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Full Length Research Paper

Correlation and Heritability in Pearl Millet (Pennisetum glaucum (L) R. Br.

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Ten genotypes of Pearl millet identified from the germplasm (Pennisetum glaucum (L) R. Br. were grown in a complete randomized block design with three replicates and the yield and four other yield contributing characters were studied. The coefficient of genotypic, phenotypic and environmental correlations and heritability in broad sense were worked out to determine the degree of association among the agronomic characters. A good amount of genetic variability for different characters were observed. Heritability of 1000-seed weight and grain yield was highest, whereas the number of productive tillers had low heritability. Grain yield was positive and significantly correlated with the number of productive tillers, panicle width, panicle length and 1000-seed weight. Significant negative correlation was observed between the number of productive tillers and panicle width. There was a positive association between the number of productive tillers, panicle length and 1000-seed weight and grain yield High significant association also existed between panicle width and panicle length.

Key word: Correlation, heritability, pearl millet, genetic advance.

INTRODUCTION

Pearl millet is the most drought tolerant of all the domesticated cereal. Pearl millet is the sixth most important cereal after wheat, rice, maize, barley and sorghum reported by FAO (1997). Although, pearl millet is extensively grown in Nigeria, the average yield is still very low. The low yield is associated with low and erratic rainfall, high temperatures, poor soil fertility, disease and insect pest pressures and low genetic potential of landraces which respond poorly to improved management practices .The only way to improve pearl yield is the adoption of improved cultivars (both hybrids and open pollinated).

To develop a programme for high yield , information on the nature and magnitude of variation in the available materials is required and associated of these characters with yield and among themselves. The present study is to investigate the interrelationship between these characters and the yield, heritability and genetic advance of some quantitative characters of peal millet (Pennisetum glaucum (L) R. Br. of selected the genotypes.

MATERIAL AND METHOD

Ten genotypes of pearl millet Pennisetum glaucum (L) R. Br. selected from pearl millet accessions from different millet growing areas in Nigeria were grown in a randomized complete block design with three replications at Lake Chad Research Institute experiment farm at Maiduguri during the rainy season of 2003-2005. Each plot consisted of 4 rows of 5m length inter and intra-row spacing of 75cm and 50cm were used. Five plants were selected from each plot for recording observation on number of productive tillers. Panicle width, panicle length, 1000-seed weight and grain yield.

RESULTS

The grain yield, 1000-seed weight, panicle length were significant and positively correlated with the number of productive tiller (Table 1). The correlation coefficients values varied from 0.5972 to 0.9704. There was a negative significant correlation between the number of productive tillers and panicle width (-0.6561). A negative correlation was observed between 1000-seed weight and grain yield (-0.4581) but not significant. Phenotypic positive correlation was recorded between the grain yield and number of productive tiller, panicle length and productive tiller (Table 1). There was a strong positive as-

Table 1. Genotypic, Phenotypic and Environmental Correlation Coefficients.

Character	Panicle width	Panicle length	1000-seed weight	Grain yield
Number of productive tiller	-0.6561*	0.5972*	0.6051*	0.9704**
	0.1811	0.8065**	0.3775	0.8113
	0.4932	0.1120	0.0243	0.6854
Panicle width		0.0895	0.2392	-0.3636
		0.7815**	0.1134	0.4396
		0.9542**	0.0831	0.6776*
Panicle length			0.2792	0.0411
			0.0157	0.3445
			0.0868	`0.5474*
1000-seed weight				-0.4581
				-0.5171
				0.7606**

*,** significant at 5% and 1% levels of probability
Note: Genotypic values are given at the top, phenotypic values at the middle and environmental correlation coefficients at the bottom.

Table 2. Genetic coefficient of variation, heritability and genetic advance.

Character	Genetic coefficient variation	Broad sense heritability	Genetic advance as % of mean	General mean
Number of productive tiller	11.50	26.87	12.65	18.67
Panicle width	23.81	20.98	8.78	5.01
Panicle length	6.78	24.53	6.95	13.68
1000-seed yield	10.07	63.81	15.76	3.98
Grain yield	27.25	52.05	39.15	20.06

sociation between panicle width and 1000-seed weight and panicle length. Environmental correlation coefficient was mostly significant between grain yield and number 1000-seed weight (Table 1). There was a strong environmental correlation coefficient (0.9542) between panicle width and panicle length.

The genetic coefficient of variation varied from 6.78 per cent for panicle length to 27.25 per cent for grain yield (Table 2). Heritability in broad sense of 1000-seed weight and grain yield was high but heritability of panicle width was lowest. However, panicle length and number of productive tiller recorded low heritability.

The genetic advance ranged from 6.95 to 39.15 percent. A high genetic advance was observed for grain yield 39.15, followed by 1000-seed weight. Genetic advance was lowest for panicle length.

DISCUSSIONS

The statistical analysis and estimate of genetic parameters showed that a good amount of genetic variability for yield and other characters existed in the materials studied. Information on correlation of these characters within and among themselves were highly heritable and strongly associated with grain yield. Out of the five yielding component, only the 1000-seed weight was highly heritable followed by grain yield, Panicle width was less heritable. Similar results were obtained by Patnaik (1989) in finger millet (Eleucine Coracana (L.) Gaertn. The highest genetic advance was observed for grain yield that is 39.15 per cent, followed by 1000-seed weight. This result collaborated with that of Singh and Mehndiratta (1990) reported high genetic advance in grain yield and 1000-seed weight but low genetic advance in days to maturing in cowpea (Vignia sinensis (L.) Saviex Hassle. Kempana and Tirumalacher 1990 reported a high genetic advance for grain yield and low genetic advance for the number of productive tiller and panicle width in finger millet.

Grain yield was positive and highly correlated with number of productive tiller, panicle length, panicle width

and 1000-seed weight, this result is in a agreement with Samathuran (1995) who obtained positive correlation between the number of productive tillers and grain yield in pearl millet from a study of yield in relation to population. In the present study, a negative correlation was observed between the number of productive tillers and panicle width, whereas positive correlation was recorded between the number of productive tillers and 1000-seed weight and grain yield.

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