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CHARACTER ASSOCIATION AND PATH ANALYSIS IN BUFFEL GRASS

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ABSTRACT

Correlation studies in buffel grass revealed that selection for plant height, tiller number/plant, leaf number/tiller and leaf length will be effective for increasing green matter while dry matter is related more to plant height and tiller number and less with leaf characters. Path coefficient analysis revealed that plants with more height and tiller number will improve dry matter while good height, high leaf number and leaf length will be desirable attributes for the improvement of green matter.

INTRODUCTION

Buffel grass *(Cenchrus ciliaris L)* has a wide range of adaptation to edaphic and climatic conditions and has tolerance to cutting and grazing regimes. In buffel grass, like other grasses, green forage yield (GFY) and dry matter yield (DMY) are the multiplicative end products of many factors contributing singly or jointly. Inter-relationships of different plant attributes among themselves and their relationship with the ultimate yield throw light on the selection criteria for the desirable types. A few studies in this direction (Jatasra and Thakral 1986; Bohra et al. 1969) have been made in the past but a clear picture could not emerge out. This study was planned to find out possible correlations between certain morphological characters and yield.

MATERIAL AND METHODS

Nine promising selections viz. IGFRI-S-624, 638, 650, 658, 660, 667, 678, 679 and 8-3-1 were grown along with one check (IGFRI-S-3108) in randomised block design with three replications at IGFRI. Experimental Farm, Jhansi. Four weeks old seedlings were planted in July 1987 and the stand was maintained under rainfed conditions. Spacing between plants was 60 cm and between rows was 70 cm. Six harvests were made on 23 Sept. and 16 Nov. in 1987, 23 March, 18 Aug. and 12 Oct. in 1988 and 21 Aug. in 1989. Each year 30 kg N/ha was applied in July. The morphological data viz. Plant height (cm), tiller number per plant, leaf number per tiller, leaf length (cm), leaf width (cm), green fodder yield (q/ha) and

dry matter yield (q/ha) were recorded from five randomly selected plants from each plot of the replications at the time of each cutting. The pooled data were analysed statistically.

RESULTS AND DISCUSSION

Plant height showed significant correlation with tillers per plant (0.368*), leaf per plant (0.811**), leaf length (0.379*), leaf width (0.715**), green fodder yield (0.645**) and dry matter yield (0.489**). Tiller number/plant was also correlated significantly with GFY (0.504**), DMY (0.505**), and leaf number/plant (0.415). It was, however, negatively correlated with leaf width (0.184) and had very low relationship with leaf lengh. Leaf number/tiiler showed high correlation with GFY (0.653)**, DMY (0.570)** and leaf width (0.550)**, while leaf length was highly correlated with GFY (0.477) and negatively correlated with DMY (0.180). Both GFY and DMY were significantly and positively correlated.

The results indicate that GFY is highly related to height, tiller number/plant and leaf characters like leaf number/tiller and leaf length. Paroda (1975) also emphasized leafiness as the most important criterion for improvement in yield and quality of forages. Dry matter yield, on the other hand, was related more to plant height and tiller number and less to leaf characters. A very low or negative correlation was obtained between tiller number and leaf length (0.009), tiller number, leaf width (0.184) and leaf length with DMY and leaf width with DMY (0.180). Such negative or negligible correlations arise primarily due to competition between sequentially developing components for common resources, such as nutrient supply.

Path coefficient analysis for DMY (Table 1) clearly suggested that plant height and number of tillers/plant had direct positive contribution on it, while leafy characters such as leaf number, leaf length, leaf width and GFY had direct negative effect on DMY. The direct positive effects of height and tiller number was due to all its associated characters. Similarly, direct negative effect of leafy characters was shared more or less equally by other via attributes.

Table 1. Direct and indirect effect of yield components on dry matter yield

	Plant height (cm)	Tiller (number/ plant)	Leaf (number/ tiller)	Leaf langth (cm)	Leaf width (cm)	GFY (q/ha)
Plant height	0.86	0.40	0.79	0.26	0.65	0.64
Tiller number	0.41	0.87	0.64	0.12	-0.15	0.82
Leaf number	-0.37	-0.29	-0.40	-0.13	-0.22	-0.33
Leaf length	-0.06	-0.02	-0.06	-0.19	-0.07	-0.01
Leaf width	-0.05	-0.02	-0.03	-0.02	-0.06	-0.01
GFY	-0.21	-0.27	-0.24	-0.15	-0.07	-0.29

Residual effect = 0.59

Path coefficient analysis for GFY (Table 2) showed high direct positive effect of leaf number, plant height and leaf length - all leafy characters. GFY was negatively

Table 2. Direct effect of yield components on green fodder yield

	Plant height (cm)	Tiller (number/ plant)	Leaf (number/ tiller)	Leaf length (cm)	Leaf width (cm)
Plant height	3.14	1.48	2.90	0.97	2.39
Tiller number	-4.55	-9.65	-7.05	-1.39	1.68
Leaf number	9.17	7.26	9.93	3.36	5.46
Leaf length	0.32	0.15	0.35	1.06	0.38
Leaf width	-7.35	1.68	-5.31	-3.47	-9.66

Residual effect = 1.18

and directly influenced by tiller number and leaf width. Although GFY showed a positive and highly significant correlation with tiller number, a negative direct effect was obtained by path analysis (Table 2) which was largely due to indirect contributing effect of height, leaf number and leaf length. A high residual effect for both GFY and DMY indicated that these were the characters other than the selected ones, responsible for net green forage and dry matter yield.

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