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MANAGEMENT OF LATE SPRING-EARLY SUMMER PASTURE SURPLUSES IN HILL COUNTRY

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Abstract

Comparisons of controlling late spring to early summer pasture growth on either easy or steep contoured land with either a fast rotation or continuous grazing policy were made in self-contained farmlets for two years.

Pasture control was maintained over more land by controlling steep land first and with continuous grazing. Animal performances (ewes, steers) were generally similar for the mid-November to early January treatment period, and subsequently until May shearing. In the first year better animal performances occurred in "steep control" farmlets during winter and early spring, but this was less evident in the second year.

Priority control of steep land during late spring-early summer is recommended because of likely longer-term benefits in pasture composition, density and production. Quick rotation grazing through the period provides a better ability to recognise and manage pasture quantities and should be adopted if summer droughts are anticipated. For well fenced properties in summer-wet areas and with integrated stock grazing, continuous grazing during late spring-early summer may be equally suitable.

Keywords: hill country, grazing management, pasture control.

INTRODUCTION

Concern about seasonal imbalances between pasture growth and animal demand generally centre on feed deficit periods for they tend to set stocking rate and performance levels. However, the consequences of feed surpluses in late spring-early summer should also be considered. Where conservation is not possible because of contour or finance limitations, the development of rank. pasture represents an immediate wastage of feed quantity and quality; and in the longer term may present problems in terms of pasture reversion, low plant density and poor stock performance (Suckling, 1975; Korte, 1982).

The balance between feed supply and demand during late spring-early summer is principally determined by climate and stock numbers. This balance can be manipulated by altering stock policies such as lambing, calving and weaning dates; stock sale and purchase; and stock class ratios. Further flexibility may also be available through grazing management options,

In reducing late spring-early summer surpluses, animal intakes need to be maximised, pasture quality retained, and the flush of reproductive grass growth common to this period discouraged. This is not achieved by a combination of hard grazings and long regrowth periods. Correct management should be a compromise between high feed offer and restricted selective grazing so that control of pasture quantity and quality is not lost. This compromise is best satisfied by either a fast rotation (<20-25 days) or continuous grazing over an area of that farm that can adequately be controlled by available stock.

The amount of control achieved will depend on land and plant type, for these factors influence pasture composition, growth and utilisation. Furthermore, the consequences of where control of pasture surpluses occur will depend on land class, aspect and stage of development. This dependence is based on differences in pastures to revert; to loose pasture density and quality; and on the ease of regaining control and productivity.

This paper discusses the results of a self-contained farmlet experiment at Whatawhata Hill Country Research Station, that sought to identify where and how late spring-early summer pasture surpluses should be controlled. For two years, it compared pasture and animal production where:

(i) Pasture control was first achieved on either easy (E) or steep (S) contoured land.

(ii) Grazing during mid-November to early January with either a fast rotation (FR) or continuous grazing (CG) policy.

FARMLET STRUCTURE AND MANAGEMENT GUIDELINES

Each farmlet was equally balanced (1:2) for areas of easy and steep land. Within replicates, land classes (aspect, stage of development) and stocking rates were similar (replicate range: 13-15 su/ha). Farmlets were stocked with four and six tooth Romney breeding ewes and 1-2 year old Angus steers (75:25 stock unit ratio). No replacement stock were carried as all lambs were removed at weaning.

(i) Prevention Phase:

Management comparisons commenced during the second week of November, immediately after weaning and shearing. Fast rotation paddocks were grazed by ewes then steers (1-2 day overlap) with rotation lengths (19-25 days) being slightly longer where grazing was predominantly on steep land. Continuously grazed paddocks were slightly under-stocked by ewes and as required, steers were moved in to eliminate patch grazing.

(ii) Maintenance Phase:

When the accumulation of surplus feed ceased in early January, rotations were established in all farmlets with the objective of removing rank feed from previously uncontrolled areas, allowing pasture to accumulate on previously controlled paddocks, and maintaining ewe body weights.

(iii) Flushing Phase:

Attempts to flush ewes for 4-5 weeks (two quick rotations over all paddocks) commenced in the second week of March. Steers remained on previously rank pasture.

(vi) Winter Phase:

Once the first mating cycle was completed (third week April) rotations were lengthened (50-70 days) to ensure complete removal of rank pasture and/or accumulate feed for late winter-early spring. Steers were given lower nutritional priority than ewes until "clean out" was achieved and then they were grazed ahead of the ewes. This transition occurred in July and late April for the first and second years respectively. During the second year, nutrition of ewes was budgeted so that treatment weights followed similar profiles.

(v) Lambing Phase:

At lambing, ewes were set-stocked and steers, while initially on saved feed, moved through set-stocked paddocks from mid-September onwards as they accumulated pasture.

RESULTS

A. 1981-1982

(i) Prevention Phase: (mid-November to early January)

Weight gains of ewes (5-6 kg) and steers (1.0-1.1 kg/hd/day) were similar for all treatments during this seven week period (Table 1). Pasture residuals were 1.9 and 1.7 t DM/ha for easy and steep paddocks respectively and associated pasture growth rates were 47 and 32 kg DM/ha/day. Pasture density and quality was maintained on a greater area where preference was first given to controlling steep land and where continuous grazing occurred (Fig. IA). At the January budget average pasture DM levels were greatest in easy control, fast rotation (EFR) farmlets and least in steep control, continuous grazing (SCG) farmlets (Fig. 1A). Easy control (E) farmlets were characterised by large areas of rank feed on steep land, while steep control (S) farmlets had approximately half the area of rank pasture which was located on easy land.

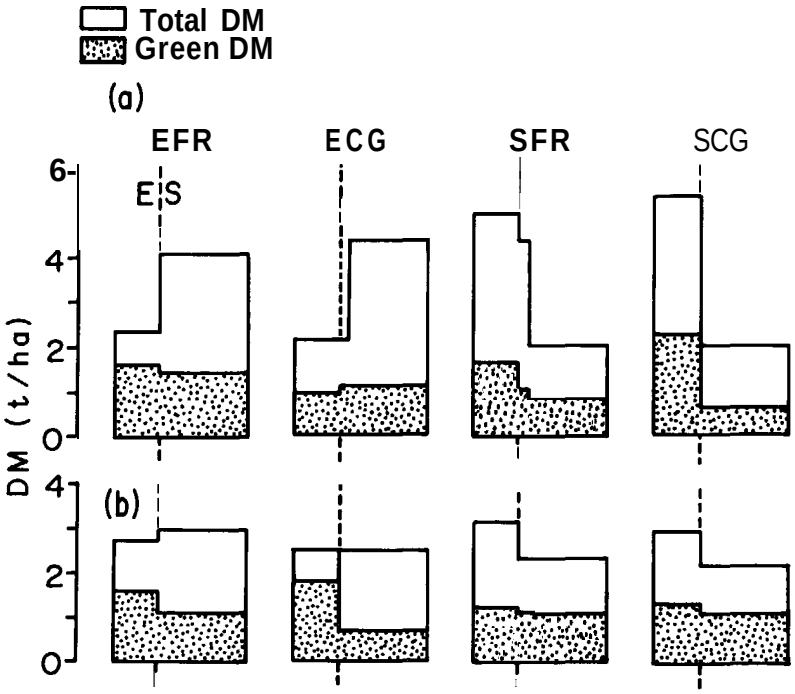

Figure 7: Total and green dry matter levels for easy-steep areas of farmlets in early January (A) and early March (B), 1982.

(ii) Maintenance Phase: (early January to early March)

Ewe weights were maintained and steer weight gains were low during this period when grazing was mainly confined to rank pasture (Table 1). Previously controlled paddocks were allowed to accumulate feed, this being least on the slow growing steep land (14 and 1 kg DM/ha/day for easy and steep land). By early March, average pasture levels were still greatest in EFR and least in SCG farmlets, but green DM levels were similar for all treatments (Fig. IA).

(iii) Flushing Phase: (early March to mid-April)

Ewe weights and weight gains during flushing were similar and consequently

Table 1: ANIMAL PERFORMANCE DATA FOR 1981/82

	FARMLETS				
	EFR	ECG	SFR	SCG	(SED)[1]
Ewe Weights (kg)					
18/11	42.5	42.4	42.4	42.3	0.4
13/1	47.6	48.9	48.7	48.0	0.7
2/3	48.6	48.8	49.4	48.2	0.5
20/4	50.2	50.7	51.3	50.0	0.5
3/8	51.4	52.1	55.6	55.7	1.2
Wool Weight (kg)					
5/5	2.57	2.53	2.60	2.63	0.08
10/11	2.00	2.03	2.17	2.17	0.04
Ovulation Rate	1.59	1.55	1.54	1.61	0.05
Lambs Weaned (kg/ha)	246	223	237	234	16
Steer Weight Gain (kg/hd/day)					
3/11-8/1	0.98	1.02	1 .00	1.10	0.10
8/1-10/8	0.03	0.00	0.08	0.03	0.04
11/8-5/11	0.89	0.83	1.16	1.02	0.18

[1] Standard error of the difference.

ovulation rates did not differ (Table 1). Rank pasture in easy paddocks of the S control farmlets had been removed by this stage and growth rates of new leaf were similar to their controlled counterparts in the E control farmlets (30 kg green DM/ha/day). This contrasted with previously rank paddocks on steep land within E control farmlets where regaining control was more difficult to achieve and pasture growth rates lower than controlled steep paddocks (15 vs 26 kg green DM/ha/day).

(iv) Winter Phase: (mid-April to mid-August)

Similar wool weights at the beginning of this period reflect the same ewe weight profiles that all treatments had followed during the previous five months. However, during this winter period ewes gained more weight up to lambing and steers lost less weight in S control farmlets (Table 1). This resulted from the continued need to regain control of steep land in E control farmlets and from generally 3-5 kg DM/ha/day higher pasture growth rates in S control farmlets. At the end of this period, just prior to lambing, all treatments had similar average pasture levels (0.9 • 1 .O t DM/ha).

(v) Lambing Phase: (mid-August to early November)

As expected, lambing performances did not differ (~ 120% live lambs; 114% weaned lambs) and with similar lamb weaning weights (20 kg), the weight of lambs weaned/ha only ranged between 220-240 kg (Table 1). However, at the

November shear an extra 0.2 kg wool was clipped from S control farmlet ewes, a result of better winter-spring nutrition. During this period, ewes and lambs were given full access to current growth, therefore the greater steer gains achieved in S control farmlets reflected their greater pasture productivity (Table 1). In addition, at weaning in November 1982 there was 0.2 t DM/ha more pasture across S control farmlets.

B. 1982/1983

(i) Prevention Phase:

Pasture residuals were 1.7 and 1.4 t DM/ha in E and S control farmlets respectively, and although ewe weight increases (~5 kg) were similar, greater steer weight gains occurred in E control farmlets (0.90 cf 0.65 kg/day, Table 2). As a result of higher stocking rates and slower pasture growth (38 and 20 kg DM/ha/day for easy and steep land) pasture control was greater in this second year (Fig. 2A), particularly in ECG farmlets where the effect of the previous years management on depressing pasture growth continued into this period. In January only EFR farmlets had a large area of rank pasture, the remainder having approximately ¾ of the farmlet at pasture levels of 1.4-l .8 t DM/ha.

Table2: ANIMAL PERFORMANCE DATA FOR 1982/83

	FARMLETS				
	EFR	**ECG**	**SFR**	**SCG**	**(SED)[1]**
Ewe Weights (kg)					
11/11	**47.9**	47.3	48.1	48.1	0.6
11/1	52.3	54.8	52.7	53.7	0.7
4/3	54.3	55.2	53.9	55.1	0.7
28/4	55.2	56.2	54.3	55.3	1.0
9/8	56.8	55.8	56.5	55.3	1.1
Wool Weight (kg)					
3/5	2.91	2.97	2.87	2.92	0.06
Ovulation Rate	**1.54**	1.58	1.50	1.44	0.06
Steer Weight Gain (kg/hd/day)					
5/11-12/1	0.89	0.85	0.69	0.63	0.14
12/1-22/4	-0.04	-0.01	-0.04	0.12	0.12
22/4-10/8	0.63	0.65	0.71	0.77	0.08

[1] Standard errof of the difference.

(ii) Maintenance Phase:

Ewe weights continued to increase by approximately 1.5 kg but steer weight gains were small as more than 2/3 of the total grazing time was spent on rank pasture. Due to moister summer conditions, pasture growth was greater in this second year (32 and 19 kg DM/ha for easy and steep land) and pasture had accumulated on controlled steep land by the end of the period (Fig. 2B). At this

stage pasture levels were slightly higher in SFR farmlets, and green pasture levels higher in CG treatments. (+ 0.2 t DM/ha).

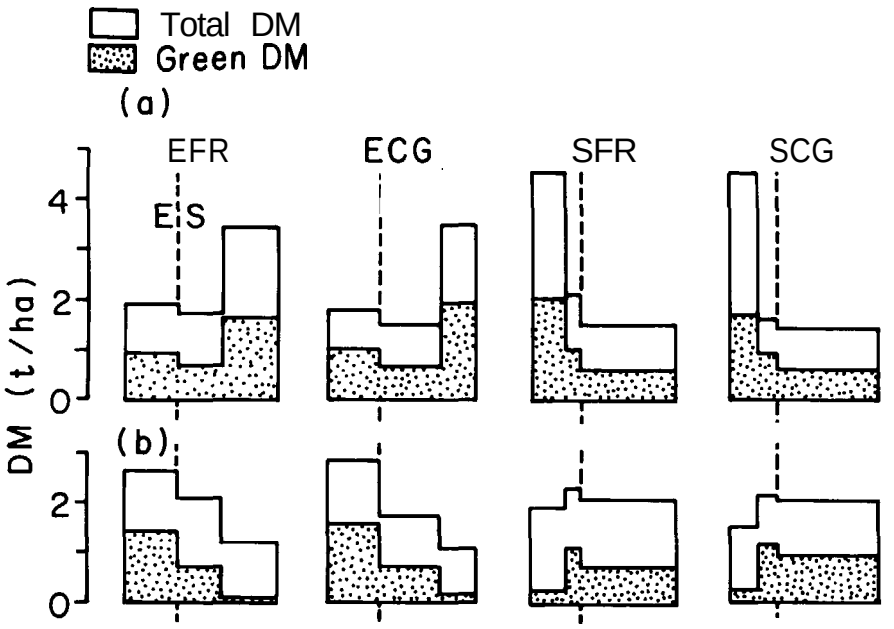

Figure ***2: Total and green dry matter levels for easy-steep areas of farmlets in early January (A) and early March (B), 1983.***

(iii) Flushing Phase:

Again, ewe weights and ovulation rates at joining were not greatly affected by treatment (Table 2). The lower ovulation rates of SCG farmlets reflected the difficulty in retaining previously accumulated pasture on steep land during a dry, early March period and a temporary drop in ewe body weight during March. Steers were confined to previously uncontrolled paddocks and consequently lost weight. At the end of this period, all farmlets had similar pasture DM levels and were considered "cleaned out".

(iv) Winter Phase:

Wool weights at May were again similar and as a consequence of designated management criteria in this second winter, ewe weights followed a similar profile (Table 2). Steers were given nutritional priority and weight gains (≃0.7 kg/hd/day) tended to be greater in S control farmlets, particularly towards the end of the winter period. Just prior to lambing, average pasture levels across farmlets were 1.1-1.2 t DM/ha.

DISCUSSION

Rather than defining the amount of pasture control that should be sought, this experiment attempted to identify how and where late spring-early summer

pasture surpluses should be controlled. Obviously, managements that promote control where it is already high may create even greater feed deficits if summer droughts follow. Conversely, managements that encourage pasture surpluses where they are already large, will only extend the time needed for stock to graze low quality feed, and further delay pasture "clean-out" and autumn-winter recovery of density and production. The effects of managing pasture surpluses on animal production will therefore depend on the amount of surplus generated, the degree of summer and/or winter-early spring feed deficits, and the time of pasture recovery.

The immediate effects of the different November-December managements compared in this experiment were reflected in pasture conditions rather than stock performance. With the exception of the steers in 1983 S control farmlets, good animal weight gains were achieved during this period whether grazing was predominantly on easy or steep land; or with rotational or continuous grazing systems. By early January, the major difference between farmlets was the greater degree of pasture control where steep land was given preference to grazing.

Although pasture control was maintained over greater areas with continuous grazing, this had no positive effect on subsequent performance once rotations were established in all farmlets. In fact, pastures on steep land that had previously been controlled by continuous grazing appeared less able to retain and/or accumulate quality pasture under dry conditions. While this may be of little consequence in summer-wet areas, it may put SCG managements at a disadvantage where dry summers are likely to occur. The in built "wedge" of pasture resulting from fast rotations was a better supplement to pasture in uncontrolled paddocks for maintaining stock condition over summer.

No obvious advantages to continuous grazing were apparent in this experiment, therefore the greater flexibility to judge and manipulate grazing pressures with fast rotations makes it a more attractive management option in an unreliable climate. Good pasture and animal performance can be achieved where pasture residuals are approximately 1.8 and 1.5 t DM/ha on easy and steep land respectively, and where increments between post- and pre-grazing pasture levels are approximately 0.7 t DM/ha. These guidelines generate rotation lengths between 15-25 days depending on pasture growth rates. Continuous grazing over the surplus period can only be confidently recommended in summer-wet areas where land is uniformly subdivided and where grazing of different stock classes is well integrated. Maintaining pastures at 1.6-1.8 t DM/ha or 2-3 cm height under this management, should ensure optimum control in terms of pasture and animal performance.

Preferential control of pasture on the two different land types provided the greatest experimental contrasts. Pasture control was maintained on more land in the S control farmlets where priority was first given to grazing the slower growing steep land. Pasture production from these steep controlled areas was subsequently greater than that in uncontrolled steep areas, once the latter were "cleaned out" and soils had rewetted. Furthermore, rank pasture that developed on easy land within S control farmlets was more readily removed (intake and decay) and recovery of pasture density and production was achieved earlier. Pasture on easy land appeared less likely to deteriorate in composition and production than steep land if control was lost.

In the first year, these pasture effects did not influence animal production until winter and spring. Animal performances were poorer in E control farmlets

where pasture density and vigour in previously rank steep paddocks did not recover until mid-spring. In the second year this difference in animal productlon between E and S control farmlets was less. This was due to a carryover effect of lower pasture levels in E farmlets from the previous year; greater levels of pasture control; and earlier pasture recovery (earlier clean-out and rains) which allowed previously uncontrolled steep land to more quickly re-establish pasture cover and production. In neither year were effective differences in pasture availability generated early enough to influence ewe nutrition at mating, ovulation rate and lambing performance.

Possible production advantages and long-term benefits in improving pasture composition of steep land (Sheath & Bircham, 1983) favour the preferential control of pasture on steeper, less productive land during late spring-early summer. Production gains are more likely to occur during winter-spring rather than before ewe mating, and they are likely to be greater where levels of pasture control are low and/or where autumn-winter pasture recovery is delayed.

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