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Short communication

GENETIC DIVERGENCE IN WHEAT

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Expression of heterosis largely depends upon the diversity of parents used in hybridization. Genetic divergence analysis provides an useful technique to identify such genetically variable strains representing diverse geographical regions. The experimental material was comprising of 23 exotic bread wheat lines selected from germplasm nurseries made available by NBPGR, New Delhi. These lines alongwith 13 exotic Indian wheat derivatives and a released cultivar, HD 2380, were grown at Regional Research Station, Bajaura (Kullu) in a randomized complete block design with three replications. Each entry was sown in three 3-meter long rows spaced 23 cm apart. Data were recorded on 10 randomly selected plants in each replication on various morphological and yield related traits were subjected to analysis of variance as well as multivariate analysis as suggested by Mahalanobis (1936). Clusters were formed as per method described by Tocher (Rao, 1952) and canonical analysis was done following Rao (1952).

Three genotypes were grouped into five clusters by application of clustering techniques. Cluster I had as many as twenty four genotypes representing diverse geographical regions. There were four genotypes in cluster II, one in cluster III, three in cluster IV and five in cluster V. The distribution of genotypes in different clusters was irrespective of their geographical proximity which is in confirmation with the finding of Reddy and Padmavathi (1996). They supposed that the diversity among genotypes belonging to same origin could be due to extremely variable environmental conditions which is desirable for selecting parents with similar adaptability. Inter-cluster D^2 values ranged from 233.90 (between clusters I and III) to 1043.36 (between clusters II and III), whereas not much differences existed for intra-cluster distances (Table 1).

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This indicates that the genotypes belonging to cluster II and III can exhibit maximum heterosis upon hybridization. The minimum distance between genotypes of clusters I and III revealed that the strains of these clusters are relatively closer, though they exhibited marked differences for days to 75 per cent flowering, plant height ad grains/spike.

Table 1. Cluster composition and average inter- and intra-cluster (diagonal values) distances

Cluster	Stocks	Average distance I	II	III	IV	V
I	EC-252503, –256488, 7DSN-51, –54, –82, –118, 2HEWSN-70, –153, 22IBWSN-149, 5HTSN-2, –21, WHT89-6, –8, –15, 16, –26, –27, –39, –223 PW-143*, –147*, 149*, BJW-280*, HD-2380**	132.65	689.43	233.90	713.10	417.65
II	PW-135*, –137*, –146*, BJW-279*		141.25	1043.36	873.81	687.33
III	BJW-283*			212.40	290.18	302.40
IV	2HEWSN-12, –47, –BJW-270*				170.08	390.11
V	7DSN-52, WHT89-25, PW-133*, BJW284*					210.00

* Indian * Exotic derivative

** Released cultivar

Table 2 shows that the strains of cluster II exhibited highest mean value for grain yield coupled with high harvest index and long peduncles. The genotypes belonging to different clusters with high mean values for yield components can thus help in obtaining wide spectrum of variability for these traits upon crossing.

Table 2. Cluster means for different characters in 37 wheat genetic stocks

Cluster	Days to 75% flowering	Days to maturity	Plant height (cm)	Peduncle length (cm)	Spike length (cm)	Grains per spike	Biological yield/plot (g)	Grain yield/plot (g)	Harvest Ind (%)
I	145.40	188.48	81.63	32.70	11.10	49.41	1560	400	20.40
II	140.00	185.67	90.67	48.04	7.92	43.17	1250	530	29.77
III	137.00	187.00	119.50	37.22	9.50	60.17	1530	450	22.72
IV	141.00	189.12	77.22	40.12	8.40	64.13	1470	390	18.50
V	135.88	184.20	65.18	34.28	10.78	56.30	1380	480	21.14

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