

Genetic diversity in brinjal germplasm

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ABSTRACT

Depending upon their mean values, the varieties like IC-1, IC-7, IGB-1, IGB-11, IGB-4 and IC-19 can be used as parents in hybridization programme for higher yield. As these genotypes have better means for yield and yield contributing characters and are placed in different clusters showing great genetic diversity.

Key words : Brinjal (*Solanum melongena* L.), Genetic diversity, Cluster, Genotypes.

Brinjal (*Solanum melongena* L.) is an important vegetable fruit crop. Farmers generally grow impure open pollinated and old varieties having good adoption but poor yield potential. Genetic improvements mainly depends upon the amount of genetic variability in the population. Mahalanobis D^2 techniques appears to a fruitful approach which is based on multivariate analysis and serves to be a good index of estimating genetic diversity (Gadekar *et al.*, 1992). Hence, an efforts was made for ascertaining the nature and magnitude amount of genetic diversity in seventy five genotypes.

MATERIALS AND METHODS

The experiment was conducted at Horticultural experimental field, Department of Horticulture, IGAU, Raipur during the year 2005-06 with 75 diverse genotypes of brinjal. The experiment was laid out in a randomized block design with three replications. One month old healthy seedlings of each genotype were transplanted with a spacing of 60cm x 45cm. The recommended package of practices was adopted for raising the crop. Observation were recorded in five randomly selected plants for twelve characters *viz.*, plant height (cm), number of primary branches per plant, plant spread (cm), number of long styled flowers, number of fruits per plant, days to 50 per cent flowering, days to first fruit set, fruit length (cm), fruit girth (cm), fruit stalk length (cm), average fruit weight (g) and fruit yield plant (g). The genetic divergence was estimated using Mahalanobis's D^2 statistic and the group constellations were formed according to Tocher's Method as described by Rao (1952).

RESULTS AND DISCUSSION

The analysis of variance showed significant difference among the genotypes with respects to each of the twelve characters. On the basis of D^2 values, the seventy five genotypes were grouped into ten cluster

(Table 1). The cluster VII was largest, comprised of 14 genotypes, followed by cluster III, which had 13 genotypes while ten genotypes were accommodated in cluster V, 9 genotypes in cluster IX, 8 genotypes in included cluster I, 7 genotypes in cluster IV, 5,4,3 and 2 genotypes were found in cluster VI, VIII, X and II, respectively.

Intra and Inter-cluster average D^2 values are presented in Table 2. The intra-cluster distance was maximum in cluster VI(2.733) and minimum in cluster IX (1.983). The highest inter-cluster distance observed between cluster II and IV (5.973), suggesting wide diversity among the constituent genotypes. The lowest inter-cluster distance was found between cluster I and V (2.387), indicating close genetic relationship among the

Table 1: Grouping of brinjal genotypes into different clusters

Cluster Number	Number of genotypes	Name of genotypes
I	8	IGB-2, IGB-46, IC-4, IC-13, IC-36, IC-38, IC-39, DBR-8
II	2	IC-19, IC-35
III	13	IGB-3, IGB-2I; IGB-22, IGB-24, IGB-27, IGB-38, IGB-42, IGB-43, IGB-54, IGB-55, IC-3, IC-5, IC-12
IV	7	1GB-II, 1GB-52, IC-2, IC-16, IC-17, IC-20, IC-42
V	10	IGB-9, IC-6, IC-23, IC-25, IC-29, IC-30, IC-31, IC-40, IC-41, IC-43
VI	5	IC-7, IC-9, IC-18, IC-28, Pusa Purple Long
VII	14	IGB-23, IGB-36, IGB-40, IGB-45, IGB-47, IGB-48, IGB-49, IC-10, IC-22, IC-24, IC-27, IC-33, IC-34, Mukta Keshi
VIII	4	IGB-4, IGB-5, IC-14, IC-26
IX	9	1GB-1, IGB-16, IGB-18, IGB-19, IGB-50, IC-8, IC-15, IC-21, IC-32
X	3	IC-1, IC-11, IC-37

Table 2: Intra and inter-cluster divergence (D2) and distance in brinjal genotypes

Cluster number	Number of genotypes	I	II	III	IV	V	VI	VII	VIII	IX	X
I	8	2.298	4.112	3.469	4.321	2.387	3.599	3.512	4.606	2.937	4.542
II	2		2.125	4.327	5.973	3.817	5.186	4.708	4.597	4.165	5.284
III	13			2.114	4.879	3.349	4.866	2.958	3.876	2.505	5.330
IV	7				2.543	4.858	3.868	3.905	3.301	4.090	4.110
V	10					2.083	3.547	3.255	4.667	3.130	5.052
VI	5						2.733	3.785	4.337	2.790	3.610
VII	14							2.371	3.730	2.555	5.641
VIII	4								2.139	3.468	4.684
IX	9									1.983	4.064
X	3										2.413

Diagonal- Intra cluster distance, Inter of the Diagonal.

Table 3: Cluster mean for fruit yield and its components in brinjal

Characters		plant height (cm)	No. of primary branches per plant	Plant spread (cm)	No. of long styled flower	No. of fruits per plant	Days to 50% flowering	Days to first fruit set	Fruit length (cm)	Fruit girth (cm)	Fruit stalk length (cm)	Average fruit weight (g)	Fruit yield per plant (g)
Cluster Number	No. of genotypes												
I	8	55.94	4.99	58.50	13.19	6.10	73.00	84.62	9.70	21.05	5.27	118.87	688.04
II	2	48.65	6.55	43.90	21.80	8.90	72.50	80.00	11.80	10.85	6.55	94.50	764.20
III	13	33.21	7.78	29.19	15.31	5.01	71.69	81.46	9.00	19.05	4.18	138.49	655.91
IV	7	56.26	6.93	57.93	12.97	7.61	67.57	79.43	14.59	27.76	4.03	277.79	910.29
V	10	61.06	8.67	61.07	16.27	5.46	72.10	83.70	9.20	16.56	4.64	104.82	583.23
VI	5	62.10	8.88	69.74	10.78	11.50	68.40	80.40	11.12	19.75	4.52	111.82	1033.86
VII	14	49.23	7.27	48.67	13.56	4.70	65.71	75.29	10.51	20.29	3.97	120.63	613.52
VIII	4	41.50	9.48	41.38	16.40	8.70	66.50	77.00	11.68	25.90	5.83	244.23	892.33
IX	9	40.88	7.44	47.60	12.80	9.00	68.11	80.33	8.96	17.89	4.41	125.78	915.63
X	3	54.87	6.87	53.80	15.40	17.53	74.67	84.33	12.47	22.20	4.13	201.20	1181.47

genotypes included.

The highest cluster mean value for plant height in cluster VI (62.10) followed by cluster V (61.06) cluster VIII had maximum (9.48), while cluster cluster I had the lowest (4.99) number of primary branches per plant. Maximum plant spread was recorded cluster VI (69.74), while, cluster III (29.19) had minimum cluster mean value. Number of long styled flowers per plant showed highest mean performance in cluster II (21.80) followed by cluster VIII (16.40) and cluster V (16.27). Number of fruits per plant and days to 50 per cent flowering exhibited highest cluster mean values (17.53 and 74.67, respectively) in cluster X. Cluster VII showed lowest cluster mean values (4.70 and 65.71) for both these characters. The highest cluster mean value for days to first fruit set was observed for cluster I (84.62) and lowest in cluster VII (75.29). Fruit length (14.59) and fruit girth (27.76) showed highest

cluster mean value in cluster IV. Cluster II exhibited highest cluster mean value for fruit stalk length (6.55) and lowest for average fruit weight (94.5). Average fruit weight exhibited the highest mean by cluster IV (277.79). fruit yield per plant exhibited the highest mean performance for cluster X (1181.47) followed by cluster VI (1033.86).

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