Indian J.Pl. Genet. Resources 7(1): 119-122, 1994
Short Communication

GENETIC DIVERGENCE IN INDIGENOUS COLLECTION OF GRAIN AMARANTH

H.C. Lohithaswa, R.S.Kulkarni and K.N. Ganeshaiah

Department of Genetics and Plant Breeding,
University of Agricultural Sciences,
Bangalore 560 065 (Karnataka)

Key words : Amaranths, genetic divergence, variance studies

Grain amarnnth (*Amaranthus* sps.) is grown along the entire range of Himalayas from Kashmir to Bhutan and to some extent in the southern hills of India as a minor grain crop. Grain amaranth promises to be a crop of great potential both for its high nutritive valaue and its adaptability to semi-arid tracts, which forms a major portion of our agricultural lands. To initiate the crop breeding programme on sound and rational basis, knowledge on existing genetic diversity in the germplasm collection is needed. A broad spectrum of variability in segregating generation can be obtained by crossing genetically diverse parents.

One hundred and forty-four genotypes were chosen from large number of collections maintained at All India Coordinated Research Project on Under Utilized and Under-Exploited Plants, University of Agricultural Sciences, Bangalore. The experiment was laid out in the month of November, 1990 in a simple lattice design with two replications following the procedures given by Cochran and Cox (1957). All the agronomic practices of the region were adopted during the entire cropping season. Observations on eleven quantitative characters viz., plant height, days to 50 per cent flowering, days to maturity, inflorescence length, stem girth at collar region, number of branches, number of rachis, fresh weight of the plant, fresh weight of inflorescence, dry weight of the stem and grain yield were recorded on ten random plants. For estimation of genetic divergence, D^2 statistic (Mahalanobis, 1936) was used. The cluster formation was done by Dendrogram technique (Sneath and Sokal, 1973).

The analysis of variance showed significant differences among the strains for all characters. The 144 genotypes were grouped into 10 clusters (Table 1). Cluster II was the biggest having 124 entries followed by the cluster III which had 12 entries. The clusters IV (SDI-66), IX (IC 35380) and X (Annapurna)

were found to be superior with respect to yield and other yield traits. The genotypes IC 35380 and **Annapurna** showed highest dissimilarity and the genotypes IC 35406 and IC 35422 showed least dissimilarity.

The characters contributing maximum to the D^2 values are given greater emphasis for deciding on the clusters for the purpose of further selection and choice of parents for hybridization and generation of large variability. The highest contributor, in this regard, was fresh weight of the plant followed by fresh weight of the inflorescence (Table 2) . This offers ample scope for

Table 1. The D^2 clusters and the entries included

Cluster number	Total accessions	Accession number
1	2	3
I	1	IC 35553
II	124	VDV-4/45, IC 35469, IC 35735, IC 35454
		T 89-13, IC 35472, IC 35481, IC35438
		IC 35604, EC 1493, V- 1989, IC 35389
		IC 35465, IC 35443, IC 35551, DPP/3/50
		IC 35470, IC 35518, DPP/2/29, NKG-88/42-1
		DPP/3/38, IC 35461, BDJ-1-847, IC 35426
		IC 35468, IC 35463, V-2008, SDI 193
		IC 35406, IC 35781, IC 35479, IC 35422
		BDJ-1-459, DPP/2/46, IC 35712, IC 35476
		IC 35452, IC 35408A, IC 35477, IC35395
		IC 35499, IC 35556, IC 35568, IC 35539
		IC 21796, IC 35565, IC 35455, T-66-49
		IC 21930, IC 35430, IC 35632, IC 35440
		T-98-34,IC35638,SDI-93,IC 35445
		DO-673, IC 21964, BD/NKG-108, IC35736IC 42256, BDJ-1-520, BDJ-1- 635, IC35440
		BDJ/NNG-62, V-217, BDJ-1/962, N-955
		IC 21796A, AO-941, P-57, BDJ/NKG-253
		BDJ/NKG-6, P-63, IC 35411, SDI- 291
		IC 35672, IC 35766, IC 35755, SDI-280
		IC 35577, IC 35741, IC 35684, IC 35473
		IC 35570, IC35574, IC 35415, IC 5564

		IC 35421, VDV-3/89/71, T-59-14, IC 35385
		IC 35193, IC 35410, V-1958, IC 35559
		IC 35742, IC 35706, IC 35579, IC 35653
		IC 35696, IC 35505, BDJ/NKG-388, BDJ-11-74
		BDJ-364, BDJ/NKG-145, BDJ/NKG-382
		BDJ/NKG-241, BDJ/NKG-341, C-1643
		KPS/88/176, IC 35546, C-1723, IC35659
		BDJ/89/384, BDJ/89/364, NKG/88/42-5
		IC 35450, BDJ/NKG-322A, BDJ/NKG-149
		V-2046, IC 42293, IC 35364
III	12	IC 35397, T-89-12, IC 35564, DPP/2/20, U110
		VDV3/89-46, IC 35399, IC 35496, IC 35447
		IC 35655, IC 35436, SD2-52,
V		IC 35552,
IV		SDI-66
VI		SDI-85
VII		IC 32181
VIII		IC35572
IX		IC 35380
X		Annapurna

Table 2. The two canonical vectors

Sl.No.	Characters	Vector 1	Vector 2
1.	Grain yield (g)	0.055	0.004
2.	Plant height (cm)	0.250	0.856
3.	Days to 50 per cent flowering	0.049	0.191
4.	Days to maturity	0.035	0.160
5.	Inflorescence length (cm)	0.073	0.146
6.	Stem girth at collar region (cm)	0.003	-0.0001
7.	Number of branches	0	0
8.	Number of rachis	0.095	0.180
9.	Fresh weight of the plant (g)	0.858	-0.336
10.	Fresh weight of the inflorescence (g)	0.419	0.047
11.	Dry weight of the stem (g)	0.063	0.188

selecting desired genotypes from cross combinations involving genotypes from the diverse groups. In this regard the genotypes viz., SDI-66, IC 35380 and **Annapurna** which showed highest diversity should generate large variability and selection could be adopted for high yielding varieties.

REFERENCES

Cochran, M.G. and G.M. Cox, 1957. Experimental Designs. Asia Printing House, New Delhi. p. 405-409.

Mahalanobis, P.C. 1936. On the generalised distance in statistics. *Proc. Nat. Acad. Sci.* (Indian) **12** : 49-55.

Sneath, P.H.A. and R.R. Sokal. 1973. Numerical taxonomy, W.H. Freeman and Co., San Francisco.