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GENETIC ANALYSIS OF YIELD AND ITS COMPONENTS IN FODDER MAIZE

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Abstract: Nine fodder maize types were evaluated in a randomized block design with three replications during summer 1992 at the College of Agriculture, Vellayani under the AICRP (Forage Crops). Genetic analysis of fodder yield and its components revealed that plant height and plant population recorded high genotypic coefficient of variation, heritability and genetic advance indicating that selection based on these characters will result in improving fodder yield. Highest genotypic correlation was observed between green and dry fodder yield and also between plant population and dry fodder yield. High heritability and high genetic advance observed for plant height indicate additive gene action and the reliability of this character during selection programmes for improving the yield.

Key words: Additive gene, correlation, fodder maize, genetic advance, genetic variability, heritability.

INTRODUCTION

Maize is a quick growing and outstanding fodder crop because of its potentiality to high drought tolerance, versatile adaptation to soil types and high dry matter production. The improvement of yield in any crop by selection depends upon the extent of genetic variability in respect of yield and its components. Correlation estimates are useful in determining how selection based on characters will result in an improvement of other correlated characters. Hence this study is carried out to estimate genetic variability and correlation of different components of yield in fodder maize.

MATERIALS AND METHODS

The materials consisted of nine fodder maize entries viz., Deccan 103, Deccan 105, Dhawal, Ganga 11, GBM 84-1, GBM 84-2, HGT 3, J 1006 and African Tall.

The study was conducted with the above nine entries in RBD with three replications during summer 1992 at the College of Agriculture, Vellayani under the AICRP on Forage Crops. The cultural and manurial practices were done as per package of practices recommendations of the Kerala Agricultural University (KAU, 1989). From each plot, a random sample of 10 plants was selected for recording plant height, number of leaves, leaf/stem ratio, green fodder yield and dry fodder yield. In addition to the above, plant population was also recorded. The data were analysed statistically and genotypic and phenotypic coefficients of variation (GCV and PCV) were calculated using the formula suggested by Burton (1952). Heritability in the broad sense (h^2) and genetic advance (GA) were calculated using the formula suggested by Allard (1960). The genotypic and phenotypic correlations were estimated as per Panse and Sukhatme (1961).

RESULTS AND DISCUSSION

Table 1. Genotypic and phenotypic coefficient of variation, heritability and genetic advance for different characters in fodder maize

Characters	GCV	PCV	h^2	GA
Plant population	58.65	116.03	50.55	11.22
Number of leaves	0.35	1.16	30.25	0.67
Leaf/stem ratio	0.00	0.03	9.59	0.03
Plant height	195.30	291.76	66.94	23.55
Green fodder yield	1.99	3.51	56.95	2.19
Dry fodder yield	0.06	0.11	54.99	0.38

Table 2. Phenotypic and genotypic correlations among characters

Characters		Number of leaves	Leaf/stem ratio	Plant height	Green fodder yield	Dry fodder yield
Plant population	P	0.15	-0.29	0.70**	0.65**	0.68**
	G	0.15	-1.66	0.93**	0.66**	0.67**
Number of leaves	P		0.05	-0.17	0.03	0.13
	G		-0.59	-0.47*	0.24	0.16
Leaf/stem ratio	P			-0.31	-0.16	-0.10
	G			-1.37	-0.80	-0.97
Plant height	P				0.29	0.30
	G				0.34	0.39
Green fodder yield	P					0.94**
	G					1.05**

P - Phenotypic; G - Genotypic **Significant at 1 per cent level; *Significant at 5 per cent level

The estimates of PCV, GCV, heritability and genetic advance are presented in Table 1. The phenotypic coefficient of variation was maximum for plant height (291.76) and minimum for leaf/stem ratio (0.03) whereas genotypic coefficient of variation was maximum for plant height (195.30) and minimum for leaf/stem ratio (0.00). Sreenivasan *et al.* (1986) suggested plant height as a criterion in selecting for green fodder yield in guinea grass. Low GCV values for number of leaves, leaf/stem ratio, green fodder yield and dry fodder yield indicate the low amount of genetic variability and the limited scope for the improvement of these characters through selection.

High heritability and low genetic advance observed for number of leaves, green fodder yield and dry fodder yield indicate the role of non-additive genes in the expression of these characters. High heritability and high genetic advance observed for plant height indicate additive gene and the reliability of this character during selection for improving the yield.

Phenotypic and genotypic correlations among characters are presented in Table 2. Plant population and green fodder yield were having highest positive correlation with dry fodder yield followed by plant height and number of leaves. The leaf/stem ratio showed negative phenotypic correlation with dry fodder yield. In the case of green fodder yield maximum correlation was obtained with plant population and plant height. Here also leaf/stem ratio showed negative correlation. Dry matter and green fodder yield were positively correlated with number of leaves per plant (Patel and Sheika, 1988). Sewi *et al.* (1988) reported that green fodder yield was positively and significantly correlated with dry matter yield at the phenotypic level. Positive high genotypic correlation was observed between plant population and green fodder yield and also with plant height and green fodder yield. Therefore, plant height should be taken into consideration during selection programme for improving the forage yield in maize.

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