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CHARACTER ASSOCIATION AND COMPONENT ANALYSIS IN NAPIER GRASS

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ABSTRACT

Correlation and path coefficient analysis was carried out using 40 diverse genotypes of napier grass for 10 component characters including green fodder yield. Number of tillers per plant, number of leaves per plant, leaf weight, stem weight and leaf stem ratio had positive correlation with green fodder yield both at phenotypic and genotypic levels. Path analysis showed positive direct effects of leaf weight, stem weight, leaf stem ratio, number of tillers per plant on green fodder yield. These traits should be given more emphasis while selecting for improvement in green fodder yield.

KEY WORDS : Napier grass, correlation, path analysis

Napier grass, *Pennisetum purpureum* (K.) Schum, has a wide spectrum of adaptation. It is a vigorous, bunchy, perennial grass and native of tropical Africa. Only a limitted work on genetic analysis has been done due to its long growing nature and non flowering types during the warmer months. It is endowed with virtues, like tall growing, profuse tillering and high leafiness, all of which go to contribute towards high biomass production. Hence, improvement of this crop for its fodder yield through selection needs immediate attention. Vijendra Das (1994) studied diverse genotypes of napier grass and found a great array of differences in genotypic and phenotypic coefficient of variation. This present study was, therefore, undertaken to study the type of association and to judge the direct and indirect effect of the various components on fodder yield.

MATERIALS AND METHODS

The materials used in the present investigation consisted of 40 genotypes of Napier grass of diverse origin (Australia, Hawaii, Kenya, Puerto Rico and USA) and maintainted in the Department of Forage Crops, Tamil Nadu Agricultural University, Coimbatore. The genotypes were raised in randomisd block design with two replications during *rabi* 1993, on one side of ridges of 3m length with the spacing of 50cm X 50cm. Data were recorded on five plants in each replication for green fodder yield (GFY) and its contributing characters when the crop was 6.5 months old, at the fourth harvest. The genotypic and phenotypic correlation coefficients and path analysis were computed following routine methods.

RESULTS AND DISCUSSION

The values of genotypic correlation coefficients were higher when compared to phenotypic correlation coefficients for all the yield parameters (Table 1). This observation indicated the masking effect of environment by the genetic constitution of each trait. GFY was correlation with number of tillers per plant (TPP), number of leaves per plant (LPP), leaf weight (LW), stem weight (SW) and leaf stem ratio (LSR), the association being positive and significant at both the phenotypic and genotypic levels. This was in accordance with the result obtained by Vijendra Das and Ratnam Nadar (1991).

Among the yield components, TPP was correlated with LPP, LW, and SW, the coefficients of correlation being positive and significant at both and genotypic levels, LPP with LW and SW ; leaf length (LL) with leaf breadth (LB) and LSR ; LB with LSR and LW with SW and LSR showed positive and significant associations at both genotypic and phenotypic levels. It may be concluded that intentional selection for TPP, LPP, LW, SW and LSR would result in simultaneous improvement of the GFY.

In the path analysis of genotypic correlations (Table 2), LW (0.7122) and SW (0.3061) exerted direct influence on the GFY. Other characters like LSR (0.0086), LB (0.0074), TPP (0.0065) and plant

Table 1. Genotype and phenotypic correlation coefficients among the nine characters in napier accession

Characters		Number of tillers/plant	Number of leaves/plant	Leaf length	Leaf breadth	Stem diameter	Leaf weight	Stem weight	Leaf stem ratio	Green fodder yield plant
Plant height	G	0.2373	0.1083	0.0659	-0.1791	-0.2150	0.1451	0.3322*	-0.1064	0.1751
	P	0.1995	0.1023	0.0574	-0.1266	-0.1560	0.1306	0.1975	-0.0775	0.1545
Number of tillers/ plant	G		0.8706**	0.2001	-0.1783	-0.1650	0.6061**	0.5775**	0.2199	0.6124**
	P		0.8292**	0.2022	-0.1103	-0.1108	0.5742**	0.5506**	0.1842	0.5829**
Number of leaves/ plant	G			0.2491	-0.1374	-0.1317	0.6632**	0.6147**	0.3013	0.6656**
	P			0.2207	-0.1010	-0.1372	0.6238**	0.5754**	0.2549	0.6266**
Leaf length	G				0.3416*	0.1113	0.2631	0.0475	0.4583**	0.2067
	P				0.2716	0.1039	0.2584	0.0454	0.4360**	0.2029
Leaf breadth	G					0.2176	0.3614*	0.1196	0.4658**	0.2993
	P					0.1635	0.2979	0.1134	0.3410*	0.2509
Stem diameter	G						-0.1679	- 0.2956	0.2255	-0.2114
	P						-0.1546	-0.2638	0.1944	-0.1924
Leaf weight	G							0.8854*	0.4680**	0.9908**
	P							0.8793**	0.4515*	0.9902**
Stem weight	G								0.0300	0.9402**
	P								0.0016	0.9372**
Leaf stem ratio	G									0.3521**
	P									0.3306

* - Significant at 5% levels ; ** - Significant at 1% level

height PH (0.0021) showed an appreciable level of direct influence on the GFY. TPP and PH were reported to have exerted direct influenc on fodder yield in napier grass and Napier-baja hybrids (Gupta and Bhardwaj, 1975 ; Katoch and Gupta, 1976 ; Vijendra Das and Ratnam Nadar, 1991).

Table 2. Path coefficient analysis showing direct (bold) and indirect effects of nine characters on green fodder yield per plant in napier accessions

Characters	Plant height	Number of tillers / plant	Number of leaves / plant	Leaf length	Leaf breadth	Stem diameter	Leaf weight	Stem weight	Leaf stem ratio	Genotypic correlation with green fodder yield/plant
Plant height	**0.0021**	0.0015	0.0000	-0.0004	-0.0013	0.0013	0.1033	0.0711	-0.0009	0.1749
Number of tillers/ plant	0.0005	**0.0065**	-0.0003	-0.0011	-0.0013	0.0010	0.4309	0.1768	0.0019	0.6124**
Number of leaves/ plant	0.0002	0.0057	**-0.0004**	-0.0014	-0.0010	0.0009	0.4723	0.1881	0.0026	0.6656
Leaf length	0.0001	0.0013	0.0000	**-0.0055**	0.0025	-0.0007	0.1873	0.0145	0.0040	0.2067
Leaf breadth	-0.0004	-0.0012	0.0000	-0.0019	**-0.0074**	-0.0013	0.2574	0.0367	0.0040	0.2993
Stem diameter	-0.0005	-0.0011	0.0000	-0.0006	0.0016	**-0.0061**	-0.1196	- 0.0905	0.0019	-0.2114
Leaf weight	0.0003	0.0039	-0.0003	-0.0015	0.0027	0.0010	**0.7122**	0.2710	0.0041	0.9908**
Stem weight	0.0005	0.0037	-0.0002	-0.0003	0.0009	0.0018	0.6306	**0.3061**	0.0003	0.9402**
Leaf stem ratio	-0.0002	0.0014	-0.0001	-0.0025	0.0035	-0.0014	0.3337	0.0092	**0.0086**	0.3522**

* - Significant at 5% levels ; ** - Significant at 1% level

However, not all the direct effects could bring about positive and significant association with yield. Only the positive direct effect of LW, SW, TPP and LSR resulted in such association. Similarly, none of the characters with negative direct effect such as LL could bring in changes in otherwise positive association with yield except the LPP.

The indirect effect of LW, SW and LSR was much more pronounced in the association of TPP and LPP with GFY. Based on the information on phenotypic and genotypic correlations and direct and indirect effects of various characters on GFY, preference may be given to LW, SW, LSR and TPP in the selection programme to isolate superior genotypes.

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NUTRIENT UPTAKE AND QUALITY CHARACTERS AS INFLUENCED BY LEVELS OF P, ENRICHED FYM AND PHOSPHOBACTERIA IN SOYBEAN

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ABSTRACT

Field experiments were conducted to study the effect of P levels, enriched FYM and phosphobacteria on nutrient uptake and quality characters in soybean. Application of 100 per cent recommended dose of inorganic P_2O_5 as enriched FYM (80 kg/ha) along with seed and soil inoculation of phosphobacteria significantly influenced the nutrient uptake and quality characters in soybean.

KEY WORDS : Soybean, P levels, enriched FYM, nutrient uptake, quality characters

Soybean (*Glycine max* (L.) Merrill) is an important leguminous crop with high protein content. The crop requires adequate amount of phosphorus for better growth and yield. Phosphorus is one of the essential plant nutrients and it is applied through various sources like inorganic P, enriched farmyard manure (EFYM) and biofertilizers. Information on the effect of P enriched FYM and phosphobacteria on nutrient uptake and quality characters of soybean is limited and needs to be investigated.

MATERIALS AND METHODS

Field experiments were conducted at the Annamalai University experimental farm, Annamalai Nagar during January - April 1996 and July - October 1996. The experiments were laid out in randomised block design replicated thrice. There were 14 treatment combinations involving 100 per cent inorganic P_2O_5 alone and its combinaiton with EFYM and phosphobacteria as well as 75 per cent inorganic P_2O_5 in combination with EFYM and phosphobacteria tested on soybean cultivar Co 1. The soil of the experimental field was clay loam with pH of 8.1. It was low in available N, medium in available P_2O_5 and high in available K_2O. A fertilizer schedule of 20 : 80 : 40 kg of N, P_2O_5 and K_2O ha^{-1} respectively was followed. P and phosphobacteria were applied as per treatment schedule. All the fertilizers were applied basally.