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Character Association Studies in Fodder Sorghum

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Correlations and path-coefficient analyses between yield and yield components were done in 23 lines of fodder sorghum. Among the characters studied number of leaves, length and breadth of leaf and thickness of stem were positively correlated with green fodder yield. Path-coefficient analysis revealed that leaf length and breadth showed high positive direct effect on green fodder yield. Eventhough the direct effect of number of leaves and stem thickness was low and negative on yield, their contribution through leaf length and breadth was considerable. It is suggested that by increasing leaf number and size in existing fodder varieties, the fodder yield can be enhanced significantly.

Sorghum is an important fodder *cum* grain millet in Tamilnadu, and grown both in dry and irrigated conditions. Sufficient improvements have been made in grain sorghum and number of varieties and hybrids were releas ed. Fodder improvement programme still requires further impetus. In the present study an attempt was made to obtain information on associations between various characters to develop a selection criterion to improve the fodder sorghums.

MATERIALS AND METHODS

Twenty three fodder varieties of sorghum were sown in a randomized blocks comprising three replications. Each entry was sown in 10 metre-square bed adopting a spacing of 3.0 x 15 cm. Observations were recorded in five randomly selected plants on plant height, number of leaves, length and breadth of fourth leaf, thickness of stem, days to 50% flowering and green fodder yield at 50% flowering stage.

Phenotypic and genotypic correlation coefficients were estimated using the formula suggested by Miller, *et al*, 1958. The path-coefficient analysis was doneusing genotypic correlation materix according to Dewey and Lu (1959).

RESULTS AND DISCUSSION

Height of plant showed significant association only with leaf length both at phenotypic and genotypic levels (Table I). The association of number of leaves with all the other characters were highly significant both at phenotypic and genotypic levels. Characters like number of leaves, length and breadth of leaf, stem thickness and fodder yield were positive and highly associated among themselves. Days to 50 per cent flow-

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TABLE I. Phenotypic (P) and genotypic (G) correlations in fodder sorghum varieties

		No. of leaves	Leaf length	Leaf breadth	Stem thickness	Days to 50 per cent flowering	Fodder yield
Height	P	0.3758	0.4430*	0.0680	0.0462	0.2885	0.1410
	G	0.3865	0.4481*	0.0637	0.0395	0.2321	0.1318
No. of leaves	P		0.8654**	0.8265**	0.8249**	0.4644	0.8605**
	G		0.8921**	0.8535**	0.9696**	0.4810*	0.8644**
Leaf length	P			0.6948**	0.7925**	0.4889*	0.8387**
	G			0.7004**	0.8227**	0.4622*	0.8566**
Leaf breadth	P				0.9091**	0.3329	0.9324**
	G				0.9374**	0.3197	0.9413**
Stem thickness	P					0.3277	0.9324**
	G					0.5845**	0.9604**
Days to 50 per cent flowering	P						0.3554
	G						0.3694

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

ering showed significant genotypic correlation with number of leaves, length of leaf and stem thickness. Height of plant and days to 50 per cent flowering were not significantly correlated with fodder yield.

In path-coefficient analysis, the breadth of leaf exerted the maximum direct effect followed by length of leaf on green fodder yield. Eventhough number of leaves and stem thickness showed significant genotypic correlation with fodder yield, their direct influence on fodder yield was negative. This indirect effect *via* length and breadth leaf was positive and high. Direct effects of days to 50 per cent flowering and height of plant were less.

Genetic improvement in fodder yield can be achieved by improving its component characters. The present study indicates that number of leaves, length and breadth of leaf determining the leaf size and thickness of stem were important component characters of the fodder yield in the present material. Path-coefficient analysis revealed that both length and breadth of leaf contributed maximum to the fodder yield. Since existing fodder varieties are considerably tall, increase in leaf size and leaf number may immediately contribute to fodder yield in sorghum. The importance of leaf area for fodder improvement have been reported in bajra (Gupta and Nanda, 1971); in cowpea (Dangi and Paroda, 1974) and in sorghum (Paroda, *et al* 1975). Number of leaves and stem thickness influenced leaf length and

TABLE II. Path analysis showing direct (thick types) and indirect effects of different characters on fodder yield in sorghum

	Height	No. of levels	Leaf length	Leaf breadth	Stem thickness	Days to 50 per cent flowering	Genotypic correlation with yield
Height	**−0.1966**	−0.0447	0.3110	0.0571	−0.0151	0.0201	0.1318
No. of leaves	−0.0760	**−0.1157**	0.6191	0.7656	−0.3702	0.0416	0.8644
Leaf length	−0.0881	−0.1302	**0.6940**	0.6282	−0.3413	0.0400	0.8566
Leaf breadth	−0.0125	−0.0987	0.4861	**0.8970**	−0.3582	0.0276	0.9413
Stem thickness	−0.0078	−0.1121	0.5710	0.8408	**−0.3822**	0.0505	0.9604
Days to 50 per cent flowering	−0.0456	−0.0556	0.3208	0.2868	−0.2232	**0.0862**	0.3694

Residual effect = 0.1486

breadth and therefore, contributed indirectly. Paroda *et al* (1975) suggested that an ideal fodder sorghum should possess more number of broad and long leaves per plant with medium flowering, medium thick stem and moderate plant height. The present study confirms that the existing tall genotypes with possess longer and broad leaves will be an ideal fodder type in sorghum.

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