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Morphological and biological variation of the self progeny of *Pennisetum purpureum*

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Introduction Napier grass (*Pennisetum purpureum*), known as elephant grass, is a tall and perennial grass with high yield and has good palatability for cattle in leafy stage. It is indigenous to sub-Saharan Africa and can be cut many times a year. It is mainly used to make inter-specific hybrids with pearl millet (*P. glaucum*) to increase production. Seed production between napier grass and pearl millet has been carried out for more than 10 years by artificially inducing pollen from napier grass at high latitude region (N 32°) in China. The seed yield is about 750 kg/hm². It is very convenient for farmer to plant. Key techniques of seed production of hybrid was studied. Napier grass was predominantly clonally propagated due to their low setting percentage and seedling growth slowly from seed. Napier grass is open pollinated, so genetic diversity arising from natural crossings is very high (Augustin and Teacenco 1993). Napier grass N51 was well known and was used as male parent in inter-specific hybrid production. The objective of this study was to assess the morphological variation and biology characteristic of the self progeny of napier grass N51, and to select new germplasm for inter-specific hybrids.

Material and methods One hundred and five accessions, self progeny of Napier grass N51, were collected and multiplication through vegetative organ. Twenty plants of each accession were planted to measure plant height, tillers, leaf length and biomass yield. Four plants of each accession were treated with 9 hour day time and fifteen hours of dark per day for 21 days with black plastic cloth (high pressure with 7 decimillimeter thickness). The spike length, number of spikes per plant and flowering period of each accession were observed to evaluate the sensitivity of the accessions to artificial short-day. The pollen activities were also checked with 2,3,5-Triphenyltetrazolium chloride solution.

Results The results indicated that all the accessions had a rather large variation in botany characteristic and biomass production (Table 1). The plant height varied from 52.5 cm to 325.0 cm. The leaf length of varied from 35.2 cm to 116.2 cm. The leaf-stem ratio was 0.36-2.64. There was a big difference in the yield of dry matter among accessions, ranging from 4812 kg/hm² to 54676 kg/hm². The sensitivity of accessions to short-day treatment was significantly different. 73 of 105 accessions were sensitive to short-day treatment, 22 were mid sensitive and other 10 were not sensitive (Table 2). The accessions with high growth height were sensitive ones, but those with plentiful tillers usually were not sensitive or lack sensitivity to short-day treatment. The pollens induced by artificial short-day had high activity and high setting percentage when they were used to pollinate pearl millet.

Table 1 Coefficient of variation of different accessions in biology characteristic and productivity.

Item	Range	Average
Heights (cm)	52.5-325.0	164.8
Tillers	5.0-48.0	19.1
Leaf-stem ratio	0.36-2.66	1.14
Biomass yield (kg/hm ²)	4812-54676	18779

Table 2 Sensitivity to short day treatment of different accessions of napier grass unit plant.

Total	Sensitivity	mid sensitivity		Insensitivity
		Few of flowering ear	Late flowering	
105	73	13	9	10

Conclusions All napier grass accessions were found to be greatly variation in botany characteristic and biomass productivity. The accessions with high growth height are more sensitive to short-day treatment than the ones with low growth height. Different accessions with different biomass yield and forage quality provide more choice for breeding in future.

Reference

Augustin E. and Teacenco F.A. 1993. Isozymatic characterization of elephant grass (*Pennisetum purpureum* Schum.). Rev. Brasil Genet. 16:685-696.