

PASTURE DIVERSIFICATION THROUGH SELECTION OF NEW *Panicum maximum* CULTIVARS IN BRAZIL

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INTRODUCTION

Cattle rearing in Brazil depends almost exclusively on pastures, of which, 35 % consist of cultivated introduced species. Guineagrass, *Panicum maximum* Jacq. is the main introduced forage grass species in cattle finishing, because of its ease of propagation, fast establishment after sowing and rapid and abundant growth of high quality forage during the rainy season. About 10 cultivars are commercialized in the country, the most important being « Colonião » : a tall, tufted perennial plant (up to 3.5 m) with erect stems and long leaves (up to 1.0 m). It presents management problems however ; when allowed to grow excessively, leaf/stem ratio decreases reducing quality, and stems are rejected by cattle. Excessive extraction of nutrients from the soil to permit this growth, and little or no regrowth in the dry season result in pasture degradation after a few years.

These reasons have led the Brazilian Agricultural Research Corporation-EMBRAPA, to introduce in 1982, 426 accessions of *Panicum maximum*, representative of the natural variability of this species, which are being evaluated at the National Beef Cattle Research Center (CNPGC), at Campo Grande, MS, Brazil, since 1984 (Savidan *et al.*, 1985). The objectives are to select morphologically distinct accessions which combine agronomic productivity and better winter growth to good seed production, and may contribute to pasture diversity.

This paper reports the results of the agronomic evaluation and selection of accessions.

MATERIAL AND METHODS

One-hundred and fifty-six out of 426 accessions of Guinea-grass were evaluated at CNPGC, from March 1984 to March 1986. The evaluated accessions result from ORSTOM collections in Kenya and Tanzania (Combes and Pernès, 1970) and were compared to nine standard Brazilian « Colonião » samples. Each accession was evaluated in four 10-plant plots, two with and two without fertilization. Details of soil characteristics, applied fertilizer, experimental design and evaluation procedures were described earlier (Jank and Savidan, 1984 ; Savidan *et al.*, 1985). This paper will report results for the main variables measured, which were : leaf dry matter yield (LDMY), leaf percentage (LP), regrowth after cuts (R), pure seed yield (PSY), percent dry-season (June to October) to year-round production (S) and percent production without in relation to that with fertilization (F).

Table 1. Mean performance of 156 accessions and of the 25 selected accessions of *Panicum maximum* evaluated in Brazil. Mean of 2 years.

Parameters	N ⁴	Range	Mean	Col ²	Best ³	Selected ¹		
		156	156	9	10	GR1	GR2	GR3
LDMY (t/ha)		2-38	14	14	33	28	19	15
LP (%)		25-84	60	62	82	74	77	73
R (grades 0-5)		0.5-3.3	2.0	1.7	3.2	2.6	3.0	3.1
PSY (kg/ha)		0-292	75	100	208	106	173	81
S (%)		3-21	10	3	16	10	10	10
F (%)		4-121	61	49	106	71	78	64
Leaf width (cm)		0.7-3.8	1.8	2.5	-	2.8	1.6	1.0
Plant height (cm)		30-180	90	114	-	120	90	70

¹ Selected accessions: GR1 = Group 1; GR2 = Group 2; GR3 = Group 3

² Col = « Colonião »

³ Mean of best 10 accessions for each characteristic

⁴ N = number of accessions

RESULTS AND DISCUSSION

Much variability was found between accessions for all variables. Four of the variables studied were found to be more important for selection in this program : LDMY, LP, R, and PSY. Mean values for nine Brazilian « Colonião » accessions were similar to means of all accessions, but much inferior to means of the 10 best accessions for each variable, indicating possibilities of selection not only of materials with distinct characteristics but also with qualities superior than those for « Colonião » (Table 1). « Colonião » presented the lowest values of S (3 %) while accessions were found exhibiting high S values (21 %). As for F, the mean of the 10 best introduced accessions (106 %), show the existence of plants which do not respond to fertilization levels within the range used here.

Based on the above variables, twenty-five accessions were selected, and since later 1987 are being evaluated in seven ecosystems within the country, in experiments belonging to a national network, coordinated by CNPGC. The accessions were selected from three morphological groups, according to plant size (Table 1). Plant height was correlated to leaf width ($r=0.81$, Costa *et al.*, 1987). Group 1 (14 accessions) comprises the tall plants with wide leaves ; group 2 (6 accessions) mid-sized plants with medium width leaves and group 3 (5 accessions) small plants with thin leaves. LDMY was the most variable characteristic among the groups and it decreased consistently with the decrease in plant size. For the other char-

acteristics, mean values were independent of plant size, tending to be higher for group 2.

Mean values for the selected accessions in each group were always lower than the 10 best accessions for each specific characteristic. That was expected since the desired forage should combine adequate performances in all characteristics. Thus, accessions were selected amongst the highest LDMYers in each group, only if they presented high, LP, R, PSY, S and F.

Accessions in group 1 produced twice that of « Colônião ». The emphasis on this group is, therefore, production, while showing a general improvement : more leaves, better regrowth, less seasonal yield distribution and better adaptability to less fertile soils.

Mean LDMY of group 2 was higher than that of « Colônião ». The greatest advantage of this group is the totally different morphology compared to « Colônião ».

The small plants of group 3 produce quantities of forage similar to « Colônião », despite the totally different morphology : they are small, with abundant thin leaves and thin succulent stems. Management should be very intense. As with group 2, these plants bring about new possibilities of utilization by other animal categories. In this sense, one plant of this group is being evaluated for grazing by horses, at CNPQC, and one accession of group 2 and of group 3 will be evaluated beginning in 1989 as pasture for recently weaned calves.

From the remainder of the collection, other accession will be selected, and compose other national trials in the near future.

CONCLUSIONS

1. Much variability was found between accessions for all variables studied.

2. Mean « Colônião » values for all characteristics were similar to mean of evaluated accessions indicating possibilities of selection of accessions superior to « Colônião » for any characteristic.

3. It was possible to select twenty-five accessions to be tested in diverse ecosystems throughout Brazil. Fourteen accessions belong to group 1, six to group 2 and five to group 3. Group 1 of morphology similar to « Colônião », are very high forage yielders while presenting overall better characteristics than « Colônião ». Groups 2 and 3, composed of small-thin-leaved plants, of production similar to « Colônião », present the advantage of utilization by other animal categories or management demands.

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