

EFFECT OF GRAZING MANAGEMENT ON DIET AND WEIGHT GAINS
OF SHEEP GRAZING ANNUAL GRASS - CLOVER PASTURE

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Rotational grazing systems have been successfully applied to perennial grass pastures in the maritime climatic regions of Great Britain, Ireland, and New Zealand for many years. Observations from more arid areas, such as South Africa, Zimbabwe, and Australia have also demonstrated the superiority of rotational grazing over continuous grazing where stocking rates are high. A great deal of interest in rotational grazing has been generated recently in the United States by Allan Savory and his students who claim that stocking rates of western rangelands may be doubled by switching from continuous grazing to an intensive rotational grazing system.

In rotational grazing, pastures are subdivided into smaller parcels called paddocks. Animals are concentrated into a single herd which is periodically moved from one paddock to the next during the green-feed period with a period of non-use between grazings. The resulting pattern of intense utilization followed by a recovery period is designed to achieve more uniform forage utilization by forcing animals to consume most of the forage in a paddock before they are moved to a fresh paddock.

Plants regrow rapidly during the non-use period because they are able to accumulate more leaf tissue than is possible under continuous grazing where animals are present to consume the new leaves as they appear. Rotational grazing has been credited with increasing pasture production, increasing livestock production, and maintaining high condition of range and pasture lands.

A study was conducted in 1977 and 1978 to compare forage on offer, dry matter intake and diets selected by sheep under rotational grazing to those under continuous grazing on annual grass - subclover pastures.

EXPERIMENTAL PROCEDURE

The study was conducted on five acres of hill pasture approximately eight miles north of Corvallis, Oregon. Species composition of the pasture before grazing in 1977 was 56 percent rattail fescue (Vulpia myuros), 12 percent soft chess (Bromus mollis), 25 percent subclover (Trifolium subteraneum), and 3 percent perennial ryegrass (Lolium perenne). The original pasture was divided in half. One 2.5-acre portion was continuously grazed throughout the grazing season (approximately April - December). The other half was subdivided into five half-acre paddocks. Sheep consecutively grazed each paddock for four days before being moved to the next paddock. Each paddock was grazed four days and then allowed 16 days to recover before being grazed again. Both rotational and continuous grazing treatments were stocked with five ewes and their lambs per acre.

Sheep were weighed every two weeks while they were on pasture. Forage on offer to sheep, amount of forage consumed (intake), and diets selected by sheep were determined for each two-week period by comparing the amount of forage present in the pasture to the amount of forage inside 10 small ungrazed exclosures, per treatment.

RESULTS AND DISCUSSION

Liveweight gains of both ewes and their lambs tended to be higher under rotational than under continuous grazing in mid- and late spring 1977. Summer weight gains, however, were lower under rotational than under continuous grazing. In 1978, no differences were apparent in weight gains between grazing management systems during any season.

The rotationally grazed pasture consistently had more total forage on offer to livestock during the midspring and late spring periods than did the continuously grazed pasture (Table 1). Herbage consumption by sheep, however, did not reflect these differences in herbage on offer. Sheep tended to consume the same amount of forage under both grazing management systems. Since no meaningful differences were detected in herbage consumption, treatment differences in lamb and ewe weight gains likely are caused by differences in the quality rather than quantity of the diet selected under rotational vs. continuous grazing.

During spring 1977, sheep on the rotationally grazed pasture ate substantially more subclover and forbs, both high quality items, than did sheep on the continuously grazed pasture. In addition, soft chess contributed more to the late spring and less to the early summer diet of rotationally grazing animals than to that of sheep under continuous grazing. Even though the greater quantity of forage on offer to ewes and lambs under rotational grazing did not affect total herbage consumption, it apparently allowed rotation animals to exercise more selectivity, thus aiding them in choosing a high quality diet from the larger bulk of forage available on rotational compared to continuously grazed pasture.

By the start of the summer dry-feed period of 1977, selective grazing by livestock had removed most of the clover and other forbs from both pastures. Higher consumption of soft chess during the late spring resulted in fewer seedheads, a preferred summer feed, being available to sheep on the rotational than on the continuously grazed pasture. Summer diets of sheep reflected differences in the amount of each plant species on offer. Approximately 97 percent of the forage consumed on both pastures was rattail fescue and soft chess. Forbs contributed little to summer diets of rotationally grazing sheep. The summer diet of sheep on the continuously grazed pasture contained approximately 3 percent forbs.

The major difference in summer sheep diets attributable to grazing management was a higher proportion of soft chess, principally seedheads, in the diets of sheep on the continuously grazed pasture.

Table 1. Continuous (C) Vs. Rotational (R) Grazing

Factor	Season 1977			
	Midspring		Late Spring	
	C	R	C	R
Ewe Liveweight Change (lbs/day)	-0.26	-0.20	-0.18	-0.04 [†]
Lamb Liveweight Change (lbs/day)	0.20	0.37 [†]	0.20	0.15 [†]
Herbage on Offer (lbs/acre)	1780	2170 [†]	1650	2500 [*]
Herbage Consumption (lbs/lb body wt/day)	.28	.27	.39	.37
	Season 1978			
	Midspring		Late Spring	
	C	R	C	R
Ewe Liveweight Change (lbs/day)	0.57	0.51	-0.18	-0.09
Lamb Liveweight Change (lbs/day)	0.93	0.86	0.37	0.42
Herbage on Offer (lbs/acre)	1420	2280 [*]	2630	3230 [*]
Herbage Consumption (lbs/lb body wt/day)	.27	.31	.32	.30
	Summer Season			
	1977		1978	
	C	R	C	R
Ewe Liveweight Change (lbs/day)	-0.33	-0.66 [*]	-0.22	-0.22
Herbage on Offer (lbs/acre)	1300	1280	2670	1940 [*]
Herbage Consumption (lbs/lb body wt/day)	.23	.23	.32	.30

*,[†] Rotational differs from continuous grazing, P<.05 and P<.10, respectively).

The spring of 1978 was relatively cool and moist. This favored the growth of cool season forbs such as subclover. Subclover was the highest single element in both forage on offer and in sheep diets during midspring 1978. Diets of animals on both rotational and continuously grazed pastures were approximately 11 percent rattail fescue, 12 percent soft chess, and 75 percent subclover in midspring. By late spring, however, the rotation pasture had more than twice as much subclover on offer than was present on the continuously grazed pasture. Sheep diets during this period were also twice as high in subclover under rotational as under continuous grazing. As in 1977, summer diets were predominately rattail fescue and soft chess.

Sheep in the rotationally grazed pasture tended to eat more rattail fescue and less soft chess during the summer than sheep on the continuously grazed pasture.

MANAGEMENT IMPLICATIONS

These data suggest that animal performance during the spring green-feed period was largely determined by the amount of subclover in sheep diets under the two treatments examined. Rotational grazing resulted in more subclover on offer to sheep than occurred under continuous grazing. When subclover was plentiful, such as in 1978, little difference in animal performance could be attributed to grazing management. When subclover was scarce, as occurred in 1977, the additional clover on offer under rotational compared to continuous grazing allowed selection of a diet higher in clover, thus increasing liveweight gains of sheep on rotationally grazed, relative to continuously grazed pasture. Subclover and other annual forbs were largely consumed on both pastures by early summer. Diets of ewes and livestock performance during this period reflected the higher contribution of soft chess, the preferred summer feed, to forage on offer under continuous compared to rotational grazing.

The observations suggest that rotational grazing can be effective in increasing forage on offer to livestock and improving animal performance during the green-feed period, when plants are actively growing. During the dry-feed period, however, rotational grazing should be avoided as it tends to suppress dietary selectivity and to reduce animal performance.