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Research Note

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.

Keywords
Pearl millet, Correlation co-efficient, Genotypic and Phenotypic, Yield component.

Pearl millet [*Pennisetum glaucum* (L.) R.Br.], a diploid species (2n =14) believed to be originated in West Africa and from there it 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 fourth 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, Uttar Pradesh, Gujarat, Maharashtra, Haryana, Karnataka, Tamil Nadu, Madhya Pradesh and Andhra Pradesh states of the country. Rajasthan stands first position in area and production of pearl millet in India. In Rajasthan, it occupied an area of 49.86 lakh ha with production and productivity of 64.34 lakh tonnes and 1290 kg/ha, respectively (Anonymous, 2011-12). 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 worked out among component and yield traits.

Fifty pearl millet hybrids including three checks, namely HHB-67 Improved, GHB-538 and 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 20th July, 2013. Observations were recorded on individual plant basis on 10 randomly selected plants from each replication for eight 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).

Analysis of variance revealed significant differences among the genotypes for all the ten characters studied, indicating the existence of considerable genetic variation in the experimental materials. The results showed that in general the value of genotypic correlation coefficient were higher than their corresponding phenotypic correlation coefficients for most of the characters, indicating a strong inherent association among the characters. The 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 (Table 1). Thus, these two attributes can serve as selection indices for seed yield improvement in pearl millet, Similar finding of significant and positive correlation had been reported by Navale *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) with 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 and biological yield per plant (0.341, 0.348) at both levels, whereas, 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 harvest index (-0.384, -0.296) at both levels. Similarly 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.

From the above study, it was concluded that the characters namely days to 50 per cent flowering, days to maturity, effective tillers per plant and harvest index may be given consideration while making selection for the pearl millet genotypes.

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Table 1. Phenotypic (P) and Genotypic (G) Correlation coefficient among ten characters in pearl millet

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

*, ** Significant at 5 and 1 per cent level, respectively.