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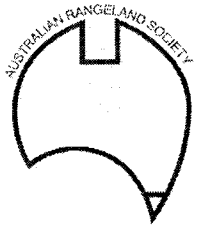

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THE INFLUENCE OF PATCHES ON THE INTAKE AND GRAZING BEHAVIOUR OF CATTLE IN TROPICAL RANGELANDS

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ABSTRACT

The influence of patches on the foraging behaviour and feed intake of cattle was investigated in a tropical rangeland environment, north-east Queensland. Areas mown to simulate grazed patches were sprayed with the indigestible marker ytterbium acetate to determine the contribution of patches to total feed intake. Digestibility and nitrogen content of the patch areas were higher than those of non-patch areas. Feed intake from paddocks with mown patches was higher than intake from paddocks with no patches. Detailed observation during morning and afternoon grazing periods showed that cattle spent a significant amount of foraging time on patches relative to the total area of the patches in the paddock.

INTRODUCTION

Patch grazing is a common phenomenon in the tropical tallgrass rangelands of northern Australia (Mott 1987). Patches occur due to selective utilisation of preferred pasture species or community types by the grazing animal. Once initiated, cattle tend to maintain these patches as short, leafy swards. While it is known that patch grazing can result in the death of perennial plants and soil degradation we understand relatively little about the contribution of patch grazing to forage intake or its role in improving diet quality. This experiment aims to quantify these factors.

METHODS

Study Site

The study was conducted at the CSIRO Lansdown Research Station, south of Townsville, Queensland. The pasture was dominated by the tussock grass *Urochloa mosambicensis*. Other main pasture species present included the grasses *Bothriochloa ewartiana*, *Bothriochloa decipiens* and *Bothriochloa pertusa* and the legume *Stylosanthes hamata*.

Experimental Design

Eight paddocks, each approximately 0.5 hectares in size, were used in this study. Areas were mown to simulate grazed patches in four of the paddocks. The remaining four paddocks had unmown patch areas. In each paddock there were five patches. Total patch area was 16% of the paddock. Each paddock was grazed by two Droughtmaster heifers for a period of ten days. Ytterbium acetate was sprayed onto the patch areas at a rate of 2g/patch area. Cattle were given chromium oxide slow release capsules six days prior to the beginning of the experimental grazing period to allow chromic oxide concentrations to equilibrate in the rumen.

Vegetation Measurements

Plucked samples, harvested to simulate the diet selected by cattle, were collected from each paddock from both within and outside patch areas at the beginning and end of each experimental period. Dry matter digestibility was determined using the pepsin-cellulase method. Nitrogen content of pasture was determined by continuous flow analyser (Technicon) following Kjeldahl digestion.

Animal Measurements

Grass samples were plucked from the patch areas of all paddocks every second day and analysed for ytterbium concentration using ICP-MS. Faecal samples were collected from each paddock daily and analysed for chromium and ytterbium concentration using ICP-MS. Ytterbium adheres to the grass

but is not absorbed in the rumen and the contribution of the patches to the diet can be calculated through determination of the concentration of ytterbium in the faeces. Total feed intake was determined using faecal output estimates from chromium oxide capsules and the digestibility of plucked pasture inside and outside patch areas. Cattle were observed during grazing periods in the morning and afternoon. Observations of grazing and behaviour were recorded every fifteen minutes onto a paddock map.

RESULTS AND DISCUSSION

Mown patch areas had a higher nitrogen content and dry matter digestibility than unmown patch areas (Table 1). This can be attributed to the fact that within mown patch areas a high proportion of the plants were reshooting. These young leaves are high in nitrogen and soluble carbohydrates but low in structural carbohydrates, making the plant more digestible to the grazing animal. As digestibility increases retention time in the rumen decreases, increasing voluntary food intake. This is reflected in the intake from paddocks with mown patch areas (Table 1). Cattle from paddocks with mown patch areas would consume up to 50% of their total diet from patches on any one day, allowing a greater dry matter intake. The higher bulk density of the pasture in the mown patch areas would also have enabled animals to attain a high intake through maintenance of a large bite size. The greater intake of cattle with access to mown patches was reflected in grazing behaviour. Total patch area in the paddocks was 16% but grazing time spent in patches was greater than this, especially in mown patch areas. Thus, when there are patches present in a paddock cattle actively seek these out.

Table 1. Effect of mown patches on diet quality, feed intake and grazing behaviour of cattle grazing tropical tallgrass pasture.

	Unmown patch	Mown patch
Dietary nitrogen (%)	1.49	1.59
Dietary dry matter digestibility (%)	49.4	52.5
Dry matter intake (kg/hd/day)	8.5	9.5
Grazing time in patches (%)	21.5	28

Patch grazing in tropical tallgrass pastures improves the intake and nutritive value of the grazing animal's diet. However, patch grazing also has undesirable effects such as the loss of desirable plant species through patch overgrazing (Mott 1987, Fuls 1992). This work is part of an ongoing experiment that will eventuate in a fuller understanding of patch grazing and enable the development of management strategies that reduce the negative effects of patch grazing and promote better pasture utilisation.

ACKNOWLEDGEMENTS

The authors wish to thank Jeff Corfield and Michael Whiting for their assistance.

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