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NUTRITION OF HALFBRED EWES ON IMPROVED TUSSOCK GRASSLAND

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SUMMARY

Performance of two-year-old (two-tooth) and three- to five-year-old ewes grazing part-improved tussock grassland was compared with that of similar ewes grazing unimproved tussock grassland, both at stocking rates of 0.75 to 1 ewe per acre. Improvement was by overdrilled clovers, grasses, and greenfeed ryecorn.

Feeding clover pasture from mating in May to early winter enabled significant savings to be made in winter hay ration. Insufficient ryecorn greenfeed was grown from overdrilling to warrant its use.

Wool weight was not affected by variation in winter feeding. Percentage of lambs reared to tailing was not consistently affected by autumn clover feeding.

Ewe performance in early spring was markedly superior on part-improved tussock grassland and their advantage in live-weight was retained through to when lambs were weaned. Growth rate of lambs was generally superior on part-improved tussock grassland.

The results suggest it may be advantageous to utilize seasonally-grown herbage when it is of high quality, because value for feeding rapidly deteriorates when conserved as standing crop for cool season use.

FESCUE TUSSOCK GRASSLAND at low altitude with sunny aspect has traditionally been winter grazing country and to conserve feed is usually not grazed in the growing season. Legume and grass oversowing, fertilizer topdressing and stock grazing can result in considerably increased herbage production. The need to graze intensively in the growing season has been indicated by O'Connor and Clifford (1966). Although season of growth may be extended in this system, the net effect will be to increase disparity in feed supplies between the peak and trough of availability, unless some conservation is practised or supplementary feed is grown.

This paper describes trials in which stock performance on unimproved tussock grassland with standard supplementary hay feeding was compared against that on tussock grassland part-improved by clover overdrilling. Where

clover-improved herbage was fed in autumn-early winter, the ration of hay was reduced; where greenfeed ryecorn was overdrilled into clover in autumn and fed in late winter the ration of hay was standard.

TRIALS

The trial area was 450 acres of fescue tussock grassland on Simons Hill Station, of easterly aspect on Pukaki soil, altitude 1800 ft, at the foot of the Mary Range, near Lake Pukaki, Mackenzie Country. The grassland was characterized by *Festuca novae-zelandiae* with *Agropyron scabrum*, *Anthoxanthum odoratum* and *Agrostis tenuis*. Annual herbage production was probably less than 2,000 lb dry matter (DM) per acre, but with cultural improvement is estimated by O'Connor (1966) to be 8,000 lb. The site was divided into three areas and a quarter of one of these was overdrilled in autumn 1968 with a seeds mixture containing red, white and alsike clovers and 'Grasslands Manawa' ryegrass and cocksfoot grasses. Non-replicated flocks containing one-third of rising 2-year-old (two-tooths) and two-thirds of 3- to 5-year-old ewes were stocked at 0.75 to 1 ewe per acre each year from mating in May to weaning of lambs in February.

For each following year the whole flock was part culled, further 2-year-old ewes added, and re-randomized.

1968 TRIAL

With clover establishing from autumn overdrilling, the salient feature was the effect of clover growth in spring-summer on stock performance at that period, hay ration in winter being the same as for stock grazing on unimproved tussock grassland.

1969 TRIAL

After lambs from the previous trial were weaned in February 1969, the clover-improved area was spelled until May. Stock fed clover after mating were given a reduced ration of hay in winter increasing from 0.5 lb per head per day in mid-June to 1 lb in mid-July to 1.5 lb in mid-August. Stock on unimproved tussock grassland were fed a hay ration of 1 lb per head per day increasing to 2 lb. Hay feeding ceased at shearing in mid-late September.

1970 TRIAL

After lambs from the previous trials were weaned (February, 1970), the clover-improved area was split and run-off boundaries of two of the unimproved areas adjusted so that the resulting total areas contained 15 to 20% of clover pasture. On one of those areas clover pasture was spelled until May and then fed off. On the other, ryecorn was overdrilled into the clover pasture in autumn and was fed off in late winter. A third area was entirely unimproved tussock grassland. Stock on the autumn clover-feeding and unimproved-grassland treatments were fed the same hay rations in winter as in the previous year. Stock on the winter greenfeeding treatment were fed the standard hay ration as those on unimproved grassland.

RESULTS

HERBAGE YIELDS

Table 1 shows the amount of herbage on the unimproved and clover-improved tussock grassland areas when stocked in May after being spelled from grazing in February. Yields were comparatively low and of low nutritive quality. Measured living clover yield was low, and varied according to its establishment and growth as affected by existing ground cover.

TABLE 1: TOTAL AND COMPONENTS OF HERBAGE YIELD OF UNIMPROVED AND CLOVER-IMPROVED TUSSOCK GRASSLAND IN AUTUMN

Type of Grassland	Year	Total DM (lb/ac)	Components of Yield (% of Total DM)			
			Living Grass	Living Clover	Dry Cured and Dead	Tussock and Other Species
Unimproved	1968	850	15	—	80	7
Unimproved	1969	1030	8	—	80	12
Unimproved	1970	780	15	—	80	5
Clover- improved	1969	2500	8	5	80	7
Clover- improved	1970	750	20	5	70	5

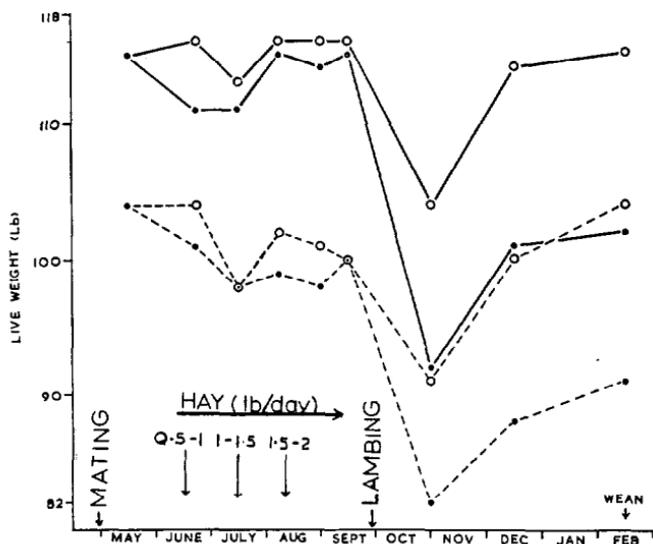


Fig. 1: Average liveweights of 2-year-old (---) and 3- to 5-year-old (—) ewes on part-improved (o) and unimproved tussock grassland (●).

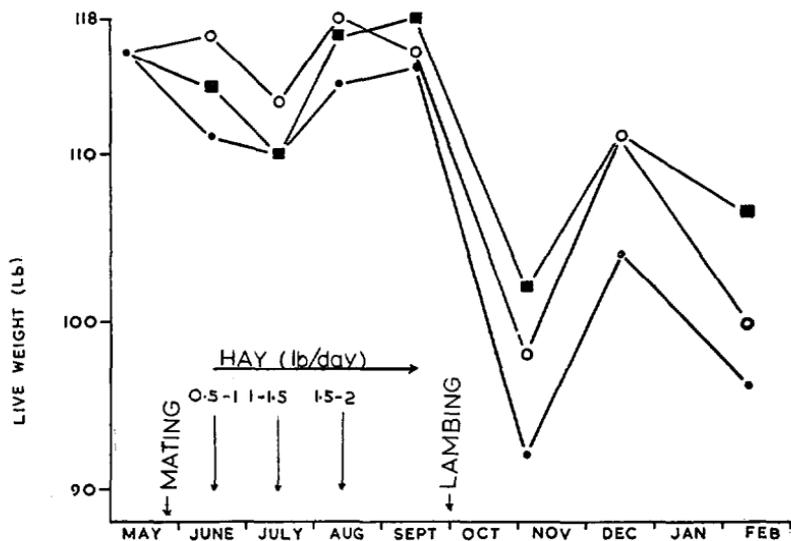


Fig. 2: Average liveweights of 3- to 5-year-old ewes on part-improved tussock grassland — autumn clover feeding (o), on part-improved tussock grassland — winter ryecorn feeding (■) and on unimproved tussock grassland (●).

EWES

Mean liveweights of 2-year- and 3- to 5-year-old ewes in the 1968 trial are shown in Table 2 and for the 1969 trial in Fig. 1. Figure 2 shows liveweight data for 3- to 5-year-old ewes in the 1970 trial; patterns of liveweight changes for 2-year-old ewes were similar to those for the older ewes. In 1968, clover growth on the overdrilled area was considered in mid-December to be sufficient for the stocking rate of the part-improved treatment to be increased from 0.75 ewe per acre to 1.25 ewes per acre.

TABLE 2: MEAN EWE LIVeweIGHTS (lb) ON PART-IMPROVED AND UNIMPROVED TUSSOCK GRASSLAND 1968 TRIAL

Type of Grassland	Age of Sheep (yr)	Liveweights at:			
		Mating	Shearing	Early Summer	Weaning
Part- improved	2	102	101	101	112*
	3-5	121	122	119	120*
Unimproved	2	103	104	96	108
	3-5	120	125	107	120

*Stocking rate increased.

By feeding clover in autumn-early winter 1969 and 1970 to maintain body-weight at that time, reduction in the amount of hay fed compared with that for the group on unimproved tussock grassland resulted in similar liveweights pre-lambing from both groups. Compared with the other treatments, ryecorn fed in late winter 1970 gave only a small increase in liveweight pre-lambing.

Between shearing and lamb tailing, ewes grazing part-improved tussock grassland showed superior performance and maintained this through to weaning. In 1968, at nearly twice the stocking rate on part-improved tussock grassland, ewe liveweight when lambs were weaned was similar to that on unimproved tussock grassland.

Lambing percentages based on numbers of lambs tailed were similar on part-improved and unimproved tussock grassland in 1969 (93-96%) but in 1970 were higher for the animals fed on clover-improved grassland in autumn than for the others (108% cf. 96-100%).

Greasy fleece weights (including belly wool) per animal were generally similar for age groups within and between treatments in all years (1968 — 7.8 to 8.5 lb; 1969 — 7.8 to 8.1 lb.; 1970 — 7.6 to 7.9 lb).

TABLE 3: MEAN LAMB LIVeweIGHTS (lb) ON PART-IMPROVED AND UNIMPROVED TUSsock GRASSLAND

Trial	Type of Grassland	Liveweights at:		
		Tailing	Early Summer	Weaning
1968	Part-improved	25	46	68*
	Unimproved	23	41	69
1969	Part-improved	26	49	65
	Unimproved	23	43	57
1970	Part-improved:			
	Autumn clover	22	46	59
	Winter ryecorn	23	48	63
	Unimproved	23	45	56

*Stocking rate increased.

LAMBS

Mean liveweights of ewe lambs are shown in Table 3. Lambs on part-improved tussock grassland grew slightly faster to early summer. In the 1968 trial at weaning, lambs from ewes stocked at twice the rate on part-improved as on unimproved tussock grassland, were of similar liveweight. Also, more wether lambs graded "prime" from the part-improved grassland (53% and 39%).

In the 1969 and 1970 trials when the ewe stocking rate was similar on all treatments, lambs from part-improved tussock grassland were heavier than those from unimproved tussock grassland.

DISCUSSION

Saving unimproved tussock grassland for winter feeding at best provides a relatively small quantity of low-quality feed so that some supplementation is important. Research at Tara Hills (Lewis, 1968) has suggested 1.5 lb lucerne hay per day as the minimum maintenance requirement of 100 to 110 lb liveweight pregnant Merino ewes. Results from the present experiments where clover was fed in late autumn-early winter show that maintenance of ewe liveweights at that time enabled savings to be made in hay fed during winter. It is stressed that these results were obtained in comparatively mild winters and condition of the stock was monitored with weighing scales rather than by visual appraisal. The saving in hay is of considerable practical importance because on most properties there is limited opportunity to make hay.

Few of the species oversown in tussock grassland can be satisfactorily conserved as standing forage for use in late winter. Clovers, particularly white clover, are frosted-off early in winter. Douglas (1966) has reported *in vitro* digestibility of 50% for frosted cocksfoot at Tara Hills in August compared with 75% for not-frosted, the herbage at the time comprising 82% of the frosted material. E. W. Vartha and P. T. P. Clifford (unpubl.) have determined *in vitro* digestibility of cocksfoot and tall fescue to decrease from 74% and 77%, respectively, in June, to 56% and 65% in August.

Ryecorn can provide high quality greenfeed which withstands harsh winter conditions. Cultural techniques for obtaining 3,000 lb DM per acre from ryecorn as greenfeed have been devised (Vartha and Clifford, unpubl.) but, without resorting to pre-drilling preparation by sprays and limited cultivation, only 230 to 930 lb DM per acre was achieved (1970 trial). At this level of production, the small effect of such greenfeed on animal performance suggests that attention could more profitably be focused on utilization of feed which can be grown without difficulty in the growing season, rather than attempting to grow ryecorn in cool season from overdrilled autumn sowings.

In agreement with Lewis (1968), these variations in winter feeding practices did not affect wool weight.

The most significant effect of clover was probably on ewe liveweight in the period after shearing to lamb tailing. Over that period, differences of 10 to 12 lb liveweight were obtained between ewes grazing improved and unimproved tussock grassland and in general these were maintained to when their lambs were weaned. Addition of clover to the ewes' diet had little effect on their milk production as shown by lamb growth to early summer. Coop (1966), in discussion of factors affecting wool production and reproduction in some high-country flocks, has suggested that liveweight before mating was one of the more important factors affecting barrenness and, because breeding ewes did not gain weight once they entered the flock, the maiden ewe must be better grown in order to increase the average liveweight of that flock.

When fed on tussock grassland that was part-improved with clover, average liveweight at mating of about 115 lb for 3- to 5-year-old ewes could in general be regained by the time their lambs were weaned whilst ewes on unimproved tussock grassland were at least 10 lb lighter at that time. They might regain their weight of the previous mat-

ing during the period from weaning to mating, but at the expense of feed supplies which could be saved for later utilization. Coop and Clark (1969) showed there was no harm in restricted feeding of ewes after mating where the restriction was for about 5 or 6 weeks and caused a weight loss of about 10 lb in animals of 142 to 150 lb initial weight. Whilst this situation might also apply to the nutrition of high-country sheep thus enabling conservation of feed, the present data suggest that feed available after mating should be utilized while its quality is still reasonable and consequently later saving may be made in hay feeding rations. Both in terms of limited opportunity to make hay and difficulties in feeding out, this is desirable management practice.

ACKNOWLEDGEMENTS

To the runholder, R. Hosken, for provision of facilities and personal assistance, and to P. Allen, A. Parkes and T. O'Carroll for stock management; Grasslands Division, Lincoln technical staff, in particular L. R. Fletcher and L. A. Maunsell, for field and laboratory assistance; Lincoln College for the loan of stock weighing scales.

The project was funded by Tussock Grasslands and Mountain Lands Institute; the Director, Prof. K. F. O'Connor, and Management Officer, G. Hughes, are thanked for their continued interest and assistance.

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