

Screening of brinjal varieties/lines resistance to brinjal shoot and fruit borer, *Leucinodes orbonalis* Guenee

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Abstract: The experiment was conducted with twenty brinjal varieties/lines at Plant Pathology Farm Field, Bangladesh Agricultural University, Mymensingh during the period from October 2007 to May 2008 to identify their characteristics for susceptibility/resistance against brinjal shoot and fruit borer infestation. In case of shoot infestation, the varieties/lines Katabegun WS, and Marich begun S were found to be tolerant while the varieties/lines Amjuri, Borka, Dharola, Deembegun, ISD 006, Kajla, Khatkhatia BAU, Laffa S, Singnath, Thamba and Uttara were found to be moderately tolerant; BL-118, Eye red, Islampuri BADC, Irribegun and Nayantara were found to be susceptible; Bijoy and Kaikka N were found to be highly susceptible. In case of fruit infestation, the varieties/lines Thamba and Katabegun WS were found to be tolerant while the varieties/lines Amjuri, BL-118, ISD 006, Islampuri BADC, Irribegun, Marich begun S, Kajla, Khatkhatia BAU, Laffa S and Singnath were found to be moderately tolerant; Borka, Dharola, Deembegun, Eye red, Kaikka N, Nayantara and Uttara were found to be susceptible and the variety Bijoy was found to be highly susceptible.

Key words: Screening, varieties/lines, brinjal shoot and fruit borer.

Introduction

Vegetable constitute important items in our daily food. Brinjal/eggplant (*Solanum melongena*) belongs to the family solanaceae. It is one of the most popular and principal vegetable crops. In Bangladesh, brinjal is the second most important vegetable crop after potato in relation to its total production (Anonymous, 1996). All over Bangladesh, brinjal is cultivated in the kitchen garden and also in large farms throughout the year. Various insects cause enormous losses to brinjal in all the seasons throughout year in Bangladesh (Alam, 1969). The brinjal is attacked by 53 species of insect pests (Nayar *et al.*, 1995). Among them the most serious and destructive one is the brinjal shoot and fruit borer, *Leucinodes orbonalis* Guenee, in Bangladesh (Alam and Sana, 1964; Alam, 1969) and India (Tewari and Sandana, 1990) and also a major pest in other countries of the world (Dhankar, 1988).

Only the larvae of this pest cause damage to shoots from 12-16 % and fruits from 20-60 % (Alam, 1970; Maurel *et al.*, 1982). It is very active during the rainy and summer seasons and often causes more than 90% damage (Ali *et al.*, 1980; Kalloo, 1988). The yield loss has been estimated up to 86% (Ali *et al.*, 1980) in Bangladesh and up to 95% (Naresh *et al.*, 1986) in

India. Indiscriminate use of synthetic chemicals for the controlling insects pest of crop plants resulted hazardous effects causing serious problems including pest resistance, secondary pest outbreak, pest resurgence and environmental pollution. In view of this requirement, the present study was undertaken to find out the resistant/tolerant brinjal varieties/lines against brinjal shoot and fruit borer.

Materials and Methods

For the experiment twenty brinjal varieties/lines were used. The experiment was laid out in a Randomized Complete Block Design (RCBD) with three replications. The experimental field was divided into three blocks and each block consisted of twenty lines. The size of the whole field was 40m x 20m. In case of shoot, the data were recorded at 60, 80, 100 and 120 days after transplanting but in case of fruit, the data were recorded at 80, 100, 120 and 140 days after transplanting. The data were analyzed by using MSTAT Package Computer Program and mean difference were adjusted with DMRT. The levels of resistance were graded on the basis of infestation following the scale of Subbarotnam and Butani (1981) as outlined in table 1.

Table 1: Grade index of Subbarotnam and Butani (1981)

Grade	% of shoot infestation	% of fruit infestation
Tolerant	<2.0	<15.0
Moderately tolerant	2.1-3.0	16.0-25.0
Susceptible	3.1-5.0	26.0-40.0
Highly susceptible	>5.0	>40.0

Results and Discussion

Shoot infestation caused by brinjal shoot and fruit borer of twenty selected brinjal varieties/lines at different days after transplantation (DAT)

Shoot infestation of different brinjal varieties/lines at different days after transplantation has been presented in table 2. The lowest shoot infestation was found in

the varieties/lines Borka (1.65), Katabegun WS (1.60), Katabegun WS (1.99) and Marich begun S (1.41) at 60, 80, 100 and 120 DAT respectively. The highest shoot infestation was found in the varieties/lines Bijoy (4.54), Kaikka N (6.05), Kaikka N (5.81) and Bijoy (4.65) at 60, 80, 100 and 120 DAT respectively. The average lowest shoot infestation was found in Katabegun WS (1.65) which was significantly different from all other

varieties/lines except Marich begun S and occupied the 20th position in the ranked order. The average highest shoot infestation was found in the variety Kaikka N (5.14) which was significantly different from all other varieties/lines except Bijoy and occupied the first position in the ranked order. On an average, the variety Katabegun WS, and Marich begun S were found to be tolerant. The varieties/lines Amjuri, Borka, Dharola, Deembegun, ISD 006, Kajla, Khatkhatia BAU, Laffa S, Singnath, Thamba and Uttara were found to be moderately tolerant. The varieties/lines BL-118, Eye red, Islampuri BADC, Irribegun and Nayantara were found to be susceptible, whereas, the varieties/lines Bijoy and Kaikka N were found to be highly susceptible. Among the twenty brinjal varieties/lines none was found resistant to brinjal shoot and fruit borer. The presence of thin stem, more branches, lower third leaf length and width, more spines, rough leaf surface area, heavily lignified thick cuticle, broad and thick hypodermis, closely packed vascular bundle and small pith area may be responsible for lower infestation and vice versa incase of higher infestation (Ali *et al.*, 1994; Hossain *et al.*, 2002; Mishra *et al.*, 1988.).

Fruit infestation caused by brinjal Shoot and fruit borer of twenty selected brinjal varieties/lines at different days after transplantation (DAT)

Fruit infestation of different brinjal varieties/lines at different days after transplantation has been presented in table 3. The lowest and highest fruit infestation were found in the varieties/lines Thamba (3.07) and Borka (32.28), Thamba (11.34) and Borka (43.22), Thamba (11.24) and Bijoy (56.14), Katabegun WS (23.08) and Bijoy (44.04) at 80, 100, 120 and 140 DAT respectively. The average lowest fruit infestation was found in the variety Thamba (13.05) which was significantly different from other varieties/lines except Katabegun WS and hold 20th position in the ranked order. The average highest fruit infestation was found in Bijoy (40.97) which was significantly different from all other varieties/lines and occupied first position in the ranked order. On an average, the varieties/lines Thamba and Katabegun WS were found to be tolerant and the varieties/lines Amjuri, BL-118, ISD 006, Islampuri BADC, Irribegun, Marich begun S, Kajla, Khatkhatia BAU, Laffa S and Singnath were found to be moderately tolerant. The varieties/lines Borka, Dharola, Deembegun, Eye red, Kaikka N, Nayantara and Uttara were found to be susceptible whereas, the variety Bijoy was found to be highly susceptible. Among the twenty brinjal varieties/lines none was found resistant to brinjal shoot and fruit borer. The lower fruit infestation may be found due to the presence of smaller fruit diameter and weight and more seed presence in the fruit.

Table 2: Shoot infestation caused by brinjal shoot and fruit borer of twenty selected brinjal varieties/lines at different days after transplantation (DAT)

Varieties/Lines	Shoot infestation caused by BSFB (%)					Ranked order	Level of resistance
	60 DAT	80 DAT	100 DAT	120 DAT	Mean		
Amjuri	1.68ef	2.21g	2.44gh	2.12h-j	2.03 l	18	MT
BL-118	1.67ef	3.08de	4.29bc	4.26ab	3.32de	6	S
Bijoy	4.54a	5.30b	5.77a	4.653a	5.04a	2	HS
Borka	1.653f	2.61fg	3.83cd	3.16cd	2.81g-i	11	MT
Dharola	2.63b-d	2.87d-f	2.98fg	2.46f-h	2.74h-j	13	MT
Deem begun	2.06d-f	2.61fg	3.14ef	2.12h-j	2.49jk	16	MT
Eye red	2.31c-f	5.30b	4.84b	4.65a	4.27b	3	S
ISD 006	1.76ef	2.52fg	3.64de	2.69ef	2.64i-k	15	MT
Islampuri BADC	2.12c-f	3.68c	5.53a	4.10b	3.90c	4	S
Irribegun	2.65b-d	2.58fg	3.99c-d	3.42c	3.19ef	7	S
Kaikka N	4.26a	6.05a	5.81a	4.42ab	5.14a	1	HS
Kajla	3.42b	2.70ef	3.55d-f	2.92de	3.09ef	8	MT
Katabegun WS	1.76ef	1.60h	1.99h	1.77jk	1.65m	20	T
Khatkhatia BAU	1.67ef	2.58fg	2.93fg	2.23g-h	2.43k	17	MT
Laffa S	1.89d-f	3.19d	2.93fg	2.59e-g	2.64i-k	14	MT
Marich begun S	1.88d-f	1.73h	2.43gh	1.41k	1.74m	19	T
Nayantara	2.00d-f	3.74c	4.67b	3.49c	3.50d	5	S
Singnath	2.93bc	2.51fg	3.41d-f	1.83ij	2.76hi	12	MT
Thamba	2.89bc	3.10de	3.38d-f	2.93de	3.04fg	9	MT
Uttara	2.51c-e	3.08de	3.79cd	2.59e-g	2.99f-h	10	MT
S.E	0.37	0.61	0.27	0.19	0.022		
CV (%)	18.82	7.88	8.94	7.94	4.83		

Within column means followed by same letter(s) did not differ significantly at P<0.05 by DMRT, H S = Highly susceptible, S =Susceptible, MT = Moderately tolerant, T = Tolerant

Table 3: Fruit infestation caused by brinjal Shoot and fruit borer of twenty selected brinjal varieties/lines at different days after transplantation (DAT)

Varieties/ Lines	Brinjal fruit infestation caused by BSFB (%)					Ranked order	Level of resistance
	80 DAT	100 DAT	120 DAT	140 DAT	Mean		
Amjuri	15.56d-g	19.98d-g	24.44h-j	25.01bc	21.22g	15	MT
BL-118	16.74c-g	21.32c-f	21.41i-k	32.38a-c	21.28g	14	MT
Bijoy	26.04ab	33.44b	56.14 a	44.04 a	40.97a	1	HS
Borka	32.28a	43.22a	36.41cd	34.59a-c	36.01b	2	S
Dharola	26.08b	32.52b	34.60c-e	36.17a-c	33.00c	4	S
Deem begun	23.76bc	24.99c	25.62hi	32.20a-c	25.57f	9	S
Eye red	20.57b-e	31.56b	37.67 c	35.56a-c	31.75c	5	S
ISD 006	16.85c-g	24.59cd	26.70f-i	36.40a-c	24.70f	11	MT
Islampuri BADC	13.69e-g	32.37b	43.66 b	43.29a	35.50b	3	MT
Iribegun	20.30b-e	34.25b	29.75e-h	27.03bc	28.34e	8	MT
Kaikka N	19.27b-e	25.21c	36.16cd	39.80ab	31.01cd	6	S
Kajla	11.24f-h	18.15fg	32.24c-f	30.44a-c	24.09f	13	MT
Katabegun WS	3.810ij	12.37h	17.63k	23.08c	14.18i	19	T
Khatkhatia BAU	22.04b-d	18.91f-g	18.97jk	32.04a-c	20.68g	16	MT
Laffa S	9.97g-h	16.86fg	23.70ij	31.48a-c	19.93g	17	MT
Marich begun S	3.23j	15.70gh	25.86g-i	31.97a-c	17.19h	18	MT
Nayantara	10.11g-i	19.91d-g	31.43d-g	37.32a-c	25.53f	10	S
Singnath	5.41h-j	21.06c-f	33.69c-e	33.33a-c	24.23f	12	MT
Thamba	3.07j	11.34 h	11.24 l	32.04a-c	13.05i	20	T
Uttara	17.23c-f	23.13c-e	32.94c-e	38.18a-c	29.24de	7	S
S.E	3.00	2.10	2.56	6.53	1.15		
CV (%)	23.22	10.69	10.51	23.68	5.43		

Within column means followed by same letter(s) did not differ significantly at $P < 0.05$ by DMRT, H S = Highly susceptible, S = Susceptible, MT = Moderately tolerant, T = Tolerant

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