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Correlation Studies Among Pearl Millet [*Pennisetum Glaucum (L.) R.Br.*] Hybrids

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Abstract

Fifty pearl millet [Pennisetum glaucum (L.) R.Br.] diverse genotypes were analysed to estimate correlation among seed yield per plant and its ten component characters. The seed yield per plant had significant and positive correlation with number of effective tillers per plant (0.643, 0.534) and harvest index (0.563, 0.554) at both genotypic and phenotypic levels.

Key words : Pearl millet, Correlation coefficient, Yield component.

Introduction

Pearl millet [Pennisetum glaucum (L.) R.Br.], a diploid species (2n =14) believed to be originated in West Africa and from there was introduced to India, Is of great importance in the arid and semi-arid tropics, where it is a staple food for millions of people. The crop is generally grown in area where environmental conditions, especially rainfall, temperature and soil fertility, are too harsh to grow other cereals. Globally it ranks 6th cereal crop in importance after wheat, rice, maize, barley and sorghum, while in India, it is forth most important cereal crop after rice, wheat and sorghum. India is the largest pearl millet growing country. In India pearl millet occupied an area of 7.30 mha with production and productivity of 8.74 mt and 1198 kg/ha, respectively (Anonymous, 2012-13). Pearl millet is mainly grown in Rajasthan, Utter Pradesh, Gujrat, Maharashtra, Haryana, Karnataka, Tamil Nadu, Madhya Pradesh and Andhra Pradesh states of the country. Rajasthan stands first positon in area and production of pearl millet in India. In Rajasthan it occupied an area of 49.86 lac ha with production and productivity of 64.34 lac tonnes and 1290 kg/ha, respectively (Anonymous, 2012-13). The grains of pearl millet are very nutritious and form the staple diet of approximately 10% of the population in India. It is a good source of carbohydrate (59.8- 78.2%), protein (11.5%), fat (4.1-6.4%) and also has good amount of minerals, particularly phosphorus and iron (2.8%). The grain yield is a complex character and direct selection for yield is not so much easy, therefore, improvement in grain yield is made through improvement in component characters. This study will determine the criteria for selection that could be effectively used with high yield potential. Hence, correlation must be

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worked out among component and yield traits.

Materials and Methods

Fifty pearl millet hybrids including three checks, namely HHB-67 Improved, check GHB-538 and check RHB-177 were evaluated in randomized block design with two replications at Agriculture Research Station, Beechwal, Bikaner (27^{0}11' N, 71^{0}54' E and 228.5 m ASL) during kharif, 2013.Each hybrid was sown by hand plough in two rows with a plot size of 4 X 1 m^2. The spacing between row to row was 50 cm and between plant to plant was 15 cm. All the recommended packages of practices for pearl millet were followed as per rainfed condition to raise a healthy crop. The experiment was sown on 20 july 2013. Observations were recorded on individual plant basis on 10 randomly selected plants from each replication for 8 characters viz, plant height (cm), number of effective tillers per plant, ear head length (cm), ear head diameter (cm),1000-seed weight (g),harvest index (%),biological yield per plant (g) and seed yield per plant (g). While two characters namely days to 50 per cent flowering and days to maturity were recorded on whole plant basis. Genotypic and phenotypic correlation coefficients were calculated using the formula suggested by Searle (1961).

Result and Discussion

Analysis of variance revealed significant differences among the genotypes for all the ten characters studied (Table 1), indicating the existence of considerable genetic variation in the experimental materials. The result on correlation in the present study revealed that in general the value of genotypic correlation coefficient were higher than of their corresponding phenotypic correlation coefficients for most of the characters , indicating a strong inherent association amongs characters. The correlation study (Table 2) revealed that seed yield was significantly and positively correlated with number of effective tillers per plant (0.643, 0.534) and harvest index (0.563, 0.554) at both genotypic and phenotypic levels. Thus ,these two attribute can serve as selection indices for seed yield improvement in pearl millet, similar finding of significant and positive correlation had been reported by Nevale et al (1995),Latha and Shanmunga (1998), Pareek (2002), Borkhataria et al (2005), Izge et al (2006) for grain yield per plant (g) with number of effective tillers per plant and by Choudhary et al (2003) for harvest index (%). Significant and negative correlation of seed yield per plant was found with days to 50 per cent flowering (-0.356, -0.303) and days to maturity (-0.349, -0.301) at both genotypic and phenotypic levels. Days to 50 per cent flowering had significant and high positive association with days to maturity (1.000, 0.996) and with ear head length (0.418, 0.327) at both levels. Similarly days to maturity had significant and positive correlation with ear head length (0.415, 0.334) at both genotypic and phenotypic levels. Also significant and positive association of plant height was observed with ear head length (0.512, 0.524) at both levels. Likewise number of effective tillers per plant had significant and positive correlation with seed yield per plant (0.643, 0.534) and biological yield per plant (0.341, 0.348) at both levels, wheres test weight showed significant and positive correlation with biological yield per plant (0.384, 0.336) at both genotypic and phenotypic levels. On other hand days to 50 per cent flowering showed significant and negative correlation with number of effective tillers per plant (-0.481, -0.407) and with harvest index (-0.384, -0.296) at both levels. Likewise days to maturity had significant and negative correlation with number of effective tillers per plant (0.483, -0.402), harvest index (-0.385, -0.309) and with seed yield per plant (-0.349, -0.301) at both genotypic and phenotypic levels. Significant and negative association of harvest index was observed with biological yield per plant (-0.605, -0.579) at genotypic and phenotypic levels.

Conclusion

The study revealed that seed yield per plant exhibited highly significant and positive correlation with number of effective tillers per plant (0.643, 0.534) and with harvest index (0.563, 0.554) at both genotypic and phenotypic levels. Whereas days to 50 per cent flowering (-0.356,-0.303) and days to maturity (0.349, -0.301) showed significant and negative correlation with seed yield per plant. Hence these characters may be

given consideration while making selection for the pearl millet genotypes.

Table 1. Analysis of variance for different characters of pearl millet hybrids

S. No.	Characters	Replications (df = 1)	Treatment (df=49)	Error (df = 49)
1	Days to 50 % flowering	7.840	41.959**	2.554
2	Days to maturity	7.290	42.016**	2.269
3	Plant height (cm)	198.810	175.165**	65.238
4	No. of effective tillers/plant	0.099	0.175**	0.026
5	Ear head length (cm)	1.690*	13.123**	2.816
6	Ear head diameter(cm)	0.054	0.052**	0.017
7	Test weight (g)	1.014*	3.548**	0.521
8	Harvest index (%	76.562	370.145**	26.192
9	Biological yield/plant (g)	27.730*	396.957**	15.379
10	Seed yield/ Plant (g)	13.860	46.532**	4.790

*, ** Significant at 5% and 1% level of significance, respectively.

Table 2: Phenotypic (P) and Genotypic (G) Correlation coefficient among 10 characters in pearl millet

		Days to Days to flowering	Days to Maturity	Plant height tillers per plant	No. of effective length	Ear head diameter	Ear head	Test weight (%)	Harvest Index per plant	Biological yield per plant	Seed yield
(1) Days to 50%	P	1.000	0.996**	-0.062	-0.407**	0.327*	-0.104	-0.184	-0.296*	0.037	-0.303*
flowering	G	1.000	1.000**	0.007	-0.481**	0.418**	-0.159	-0.253	-0.384**	0.075	-0.356*
(2) Days to	P		1.000	-0.050	-0.402**	0.334*	-0.097	-0.187	-0.309*	0.050	-0.301*
maturity	G		1.000	0.013	-0.483**	0.415**	-0.128	-0.245	-0.385**	0.083	-0.349*
(3) Plant	P			1.000	0.203	0.524**	0.176	0.072	-0.092	0.323*	0.208
height	G			1.000	0.202	0.512**	0.089	0.144	-0.013	0.342*	0.301*
(4) No. of	P				1.000	-0.094	0.235	0.086	0.119	0.348*	0.534**
effective	G				1.000	-0.216	0.436**	0.088	0.221	0.341*	0.643**
tillers/plant											
(5) Ear head	P					1.000	0.018	-0.181	0.084	0.067	0.163
length	G					1.000	-0.151	-0.320*	0.126	0.001	0.110
(6) Ear head	P						1.000	-0.012	0.093	0.244	0.303*
diameter	G						1.000	-0.119	0.112	0.272	0.279
(7) Test weight	P							1.000	-0.054	0.336*	0.264
	G							1.000	-0.114	0.384**	0.264
(8) Harvest	P								1.000	-0.579**	0.554**
index (%)	G								1.000	-0.605**	0.563**
(9) Biological	P									1.000	0.279
yield /plant	G									1.000	0.249
(10) Seed	P										1.000

yield/ Plant G

1.000

References

Anonymous, 2012-13. Area and production of pearl millet. All India coordinated pearl millet improvement project (ICAR). A.R.S Mandor, Jodhpur .

Anonymous, 2012-2013. Vital Agricultural Statistics: Directorate of Agriculture, Jaipur, Rajasthan.

Borkhataria, P.R., Bhatiya, V.J., Pandya, H.M., and Valu, M.G. 2005. Variability and correlation studies in Pearl millet. National J. Plant Improvement, 7(1):21-23.

Chaudhry, M.H., Subhani, Ghulam M., Shaheen M.S., Saleem and Usman. 2003. Correlation and Path Coefficients Anaiysis in Pearl millet (Pennisetum americanum L.). Pakistan J. Biological Sci., 6(6):597-600.

Izge, U., Kadams, M. and Gungula, T. 2006. Studies on character association and path analysis of certain quantitative characters among parental line of pearl millet (Pennisetum glaucum) and their f_1 hybrids in a diallel cross. African J. Agric. Res., 1(5): 194-198.

Latha, R. and Shanmunga, S.P. 1998. Studied on character association in grain pearl millet. Madras Agric. J., 84 (11-12): 687-689.

Navale, P.A., Nimbalkar, C.A., Kulkarni, V.M. and Narayana, H. G. 1995. Correlation and path analysis in pearlmillet. J. Maharashtra. Agric. Univ., 20(1):43-46.

Pareek, S. 2002.Correlation and path anaiysis in pearl millet (Pennisetum glaucum (L.) R. Br.). Res.on Crops, 3 (1):75-77.

Searle, S.R. 1961.Phenotypic, genotypic and environmental correlations. Biometrics, 17:474-480.