REFERENCES

CHHOTEY LAL and SINGH,A.B. 1974. Line x tester analysis in Indian mustard. Indian J. Agric.Sci.44: 508-602.

KEMPTHRONE,O. 1957. An Introduction to Genetic Statistics, John Wiley and Sons, New York, pp 468-471.

MANI,S.C. and RAO, M.V. 1977. Combining ability in Wheat (*Triticum aestivum* L.) Proc. of the first National Seminar on Genetics Wheat Improvement, Ludhiana: 23-30.

SANDHU,B.S. and KHEHRA,A.S. 1976. The role of epistatis in the inheritance of yield and its components in groundnut. Crop Improvement 3:9-17

Madras Agric. J., 81(10): 532-534 October, 1994

https://doi.org/10.29321/MAJ.10.A01573

ASSOCIATION ANALYSIS IN GRAIN SORGHUM (*Sorghum bicolor* (L.) MOENCH)

P.VEERABADHIRAN, S.PALANISAMY and G.A.PALANISAMY

School of Genetics, TNAU, Coimbatore

ABSTRACT

The correlation coefficients at genotypic level between eight quantitative characters and path coefficients were estimated in eightyone hybrids and eighteen parents of sorghum. Genotypic correlations clearly established the positive and significant relationship between panicle weight and yield, number of grains per panicle and yield, number of leaves and yield, days to bloom and yield. The intercorrelation among the yield components were also estimated. Partitioning of the correlation coefficient through path analysis indicated that the direct effect of number of grains per panicle was maximum and positive upon yield and this was followed by 1000 grain weight and days to 50 per cent bloom.

The component characters of yield are not independent in their action but are interlinked. In this interlinked compex genetic system, selection practised for an individual character might subsequently bring about simultaneous change in others. Therefore, an understanding of the association between the component and their relative contribution to yield is essential to bring out a rational improvement in the desirable traits as they might be differently correlated. To understand the association between characters, the present study was carried out.

MATERIALS AND METHODS

Eighty one hybrid combinations along with their eighteen parents (9 lines + 9 testers) were evaluated adopting a randomised block design with two replications. The row to row and plant to plant distances were 45 cm and 15 cm respectively. The biometrical observations on grain yield and yield components were recorded on five randomly selected plants per replication. The replicationwise mean values of the genotypes were subjected to statistical analysis. Based on the data collected, the genotypic correlation coefficients were estimated following standard procedures. Path coefficient analysis as applied by Dewey and Lu (1959) was utilised to partition the genotypic correlation coefficients into measures of direct and indirect effects.

RESULTS AND DISCUSSION

The genotypic correlation coefficients were estimated based on the genotypic variances and covariances. The correlation coefficients between yield and yield components and the

Table 1. Genotypic, correlation coefficients among yield characters

Characters	Plant height	Panicle length	Number of leaves per plant	Panicle weight	Number of grains per panicle	1000 grain weight	Grain yield / plant
Days to 50% bloom	0.21*	-0.01	0.80**	0.57**	0.38**	0.27**	0.49**
Plant height		0.09	0.38**	0.41**	0.16	0.58**	0.41**
Panicle length			0.10	0.15	0.21**	-0.19	0.14
Number of leaves per plant				0.62**	0.46**	0.37**	0.56**
Panicle weight					0.75**	0.49**	0.88**
Number of grains per panicle						0.05	0.87**
1000 grain weight							0.49**

** Significant at one per cent level. * Significant at five per cent level.

Table 2. Path coefficient analysis showing direct and indirect effects

Characters	Days to 50% bloom	Plant height	Panicle length	Number of leaves / plant	Panicle weight	Number of grains / panicle	1000 grain weight	r_g with yield
Days to 50% bloom	0.1300	0.0068	-0.0002	-0.0952	0.0382	0.3014	0.1124	0.4934**
Plant height	0.0270	0.0328	0.0027	-0.0458	0.0274	0.1256	0.2390	0.4081**
Panicle length	-0.0009	0.0030	0.0303	0.0114	0.0103	0.1694	-0.0797	0.1438
Number of leaves per plant	0.1037	0.0126	-0.0029	-0.1194	0.0416	0.3646	0.1554	0.5556**
Panicle weight	0.0744	0.0134	0.0047	-0.0745	0.0667	0.5962	0.2013	0.8822**
Number of grains per panicle	0.0496	0.0052	0.0065	-0.0551	0.0503	0.7905	0.0212	0.8682**
1000 grain weight	0.0352	0.0189	-0.0058	-0.0447	0.0324	0.0404	0.4147	0.4911**

Underlined figures denote the direct effects. Residual effect : = 0.1885 ** Significant at one per cent level

intercorrelations among themselves are furnished in Table 1.

Significant positive association of days to 50 per cent bloom with grain yield has been observed (0.492) and this is similar to the findings of Devadas Rao (1985). This trait recorded significant positive intercorrelation with all traits except panicle length. Days to 50 per cent bloom had a direct positive effect on grain yield and this finding is in agreement with the findings of Devadas Rao (1985). The indirect effect of days to 50 per cent bloom was high and positive through number of grains per panicle (0.3014) and 1000 grain weight (0.1124) (Table 2).

Significant positive genotypic correlation of plant height with grain yield (0.41) was noticed. The intercorrelation recorded between plant height and number of leaves per plant, panicle weight and 1000 grain weight was positive and significant. Shinde (1981) observed a positive correlation between plant height and grain weight. Salikumar and Singhania (1984) reported non-significant genotypic correlation of plant height with panicle length as in the present study. The positive and significant association of plant height with number of leaves per plant in the present was also reported by Kukadia *et al.* (1984).

The direct positive effect of plant height with yield is not considerable (0.0328) and the indirect influence of plant height was positive and high through 1000 grain weight (0.2390) and number of grains per panicle (0.1256) (Table 2).

Panicle length recorded low and non-significant association with yield and this finding agrees with that of Srihari and Nagur (1980). This traint showed a positive and significant intercorrelation with number of grains per panicle.

A high positive association was observed between number of leaves per plant and grain yield (0.56), similar to the findings of Srihari and Nagur (1980). This trait also recorded significant and positive interassociation with all the other traits except panicle length. This traint exhibited a direct negative effect with yield as was observed by Salikumar and Singhania (1984). However, a positive indirect effect through all other characters studied except panicle length was observed (Table 2).

The association of panicle weight with grain yield was positive significant and high (0.88). Panicle weight had positive significant association with all the other characters studied except panicle length. The direct effect of panicle weight on yield was very low and the indirect effect of this trait through number of grains per panicle was high (0.5962) (Table 2).

High degree of positive and significant association was noticed between number of grains per panicle and grain yield (0.87). The direct positive effect of this trait with yield was very high when compared to all other characters studied. This trait also had significant positive inter-association with all the other traits except plant height and 1000 grain weight. The indirect effects through other characters was found to be very low and negligible (Table 2).

Positive and significant correlation between 1000 grain weight and grain yield (0.49) showed the importance of this trait in deciding the yield. The direct effect of this trait on yield was high and the indirect effect through other characters are found to be very low. The inter correlation with

panicle length and number of grains was found to be non-significant and it was positive and significant with all other characters (Table 2).

The present study indicated that panicle weight, number of grains per panicle, number of leaves per plant and days to 50 per cent bloom appeared to be major components for grain yield and selection for these traits will lead to increase in grain yield in grain sorghum.

REFERENCES

DEVADAS RAO,L.V. 1985. Heterosis, correlation and path coefficient study in sorghum (*Sorghum bicolor* (L.) Moench.) **Thesis abstracts 11**: 297-298.

DEWEY,D.R. and LU,K.H. 1959. A correlation and path coefficient analysis of components of crested wheat grass seed production. **Agron.J.51** : 515-516.

KUKADIA,M.V., SINGHANIA,D.L., DESAI,K.B., PATEL,R.H. and RAJA,K.R.V., 1984. Factor analysis in forage sorghum. **Sorghum Newsl., 27**: 18.

SALILKUMAR, and SINGHANIA, D.L. 1984. Character association and path analysis in grain sorghum. **Sorghum Newsl. 27**: 16.

SHINDE,V.K. 1981. Genetic variability and its components. **J. Maharashtra Agric. Univ., 6**: 30-32.

SRIHARI,A. and NAGUR,T. 1980. Association between multiple regression analysis in sorghum. **Sorghum Newsl. 23**: 10-12.

Madras Agric. J.; 81(10): 534-537 October, 1994

ROW SPACING, N AND MULCHING ON YIELD, RUE AND NUTRIENT UPTAKE OF RAINFED WHEAT

S.K.UTTAM and S.K.DAS.

Department of Soil Conservation & Water Management, Chandra Shekhar Azad University of Agriculture & Technology, Kanpur.

ABSTRACT

Results of two field study (1986-87 and 1987-88) conducted at the Soil Conservation and Water Management farm, Kanpur showed that application of N at 60 kg/ha recorded higher root depth and root weight, grain yield and N,P,K uptake. Method of half drilled at sowing + half foliar application of nitrogen showed better results in comparision to drilling entire dose of N as basal. Grain yield of wheat at a row spacing of 20 cm was at par with 25 cm row spacing, during normal rainfall season. During drought season, 25 cm row spacing registered higher yield. The best development of roots was observed in 30 cm row spacing. Application of maize stalk at 4t/ha performed better in comparison to weeding and hoeing in respect of maximum root expansion, yield, rainfall use efficiency and nutrient uptake.

The yield is significantly influenced by the plant population per unit area. Generally spacing exerts its effects in two ways: firstly under wider spacing, individual plant may yield more with low yield per hectare whereas under narrow spacing, individual plant may yield low with more yield per hectare due to variation in plant population. Thus, optimum plant population must be ensured. The favourable effect of mulches on soil moisture status and microclimate conditions have resulted in to higher crop yields at many places. The extent of increase in yield was, however, much dependent upon nature of mulch, mulching method, soil and rainfall characters of the area. Experiments conducted in different parts of the country have clearly shown that surface mulching increased the yield of rainfed. Fertilizer application to wheat had great importance in raising the production. Nitrogen is an universally deficient nutrient in majority of our soil and need maximum attention ance of soil fertility.

MATERIALS AND METHODS

The field experiment on rainfed wheat (*Triticum aestivum* L.) variety 'C 306' was conducted during *rabi* seasons of 1986-87 and 1987-88 at Kanpur on sandy loam soil (56.8% sand, 21.6% silt and 20.0% clay), slightly alkaline (pH 7.8), low in organic carbon (0.29%) and total-N (0.030%), medium in available P_2O_5 (16.6 kg/ha) and available K_2O (138 kg/ha) with field capacity as 19.5 per cent, wilting point 6.2 per cent and bulk density 1.5 g/cc. The rainfall of 38.5 mm and 25.0 mm during *rabi* season of 1986-87 and 1987-88, respectively, was received effectively. At sowing time natural available soil moisture in100 cm soil profile was 23.4 and 23.2 cm during 1986-87 and 1987-88, respectively. The treatments consisted of three row spacings *viz.* 20, 25 and 30 cm; two mulching practices *viz.* weeding and hoeing twice and maize stalk mulch at 4t/ha; four nitrogen levels *viz.* 0, 30, 60 and 90 kg/ha and two