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# Sheep distribution and herbage utilisation after oversowing and topdressing part of a high country summer range

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## ABSTRACT

Oversowing and topdressing of a small area within a defined but unfenced part of a high country summer range caused sheep to concentrate on that treated area. Sheep density and grazing pressure were respectively 4 and 7 times greater than on the untreated area. As fewer sheep grazed the untreated area dry matter utilisation overall decreased in the following 2 years.

## INTRODUCTION

This paper discusses changes in sheep distribution and pasture utilisation following oversowing and topdressing part of a summer range. The 590 ha study area (Fig. 1) on Glenthorne sheep run in Canterbury, was described by Harris and O'Connor (1980) in an initial study of grazing behaviour of sheep for the 3 summers, from 1974/5. Subsequently, in September 1978, 44.0 ha of the study area was aerially oversown with Huia white clover and topdressed with 10% sulphur-enriched superphosphate at 454 kg/ha. No fencing was involved either in the definition of the study area or in the definition of the treated area within it.

Sheep management was unchanged in that the mixed-age wethers were released onto the summer

range in October and removed in April as before. Sheep were able to enter and leave the study area which was part of a 6200 ha summer range. Within the study area they were able to move freely. For the 3 seasons following oversowing and topdressing, the distribution of sheep was observed on all 23 land units (Fig. 1). Available herbage dry matter was measured on 27 sites for the 3 seasons and these measurements were used to calculate grazing pressures (stock units/tonne of available dry matter) on 15 of the better vegetated land units. Diet of the sheep was analysed qualitatively, using a faecal plant cuticle technique (Stevens, 1977).

## RESULTS

Sheep numbers on the whole study area did not increase after oversowing and topdressing, but more sheep than before grazed the treated area and fewer the unimproved area. The treated area held more than twice the number of sheep in the 3 years after oversowing and topdressing than in the 3 years before (Table 1).

For the whole study area the available dry matter levels at the end of the season (Fig. 2) averaged 370

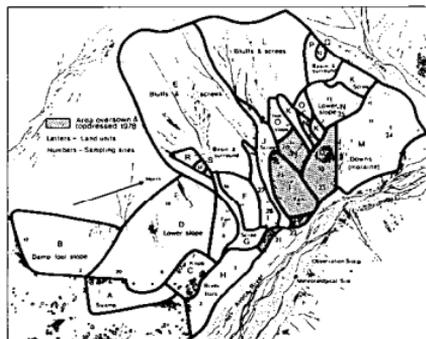


FIG. 1 Plan of study area showing boundaries of land units, vegetation sampling sites, and observation site.

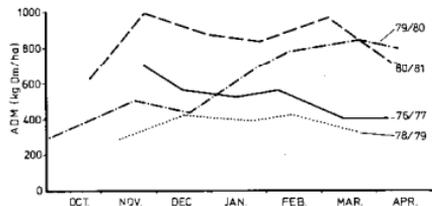


FIG. 2 Seasonal changes in available dry matter (ADM) within the study area.

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**TABLE 1** Sheep numbers on whole study area and oversown-topdressed area before and after treatment (means of from 9 to 12 observations per year).

	Before treatment			Mean	After treatment			
	1974/5	1975/6	1976/7		1978/9	1979/80	1980/1	Mean
Whole study area	247	281	361	296	280	275	233	263
Treated area	32	47	49	43	68	106	103	92

kg/ha in the years before treatment (1976/7, 1978/9 illustrated) and 825 kg/ha in the years after treatment (1979/80, 1980/1 illustrated). The consequence of increased herbage growth on a small area as a result of treatment, without any increase in the total number of sheep on the study area, was a reduction in the overall level of herbage utilisation. Nevertheless, grazing pressure on the treated area in the 1979/80 and 1980/1 seasons was 7 times, and sheep density 4 times, greater than on the unimproved part (Table 2). The effect of this

**TABLE 2** Sheep density (sheep/100 ha) and grazing pressure (sheep/tonne ADM)\* on untreated and treated areas in 1980/1.

	Untreated	Treated
Sheep density (mean of 12 observations)	53	240
Grazing pressure (mean of 6 observations)	.52	4.0

\* Available dry matter

differential grazing was that at the end of the 1979/80 and 1980/1 seasons there were 400 kg/ha more standing dead material on treated than untreated areas but no difference in green dry matter.

The proportions of *Anthoxanthum odoratum* and of all grasses in the diet of sheep declined and the proportion of hawkweed increased between 1976/7 and 1980/1 (Table 3). Faecal samples collected from the treated area showed a higher proportion of *Trifolium* spp. fragments.

**TABLE 3** Botanical Composition of sheep diets. (Percentage identified plant cuticle in faeces from untreated and treated areas).

		1976/7		1980/1	
		Untreated	Treated	Untreated	Treated
Grasses:	<i>A. odoratum</i>	21	5	7	7
	<i>Agrostis tenuis</i>	9	7	7	7
	<i>Notodanthonia</i> spp.	7	8	8	8
	Total grasses	63	57.	43	43
Herbs:	<i>Trifolium</i> spp.	20	15	25	25
	Hawkweeds	trace	12	13	13
	Other	18	15	17	17

## DISCUSSION

Oversowing and topdressing part of a summer range caused sheep to concentrate on the treated area, with subsequent good utilisation of herbage on that area, but under-utilisation of herbage, especially sweet vernal on the untreated area. As there was no increase in sheep numbers on the study area it may be hypothesised that the area treated may have been too small (less than 1 percent of the summer range) to have affected the behaviour of the sheep on the whole summer range or that the drive to keep to a "home range" may be too strong for a factor such as partial oversowing and topdressing to affect their behaviour. J. P. Parkes (personal communication) studied hare movements near the Glenthorne study area and found a threefold increase in use of an oversown and topdressed area after treatment due to local hares spending more time in the area, rather than to hares being attracted from other areas. It was evident that hawkweed was readily grazed on the treated area but there was no visual evidence of hawkweed being eaten on the untreated area. It is inferred from the incidence of hawkweed fragments in faeces collected on the untreated area that considerable transfer of nutrients in dung may have occurred from the treated to the untreated area. The short term effects of partial oversowing and topdressing have been dramatic differences in animal density and herbage utilization but in the longer term such effects might be diluted by stock transfers.

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