Acknowledgements

The authors gratefully acknowledge financial support from Meat and Livestock Australia.

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doi:10.1017/S2040470010000580

The effect of pasture utilization on the defoliation of grass species by steers grazing a tropical savanna woodland during the dry season

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Introduction

The relationship between grazing pressure and differences in the defoliation rate of grass species is not well understood for tropical savannas even though it is likely to have a substantial influence on the persistence of preferred species, pasture condition and sustainability of the grazing system. The objective of this study was to examine the relationship between grass species characteristics and their defoliation rate in a paddock under increasing levels of utilization.

Materials and Methods

Nine steers (318 ± 18 kg SD) grazed a Eucalyptus savanna woodland for 14 days near Charters Towers (QLD, Australia) during the late dry season of 2009. The pasture was fully mature as cattle did not have access to the experimental area (2.25 ha) since the beginning of the

Table 1 *Level of utilization (%) and plant description, STR: stem tensile resistance (N), SD: stem density (stems dm^{-2}), DMD: dry matter digestibility (%), LSR: leaf/stem ration, BD: bulk density (g m^{-3}), PH: plant height (cm); BA: plant basal area (cm^2 m^{-2}), PP: proportion in pasture, D: day*

									Utilization	
	STR	SD	DMD	LSR	BD	PH	BA	PP	D 5	D 7	D 13
Aristida spp.	38	15	48	0,46	762	73	155	0.14	2	37	76
Bothriochloa ewartiana	182	22	47	0,28	2561	70	386	0.12	5	25	46
Bothriochloa pertusa	33	34	50	1,37	1964	40	777	0.08	49	73	81
Eragrostis lacunaria	8	254	50	0,75	6083	18	110	0.14	11	38	77
Eragrostis sororia	42	41	48	0,58	1810	66	169	0.16	12	44	70
Eriachne glauca	25	22	48	0,36	851	74	162	0.13	1	26	68
Heteropogon contortus	94	6	47	0,70	785	85	90	0.08	7	40	64
Leptochloa divaricatissima	47	5	49	0,65	489	96	232	0.08	1	34	62
Pasture utilization									10	38	70

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previous wet season. To achieve approximately 70% pasture utilization, stocking rate was increased by reducing the paddock size on day 3 and adding animals on day 8 which grazed the area until the end of the experiment. The animals had free access to dry lick with 30% urea and consumed 195 g per animal per day. Botanical composition of the reduced paddock, as well as grass densities and characteristics were assessed at the beginning of the experiment. Defoliation of 75 plants per species of the reduced paddock was measured every second-day to provide a defoliation rate for each species. The significance of the difference in chemical, structural and fracture properties between grass species was determined using ANOVA.

Results and discussion

Total pasture utilization reached 70% on day 13 (Table 1). Starting and ending biomass were 2238 and 576 kg DM ha^{-1}, respectively. The results confirm that with increasing pasture utilization, the defoliation rate of grasses varied among species. *Bothriochloa pertusa* (Bp) was the preferred species, with the highest levels of utilization after 5, 7 and 13 days. This species had the highest leaf/stem ratio and basal area ($P \leqslant 0.05$), and intermediate stem tensile resistance, stem density, bulk density and plant height. These characteristics probably allowed the steers to achieve high nutrient intake rates. The steers avoided *B. ewartiana* possibly due to its tough stems and low leaf/stem ratio.

Conclusions

In this tropical pasture the steers heavily grazed the preferred species at low to intermediate levels of overall pasture utilization (10 to 38%). In order to increase the utilization of less preferred species it was necessary to achieve high levels of pasture utilization (60 to 70%). The animals prefered species that form dense leafy patches and avoid species with tough stems of low leaf/stem ratio.

Acknowledgements

The authors gratefully acknowledge funding from MLA.

doi:10.1017/S2040470010000592

Configuration of livestock rearing areas in order to maintain the stability of forage systems considering the biophysical hazards of humid tropical climates – Example in French Guyana

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Introduction

At the time of an agriculture development program during the 1970s in French Guyana, cow-calf systems were set up where productivity relied on intensification of grazed pastures. Besides the difficulties of adapting such systems to an environment little understood at that time, breeders and technical staffs had to face a number of biophysical hazards. The floral composition of the grassland proved to be very fragile. Several species were very invasive. Moth attacks frequently contributed to the defoliation of some areas. Rainfall levels were irregular more often than expected causing a slowing down of the growth of herbaceous species during long dry seasons (occurring more and more frequently). High levels of rainfalls reduced the pasture areas (sullied grass). Sandy soils increased the drought effects and paradoxically, because of a deep layer of underground clay, drenching increased after heavy rains. Nevertheless, the use of inputs (fertilizers, pesticides) and of mechanical operations allowed continuous pasture production. But the combination of hazards and financial load (high price of inputs and equipments) has caused breeders to consider the possibility of modifying their forage system in order to sustain its operation (Huguenin, 2008).

Materials and methods

To conduct and direct his production system, the breeder considers i) his territory, ii) his operation, iii) the herd management and the feeding needs, iv) the state of the grassland. The purpose is to achieve production objectives but also to build an estate that gets social acknowledgement in vocational and family areas. Our study dealt with the analysis of consistency between these different components of the management of a production system, which required the design of a functional scheme. To that purpose a production system jointly viewed between a biophysical and an organization system was used. (Duru and Hubert, 2003).

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