A PRELIMINARY TRIAL ON THE SPRING GRAZING OF LUCERNE

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Abstract

In a trial at Wairakei Research Station, the effect of three spring grazing managements on subsequent summer and early autumn hay production of lucerne was assessed relative to hay management over the entire period. Overall the two rotational grazing treatments where the lucerne was grazed at an immature stage of growth (grazed at 12 to 15 cm, and at 25 to 30 cm) reduced subsequent production in two hay cuts by 20% and 18%, respectively. A rapid rotation of 4 days at a stocking rate of 30 hoggets/ha where the stocking rate was in harmony with the lucerne growth had an unexpectedly small effect on subsequent lucerne production.

The intermittent grazing treatments allowed greater weed ingress than the rapid rotational or hayed treatments. Spring production was reduced, compared with hay production, by 58% by the two intermittent grazing treatments and while no permanent harm was done to the lucerne stands these systems cannot be recommended because of the large losses. Where it is necessary to graze the early spring growth of lucerne, the rapid rotational system at a light rate appears to be a suitable method but this should be changed to rotational grazing of mature lucerne as soon as possible, because of the assumed lower production under the former system.

INTRODUCTION

THE grazing management requirements of lucerne have been well investigated with the singular answer that lucerne requires from 4 to 6 weeks' spelling between grazings to maintain optimum production (Iversen, 1967; O'Connor, 1970). There is also general agreement that defoliating lucerne in an immature state lowers its subsequent production (Keoghan, 1967).

In relation to early spring production, Janson (1974) showed that an early start to spring grazing was more detrimental to spring production than a later start. Nevertheless, in a situation where feed is in short supply in early spring, grazing lucerne at an early stage may be necessary.

Set-stocking of lucerne drastically lowers production if it is carried out over a prolonged period (Iversen, 1967; Peart, 1968). There are, however, few data available on the effects of set-stocking lucerne for part of the year such as during the spring lambing period. Janson (1974) investigated this point in Canterbury and found that while less feed was produced under set-stocking than rotational grazing, lamb liveweight increases were similar (at a stocking rate of 30 ewes and lambs/ha). However, 4 weeks after the trial finished, there was 30% more regrowth on the rotationally grazed treatments, but later cuts showed that the difference had disappeared.

In 1972 a preliminary investigation into the spring grazing of lucerne was conducted at Wairakei Research Station to assess the effect of a rapid rotation on a 4-day cycle with rotational grazing of lucerne at 12 to 15 cm and 25 to 30 cm height, as compared with cutting at the hay stage.

METHOD

A trial area of twenty-four, 0.1 ha paddocks of 7-year-old lucerne comprising four cultivars (Wairau, Hunter River, Glutinosa, Rhizoma), with previous hay and grazing histories was re-randomized to give three grazing managements with 8 replicates.

(1) Lucerne grazed when it reached 12 to 15 cm with 119 hoggets/ha.

(2) Lucerne grazed when it reached 25 to 30 cm with 119 hoggets/ha.

(3) Lucerne grazed on a rapid rotation of 4 days with 30 hoggets/ha, begun when the lucerne was 12 to 1.5 cm high.

One standard cage (3.4 m X 1.5 m) was placed in a permanent position in each paddock to measure hay production.

Treatments began on September 22, 1972, when the lucerne was 12 to 15 cm high and continued until December 19, the date of the second hay cut. During the final grazing, the stocking rate on some paddocks was doubled to complete the grazing on the prescribed date. After this, all stock were removed and two hay cuts were taken, on February 9 and March 28, 1973, to measure the difference between paddock production and that in the associated cage.

At the beginning of the trial, the rapid rotation treatment had 20 hoggets/ha but, as they could not control the growth, the sheep numbers were raised to 30 hoggets/ha on October 6.

RESULTS

Spring production and details of the grazing management adopted during this period in the rotationally grazed treatments are given in Table 1. It shows that repeated grazings at 12 to 15 cm seduced production by 65% and at 25 to 30 cm it was reduced by 52% when compared with the hay produced over the same period. Production was not measured on the rapid rotational system and it is assumed that it was of a similar order to the other grazing treatments. No allowance was made for growth during the grazing period as this was thought to be minimal because sheep would interrupt the lucerne growth by eating off the growing points.

TABLE 1: SPRING MANAGEMENT AND LUCERNE PRODUCTION (kg/ha DM)
SEPTEMBER 22 TO DECEMBER 19

Treatment	*Date Grazing Commenced, including Individual Paddock Variability*	*Average No. Days Grazed*	*Average Production at Start of* Grazing	*Total*
Graze	25 Sep. ± 2 days	9	520	
12-15 cm	20 Oct. ± 10 days	10	480	
	21 Nov. ± 7 days	8	500	
	12 Dec. ± 5 days	4	650	2150
Graze	1 Oct. ± 2 days	11	920	
25-30 cm	6 Nov. ± 3 days	10	1050	
	9 Dec. ± 5 days	6	940	2910
Hay cut	31 Oct.	—	3250	
	19 Dec.	—	2850	6100

TABLE 2: TOTAL SUBSEQUENT LUCERNE PRODUCTION
(DECEMBER 19 TO MARCH 28, 1973)

Previous Treatment	*Yield (kg/ha DM)*
Grazed 12-15 cm	4360 b
Grazed 25-30 cm	4430 b
Rapid rotation	5420 a
Hayed	5430 a
c v	18%

Duncan's Multiple Range Test: means without a common letter differ significantly ($P<0.05$).

TABLE 3: WEED PRESENCE IN LUCERNE ON FEBRUARY 9, 1973
(counts/30 m^2)

	Canadian Fleabane (Erigeron canadensis)	*Scotch Thistle (Cirsium vulgare)*
Grazed 12-15 cm	**46** aA	**17** aA
Grazed 25-30 cm	**41** aA	8 bA
Rapid rotation	13 bA	**6** bA
C V	**102%**	**86%**

Duncan's Multiple Range Test: means without a common letter differ significantly (lower case, $P<0.05$; capitals, $P<0.01$).

The effects of the different spring grazing management systems on subsequent lucerne yields are shown in Table 2. The reduction in growth was 20% in the paddocks grazed at 12 to 15 cm and 18% in the paddocks grazed at 25 to 30 cm. The rapid rotational system resulted in no reduction of subsequent growth.

At the production cut of February 9, the number of weeds was assessed and Table 3 shows that the intermittent grazing allowed many more weeds to grow than on the rapid rotation treatments. There were virtually no weeds in the cages cut for hay.

DISCUSSION

The negligible effect on subsequent production caused by the rapid rotational system in early spring was unexpected as it is a system which approaches the practice of set-stocking which has been shown to have drastic detrimental effects on lucerne production (Iversen, 1967; Peart 1968). The effect is probably attributable to the stocking rate chosen being in equilibrium with the growth of the lucerne during the spring period. Under the rapid rotational system, the lucerne was maintained at a height of 10 to 20 cm and the success of this treatment appears to be that the lucerne was not grazed down to ground level to give continued removal of the emerging basal shoots. It is not known whether such an effect would occur on a farm scale and this point needs further investigation.

The grazing of lucerne at an immature stage during the spring gave similar depressions to production to those found in cutting trials (Keoghan, 1967). However, the subsequent cuts at the hay stage of growth showed that the depression of spring growth was partially compensated by good summer management. Janson (1974) also found that depressions in growth from mismanage-

ment in the spring could be overcome by good management in the summer and autumn.

The considerable ingress of weeds where the lucerne was grazed bare at an immature stage indicates the delicate balance which exists between lucerne and weeds and points to the need for good management to maintain a pure stand. It is of interest that there were considerably fewer weeds where the ground cover was not removed under the lenient rapid rotation treatment.

The hay cuts in the summer and autumn indicate that no serious damage was done to the lucerne by adopting a shorter rotation over the 12-week period in spring. The most drastic effect that occurred was the large drop in spring production. Janson (1974) has indicated that rotational grazing of ewes and lambs on mature lucerne has been successful in mid-Canterbury and from the point of view of maximizing lucerne production in spring this system should be the recommended one. Nevertheless, in situations where limited feed is available in early spring, a rapid rotational system at a stocking rate in equilibrium with the growth rate of lucerne does little harm and is less debilitating to subsequent lucerne growth than rotationally grazing short, freshly grown lucerne to ground level. Where such a method has to be applied in the early spring, it is probably sound policy to return to a longer rotational grazing system, where mature lucerne is grazed, as quickly as possible.

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