armigera* on number and weight basis. Fruit damage (on number basis) at first fruit harvest during first fortnight of July (28SW) gradually increased in succeeding weeks till first fortnight of August (32 SW); and thereafter declined till crop attained senescence. The cumulative

infestation over one and half month of harvesting revealed a minimum fruit damage of 6.35% in genotype SK-TVAR-1093 followed by others (Table 1). Among the commercial varieties, the least fruit infestation was recorded in cultivar Punjab Chuhara (12.79%) followed by Roma (16.02%), Local (19.61%), Punjab Ratta (21.67%), Kashi Aman (23.06%) and Arka Vikas (30.76%). Fruit damage (on weight basis) during initial week of picking in the first fortnight of July (28SW) either gradually increased/ decreased in succeeding weeks till first fortnight of August (32 SW), and in some genotypes increased till crop attained senescence.

The cumulative infestation during entire crop growth at successive pickings revealed a least damage of 7.64% in genotype SK-TVAR-1093 followed by others, with the maximum being in the genotype SK-TVAR-1121 (33.54%). Among commercial varieties, the least fruit infestation was observed in Punjab Chuhara (12.10%) followed by Roma (15.82%), Local ((17.06%), Punjab Ratta (24.48%), Kashi Aman (26.34%) and Arka Vikas (32.62%).

These results corroborate with those of Singh et al. (2011**)** who found none of the screened tomato hybrids as highly resistant. The maximum infestation of 37.69% observed by Sajjad et al. (2011) is more or less in confirmation with present observations. Wani et al. (1998) observed 34.76 and 33.87% infestation on number and weight basis in the cultivar Arka Vikas; 16.02 and 15.82% infestation in the cultivar Roma in the present study is corroborated by Wani et al. (1998).

The genotype SK-TVAR 1093 gave maximum fruit yield of 350.46 q/ha; it was the least infested with lowest larval population (0.39/plant) and fruit damage of 6.35 and 7.64% on number and weight basis, respectively. Among the commercial cultivars, maximum yield of 311.19 q/ha was in Punjab Chuhura with lowest larval population (0.79/plant) and least fruit infestation of 12.79 and 12.10% on number and weight basis, respectively. These observations corroborate with those of Ashfaq et al. (2012) and Usman et al. (2013).

Genotypes SK-TVAR-1048, SK-TVAR-1093, SK-TVAR-1142, SK-TVAR-1181 and H-86 with infestation <10% are thus categorized as resistant; infestation between 10.1 to 20.0% in the genotypes SK-TVAR-1101, SK-TVAR-1083, SK-TVAR-1089, SK-TVAR-209, BRDT-2, BRDT-3, Local, Punjab Chuhura

Table 1. Evaluation of tomato genotypes against *H. armigera* (2016)

S. No.	Genotypes/varieties	Mean larval population	Fruit damage (%)		Yield (q/ha)
			No. Basis	Wt. Basis	
1.	SK-TVAR-1107	1.79	33.52	32.64	267.96
2.	SK-TVAR-1101	0.71	11.78	12.93	313.38
3.	SK-TVAR-1181	0.59	9.16	8.65	319.16
4.	SK-TVAR-1089	0.86	13.04	11.03	308.22
5.	SK-TVAR-1018	1.66	32.81	31.68	277.29
6.	SK-TVAR-1093	0.39	6.35	7.64	350.46
7.	SK-TVAR-1134	1.39	24.06	26.21	285.26
8.	SK-TVAR-1142	0.53	8.77	8.65	322.44
9.	SK-TVAR-1048	0.42	7.82	9.41	339.47
10.	SK-TVAR-1121	1.53	31.05	33.54	279.21
11.	SK-TVAR-1083	0.71	11.24	12.29	313.40
12.	SK-TVAR-209	1.19	20.42	21.49	290.98
13.	BRDT-2	0.93	14.03	15.29	303.54
14.	BRDT-3	0.99	15.45	12.06	298.43
15.	H-86	0.66	10.62	8.29	318.80
16.	Arka Vikas	1.46	30.76	32.62	284.27
17.	Kashi Aman	1.33	23.06	26.34	287.96
18.	Local	1.13	19.61	17.06	291.51
19.	Punjab Chuhura	0.79	12.79	12.10	311.19
20.	Punjab Ratta	1.26	21.67	24.48	289.37
21.	Roma	1.03	16.02	15.82	296.51

and Roma get categorized as moderately resistant; and genotype SK-TVAR-1134, Kashi Aman and Punjab Ratta with 20.1 to 30.0% damage as moderately susceptible; and with 30.1 to 40.0% in the genotypes SK-TVAR-1018, SK-TVAR-1107, SK-TVAR-1121 and Arka Vikas, as susceptible.

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