Indian J. Genet., **57** (3): 319–321 (1997)

GENETIC VARIABILITY IN NAPIER GRASS (*PENNISETUM PURPUREUM* (K.) SCHUM)

P. SUTHAMATHI* AND M. STEPHEN DORAIRAJ

School of Genetics, Tamil Nadu Agricultural University
Coimbatore 641003

(Received: February 6, 1996; accepted: May 18, 1996)

ABSTRACT

Forty genotypes of napier grass of diverse origin were used to estimate genetic variability for sixteen characters. Leaf weight, green fodder yield per plant, stem weight, crude fat content, number of leaves and tillers per plant, plant height, crude protein content, and stem diameter recorded high genotypic coefficient of variability, heritability and genetic advance.

Key words: Napier grass, genetic variability, heritability, genetic advance.

The tremendous success achieved in the production of high yielding and high quality interspecific hybrids between Napier grass and pearl millet, popularly known as bajra-Napier hybrid grass, such as, Giant Napier from IARI, New Delhi, NB 21 from Ludhiana, BN 2 from Kalyani; and CO 1 and CO 2 from Coimbatore, has enlarged the scope of further advancement in green fodder yield. It is on this consideration and in order to exploit the variation in the source material as efficiently as possible, the present study in Napier grass was taken up.

MATERIALS AND METHODS

Forty genotypes of Napier grass of diverse origin collected from Australia, Hawaii, Kenya, Puerto Rico and maintained in the Department of Forage Crops, Tamil Nadu Agricultural University, Coimbatore, were raised in randomized block design with two replications, using rooted slips on one side of 3 m long ridges at 50 x 50 cm spacing. Observations were recorded on five random plants for green fodder yield and its contributing characters when the crop was 6.5 months old, at the fourth harvest. Representative plant samples from each replication were taken to estimate quality

*Present address: Department of Rice, Tamil Nadu Agricultural University, Coimbatore 641003.

characters. Dry matter content and ash content were determined by the method given in AOAC [1], crude protein content following Humphries [2], crude fibre content after Goering and Vansoest [3], and oxalic acid content according to Talapatra et al. [4].

RESULTS AND DISCUSSION

The variances due to genotypes for all the traits were significant. The data on mean, variability, heritability and genetic advance are presented in Table 1.

Table 1. Estimates of variability, heritability and genetic advance in Napier grass

Character	Mean	Range	PCV	GCV	Heritability	Genetic advance (% of mean)
Plant height (cm)	70.3	46.4–105.9	23.9	21.5	80.7	39.8
Tillers per plant	18.6	11.2–31.2	23.9	22.7	89.7	44.3
Leaves per plant	159.0	93.5–303.3	30.6	28.7	88.0	55.5
Leaf length (cm)	68.1	55.2–81.8	12.5	12.3	95.7	24.8
Leaf breadth (cm)	2.1	1.2–2.9	18.9	15.5	66.9	26.2
Stem diameter (cm)	1.1	0.6–1.6	22.4	20.9	86.6	40.1
Leaf weight (g)	230.9	93.0–500.0	42.8	42.8	99.9	88.3
Stem weight (g)	106.4	42.0–208.0	37.2	37.0	98.8	75.7
Leaf stem ratio	2.2	1.4–3.1	19.0	18.2	92.1	36.1
Green fodder yield per plant (g)	337.1	135.0–703.5	40.1	40.0	99.9	82.5
Dry matter content (%)	22.6	17.9–28.1	12.1	11.6	92.1	22.9
Ash content (%)	9.8	8.2–12.1	11.5	10.1	76.3	18.1
Crude protein content (%)	9.8	5.5–14.6	21.5	20.9	94.1	41.8
Crude fat content (%)	2.9	1.5–4.9	31.3	31.0	97.6	63.0
Crude fibre content (%)	27.2	20.9–31.9	9.3	8.8	90.9	17.3
Oxalic acid content (%)	2.8	2.1–3.2	11.6	9.2	63.5	15.2

The estimates of PCV and GCV were close to each other for all the characters, indicating that the environment had little influence on the expression of these characters. Leaf weight, green fodder yield per plant, stem weight, crude fat content, number of leaves and tillers per plant, plant height, crude protein content and stem diameter showed high PCV and GCV estimates. There is enough scope for selection based on these characters, and the diverse genotypes can provide materials for a sound breeding programme.

Estimates of heritability and genetic advance in combination are more important for selection than heritability alone [5]. Heritability combined with high genetic advance (as percentage of mean) observed for leaf weight, green fodder yield per plant, stem weight, crude fat content, crude protein content, number of leaves and tillers per plant and stem diameter showed that these characters were controlled by additive gene effects and phenotypic selection for these characters is likely to be effective. Crude fibre content also had high heritability, but recorded low genetic advance. Low heritability along with low genetic advance was noted for oxalic acid content which shows that these two traits are controlled by nonadditive gene action. As some traits are governed by additive and others by nonadditive genes, diallel selective mating or reciprocal recurrent selection may be adopted for improvement of yield and quality.

REFERENCES

1. AOAC. 1970. Official Methods of Analysis (11th edn.). Association of Official Agricultural Chemists, Washington, D.C.

2. E. C. Humphries. 1956. Mineral components and ash analysis. Modern Methods of Plant Analysis. Springer–Verlag, Berlin.

3. H. K. Goering and P. J. Vansoest. 1970. Forage Fibre Analysis. Agriculture Hand Book No. 397, USDA.

4. S. K. Talapatra, S. C. Ray and K. C. Seen. 1948. A new method of estimation of oxalic acid in biological materials and the oxalic content of Indian feed stuffs. Indian J. Vet. Sci. Anim. Husb., **18**: 99–108.

5. J. L. Lush. 1949. Heritability of qualitative characters in farm animals. Proc. 8th Genetics Congress. Hereditas (Suppl.): 356–375.