

Characterization of brinjal (*Solanum melongena* L.) germplasm

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Brinjal (*Solanum melongena* L.) is the most popular and widely cultivated native vegetable crop of Indian, but no clear records of domestication are available (Chaudhary, 1976). The crop is extremely variable in India substantiated by the presence of wild relatives of *Solanum melongena* which are perennial herb or shrub with bitter fruits (Bhaduri, 1951). Though the principal method used for improvement of this crop in India is selection from indigenous germplasm, yet comprehensive characterization of this crop has not been done. An evaluation of germplasm gives considerable data to classify the material. Germplasm collection, maintenance and its evaluation for economically important traits is a pre-requisite for starting any breeding programme for the genetic improvement of the crop. An attempt has been made in the present study to evaluate the germplasm from different eco-geographic sources for some important characters in brinjal for 65 genotypes maintained in All India Coordinated Research Project on Vegetable Crops, Mahatma Phule Krishi Vidyapeeth, Rahuri (M.S. India) under Western Maharashtra conditions.

The experimental material was grown in *kharif* season of 2009 in a randomized block design with two replications. The genotypes were evaluated and characterized for six quantitative characters *viz.*, spiny ness, flower colour, fruit shape, fruit colour, growth habit and fruit habit. Sixteen quantitative characters included fruit length, fruit breadth, fruit weight, fruit girth, plant height, number of primary branches per plant, plant spread (SN and EW), days to 50% flowering, number of fruit per plants, yield/plant, yield/ha, days to first harvest, duration of harvesting, % fruit infestation (weight basis) and % fruit infestation (number basis). Each plot consisted of 20 plants spaced at 75 x 75 cm. Five random plants per replication were selected to record observations on six quantitative characters and 16

different quantitative characters *viz.*, Data were analyzed following Panse and Sukhatme (1985).

In the present investigation, most of the genotypes showed spreading and semi-spreading growth habit. In the earlier (Tambe *et.al.* 1992) as well as in present study 72.31% of the genotypes had spreading, 18.46% had should semi-spreading and 9.23% had erect growth habit and data was supported by the Hazra *et al.* (2003). Fruiting habit was also solitary in most of genotypes (90.77%). Most of genotypes were non spiny (78.46%) while the remaining were spiny (21.54%). Out of 65 genotypes, 64 were having purple colour flowers while one genotype had white colour flowers. Fruit shape is an important character of any fruit vegetable crop. Maximum genotypes had either oval or round fruits. The fruit shape was observed to variable and oblong (20.00%), oval (36.92%), round (32.31%), medium long (some what cylindrical with tapering towards calyx end) (9.23) and long (1.54%). No correspondence was recorded between fruit shape and size. Colour development in the fruits appeared to be a pronounced characters in brinjal as all the genotypes showed fruit coloration. However, intensity of the basic purple fruit colour varied with the genotypes presumably due to different final anthocianin and chlorophyll contents in the fruits. The genotypes fell into five fruit colour groups namely purple (47.69%), green (21.54%), white (4.62%), purple with white stripes (16.92%) and green with purple and white strips (9.23%) (Table 1). The variations in different colour behaviour of brinjal fruits was also reported by Tambe *et al.* (1992), (Singh *et. al.* 1999) and Hazra *et al.* (2003).

All 16 quantitative characters embracing growth, floral and fruit characters varied significantly among the 65 genotypes (Table 2). The genotypes were dwarf to very tall (38.17 to 105.80 cm plant height) with a few to very high branching habit (2.82 to 7.72) exhibiting three different growth habits. Plant spread was loose to compact (46.85 to 91.25 cm South-North and 47.39 to 106.72 cm East-West). Similar findings were also reported by Hazra *et.al.*, (2003). Early fruiting is

Table 1. Frequency distribution of 65 genotypes of brinjal for six qualitative characters.

Spinyess	Flower colour	Fruit shape	Fruit colour	Growth habit	Fruiting habit
Spiny (14)	Purple (64)	Oblong (13)	Purple (31)	Spreading (47)	Solitary (59)
Nonspiny (51)	White (1)	Oval (24)	Green (14)	Semi-spreading (12)	Clustering (6)
		Round (21)	White (3)		
		Medium long (6)	Purple with white strips (11)		
		Long (1)	Green with purple and white strips (6)		

(Number of genotypes in parenthesis)

Table 2. Quantitative characteristic of 65 genotypes of brinjal.

Character	Range		Mean	S.E. \pm	C.D. at 5%	CV%
Fruit length (cm)	4.20	- 17.35	7.25	0.75	2.12	14.66
Fruit breadth (cm)	3.23	- 7.73	5.15	0.64	1.18	17.68
Fruit weight (g)	31.79	- 200.45	57.14	3.10	8.76	7.67
Fruit girth (cm)	12.58	- 21.96	15.90	1.00	2.84	8.96
Plant height (cm)	38.17	- 105.80	58.90	3.47	9.81	8.34
Number of primary branches per plant	2.82	- 7.72	4.52	0.53	1.50	16.65
Plant spread (SN-cm)	46.85	- 91.75	64.71	1.59	4.50	3.48
Plant spread (EW-cm)	47.39	- 106.72	68.32	1.63	4.63	3.39
Days to 50% flowering	57.35	- 90.90	77.99	2.17	6.15	3.95
Number of fruit per plant	16.67	- 36.88	24.14	1.19	3.37	7.00
Yield /plant (kg)	0.96	- 2.80	1.39	0.11	0.31	11.25
Yield /ha (q)	168.90	- 360.35	252.24	4.07	11.50	12.28
Days to first harvest	51.25	- 99.70	88.30	4.50	12.71	7.20
Duration of harvesting	104.80	- 118.51	111.84	2.18	6.16	2.76
% fruit infestation (weight basis)	25.28	- 40.21	32.85	1.71	3.43	5.22
% fruit infestation (number basis)	27.12	- 37.85	33.40	1.08	2.17	3.26

important trait in improvement of the crop. Some of the genotypes produced early fruits while others were producing late fruits as the days to 50% flowering varies between 57.35 to 90.90, with the average of 77.55 days and the days to first harvest and duration of harvesting depends upon earliness of the genotypes (Singh *et.al.* 1999).

The fruit size of various genotypes are in all small, medium and large ranges. The fruit weight was range in between the 31.79 to 200.45 g, with the average of 57.14 g. The fruit girth was also important character and it ranged in between 12.58 to 21.96 cm. The fruit length and breadth are importance parameters for a marketable fruit. Small and medium fruits have better acceptance for culinary purpose while big fruits have value for preparation of bharta (roasting purpose). Fruit length ranged from 4.20 to 17.35 cm, while fruit breadth ranged from 3.23 to 7.73 cm (Singh *et.al.* 1999).

Brinjal is a fruit vegetable, so the yield is an important characteristic governing the income to farmers. It ranged

from 0.96 to 2.80 kg/plant and 168.90 to 360.35 q/ha depending on genotypes. The yield variation in brinjal genotypes was also observed by Tambe *et al.* (1992). The losses caused by shoot and fruit borer, a serious pest, in brinjal genotypes was also reported by Dhankar *et al.* (1977). The fruit infestation is most important character for marketable yield in brinjal. All the genotypes recorded 25.28 to 40.21% fruit infestation on weight basis and on number basis in a season.

Growth, floral and fruit characters have been expressed mostly as separate genotypic features, so it was difficult to identify a set character for general characterization of brinjal. The crop is extremely variable in India because of highly differential selection pressures according to regional preferences for plant and particularly fruit characters. For this reason, several botanical classifications of the species, which have been proposed, do not seem very helpful (Choudhury, 1976). The consumer preference for brinjal varies from region to region and locality to locality. Hence, it is necessary

to characterise the genotypes of brinjal having better acceptance and wide adoptability in the country. The geographical situations for brinjal adaptability should be essentially considered while characterizing brinjal genotypes. The elite varieties, land races, local types, wild relatives, stable breeding lines, indigenous cultivars should be characterized for different qualitative and quantitative characters and utilized for breeding programme in brinjal. The characters which govern the quality of brinjal *viz.*, fruit colour, fruit shape, spinyness, less seeds in fruit, higher yield, erect and compact growth habit, solitary fruiting habit, earliness, resistance to biotic and abiotic stress should be considered for improvement of the brinjal in future.

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