AGRONOMIC EVALUATION OF NOVEL GERMPLASM UNDER GRAZING: ARACHIS PINTOI BRA-031143 AND PASPALUM ATRATUM BRA-009610

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ABSTRACT

The effect of the animal on the pasture and their reverse consequence was studied on two replicated areas of 0.27 and 0.18 ha in a grass-legume sward established in a poorly humid drained soil in the Brazilian Cerrado. The A. pintoi BRA-031143 and P. atratum BRA-009610 sward was evaluated during four consecutive years under two grazing pressures (GP). The imposed GP affected the botanical composition and pasture availability. Mean live weight gain/animal/day under the two imposed GP varied from 387±17g, 578±68g, 697±35g and 687±123g between the 1992/93 and 1995/96 rainy seasons. During the dry season the LWG/animal/day varied from 203±16g and 99±36g for 1993 and 1994, respectively. The results showed the potential of the A. pintoi/P. atratum sward for the seasonally flooded land of the Cerrado ecosystem.

KEYWORDS

Botanical composition, liveweight gain, germplasm evaluation, grass, grazing system, legume

INTRODUCTION

Arachis pintoi and Paspalum spp were indicated as promising species among the selected materials at the Forage Evaluation Programme at the Cerrados Research Centre-CPAC, located in Planaltina, DF. Arachis pintoi BRA-031143 showed high forage attributes, as well as potential for ground cover and as an ornamental. In agronomic evaluations at CPAC, the A. pintoi ecotype BRA-031143 showed higher drought tolerance, quality, aggressiveness and resistance to pests and diseases than cv. Amarillo. P. atratum BRA-009610, indigenous from the border of the Pantanal-MS, excels in aggressiveness, health and high seed yield potential and is a new alternative for ecosystems submitted to seasonally waterlogged situations.

After the agronomic evaluation, grazing trials should then be conducted to evaluate the effect of pasture on livestock and their reverse (Lucas, 1962). The biological systems may be also affected by many other factors, which will influence the animal performance, behavior and pasture yield. Grazing periods associated with resting days and grazing pressure will define the development of pasture and animals (Maraschin, 1986). The objective of this study was to evaluate a sward established with two new accessions, in different intensities, soil seed bank reserves and animal performance resulting from the mean yield of the two GP's. The analysis in this work is restricted to the effect of GP over the botanical composition, forage availability (t Test -P=0,05), LWG during the rainy and dry seasons and animal production/ha/year. The daily weight gain had been calculated through the regression coefficient (b1) of the equation Y= b0 +b1X.

RESULTS AND DISCUSSION

After establishment, the area was resettled by different grasses (Paspalum spp; Brachiaria spp and, in minor proportion with Hyparrhenia and Andropogon spp and broad leaf species). This enroachment was mainly due to problems of establishment of P. atratum and the recognized lower ground cover of A. pintoi, when established vegetatively (PIZARRO, E. A. & RINCON, A., 1994). During the first semester of 1992 no records were taken. Grazing was used as a tool for sward formation. Since November, 1992 data had been recorded. The effective average GP, obtained at the end of the grazing periods were 12,60 ± 3,90% for the LGP and 5,93 ± 0,44% for the HGP, respectively. In the LGP the rate obtained was superior to the theoretical conceived with a range from 8 to 10%. The practical and physical impossibility of weekly adjustments, associated to the rate of pasture growth may explain those results. Frequently differences between theoretical and effective GP were observed elsewhere.

The botanical analysis of the componentes was divided in two fractions, A. pintoi and P. atratum plus other grasses. In the first grazing cycle, during rainy season, (92/93) the botanical composition still reflected the situation resulted from establishment, with A. pintoi contributing more than 50% of the forage yield. The botanical composition and availability of green dry matter (GDM) during the experimental period did not differ within the GP’s (P < 0.05). The forage on offer was 5.1 ± 0.426 t/ha (LGP) and 5.5 ± 0.484 t/ha (HGP). In the grazing cycles of 92/93 and 93/94 of the GP's forage on offer was 5.1 ± 0.426 t/ha (LGP) and 5.5 ± 0.484 t/ha (HGP). In the Grazing periods associated to the rate of pasture growth may explain those results. Frequently differences between theoretical and effective GP were observed elsewhere.
by the resting period of 21 days which was used until March 1994. This period was considered short for the grass, and improved the competitive advantage of other grasses. The availability of GDM obtained, in the two periods, was $6.5 \pm 0.461$ t/ha and $7 \pm 0.535$ t/ha for the LGP and $3.4 \pm 0.334$ t/ha and $4.7 \pm 0.482$ t/ha for the HGP, respectively. In the grazing cycle of 95/96 no differences between the forage availability and botanical composition were found. During the dry periods, the low temperatures recorded and rain shortage interfered with pasture growth. A trend for recuperation of \textit{P. atratum} in prejudice to the other grasses was observed, and the proportion of \textit{A. pintoi} stabilized. This trend of the legume may be attributed to the high quantity of seeds laid in the soil-bank, which germinate at the beginning of the rainy season. This fact was observed in other pasture situations (GROF, B., 1985). Estimates made between 0-20 cm depth showed the existence of 300 and 332 kg of pure seeds/ha, at the second and fourth year, respectively.

Table 1 shows data on stocking rate, daily LWG, per each season and yield per ha from the mean of the two GP's. These data show the possibility of beef production at a low cost. Since this species has low nutrient requirement. Phosphorus and potassium were applied every two years. During 1995, the dry grazing period of evaluation was interrupted due to a severe drought. The regression equations to adjust DLWG (b1) had $r^2$ values higher than 0.95 (P<0.01). Rates of DLWG obtained are compatible to those found in \textit{A. pintoi} cv. Amarillo in association with \textit{Brachiaria} spp (GROF, B., 1985; LASCANO, C., 1994; HERNANDEZ, M., et al, 1995). High annual yield/ha in tropical ecosystems is reached only when forage species have high yield potential and when nitrogen is applied. In the present trial, the animal performance may be even higher, as it results from an average between the high and low GP's. New trials have to be established to compare LWG per animal and per ha.

**CONCLUSIONS**

For the trial objectives and the proposed methodology for evaluated new germplasm, the GP used imposed different intensities of pasture utilization. \textit{A. pintoi} has high resistance to pasture and trampling, as shown by its large contribution to the botanical composition at higher GP rates.

\textit{Paspalum atratum}'s evaluation was underestimated due to poor establishment, however it recovered through the years under both GP's as the botanical composition showed. LWG per animal, per day, per ha and year confirm the high yield potential of associations between grasses and \textit{A. pintoi} BRA-031143.

The proposed methodology is easy to establish. It can generate relevant information concerning germplasm and animal performance. On the other hand, the maintenance cost and hand labor involved is reduced when compared to classical grazing experiments.

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**REFERENCES**


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<tbody>
<tr>
<td>Mean stocking rate (AU/ha)$^3$</td>
<td>2.90</td>
<td>1.95</td>
<td>2.92</td>
<td>3.62</td>
</tr>
<tr>
<td>MLWG $^4$ dry period (g/a/day)</td>
<td>203±16</td>
<td>99±36</td>
<td>-</td>
<td>-</td>
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<tr>
<td>grazing days</td>
<td>168</td>
<td>140</td>
<td>-</td>
<td>-</td>
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<tr>
<td>MLWG $^4$ rainy season (g/a/day)</td>
<td>387±17</td>
<td>578±68</td>
<td>697±35</td>
<td>687±123</td>
</tr>
<tr>
<td>grazing days</td>
<td>168</td>
<td>158</td>
<td>238</td>
<td>129</td>
</tr>
<tr>
<td>Yield (kg/LWG/ha/year)$^5$</td>
<td>574</td>
<td>793</td>
<td>545</td>
<td>610</td>
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1 Evaluation between Oct./94 and May/95. 2 Evaluation between Nov./95 and May/96. 3 AU = 450 kg. $^4$MLWG = Mean liveweight gain. $^5$Yield =liveweight.