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Varietal Resistance in Brinjal to Insect-Pests and Disease

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ABSTRACT

Field experiment conducted to study varietal resistance in brinjal to various insect-pests, disease and their yield potentiality in middle Gujarat agro-climatic conditions during kharif 1988 to 1990 showed significant differences in their resistance to jassid, *Amrasca biguttula biguttula* I., whitefly, *Bemisia tabaci* G., shoot and fruit borer, *Leucinodes orbonalis* G. and little leaf disease. Whereas, none of them showed resistance to aphid, *Aphis gossypii* G., Brinjal varieties Chaklasi doli, Doli-5 and Pusa purple cluster were found resistant to jassid, shoot and fruit borer and little leaf disease. Of course, Chaklasi doli and Doli-5 were found more susceptible to whitefly than Pusa purple cluster. However, Chaklasi doli and Doli-5 had significantly higher marketable fruit yield than Pusa purple cluster.

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INTRODUCTION

Brinjal, *Solanum melongena* L. is an important vegetable crop cultivated throughout the year which is damaged by a number of pests and diseases, Butani and Verma (1976). A wide variety of insecticides are used to control insect damage, Awasthi (1985). To minimize the use of synthetic insecticides and problems arised due to their frequent use, it is very essential to cultivate a resistant/ tolerant brinjal variety to pests and diseases. In view of this requirement an experiment was conducted to screen out the resistant/ tolerant brinjal varieties to pests and diseases at Gujarat Agricultural University during kharif, 1988 to 1990.

MATERIALS AND METHODS

Field experiment was conducted in a randomized block design with three replications. The plot size was 4.2 m x 3.6 m. The row to row and plant to plant spacing was 90 and 60 cm. respectively. Eight brinjal varieties (Table-1) were studied for their resistance to aphid, *Aphis gossypii* Glover, jassid, *Amrasca biguttula biguttula* Ishida, whitefly, *Bemisia tabaci* Genndius and shoot and fruit borer, *Leucinodes orbonalis* Guen. The nymphal and/adult populations of sucking pests were recorded on three leaves at different heights of each of 5 tagged plants selected at random from each of the plots. The population counts were taken at an interval of one week starting after four weeks of

TABLE 1

Susceptibility of various brinjal varieties to insect-pests, disease and yield.

Variety	Av. no. of sucking pest/leaf			Damage by L. orbonalis (%)		Little leaf disease (%)	Marketable fruit yield (q/ha)
	Aphid	Jassid	Whitefly	Shoot	Fruit		
Junagadh long	1.31* (2.72)	0.95* (0.43)	1.41* (2.15)	23.65** (18.73)	14.17** (6.57)	51.16** (55.89)	27.08
G. B. 6	1.26 (1.77)	1.03 (0.61)	1.16 (1.11)	26.61 (22.66)	22.37 (16.92)	59.19 (49.69)	36.69
Junagadh oblong	1.41 (3.91)	0.98 (0.49)	1.12 (0.94)	27.41 (25.16)	15.57 (9.31)	59.91 (58.56)	20.66
GB 1	1.34 (3.26)	0.97 (0.46)	1.12 (0.96)	29.60 (28.04)	12.67 (7.10)	44.00 (58.55)	33.53
Chaklasi doli	1.27 (1.69)	0.94 (0.40)	1.18 (1.15)	22.32 (17.90)	13.33 (6.32)	34.18 (35.79)	81.08
Pusa purple cluster	1.19 (1.40)	0.96 (0.46)	1.10 (0.90)	20.01 (15.13)	15.02 (6.96)	28.25 (33.72)	42.93
Pusa Purple long	1.25 (1.64)	1.03 (0.79)	1.05 (0.80)	22.09 (17.10)	17.47 (11.54)	55.47 (55.43)	50.50
Doli 5	1.21 (1.46)	0.94 (0.40)	1.33 (1.82)	19.42 (15.50)	15.29 (7.54)	27.35 (25.59)	71.09
S. Em. ±	0.08	0.02	0.07	2.30	2.00	4.68	8.43
C. D. at 5 %	NS	0.06	0.20	NS	5.68	14.21	23.96
C. V. %	60.88	22.76	25.41	27.44	34.95	22.00	51.11

* $\sqrt{X + 0.5}$ transformed values.

** Arcsin $\sqrt{\text{percentage}}$ transformed values.

Figures in the parentheses are original values.

transplanting of brinjal seedlings till the last picking of fruits. The damage caused by shoot and fruit borer, *L. orbonalis* G. to shoots was also recorded at an interval of one week starting from four weeks after transplanting till fruit formation by counting the total number of shoots and the number of infested shoots in the entire plot. The fruit damage was recorded by observing number of healthy and damaged fruits at each picking. The little leaf incidence was recorded by observing all the plants of each plot at weekly interval starting after six weeks of transplanting till the last picking. Yield data of each variety were recorded. The data were analysed statistically by analysis of variance (Table 1).

Correlation coefficient for jassid and whitefly with trichome and *L. orbonalis* with colour of the brinjal fruits was also studied.

RESULTS AND DISCUSSION

Aphid : None of the eight brinjal varieties showed resistance to aphid, *A. gossypii.*

Jassid : The brinjal varieties Doli-5, Chaklasi doli, Junagadh long and Pusa purple cluster were found resistant to jassid, *A. biguttula biguttula* than G.B.-6 and Pusa purple long, which showed equal susceptibility as G.B.-1 and Junagadh oblong.

Whitefly : Pusa purple long, Pusa purple cluster, G.B.-1 and Junagadh oblong showed significantly higher resistance to whitefly, *B. tabaci* as compared to Doli-5 and Junagadh long, whereas G.B.-6 found resistant to whitefly in comparison to Junagadh long.

Shoot and fruit borer : The shoots of all the eight brinjal varieties were found equally susceptible to *L. orbonalis*, whereas the fruits of G.B.-1, Chaklasi doli, Junagadh long, Pusa purple cluster, Doli-5 and Junagadh oblong were found more resistant to *L. orbonalis* as compared to G.B.-6, which was also found equally susceptible as Pusa purple long. Considering the fruit damage by *L. orbonalis* Chaklasi doli, Doli-5, Pusa purple cluster, G.B.-1, Junagadh long and Junagadh oblong were found highly resistant. However, Lal *et al.* (1976) reported G.B.-6 and Pusa purple long fairly resistant.

Little leaf disease : Brinjal Doli-5 and Pusa purple cluster were found resistant to little leaf disease as compared to rest of the brinjal varieties studied except Chaklasi doli. Chaklasi doli and G.B.-1 showed significantly superiority over G.B.-6 and Junagadh oblong by having low incidence of little leaf disease. Junagadh long, Pusa purple long, G.B.-6 and Junagadh oblong were found equally susceptible to this disease.

Yield : Chaklasi doli and Doli-5 gave higher yield of marketable fruits than rest of all the brinjal varieties except Pusa purple long, which had equal yield as Doli-5. Pusa purple long showed higher yield potentiality than Junagadh oblong.

Thus, from the above varietal screening tests, it was found that due to low susceptibility of brinjal varieties (viz., Chaklasi doli and Doli-5) to insect pests and disease, the higher quantity of marketable fruits were obtained.

The study on correlationship between pest incidence and morphological characters of the brinjal plant (Table 2) showed negative ($r = -0.74$) correlation between jassid and trichomes as well as shoot and fruit borer and colour of the fruits ($r = -0.80$). Whereas, the positive ($r = 0.90$) correlation was found

TABLE 2

Correlation coefficient for insect-pests and morphological characters of brinjal.

Insect pest	*Morphological character*	*Correlation coefficient (r)*
Average number of jassid/leaf	No. of trichome/cm^2 on under surface of leaf x length of trichome	-0.74*
Average number of whitefly/leaf	Length of trichome on under surface of leaf	0.90*
Fruit damage by *L. orbonalis*	Darkness of the colour of fruit	-0.80*

* Highly significant at 5%.

between whitefly and trichomes. The brinjal varieties Doli-5, Chaklasi doli, Junagadh long and Pusa purple cluster having long and higher number of trichomes per unit area on the under surface of the leaf were found resistant to jassid (Table 3). Similarly, the brinjal varieties (viz.,

TABLE 3

Morphological characters of various brinjal varieties.

Variety	*Colour of fruit*	*Index*	*Av. no. of trichomes/ cm^2 on under surface of leaf (X)*	*Length of trichome (mm) (Y)*	*Hairyness of leaf (X x Y)*
Junagadh long	Taupe brown	5	514.81	0.6438	331.43
GB-6	Violet carmine	1	1300.00	0.2915	378.89
Junagadh oblong	Dark perilla purple	2	1024.07	0.3132	320.74
GB-1	Taupe brown	5	955.79	0.2980	284.83
Chaklasi doli	Raisin black	4	1092.	0.3002	327.94
Pusa purple cluster	Blackish purple	3	903.70	0.3828	345.94
Pusa purple long	Violet carmine	1	520.37	0.2654	138.08
Doli-5	Taupe brown	5	916.67	0.4437	406.73

Doli-5, Junagadh long, G.B.-1 and Chaklasi doli) having dark colour fruits (i.e. Taupe brown/Raisin black) were found resistant to *L. orbonalis*. However, the light colour fruits of G.B.-6 and Pusa purple long showed higher susceptibility to *L. orbonalis*. The variety Junagadh long and Doli-5 having long trichomes were found more susceptible to whitefly as compared to Pusa purple long, G.B.-1 and Junagadh oblong. Bindra and Mahal (1981) have also reported the low susceptibility to jassid. *A. biguttula biguttula* of brinjal varieties having long and high density hairs on the brinjal leaf.

REFERENCES

Awasthi, M. D. 1985. Persistence pattern and safety evaluation of synthetic pyrethroids on egg plant. *Indian J. Agric. Sci.*, **55**(9) : 600-603.

Bindra, O. S. and Mahal, M. S. 1981. Varietal resistance in egg plant to the cotton jassid, *Amrasca biguttula biguttula*. *Phytoparasitica* **9** (2) : 119-131.

Butani, D. K. and Verma, S. 1976. Pest of vegetable and their control. Brinjal *Pesticides*, **10**(2) : 32-35.

Lal, O. P., Sharma, R. K., Verma, T. S., Bhagchandan, P. M. and Chandra, J. 1976. Resistance in brinjal to shoot and fruit borer, *Leucinodes orbonalis* G. (Pyralidae : Lepidoptera) *Vegetable Science*. **3** (2) : 111-116.