speeds prevail receive greater amount of water than the segments associated with faster rotation.

Among the three climatic factors, wind valocity alone had significant negative regression coefficient indicating that as the wind valocity increased the uniformity decreased. Relative humidity and atmospheric temperature had little effect on uniformity coefficient.

From the above data it is clear that wind velocity is the dominant factor to affect the uniformity of water distribution. Hence, it is advisable to operate the sprinklers under low / no wind conditions.

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GENETIC DIVERGENCE IN BLACK GRAM

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ABSTRACT

A group of 30 strains of black gram collected from different geographic regions of India was studied to analyse the extent of genetic divergence using Mahalanobi's D^2 technique. The strains got grouped into eight clusters and the clustering pattern was independent of geographic distribution. Characters, pod yield and seeds/pod were found to be important contributors to genetic divergence.

KEY WORDS :   Black gram, genetic divergence

The success of a breeding programme through hybridisation is highly dependent on genetic divergence of parents involved. The utility of analysis of genetic divergence in discriminating population with diverse geographic origins has been emphasised already (Murthy and Arunachalam, 1966). In self pollinated crops, the choice of parents for hybridisation largely depends on wide adaptation, genetic variability and high yield potential. Hence, the present investigation was taken up to estimate the genetic divergence among 30 strains of black gram *Vigna mungo* L. Hepper with diverse geographic origin.

MATERIALS AND METHODS

The materials comprised of 30 strains of black gram (from various parts of India) grown in a randomised block design with three replications at the Pulses Breeding Station, Tamil Nadu Agricultural University, Coimbatore. The plots were single rows of 3 m length with inter - and intra - row spacings of 45 cm and 15 cm, respectively. Observations were recorded for eight economic traits *viz.*, plant height (cm), number of branches, number of pod/clusters. pod length (cm), number of seeds/pod, number of pods/plant, pod yield/plant (g) and seed yield/plant (g).

Following the analysis of variance, the data were subjected to multivariate analysis and the diversity of characters was studied using D^2 technique (Rao, 1952). Contribution made by various characters towards divergence was computed by the ranking of characterwise D^2 values for all possible pairs of combinations of the 30 strains (435 pairs).

RESULTS AND DISCUSSION

Analysis of variance (ANOVA) of plot means revealed highly significant differences for all the eight characters indicating the existence of genetic

Table 1. Distribution of strains in clusters (D^2)

Cluster	No. of strains	Name of strains	Source
I	9	LBG 20	Lam
		P24	Pant Nagar
		LBG 10	Lam
		CO5	Coimbatore
		Vamban 1	Vamban
		P I	Tamil Nadu
		AC 267	Tamil Nadu
		DU 2	Dholi
		BP 3	Tamil Nadu
II	4	AC 214	Tamil Nadu
		CO 2	Coimbatore
		AB 15	Tamil Nadu
		CO 1	Coimbatore
III	4	Karaikal	Pondicherry
		T9	Uttar Pradesh
		CO 3	Coimbatore
		AC 297	Tamil Nadu
IV	5	NP 16	Tamil Nadu
		P 133/18	Pant Nagar
		P 131	Pant Nagar
		LU 182	Ludhiana
		LU 279	Ludhiana
V	4	H70/3	Uttar Pradesh
		NP 7	Tamil Nadu
		D 123	Dholi
		G 104	Tamil Nadu
VI	2	Chennikulam	Tamil Nadu
		P 133/5	Pant Nagar
VII	1	LBG 402	Lam
VIII	1	LU 229	Ludhiana

variability among the strains analysed. The dispersion between the variables was also highly significant as tested by Wilk's criterion.

The values of D^2 corresponding to 435 possible combinations were computed taking two strains at a time. The D^2 values ranged from 0.00 to 164.00 indicating high divergence among the strains. The 30 strains could be grouped into eight clusters as presented in Table 1. Cluster I was the largest with 9 strains followed by cluster IV with strains. The clusters II, III and V had 4 strains each while the cluster VI included 2 strains. The cluster VII and VIII were the smallest and had only one strain each. The intercluster distance was maximum between clusters VII and VIII (164.00), followed by IV and VI (141.42) (Table 2). The intracluster distance ranged from 0.00 to 40.21, the maximum of which was observed within cluster III followed by clusters VI and I.

The clustering pattern reveals that the strains usually did not cluster according to their geographical distribution. Similar lack of parallelism between genetic clustering and geographical distribution has been reported earlier (Malhotra and Singh, 1971). The occurrence of strains of same geographical region in various clusters and vice versa is likely due to the free exchange of seed materials among different regions for breeding purposes, hence the character constellations that might be associated with a particular region in nature lose their individuality under human interference. Genetic drift and selection in different environment could be other important factors contributing to genetic divergence among strains of a particular geographic region. However, in some cases, the effect of geographic origin influenced clustering, for instance cluster II had all the strains from Tamil Nadu, while five out of nine strains in cluster I were from Tamil Nadu, indicating that, although geographic distribution was not the sole criterion for genetic diversity, its importance on divergence is indisputable.

The cluster VI revealed the highest mean value for plant height while cluster II for number of primary branches and number of clusters. The

Table 2. Intra (diagonal) and intercluster D^2 values of black gram clusters

Cluster	I	II	III	IV	V	VI	VII	VIII
I	18.72	18.16	41.76	30.56	29.71	109.52	48.91	84.82
II		15.21	40.62	37.57	31.97	116.18	51.17	69.73
III			40.21	67.53	20.10	53.84	50.70	23.13
IV				12.74	51.12	141.42	24.92	107.18
V					12.12	55.51	18.50	46.31
VI						30.58	94.00	45.05
VII							0.00	164.00
VIII								0.00

Table 3.   Cluster means and contribution of different characters to divergence

Characters	Cluster								Contri-bution to divergence (%)
	I	II	III	IV	V	VI	VII	VIII	
Plant height (cm)	18.60	18.68	28.56	15.80	24.54	36.32	22.10	32.70	9.72
No. of Primary branches	1.97	2.88	1.69	2.36	2.11	1.50	2.77	2.10	18.02
No. of clusters	5.14	7.31	5.62	5.47	5.63	5.77	6.63	6.92	1.52
No. of pods/plant	21.56	24.02	20.34	16.81	20.47	20.79	13.83	24.97	1.58
Pod length (cm)	4.58	4.53	4.79	4.46	4.60	4.40	4.93	5.23	5.71
Seeds/pod	6.46	6.37	6.70	6.73	6.77	6.58	6.96	7.12	20.56
Pod yield (g)	11.15	12.13	10.53	8.45	10.60	10.25	7.15	13.33	42.43
Seed yield (g)	6.31	6.86	5.94	4.98	6.06	5.89	4.15	7.64	0.46

cluster VIII with a single strain (Lu 229) revealed highest mean values for all the other five characters (Table 3). The percentage contribution to divergence by the eight characters were computed and furnished in Table 3. The highest contribution was made by the character pod yield (42.43%) followed by seeds per pod (20.56%) and number of primary branches (18.92%). These traits are important yield contributing attributes and should be very useful for further consideration in hybridization and improvement of black gram.

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HIGH YIELDING RED GRAM HYBRID : CoH 2

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ABSTRACT

The high yielding red gram hybrid CoH 2 was developed using the genic male sterile line ms Co 5 as female parent and ICPL 83027 as male parent. This hybrid is photoinsensitiv and matures in 120 to 130 days. It gives an average yield of 1050 kg/ha and is also suited for rainfed and irrigated conditions.

Pulses are rich in protein and form the part of the vegetarian diet. In Tamil Nadu, black gram, green gram, cowpea and red gram are some of the major pulses grown. Of which, red gram occupies the second place in area. There has been a general increasing trend in area, and production of pulses during the past three decades but a major break through is not observed in productivity. Hence, heterosis breeding was contemplated to open new vistas in increasing the productivity by using genic male sterility.

MATERIALS AND METHODS

The parentage of this hybrid is ms Co 5 x ICPL 83027. The female parent ms Co 5 was developed from the spontaneous male sterile mutant from the variety Co 5. The pollen parent ICPL 83027 and ms Co 5 were raised in isolation and multiplied. In next season, the female and male parents, were raised in 6:1 ratio with two rows of male parent in border and one row of sunflower in order to attract honeybees to enhance cross pollination during kharif 1991. The hybrid performed well in station trials (ST) conduced