



Screening of brinjal genotypes for shoot and fruit borer (*Leucinodes orbonalis* Guenee.) under hill zone of Karnataka

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Abstract: The present investigation was carried out at College of Horticulture, Mudigere situated under hill zone of Karnataka. Twenty eight brinjal genotypes were screened and observed for the incidence of shoot and fruit borer. Among the twenty eight genotypes none of them were immune/highly resistant to fruit and shoot borer infestation. Shoot and fruit borer incidence on fruit was lower in the genotypes Arka Neelkant (13.80%) followed by IC354597 (19.65%) and Shyamala (20.25%) and higher incidence was recorded in genotypes R-2551 (73.74%), R-2588 (70.89%) and L-3261 (70.66%) recorded higher incidence. Arka Neelkant and IC354597 were found be fairly resistant. Whereas, Alduru Local, R-2554, IC332508, L-3261, IC420590, R-2551, R-2588, IC281112, IC90151, IC374892, IC545884 and R-2592 were highly susceptible genotypes.

Key words: Brinjal, Genotypes, Hill zone, Karnataka, Shoot and fruit borer, Screening

Introduction

Brinjal (*Solanum melongena* L.) belongs to the family *Solanaceae*, having chromosome number of $2n=24$ and referred by different names viz. Egg plant, Aubergine (French), Baingan (Hindi), Badanekai (Kannada), Vangi (Marathi) and Vankai (Telugu), Katharikai (Tamil), etc. According to Vavilov (1928) centre of origin of brinjal is the Indo-Burma region. Crop improvement is a holistic activity in which pest and disease suppression is an integral component. In other words, resistance breeding should not be an adjunct to the main stream of breeding efforts. Among the major pests infesting the crop, shoot and fruit borer (*Leucinodes orbonalis* Guenee.) is the most limiting factor distributed all over the India, causing heavy yield losses up to 70% (Jat and Pareek, 2003). Therefore, there is need to study the extent of incidence of this pest among the genotypes and to classify them into immune, resistant and susceptible genotypes which would be helpful in further crop improvement programme.

Materials and Methods

The screening was done with twenty eight brinjal genotypes at College of Horticulture, Mudigere, which is situated in the Western Ghats and represents the typical hill zone (Zone-9 and Region-V) of Karnataka and lies at $13^{\circ}25'$ North latitude and $75^{\circ}25'$ East longitude with an altitude of 980 m above mean sea level. The experiment was laid out in Randomized Complete Block Design (RCBD) with two replications during the year 2015. A spacing of 75×75 cm was followed. All the cultural operations except the plant protection measures were followed as per package of practice. Five plants were randomly selected and observations were recorded for the incidence of shoot and fruit borer in each brinjal genotype from transplanting to harvest. Damaged and undamaged fruits, from randomly selected plants in each genotype were counted in all pickings. Per cent fruit infestation

was calculated by the method suggested by Wakil *et al.* (2009). The infestation level in each genotype was classified as per the method adopted by Kale *et al.* (1986) and details are given in table 2.

Result and Discussion

The data pertaining to per cent shoot and fruit borer infestation, Categorization of brinjal genotypes based on the mean per cent fruit infestation by shoot and fruit borer and *per say* performance of each of the genotypes is given in Table 1, Table 2 and Table 3, respectively. Among the twenty eight genotypes none of them were immune/highly resistant to shoot and fruit borer infestation. Arka Neelkant and IC354597 were found be fairly resistant with infestation of 13.80% and 19.65%, respectively. This might be due to presence of many biochemical factors which are known to be associated with insect resistance in genotypes. It is obvious in many cases that the biochemical compounds are more important than morphological and physiological factors in conferring non-preference and antibiosis. Some biochemical constituents may act as feeding stimuli for insects. Occurrence at lower concentration or total absence of such biochemicals leads to insect resistance. These results are in consonance with findings of Singh (1983). The biochemical constituents like glycoalkaloid (solasodine), phenols, phenolic oxidase enzymes viz., polyphenol oxidase and peroxidase are available in brinjal and these biochemical constituents possess insect resistant properties. This is in support with the findings of Kalloo (1988). Doshi *et al.* (1998) suggested that selection of genotypes with higher glycoalkaloid (solasodine) content, total phenols and polyphenol oxidase activity which would help to improve resistance to shoot and fruit borer infestation without compromising yield potential. Similarly, Soundararajan and Baskaran (2001) found that the solanine content and total phenols reduced the insect population in brinjal. Screening of brinjal genotypes against shoot and fruit borer

Table-1: Mean percent infestation by shoot and fruit borer in different genotypes (Values in parenthesis represent arcsine transformed value)

Genotypes	% infestation
L-3267	37.01 (37.47)
IC410129	25.75 (30.49)
Alduru Local	50.19 (45.10)
Devanuru Local	30.36 (33.43)
R-2554	41.57 (40.16)
Shyamala	20.25 (26.74)
IC332508	56.13 (48.52)
R-2589	37.33 (37.66)
Kanathi Local	36.12 (36.94)
L-3261	70.66 (57.20)
IC420590	47.29 (43.44)
R-2551	73.74 (59.17)
IC354597	19.65 (26.31)
R-2588	70.89 (57.34)
IC281112	40.85 (39.72)
IC354140	24.17 (29.44)
L-3272	33.75 (35.51)
Arka Neelkant	13.80 (21.80)
Pusa Kranthi	36.88 (37.39)
IC397557	28.64 (32.35)
L-3266	31.91 (34.39)
Pusa Purple Long	27.15 (31.40)
Arka Shirish	24.36 (29.57)
R-2587	38.66 (38.44)
IC90151	63.39 (52.76)
IC374892	46.19 (42.79)
IC545884	40.91 (39.76)
R-2592	43.05 (41.00)
Mean	39.66
S.Em ±	2.79
C.D (5%)	8.64

Table-2: Categorization of brinjal genotypes based on the mean percent fruit infestation by shoot and fruit borer

Category	% infestation	Genotypes
Immune	0	-
Highly resistant	1-10	-
Fairly resistant	10-20	Arka Neelkant, IC354597
Tolerant	20-30	IC410129, IC397557, Shyamala, IC354140, Pusa Purple Long, Arka Shirish
Susceptible	30-40	L-3267, Devanuru Local, R-2589, Kanathi Local, L-3272, Pusa Kranthi, L-3266, R-2587
Highly susceptible	>40	Alduru Local, R-2554, IC332508, L-3261, IC420590, R-2551, R-2588, IC281112, IC90151, IC374892, IC545884, R-2592

Table-3: *Per se* performance of genotypes for morphological and yield attributes

Genotypes	1	2	3	4	5	6	7	8	9	10	11	12	13
L-3267	63.60	8.65	82.50	42.50	63.00	3.30	5.10	2.50	4.16	10.30	9.64	94.50	1.71
IC410129	54.95	8.60	75.80	45.00	50.50	3.60	2.90	1.50	3.51	5.75	10.35	73.50	1.31
Alduru Local	62.95	7.80	69.69	35.00	53.50	4.20	6.00	1.10	3.40	13.06	10.81	93.50	0.90
Devanuru Local	68.77	8.65	63.25	63.50	73.50	4.00	3.40	1.40	4.53	21.30	9.71	98.50	2.32
R-2554	52.00	5.90	58.25	45.50	54.50	2.60	2.50	1.10	3.89	13.85	10.45	90.00	0.60
Shyamala	49.25	6.55	76.00	56.50	68.50	3.90	4.20	1.00	2.97	14.38	9.31	86.50	0.89
IC332508	67.40	7.50	79.65	25.50	53.50	3.10	4.00	1.00	3.65	11.96	10.32	97.50	1.43
R-2589	64.59	6.20	58.00	40.50	54.50	3.00	2.40	1.35	3.15	8.23	11.22	60.50	0.44
Kanathi Local	62.05	9.25	68.10	48.50	67.50	2.10	6.50	1.30	4.25	5.08	5.27	74.50	1.68
L-3261	61.90	7.85	69.50	46.50	79.00	3.00	5.10	1.00	3.28	12.16	10.00	94.00	1.46
IC420590	69.25	7.10	55.20	41.00	50.50	2.30	5.70	1.00	3.48	7.67	7.44	65.50	1.10
R-2551	71.35	7.85	84.20	37.00	64.00	2.20	4.20	1.00	4.32	7.32	7.42	62.00	1.39
IC354597	58.40	8.75	67.24	41.00	51.00	5.90	3.10	3.00	6.24	17.88	8.67	63.50	0.83
R-2588	58.80	9.00	74.15	45.50	69.00	3.00	3.40	1.65	4.26	8.17	8.77	80.50	0.97
IC281112	62.85	8.20	82.10	44.50	68.50	2.40	3.70	1.65	4.56	13.93	8.19	61.00	1.06
IC354140	68.25	7.00	63.85	43.00	51.50	5.50	5.50	3.00	5.77	7.55	8.22	70.50	2.00
L-3272	64.85	4.50	44.00	45.00	53.00	2.40	4.10	1.00	5.35	10.49	9.21	70.00	1.29
Arka Neelkant	49.15	4.85	68.75	42.50	51.00	5.40	4.10	2.90	6.48	9.95	9.10	69.50	1.19
Pusa Kranthi	49.40	8.85	67.10	40.50	48.50	2.90	4.90	1.00	3.73	12.06	9.20	68.50	1.24
IC397557	72.89	9.70	80.55	36.50	55.00	2.75	3.50	1.10	4.23	16.23	5.95	69.00	1.18
L-3266	54.60	8.25	56.05	41.00	49.00	2.50	4.80	1.00	5.14	14.52	8.32	67.50	1.50
Pusa Purple Long	70.25	6.75	76.80	34.50	50.00	3.10	1.90	1.45	4.83	10.55	7.64	63.50	0.95
Arka Shirish	70.83	11.20	81.78	45.00	56.00	3.40	5.40	1.40	4.76	15.26	11.28	85.00	1.79
R-2587	54.00	8.15	70.80	54.50	60.50	2.10	3.50	1.00	3.44	8.19	7.39	98.50	1.07
IC90151	58.25	8.30	76.35	50.50	73.50	2.50	5.70	1.20	5.34	6.05	8.59	94.50	1.46
IC374892	66.90	7.40	77.40	52.50	70.00	2.70	3.30	1.30	4.56	8.12	8.65	94.00	1.02
IC545884	65.23	8.80	71.80	46.50	55.50	2.90	7.00	1.45	6.94	7.71	7.80	95.50	1.43
R-2592	61.55	8.60	78.90	59.00	78.50	2.60	4.30	1.10	7.11	5.34	8.29	107.00	1.53
Mean	61.94	7.86	70.62	44.80	59.75	3.19	4.29	1.44	4.54	10.82	8.83	80.30	1.53
S.Em ±	3.92	0.53	6.07	3.17	3.94	0.32	0.39	0.18	0.38	1.57	0.87	3.95	0.17
C.D. (5%)	11.38	1.54	17.61	9.21	11.44	0.93	1.14	0.51	1.09	4.56	2.42	11.45	0.51

1. Plant height (cm); 2. Number of primary branches; 3. Plant spread from east to west (cm); 4. Days to flowering; 5. Days to fifty percent flowering; 6. Number of flowers/cluster; 7. Number of clusters/plant; 8. Number of fruits/cluster; 9. Fruit diameter (cm); 10. Fruit length (cm); 11. Pedicel length (cm); 12. Days to picking; 13. Yield per plant (kg)

infestation have been also done by Elanchezhyan *et al.* (2008), Mannan *et al.* (2009) and Javed *et al.* (2011).

Highest shoot and fruit borer infestation on fruit was recorded in R-2551 (73.74%), R-2588 (70.89%) and L-3261 (70.66%). The susceptible nature of these genotypes towards borer infestation might be due to the low level of the biochemical constituents which may be insufficient to confer resistance to borer attack in the fruit. It is therefore, suggested that while selecting genotypes for shoot and fruit borer resistance, apart from their performance based on *per se*, due consideration may also be given on the quantity of biochemical constituents. These results are in agreement with previous findings of Prabhu *et al.* (2005).

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