

Published on: 1st Nov 2012**GENETIC DIVERGENCE IN *VIGNA RADIATA* (L.) WILCZEK**

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ipatel1970@gmail.com**ABSTRACT:**

Forty mungbean (*Vigna radiata*(L.) Wilczek) genotypes were grouped in to eleven clusters based on their genetic diversity. Genetic diversity was found to be unrelated to geographical diversity. The maximum inter cluster distance was observed between cluster III and IX, II and IX, III and VII, III and VI indicating wide divergence among these clusters. Iron content had maximum contribution to the total divergence followed by phosphorous content, harvest index and seed yield per plant.

KEY WORD: Mungbean, Genotypes, Clusters, Genetic, Geographical, Phosphorous.

INTRODUCTION:

In the traditional vegetarian diet of Indian population, pulses occupy second place next to cereal and is the main source of protein. Among pulses, mungbean (*Vigna radiata*(L.) Wilczek) is the most important pulse crop in India. Mungbean is a short duration (60 to 75 days) crop and plays vital role in meeting the quantitative and qualitative requirement of food and protein throughout the world. Pulses provides 22-24 percent protein and the seed are considered easily digestible. It also provides nutritional fodder to the cattle and improve the soil fertility through atmospheric nitrogen fixation process with the help of *Rhizobium spp.* Genetic diversity in the germplasm is of major interest to plant breeder. For breeding program diverse genotype should be selected as parents for making crosses to obtain high heterotic expression in F1's and greater the possibility of generating broad spectrum of variability in segregation generation.

MATERIAL AND METHODS:

Present study comprises 40 genotypes of mungbean and the experiment was conducted at the centre for crop improvement, our field at Palanpur, During *Kharif*- 2011. The experiment was conducted in a randomized block design with three replications with 45cm and 10cm inter and intra row spacing, respectively adopting recommended package of practices and need-based plant protection measures to

raise a good crop. Observation were recorded on five randomly selected plants for each genotype in each replication for fourteen characters viz. days to 50% flowering, plant height(cm), Number of branches per plant, Number of pods per plant, Pod length (cm), Number of seeds per pod, 100 seed weight (g), Seed yield per plant(g), Harvest index (%), Crude fiber content(%), Calcium content (mg/100g), Iron content (mg/100g), Mahalanobis D^2 analysis was used to estimate genetic divergence among the 40 genotypes. Total eleven clusters were formed using Tocher's method as described by Rao (1952).

RESULTS AND DISCUSSION:

All the germplasm lines were classified into 11 clusters (Table 1). Among these, cluster V was the largest cluster containing 7 genotypes followed by cluster VI (6 genotypes), clusters X and XI (5 genotypes), cluster IX (4 genotypes), clusters I, II and III (3 genotypes), cluster VIII (2 genotypes), and clusters IV and VII each of comprised one genotype. The intra cluster distance (D) ranged from 0.00 to 24.51 (Table 2). Cluster VI had the highest value (24.51) followed by cluster VII (24.03), cluster X (20.62), cluster III (19.51), cluster I (17.65) and cluster II (17.46). It indicated more diversity among the genotypes with in these clusters. The inter cluster distance (D) ranged from 12.36 to 100.6. The minimum inter cluster distance (12.36) was observed between cluster IV and cluster V. which indicated that the genotypes of these two clusters were very close to each other. The maximum inter cluster distance was observed between clusters III and IX, II and IX, III and VI, Which showed that the genotypes from the clusters II, III, VI, VII and IX could be used as donors in hybridization programme for obtaining a wide spectrum of variation among the segregation. The clustering pattern showed that genotypes of different geographical areas were clubbed in one group and also the genotypes of the same geographical area were grouped in another cluster indicating that there was no formal relationship between geographical diversity and genetic diversity. (1966) genetic drift and selection in different environments could cause greater diversity than geographical distance.

The cluster mean for different characters indicated considerable difference between the clusters for all the characters (Table 3). Clusters VIII had the highest number of branches per plant, pod length, number of seeds per pod and 100-seed weight; cluster X for number of pods per plant, harvest index and seed yield per plant. The relative contribution of different characters towards the genetic divergence showed that the iron content had maximum contribution to the total divergence followed by phosphorous content, calcium content, harvest index and seed yield per plant. Loganathan *et al.* (2001) reported that seed yield per plant contributed moderate towards diversity.

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Table 1: The distribution of forty mungbean genotypes to different clusters on basis of D² statistic

Cluster	Number of genotypes	Genotypes
I	3	GM-05-08,GM-07-012,KM-09-178
II	3	KM-09-157,KM-09-161,KM-09-186
III	3	GM-05-05,GM-07-06,KM-09-174
IV	1	KM-09-155
V	7	GM-06-08,GM-07-05,GM-07-07,GM-07-09,GM-07-10,GM-07-14,KM-09-167
VI	6	KM-09-156,KM-09-158,KM-09-159,KM-09-164,KM-09-188, K-851
VII	1	GM-02-16
VIII	2	GM-07-01,KM-09-172
IX	4	GM-04-02,GM-04-04,KM-09-173,KM-09-184
X	5	KM-09-152,KM-09-153,KM-09-177,KM-09-185,KM-09-187
XI	5	KM-09-165,KM-09-166,KM-09-179,GM3,GM4

Table 2: Average intra (Bold) and inter cluster distance (D) ($D = \sqrt{D^2}$) values in (*Vigna radiata*(L.) Wilczek)

Cluster	I	II	III	IV	V	VI	VII	VIII	IX	X	XI
I	17.65	38.99	63.77	21.56	26.23	41.83	31.16	21.57	59.94	28.73	43.88
II		17.46	33.92	30.75	25.15	65.02	60.36	38.71	84.54	29.32	25.75
III			19.51	55.83	51.72	82.79	87.23	58.53	100.6	47.21	46.82
IV				0.00	12.36	53.69	37.33	28.95	73.85	30.79	29.39
V					0.00	60.21	42.73	34.32	80.77	31.71	19.67
VI						24.51	47.27	32.66	30.77	45.62	77.17
VII							24.03	39.68	61.57	50.30	59.51
VIII								0.00	50.37	23.63	50.92
IX									20.62	63.24	98.04
X										23.56	43.63
XI											0.00

Table 3: Cluster means for different characters in *Vigna radiata*(L.) Wilczek

Clusters	Days to 50% flowering	Plant height (cm)	Number of branches per plant	Number of pod per plant	Pod length (cm)	Number of seed per pod	100 seed weight (g)	Harvest index (%)	Protein content (%)	Crude fiber content (%)	Calcium content (mg/100g)	Phosphorous content (mg/100g)	Iron content (mg/100g)	Seed yield per plant(g)
I	43.17	37.83	4.69	15.23	7.12	10.7	4.47	34.59	21.02	4.36	108.33	265.81	2.91	5.83
II	42.2	37.72	5.12	16.97	6.83	10.34	4.00	34.92	21.73	4.63	115.33	252.14	4.39	7.00
III	44	37.07	4.33	13.79	6.88	10.49	4.11	30.22	21.32	4.61	102.22	305.30	5.55	4.91
IV	46	34.8	4.27	10.17	6.63	10.07	3.83	26.07	22.01	4.76	123.33	213.10	3.35	3.38
V	41.66	38.53	4.6	14.53	7.07	9.87	4.17	30.80	21.21	4.75	120.00	184.27	3.65	5.22
VI	41.67	39.99	4.75	14.35	7.1	9.71	4.33	33.30	21.37	4.60	115.24	426.32	2.44	5.05
VII	42.93	38.77	4.95	15.03	7.15	9.95	4.53	30.47	21.69	4.67	127.33	223.00	1.99	5.38
VIII	43.33	42.4	5.2	12.87	8.5	11.73	5.17	22.40	20.74	4.64	113.33	331.93	3.20	4.02
IX	44.78	43.53	4.87	15.64	6.81	10.37	4.5	35.15	20.82	4.52	98.89	514.12	1.80	6.41
X	24.89	40.58	4.76	17.66	7.16	9.94	4.17	43.27	21.37	4.66	98.90	332.7	3.68	7.45
XI	42.67	37.43	4.4	15.93	6.30	9.43	3.67	28.34	21.34	4.44	133.33	134.8	4.3	5.67