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CATTLE LIVEWEIGHT CHANGES ON FODDER ROLLS AND STANDING HAY OF TOWNSVILLE STYLO/NATIVE GRASS

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Summary

Two methods of utilising Townsville stylo (Stylosanthes humilis) /native grass pastures during the dry season were studied at Adelaide River in the Northern Territory.

Liveweight changes of Brahman cross weaner and yearling steers were significantly better when grazing fodder rolls compared with standing hay.

Within any year the crude protein content of fodder rolls and standing hay was similar but invitro digestibility and intake of feed was greater on fodder rolls. Animal performance was improved in the year where the pastures had a greater proportion of Townsville stylo.

I. INTRODUCTION

Although Townsville stylo (Stylosanthes humilis) based pastures at Adelaide River can support reasonable liveweight gain during the wet season they barely maintain animals during the dry season. In contrast liveweight gains at Katherine, which has a drier and less humid dry season, may be substantial (Wesley-Smith 1972) possibly because the dry pasture decays less rapidly and is more digestible. Digestibility may be a major determinant of intake (Minson 1972) hence the poor animal performance at Adelaide River may be due to poor digestibility of dry pasture.

Haymaking is a common method of preserving feed quality. Conventional baling is a doubtful economic practice in the area except for special purpose feeding. However, fodder rolling is considerably cheaper and additional savings in cost of picking-up, storage and feeding out are possible.

The object of the work was to compare the liveweight changes of steers grazing either standing hay or fodder rolls during the dry season, and to relate these responses to pasture characteristics.

11. MATERIALS AND METHODS

(a) Location and Climate

The trials were conducted at the Upper Adelaide River Experimental Station (U.A.R.E.S.) 76 km south of Darwin at latitude 13°S. The area has a tropical monsoon climate with an average annual rainfall of 1270 mm which falls mainly from December to April.

The experimental site on the solodic soils of the Adelaide River floodplain was divided into 8 paddocks of 2 hectares, each containing a water trough and shade.

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(b) Fodder

The principal pasture species were Townsville stylo (an introduced legume); and Chloris, Digitaria, and Bothriochloa, (native grass species). The proportions of Townsville stylo varied from approximately 70% in 1971 to 20% in 1972.

During the 1971 dry season, the site was divided into two areas of 4 paddocks. In each area (trials 1 and 2) two paddocks were randomly selected and left as standing hay and two were fodder rolled. In the 1972 dry season, four paddocks were randomly allocated to standing hay and four to fodder rolls (trial 3).

The pastures were not grazed during the whole of the wet seasons prior to the trials. Fodder rolls were made on May 18, 1971, and May 5, 1972, when the pastures were at an advanced stage of maturity and starting to dry off.

Twenty 0.2 m^2 quadrats from each standing hay paddock and 10 fodder rolls from each fodder roll paddock were weighed monthly in trials 1 and 2 and at the start and finish of trial 3 to estimate feed intake. Samples of fodder were collected at fortnightly intervals in 1971 and six-weekly intervals in 1972 to estimate crude protein content and in vitro dry matter digestibility (Newman 1972).

(c) Animals

In 1971 in each trial Brahman cross weaner steers were-ranked on liveweight then after stratification randomly allocated to groups of 15. Each group was allocated to a 2 ha paddock. Trial 1 area was grazed from July 7 to September 1, and trial 2 area from September 2 to October 26 when it was terminated following heavy early rains. In 1972 (trial 3) groups of 8 Brahman cross yearling steers grazed on each 2 ha paddock from September 7 to November 30 when the first heavy rains had fallen. After this the steers grazed together on native pasture until May 25, 1973, when they were weighed to estimate compensatory growth.

In 1971 the steers were weighed at fortnightly intervals, but at intervals of six weeks or more in 1972. The animals were weighed at 9 a.m. directly off pasture.

(d) Statistical analyses

Analyses of variance were performed on all liveweight and pasture crude protein data, and on invitro digestibility in trial 3. The regression relationship between liveweight changes and pasture invitro digestibilities was examined.

III. RESULTS

Liveweight changes and estimated feed intake of steers together with data on the crude protein content and invitro digestibility of fodder dry matter and rainfall data are shown in table.

The steers initially gained weight on both fodders except for standing hay in trial 3, the gains being significantly greater on fodder rolls.

TABLE 1

Mean effects of fodder rolls and standing hay on liveweight changes and pasture data

Trial periods	Fodder rolls				Standing Hay				Rainfall (mm)
	Liveweight Change (kg)	Crude Protein (%)	Invitro digestibility (%)	Estd feed intake (kg/beast/d)	Liveweight change (kg)	Crude protein (%)	Invitro digestibility (%)	Estd feed intake (kg/beast/d)	
Trial 1 1971									
Jul 7-Jul 20	11.4 **	9.5	38.3	10.7	7.0**	10.2	38.3	2.5	0
Jul 20-Aug 3	3.6 **	8.2	37.4		-0.4**	7.3	32.8		
Aug 3-Aug 17	-2.2	8.6	32.6	4.0	-3.7	7.6	29.4	3.2	3
Aug 17-Sept 1	-2.6	8.8	36.2		-0.4	9.4	32.4		
Trial 2 1971									
Sept 1-Sept 14	4.7**	9.2	39.5	10.1	0.8**	9.8	34.0	4.7	28
Sept 14 - Sept 28	-1.3	9.6	36.6		-0.9	8.8	30.1		
Sept 28-Oct 12	-3.5**	8.9	33.4	6.0	-10.0**	9.2	27.8	5.4	63
Oct 12-Oct 26	-7.6	8.0	24.0		-9.1	10.4	26.9		
Trial 3 1972-73									
Sept 7-Oct 19	1.0*	5.6	43.3**	5.7	-3.2*	4.2	37.5**	4.1	106
Oct 19-Nov 30	-19.6*	4.5	37.3**		-37.5*	4.3	31.7**		
Nov 30-May 25 1973	56.0				62.4				

Significant differences between treatments: *, $P < 0.05$; **, $P < 0.01$

Later they lost weight with significantly greater losses being recorded on standing hay in trials 2 and 3. There were net gains on both fodders in trial 1, but losses in trials 2 and 3.

The crude protein contents of the two fodders did not differ significantly in any trail, also there was no significant fall in crude protein during any trial. The average crude protein content of the Townsville stylo dominant pasture in 1971 (8.8%), was significantly higher than the grass dominant pastures in 1972 (4.6%).

Invitro digestibility of fodder rolls was greater than standing hay at the start of trials 2 and 3. Fodder rolls maintained an advantage in digestibility for the duration of each trial except for the last period of trial 2 when the fodder rolls were almost completely eaten. The regression equation relating liveweight change per fortnight (LWG, Kg) and invitro digestibility (D,%) for trials 1 and 2 was:-

$$LWG = 1.05\ D - 35.65 \pm 0.18,\ r = 0.84\ (P < 0.01)$$

Estimated feed intake was greater on fodder rolls than standing hay, in the initial grazing periods, but later fell to similar levels when the fodder rolls were heavily grazed. Apparent utilization of pasture in 1971 and 1972 averaged 66% and 65% for fodder rolls, and 35% and 47% for standing hay respectively.

No compensatory weight gains were recorded in trial 3.

IV. DISCUSSION

The steers grazing fodder rolls of Townsville stylo/native grass initially gained more liveweight and then lost less than those grazing standing hay. Cayley, Bishop and Kentish (1970), found similar results when comparing fodder rolls and standing hay of perennial rye grass/subterranean clover pastures in southern Victoria.

Since within years the crude protein content of the 2 fodders were similar this factor did not account for the superior animal gains on fodder rolls. However, the average crude protein content of the 1972 fodders was significantly lower than that of the 1971 trials and less than that considered necessary if voluntary intake was not to be reduced by protein deficiency (Minson 1973). This contributed to lower overall animal performance of the 1972 trial compared with the 1971 trials. The lower proportion of Townsville stylo in the 1972 pastures was thought responsible for the lower crude protein content,

Liveweight change was related to invitro digestibility of standing hay or conserved fodder in the 1971 trials; in general the more digestible the fodder the greater the intake and rate of liveweight gain, The digestibilities of standing hay were lower than fodder rolls at the start of trials 2 and 3 (in September) and again fell more rapidly. This suggests that the reduced exposure of pasture to weathering by fodder rolling was responsible for the better performance of animals given fodder rolls.

The treeless flood plains at Adelaide River are suitable sites for fodder rolling. However, because of wet soil conditions the annual pastures were fodder rolled at a late stage of maturity when pasture quality

was poor. Fodder rolls made earlier could be expected to produce better animal gains relative to gains made on standing hay than those recorded in our work.

On soils where water logging prevents early mowing of the native grasses at a more digestible stage it may be practicable to conserve a perennial legume such as Calopogonium mucunoides which would be at an earlier stage of maturity when the flood plains dry out.

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VI. REFERENCES

CAYLEY, J.W.D., BISHOP, A.H., KENTISH, T.D. (1970). Proc. Aust. Soc. Anim. Prod. 8 : 488.

MINSON, D.J., (1972). Aust. J. exp. Agric. Anim. Husb. 12 : 21

MINSON, D.J., (1973). Aust. J. exp. Agric. Anim. Husb. 13 : 153

NEWMAN, D.M. (1972). J. Aust. Inst. agric. Sci. 38 : 212

WESLEY-SMITH, R.N., (1972). Aust. J. exp. Agric. Anim, Husb. 12 : 566