

The Study of Phenotypic Variation and Cluster Analysis for Quantitative Traits of Corn (*Zea mays* L.)

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ABSTRACT

In order to study the relationships between grain yield an experiment was carried out in randomized complete block design with four replications in Shahrood Agricultural Research Station during 2006-07. Cluster analysis with minimum ward variance method grouped the hybrids in 4 groups. In order to proving the truth of the classification obtained from cluster analysis discriminate function analysis and multivariate analysis verified the accuracy of classification from cluster analysis and grouped the hybrids in 4 groups. Result of four methods of multivariate analysis of variance Wilk's lambda showed that there were significant differences between 4 groups resulted from the cluster analysis

Keywords, Cluster analysis, Discriminate function analysis and Multivariate analysis,

INTRODUCTION

Cluster analysis is commonly used for studying the genetic diversity and for forming core subjects for grouping accessions with similar characteristics into homogeneous categories. Rahimian. S. et al (2004) classified rice cultivars to 5 groups with cluster analysis. Abozari (2006). Classified IRANIAN and foreign rice cultivars to 4 groups with cluster analysis for hybrids production and breeding for high yield.

MATERIALS and METHODS

In order to evaluation of selection of best hybrids 17 hybrids KSC700, NS540, OSSK444, OSSK499 ,OSSK590 , ZP434 ,BC678, COVENTRY , MAVERIK, BC504 , BC666, BC404, KOSS444 ,CISKO, PONCHO was studied in Randomized complete block design with 4 replications. Agricultural Research Station of Shahrood.

Plots included 2 rows of corn with 6 mt in each row. Distance between rows was 70 cm and between plants 20 cm. Traits included plant height without tassel, plant height with tassel, cub dry weight, seed dry weight, Number of seed row per ear, Number of seed per row, Number of seed per ear, seed deep, ear length, ear diameter, cub diameter, 100- seed weight, seed yield, Biological yield and harvest index. Analysis of variance did with SAS program. Correlation analysis did with SPSS program ver. 9

RESULTS and DISCUSSION

Analysis of variance showed that all of traits between hybrids was significant. Classification of hybrids resulted into 4 clusters grouping of 17 genotypes. Cluster 1 accommodated maximum number of genotypes

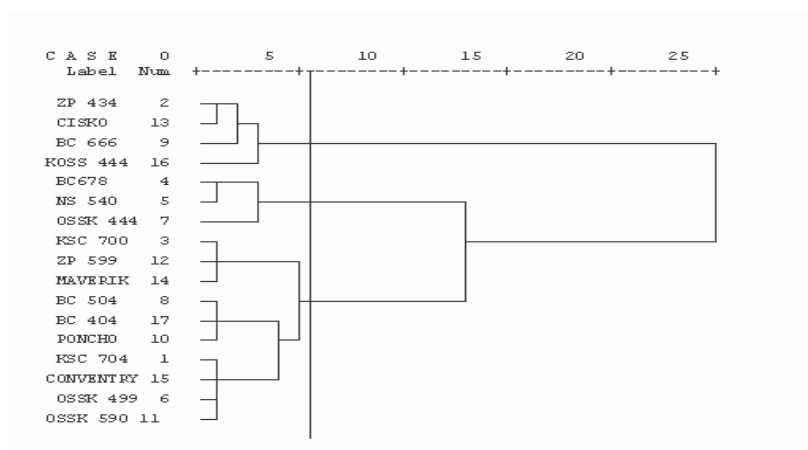


Figure1. Dendrogram of corn hybrids on different traits using ward method

First group including hybrids ZP 434, CISKO, BC 666 and KOSS 444. first group hybrids for Ear diameter (4.2), Number of seed per row (35.44), Number of seed row (14.81), 100 seed weight (28.84), Seed dry weight per ear (106.10), Number of seed per ear (519.95), Seed yield (7798.75), Seed deep (0.6807), Biological yield (17912.5) were lower than general mean. This cluster and its hybrids are valuable because Cub diameter (2.818), Ear length (20.64), Plant height without tassel (172.4), Plant height with tassel (207.25), Ear height (72.03), Cub dry weight per ear (16.09) and Harvest index (0.4303) were high. Between these traits together and with grain yield correlation is high and positive and could be used for hybrid and transform of desirable traits. Second group included hybrids BC 678, NS 540 and OSSK 444. Second group hybrids for Cub diameter (2.895), Ear length (20.28), Number of seed per row (34.92), Plant height without tassel (179.36), Plant height with tassel (218.06), Ear height (81.33), Cub dry weight (17.71), Seed yield (6685.33) and Harvest index (0.5072).

Third group including KSC 700, ZP 599 and MAVERIK. Third group hybrids for Cub diameter (2.996), Number seed row (14.58) and Ear height (77.33), Ear diameter (4.15), 100 seed weight (22.77), seed dry weight (69.37), Number of seed per ear (462.86), Seed deep (0.5979), Ear length (18.23), Cub dry weight (15.83), Seed yield (4955.66), Harvest index (0.3858), Biological yield (13620), Number of seed per row (31.75), Plant height without tassel (167.76) and Plant height with tassel (205.96).

Group including BC 504, BC 404, PONCHO, KSC 704, CONVENTRY, OSSK 499 and OSSK 596. group hybrids for Ear diameter (4.198), 100 seed weight (25.98), Plant height without tassel (176.8),

Plant height with tassel (214.01), Seed deep (0.6866) and Biological yield (15084.28).Seed dry weight per ear (85.96), Number of seed per ear (484.78), Ear length (19.46), Cub dry weight (16.34), Seed yield (6488.28), Harvest index (0.4351), Number of seed per row (34.05) and Ear height (76.37) and seed deep at this cluster were high which could be used for confluence. First group of cluster had high yield and yield components and could be used for production of new hybrids. Second cluster hybrids could be used for plant height trait. Forth cluster hybrids could be used for harvest index and seed deep hybrids. Mean bias percent for each of groups measured for 16th traits. This bias revealed that there was variation in hybrids. In each groups, genetic relationships are high and between each groups are low, then for confluence and heterosis different groups hybrids according to traits man value for each of groups could be used. There were not differences between 4th groups of hybrids according to distinction function correction groups selection according to cluster analysis was about 94.1%. For test of correction groups selection according to cluster analysis multiple variance analysis and wilks lambda statistical carried out and showed significantly differences between groups carried out by cluster analysis.

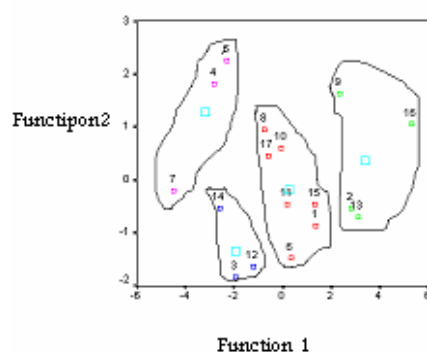


Figure 2. Canonical discriminant functions by Fisher method

	dft	dfe	valid	F	Pr<F
Wilk's lambda	3	13	0.541	3.67	0.04

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