

ALTERNATIVES TO DRY ANNUAL PASTURE FOR STEERS OVER SUMMER
AND LATER EFFECTS ON LIVELWEIGHT GAIN DURING WINTER

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Summary

Angus steers aged seven months were subjected to grazing treatments between December 1966 and September 1967. The liveweight gains of the steers were compared at similar stocking rates on either annual pasture or dry-land lucerne and where hay was cut from portion of the plots and fed back in the late summer and autumn.

Over summer liveweight gains on lucerne regrowth (0.54 kg/d) and hay from lucerne regrowth (0.80 kg/d) were significantly greater ($P < 0.05$) than those obtained with- standing pasture (0.30 kg/d) or pasture hay (0.36 kg/d). Over autumn the liveweight gains on first-cut lucerne hay (0.22 kg/d) and on pasture hay (0.15 kg/d) were significantly different ($P > 0.05$) from the liveweight loss on standing pasture (-0.19 kg/d).

During winter steers grazing annual pasture from which hay had been conserved in the previous spring lost weight at a significantly greater rate than those grazing lucerne which had been cut once or twice for hay or annual pasture which had not been cut for hay.

I. INTRODUCTION

In North-East Victoria, young beef cattle weaned at the usual time in early summer thereafter gain little or no weight on dry annual pasture (Hamilton and Bath 1970). The present paper reports the liveweight changes of steers variously grazing either dry annual pasture or on annual pasture or dry-land lucerne from which hay had been conserved and fed back during summer and autumn. Further observations during winter, when hay was no longer fed, provide an indication of the effect on **herbage** production at this time from having used the areas in the way necessary to provide the earlier alternatives.

II. MATERIALS AND METHODS

(a) Location and description of observations

The observations were made on Angus steers about 7 months old and 207-242 kg liveweight at the start of the experiment. Four groups, each of eight animals matched on body weight, were grazed on plots of annual pasture or dry-land lucerne. From some of these plots hay had been conserved. On plots where hay was conserved it was conserved from the whole area. With one exception the hay was fed back on the plots from which it had been conserved (Table 1). The stocking rate in all treatments was 2.5 steers per hectare, and the animals had access to the whole plot area continuously.

Feeding with first-cut lucerne hay began as soon as all the second-cut hay had been fed. Hay was given to Group 1 on May 15, when germination had been delayed a month later than expected and most of the standing pasture had been eaten. Feeding with hay ended as soon as it became apparent that the germinating annual pasture was going to become established. The experiment ended with the onset of rapid spring growth. These environmental factors determined the duration of the feeding periods given in Table 1.

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TABLE 1
Nature of grazing and hay offered

Group	<u>Paddock grazing</u> ⁺	<u>Hay offered</u>			<u>Paddock grazing</u> ⁺
	19.X11.66 to 26.V1.67	19.X11.66 to 24.111.67	24.111.67 to 15.V.67	15.V.67 to 26.V1.67	26.V1.67 to 4.1X.67
1	DP	-	-	PH ⁺⁺	GP
2	PH aftermath	PH	PH	PH	GP
3	LH-1 regrowth	-	LH-1	LH-1	GL
4	LH-2 regrowth	LH-2	LH-1	LH-1	GL

⁺ DP = dry annual pasture; PH = hay from annual pasture; LH-1 = first-cut lucerne hay; LH-2 = second-cut lucerne hay; GP = green annual pasture; GL = green lucerne.

⁺⁺ This hay was provided from that made for Group 2, otherwise all hay was provided from within each plot.

The steers were drenched with tetramisole at the start of the experiment and in early May, and were fed fresh bales of hay every two or three days, so that hay was always available.

(b) Pasture and fodder conservation

In the spring of 1966, the annual pasture (assessed visually) contained about 70 per cent of Trifolium subterraneum and 30 per cent of annual grasses, mainly Lolium rigidum. The lucerne contained about 20 per cent of annual grasses (mainly Lolium rigidum) at the first cutting, but none at the second.

The hay was conserved as described in Table 2.

TABLE 2
Description of the different hays

Source of hay	Stage of growth	Date of cutting	Date of baling	Rain during harvest	Comments ⁺
Annual pasture	Ryegrass, early flowering; clover setting seed	22-29.X.66	5-7.X1.66	35 mm	Leafy but slightly mouldy
Dryland lucerne	Full flower	" (first cut)	"	"	Coarse and stemmy no mould
Dryland lucerne	Early flowering	9-10.X11.66 (second cut)	12.X11.66	Nil	Green and leafy no mould

⁺ Chemical analysis not available

The hay was stored behind a fence at the end of each plot, in wedge shaped stooks of 10 bales set on edge. A total of 141 mm of rain fell between baling at the first haymaking and when the second cut lucerne hay was made. The rain was fairly evenly distributed over the five week period. A further 59 mm fell between December 10 and the end of May.

In late December, the mean quantities of standing herbage (from two quadrats 1.49 m² per plot) in the four treatments listed in Table 1 were 5060, 1980, 3220 and 850 kg dry matters/ha respectively- The number of bales of hay made and, in brackets, the number actually fed were 0 (15), 80 (55), 49 (43) and 71 (65) per animal respectively. The total amount of hay offered per animal was 293, 1074, 569 and 1506 kg respectively.

(c) Statistical analysis

Weight changes of individual animals (8 replications of 4 treatments) were estimated by analysis of variance and means discriminated by Duncan's Multiple Range Test.

III. RESULTS

The annual pasture was dry at the start of the experiment and remained dry until germination began in early June. The lucerne regrowth started to shed its leaves in mid January and most of the leaves were shed by mid February. After this, until there was more vigorous growth from early June onwards, there were only a few fresh shoots on each crown of lucerne. These shoots were about one cm long where lucerne had been cut twice, but about three to four cm long in among the coarse stems of lucerne regrowth where lucerne had been cut only once.

After germination, there was a dense sward where annual pasture had only been grazed, but much bare ground where it had been cut for hay. It seemed that the difference occurred because haymaking had resulted in almost the complete removal of grasses. During this time, a visual assessment of the lucerne plots indicated that lucerne contributed about 90 per cent of the herbage on offer.

The changes in weight of the animals during separate periods are set out in Table 3.

TABLE 3

Mean daily liveweight change during each of four periods and
mean total liveweight gain

Group	Liveweight change kg/d				Liveweight gain (kg)
	19.X11.66	24.111.67	15.V.67	26.V1.67	19.X11.66
	to 24.111.67	to 15.V.67	to 26.V1.67	to 4.1X.67	to 4.1X.67
1	0.30 a ⁺	- 0.12a	- 0.19a	- 0.04a	11.7a
2	0.36 a	0.15b	- 0.06a	- 0.47b	6.3a
3	0.54 b	0.18b	0.30b	- 0.20a	59.4b
4	0.80 c	0.28b	- 0.14a	- 0.22a	62.2b

⁺ Values in any column with a different notation differ significantly (< P 0.05).

From mid December to late March the mean rate of change in liveweight of animals of groups 1 and 2 differed little, but in both of these groups it was significantly lower than that of animals of Group 3 (P< 0.05); and this in turn was significantly lower than that in those of Group 4 (P< 0.05).

From late March to mid May, animals of Group 1 lost weight, but those of other groups gained. The rate of gain did not differ significantly between animals of groups 2, 3 and 4, but animals in those groups differed significantly from those in Group 1 (P< 0.05).

However, the animals of Groups 2 and 4, as well as those of Group 1, lost weight from mid May to mid June; the situation was reversed for Group 3. This difference also was statistically significant (P< 0.05). The animals of all groups lost, weight from mid June to early September, but the rate of loss was significantly greater in Group 2 than in Groups 1, 3 and 4 (P<0.05).

IV. DISCUSSION

Only lucerne regrowth and second cut lucerne hay produced appreciable gains in weight. The weight gains on pasture hay and first cut lucerne hay were poor. The weather conditions at haymaking and the fibrous nature of the first cut lucerne hay may have contributed to the poor result (Table 2). Certainly the second cut lucerne hay which was green and leafy and conserved under good weather conditions promoted reasonable gain in weight. However, it is surprising that the feeding of pasture hay and first cut lucerne hay did not result in substantially greater weight gains than those obtained on dry, standing annual pasture. It is possible that other factors associated with the method of storing and feeding the hay were involved.

During winter, (late June to early September), the conservation and feeding back of the annual pasture hay was associated with substantially greater liveweight loss. (Group 2) than that where it was not undertaken (Group 1). As no hay was fed during winter this difference in liveweight loss must reflect a difference in growth of pasture during this period. This difference in pasture growth seemed to occur because haymaking had resulted in almost the complete removal of grasses from the pasture at this time, and there was insufficient clover to form a dense sward. Experience at Rutherglen suggests that if germination had occurred at the usual time in April there would have been more clover to compensate for the loss of grasses, and then the effects of haymaking on the pasture produced during winter would not have been so great. Myers and Squires (1968) found that making hay from a grass-dominant annual pasture substantially reduced subsequent pasture production during winter but making hay from a clover-dominant pasture had no such effect. Pullman and Allden (1971) found that spraying a pasture with a plant desiccant during spring resulted in a reduced grass content in the pasture during the following winter. The liveweight changes of the animals suggest that conservation during spring had a less damaging effect on the herbage production of lucerne at this time than on that of annual pasture. However, the lucerne was located in a different paddock from the annual pasture and so some factor associated with a difference in location may have contributed to the difference in result, even although there was no evidence of such a factor.

The feeding back of first-cut lucerne hay from mid May to late June was accompanied by loss in weight where two cuts had been conserved. (Group 4), whereas it was accompanied by substantial gain where only one cut was conserved (Group 3). Since the rate of liveweight gain of the steers in the two groups was similar when both received first-cut lucerne hay in the earlier period, it seems that the difference in weight change at this time reflects a difference in the rate of growth of lucerne, and not a difference in the quality of the hay. It could have been that the longer shoots throughout summer and early autumn (mid December to mid May) on lucerne cut only once, as described earlier, enabled a faster growth response in this lucerne to the rain and lower evaporation rates that came with the onset of autumn.

Overall, the results of this experiment have shown that feeding with lucerne regrowth and second-cut lucerne hay may be effective in improving the weight gain of young beef cattle compared to grazing them on dry pasture, but that feeding with annual pasture or second-cut lucerne hay which has been stored in the paddock may not be effective in achieving this objective.

V. ACKNOWLEDGMENTS

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VI. REFERENCES

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