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 stablished with two new accessions, in different intensity of uses and, at the same time, to evaluate the effect of the pasture in the animal performance, within a simplified grazing-trial proposal for evaluation novel germplasm in small plots.

MATERIALS AND METHODS
The sward composed of *Paspalum atratum* (Swallen) BRA-009610 and *Arachis pintoi* (Krap & Greg) BRA-031143, was established in December, 1991, on a low humid gley soil at the Cerrados Agricultural Research Center-CPAC, located in Planaltina, DF. (15½ 35 S, 47½ W and 1000 masl). *A. pintoi* was established vegetatively in rows at intervals of 1 meter using 4 to 5 stems/meter and *P. atratum* was planted by broadcasting 2 kg/pure seed/ha. In April, 1992, 60 kg/ha of K_2O and 40 kg/ha of P_2O_5 were applied. The total area of 0.90 ha was sub-divided and fenced. The two treatments were arranged in a completely randomized block design with two replicates. The two plot sizes used (0.27 and 0.18 ha) were chosen to impose the two GP's, ranging from 8 to 10% kg DM/100kg/day (LGP) and from 4 to 6% (HGP), respectively. In November, 1992, grazing started in the four plots using a single group of three animals, plus put and take animals in a rotational grazing system (seven grazing days/21 resting days). LWG was recorded every 28 days. Four samples (0.5 m2) cut at ground level were made before and after each grazing period. At the beginning of the dry season (May) of the second year of evaluation the animals were replaced by young bulls (eight to 10 months), which remained in the experiment until May of the following year. From the second year of evaluation, crossbred animals European x Zebu were used, instead of the initial Zebu type. Also, the grazing cycle was changed to 10 days grazing/30 days resting and LWG was recorded every 30 days. By doing so, the arrangements of GP occurred in one month within treatments of HGP and in another month within treatments of LGP. Every two years 40 kg/ha of P_2O_5 and K_2O was applied. The parameters evaluated were yield, forage availability and forage residue (green dry matter-GDM), botanical composition, forage quality, seasonal growing rate at 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 throught the regression coefficient (b1) of the equation $Y= b0 + b_1X$.

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 93/94 and 94/95 of the GP's significantly affected botanical composition, with the proportion of *A. pintoi* being greater at the higher GP (LASCANO, C., 1994; HERNANDEZ, M., 1995). During the experimental period, there was a reduction of the components *Paspalum* and Arachis, explained

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 + 0.461 t/ha and 7 ± 0.535 t/ha for the LGP and 3.4 ± 0.334 t/ha and 4.7 ± 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 *P. atratum* in prejudice to the other grasses was observed, and the proportion of *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 *A. pintoi* cv. Amarillo in association with *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. *A. pintoi* has high resistance to pasture and trampling, as shown by its large contribution to the botanical composition at higher GP rates.

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 *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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Table 1
Cattle performance in an *Arachis pintoi* BRA-031443/*Paspalum* atratum BRA-009610 sward in a seasonally flooded land in the Cerrado. Planaltina. DF. Brazil.

	GRAZING CYCLES			
PARAMETERS	1992/93	1993/94	1994/95[1]	1995/96 [2]
Mean stocking rate (AU/ha)[3]	2,90	1,95	2,92	3,62
MLWG [4] dry period (g/a/day)	203±16	99±36	-	-
grazing days	168	140	-	-
MLWG [4] rainy season (g/a/day)	387±17	578±68	697±35	687±123
grazing days	168	158	238	129
Yield (kg/LWG/ha/year)[5]	574	793	545	610

[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.