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TECHNICAL NOTES

GRAZING ASSESSMENT OF THE TROPICAL LEGUME *CALOPOGONIUM CAERULEUM*

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ABSTRACT

The perennial, trailing legume Calopogonium caeruleum grown with common guinea grass (Panicum maximum), was evaluated under continuous grazing at c 2.5 beasts ha⁻¹ over three years at Utchee Creek in the wet tropics of Queensland.

C. caeruleum was rarely eaten and by the third year the guinea grass was selectively grazed out and C. caeruleum dominated the pasture. The average daily liveweight gain declined from c 0.5 kg beast⁻¹ in the first two years to less than 0.2 kg beast⁻¹ in the third year.

INTRODUCTION

Harding (1972) noted that *Calopogonium caeruleum*, a vigorous trailing legume of Central and South American origin showed promise as a pasture legume for the wet tropics of North Queensland. It was high yielding, grew better in winter than common centro (*Centrosema pubescens*) and possessed strong stolon development.

In a subsequent small plot experiment under common grazing *C. caeruleum* maintained a much higher botanical content in association with guinea grass than did several other legumes in the genera *Centrosema* and *Pueraria* (C. Middleton—unpublished data). Furthermore, by 1976 *C. caeruleum* had become the dominant legume in a 0.8 ha paddock of guinea grass at Utchee Creek that had been sod-seeded in 1973 with *C. caeruleum* (CPI 28107) and *Centrosema pubescens*.

The project reported here followed animal performance and pasture changes when this 0.8 ha area was grazed continuously by Brahman cross steers.

MATERIALS AND METHODS

The trial was located at Utchee Creek (AAR 3600 mm) near South Johnstone in

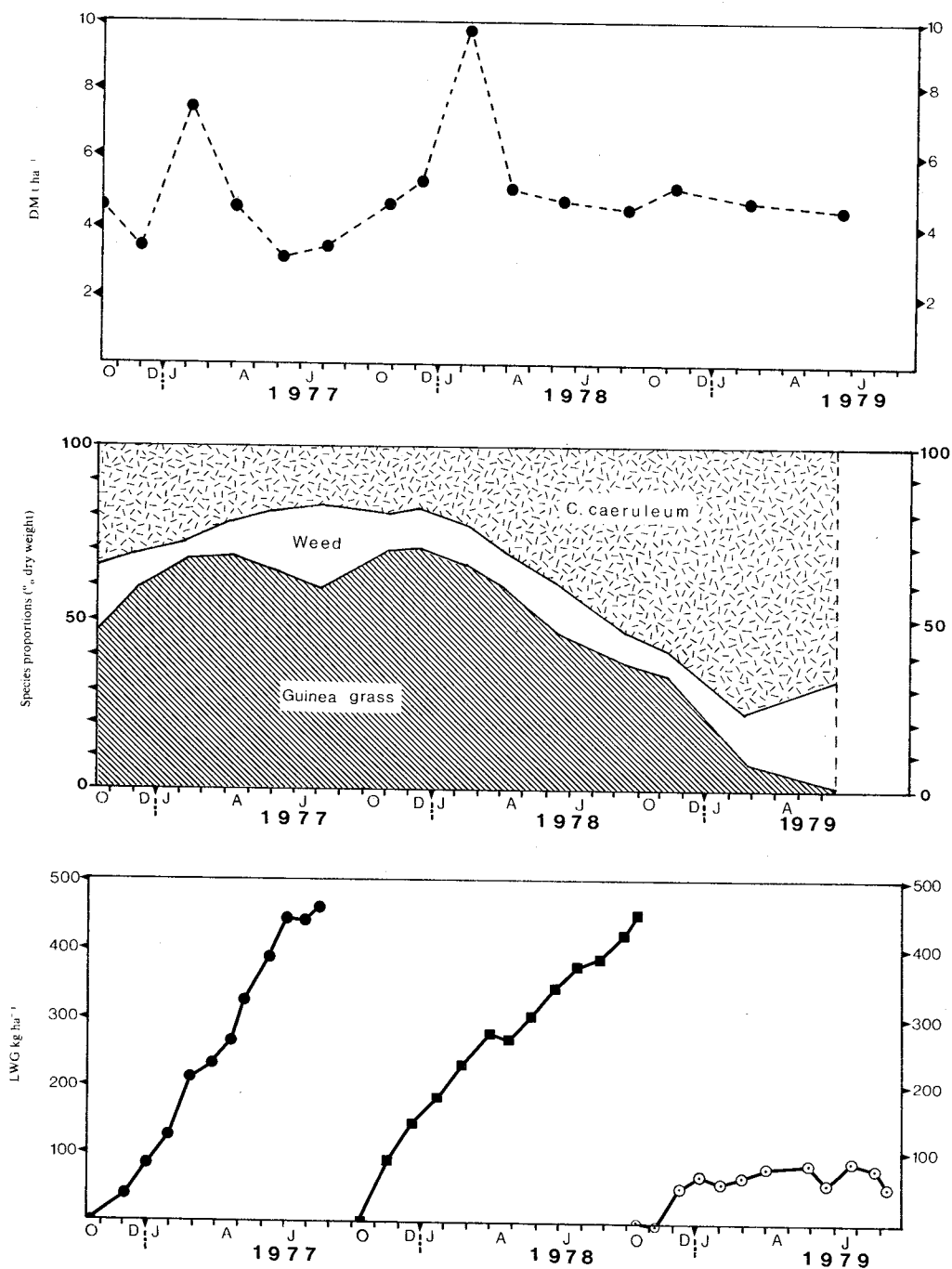


FIGURE 1

Dry matter (DM) on offer, botanical composition (species proportions) and cumulative liveweight gain (LWG) of Braham cross steers grazing a guinea grass/*C. caeruleum* pasture over three years at Utchee Creek, North Queensland

north Queensland on a mixture of soil of volcanic and metamorphic origin. The experimental area was adequately fertilized with P, S, K and Mo. The area was continuously grazed between October 1976 and September 1979, except for August and September 1977, when stock were removed because of a feed shortage in an exceptionally dry winter. Initially two steers ($2.5 \text{ animals ha}^{-1}$) were included. This was increased to three ($3.75 \text{ animals ha}^{-1}$) in January 1977. From October 1977 the stocking rate was held at $2.5 \text{ animals ha}^{-1}$. Animals were $c 300 \text{ kg}$ liveweight ($1\frac{1}{2}$ –2 years of age) at entry, were weighed unfasted at monthly intervals and removed and replaced after 5–8 months.

Four to six times per year dry matter on offer was estimated by the comparative yield method (Haydock and Shaw 1975) while botanical composition was estimated by dry-weight-ranking ('t Mannetje and Haydock 1963) modified to include cumulative ranking (Jones and Hargreaves 1979).

RESULTS AND DISCUSSION

Rainfall over the experimental period was typical for the area although winter-spring rainfall (July to October) in 1977 (237 mm) and 1979 (198 mm) was below normal (360 mm).

In October 1966 there was 4360 kg ha^{-1} of dry matter on offer comprising 4% guinea grass, 32% *C. caeruleum*, 4% other useful species and 17% weed. Throughout the experiment dry matter on offer was greater than 3000 kg ha^{-1} .

Over the first two years of the trial the average daily liveweight gain was 0.49 kg and 0.54 kg (451 and 446 kg ha^{-1} respectively). Although this was reasonable for tropical pasture (Stobbs 1976) it was less than that recorded from other guinea grass/legume pasture in the area (Mellor, Hibberd and Grof 1973, Mellor and Round 1974).

A rapid decline in animal performance commenced in early 1979 (Figure 1) and between January and August $< 0.2 \text{ kg liveweight gain animal}^{-1} \text{ day}^{-1}$ was recorded.

It was apparent that animals were not eating the *C. caeruleum* and an examination of the pasture sampling data suggested that the decline in animal performance occurred as a result of the decline in guinea grass accompanied by a corresponding increase in *C. caeruleum* (Figure 1). During the first two years the guinea grass comprised 40%–60% of total dry matter ($> 2000 \text{ kg dry matter ha}^{-1}$) and animal performance was reasonable. After animals ceased to gain weight at the beginning of 1979 the guinea grass on offer was less than $500 \text{ kg dry matter ha}^{-1}$, presumably as a result of its selective overgrazing in conjunction with intense competition from the $> 3000 \text{ kg dry matter ha}^{-1}$ *C. caeruleum*. With the loss of guinea grass in early 1979 the content of the inedible weed *Hyptis capitata* (Knobweed) increased rapidly.

The implication that this response was peculiar to the guinea/*C. caeruleum* pasture is supported by many years of results at Utchee Creek whereby guinea/centro pastures comfortably fatten steers grazing in excess of $2.5 \text{ animals ha}^{-1}$ (Mellor, Hibberd and Grof 1973, Mellor and Round 1974).

No reason for the high degree of unpalatability in *C. caeruleum* can be offered, nor could we find any reference to its performance under grazing elsewhere. However, its close taxonomic relative *Calopogonium mucunoides* has a long history of unpalatability to cattle in the wet tropics of North Queensland (Schofield 1941, Graham 1946).

Our experience with *C. caeruleum* highlights the specific need to include early grazing evaluation when testing legumes particularly within the *Calopogonium* genus.

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PROCEEDINGS

PASTURE MANAGEMENT, PERSISTENCE AND UTILIZATION FOR BEEF AND DEER FARMING

FIELD MEETING—JUNE 19, 1981

This meeting was organized at "Oakwood", the property of Mr. Ian Hart of Upper Kandanga, Mary Valley, Queensland. In 1969 the Society visited "Oakwood" where the first improved pastures had been sown in 1956. As pasture persistence is a major factor in maintaining better levels of animal production, the area was revisited to learn how successfully the persistence of Mr. Hart's pastures had been over a period of 12–25 years. The property was originally a beef breeding and fattening enterprise. In recent years Mr. Hart has incorporated deer farming, in which area he is a pioneer, into his farming system.

INSPECTION OF OLD PASTURES

MR. IAN HART

"Oakwood", Upper Kandanga.

The current year has been one of the driest on record and the last four summers have had below average rainfall. As a result the areas have been more heavily grazed than is desirable and weeds are becoming a problem in some places.

The first area inspected had been planted in 1964. It was old cleared scrub country that carried weak Pioneer Rhodes grass (*Chloris gayana*). It was ripped with a chisel plough and planted to 3 kg ha⁻¹ Tinaroo glycine (*Neonotonia wightii*) and 1 kg ha⁻¹ Siratro (*Macroptilium atropurpureum*). Mostly no grass was planted and these areas now have a weed problem but in parts green panic (*Panicum maximum* var. *trichoglume*) was planted and this has combined well with the legumes and strongly resisted weed invasion. In some other areas Nandi setaria (*Setaria sphacelata* var. *sericea*) was planted but has not kept out the weeds any better than the re-establishing Rhodes grass.

Since planting these areas have never been spelled. However the paddocks contain both hills and flats and the cattle tend to concentrate on the flats in summer. On these white clover (*Trifolium repens*) has volunteered strongly with the fertilizer applications that have accompanied the sowing of the pastures since 1964. This naturally spells the tropical species on the hills over summer and they are then heavily grazed in winter. The whole paddock, flats and hills, was planted to the tropical legumes but they have disappeared from the flats, being replaced by the white clover. This clover was planted prior to 1954 but was not conspicuous until the fertilizing of the tropical pastures commenced in 1964.

Since 1964 this paddock has received 3.6 tonnes of fertilizer per hectare, mainly