
GRAZING MANAGEMENT OF PERENNIAL RYEGRASS/ WHITE CLOVER PASTURE IN-LATE SPRING

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Abstract

The patterns of herbage accumulation and the tiller dynamics of a "Grasslands Nui" perennial ryegrass dominant pasture were compared under two grazing intensity treatments in late spring. Rank stemmy herbage developed with lax grazing whereas dense leafy pasture developed with close grazing. Dead herbage and uneaten stems in rank pastures shaded photosynthetic tissue. Leafy swards had a higher herbage accumulation rate and a higher tiller density than stemmy swards. Methods of achieving leafy pasture on farms by combinations of hard grazing, forage conservation and mechanical topping are discussed briefly.

INTRODUCTION

Almost invariably seed stalk and roughage develop in ryegrass dominant pasture during the late spring because livestock are unable to consume all spring growth. Saxby (1948) and others since (Hall 1973; Matthews 1979), have commented that an abundance of seed heads, combined with rank leaf growth and dry weather during the summer and autumn, was usually associated with relatively low rates of leaf production. In contrast, if pastures were prevented from flowering and setting seed, then the period of summer and autumn growth was apparently prolonged. An experiment was conducted to critically examine these observations.

EXPERIMENTAL

A grazing experiment was conducted during 1976-7 on a *Lolium perenne* "Grasslands Nui" perennial ryegrass/*Trifolium repens* "Grasslands Huia" white clover pasture at Massey University. Two late spring/early summer (October to December) grazing intensities were compared in a randomised block design with four replicates. The grazing intensities, defined in terms of residual leaf area index (LAI), were HARD (residual LAI = 0.0-0.2) and LAX (residual LAI = 0.6-1.0). Paddocks were grazed with sheep for 2-3 days when the pasture had re-grown sufficiently to intercept 95% of noon sunlight. During late summer and autumn both treatments were under a common management to test residual effects of the previous grazing management. Grazing was lax in late summer and hard in autumn. Herbage mass and accumulation (production) were measured (Hodgson 1979, Korte & Sheath 1979), and tiller dynamics followed. Live ryegrass tillers were tagged with coloured plastic rings in fixed frames placed in plots after each grazing (four

10.2 cm diameter frames per plot), and re-examined before the subsequent grazing.

RESULTS

REPRODUCTIVE DEVELOPMENT OF THE SWARD

At the time of the first grazing in October stem elongation had begun in ryegrass. With hard grazing, sheep removed leaf and stemmy growth, the latter resulting in little further reproductive development in ryegrass. Subsequent hard grazings also removed stemmy herbage so that in January and February there was little stem in previously hard grazed swards (Table 1). Also, hard grazed swards became more leafy, as indicated by the leaf area index, than lax grazed swards. In contrast, with lax grazing sheep selected leaves and avoided both stemmy and dead herbage. As a result considerable quantities of ryegrass stem and dead herbage accumulated in lax grazed swards (Table 1).

TABLE 1: PASTURE COMPOSITION AT 95% LIGHT INTERCEPTION AFTER LATE SPRING/EARLY SUMMER HARD AND LAX GRAZING TREATMENTS.

	Lax	Hard
Date	7 Feb	25 Feb
Herbage mass (kg DM/ ha):		
Ryegrass stem	783 (18)†	249 (7)*
Dead herbage	1527 (35)	300 (9)*
Total Leaf Area Index (LAI):	2.8	4.7*

† Percent of total herbage mass

* Hard significantly different from Lax ($P < 0.05$)

HERBAGE ACCUMULATION

During the late spring/early summer period total herbage accumulation was similar in both hard and lax grazed treatments (Table 2). However, considerably more green herbage and significantly less dead herbage accumulated in the hard grazed treatment. In autumn, when both treatments were grazed similarly, 69% more green herbage and 16% more total herbage accumulated where grazing had been hard rather than lax the previous spring/summer. Of the green herbage accumulating over the whole experiment 64% was ryegrass, with white clover (25%) and *Poa annua* (10%) contributing most of the remainder.

TABLE 2: NET HERBAGE ACCUMULATION DURING THE EXPERIMENT
(kg DM/ha)

	25 Oct — 30 Jan		30 Jan — 1 June	
	Lax	Hard	Lax	Hard
Green Herbage	5721	6592*	1457	2463*
Dead Herbage	992	-240*	-421	242
Total	6713	6352	1036	2705

* Hard significantly different from Lax ($P < 0.05$)

TILLER DENSITY

Ryegrass tiller density was markedly affected by the grazing treatments (Figure 1). Compared with pastures lax grazed during the late spring, pastures hard-grazed had a considerably greater vegetative tiller density during summer. This difference in density was still apparent in June when tiller cores (Mitchell & Glenday, 1958) were taken, despite both treatments having been grazed similarly for several months (Hard 8660, Lax 6720 tillers/m²).

Reproductive tiller density was greatest at the first grazing and declined thereafter. With lax grazing the decline was gradual as culms died, whereas most reproductive tillers died within a few days of hard grazing, the growing point having been removed. Secondary reproductive tillers appeared after the first grazing but these were smaller and less numerous than reproductive tillers present at the start of the experiment.

DISCUSSION

The hard and lax grazing treatments, designed to remove all leaf and some leaf respectively, had their main influence through affecting ryegrass flowering. Close grazing resulted in leafy pasture because apical meristems were removed from flowering tillers, largely preventing stem development and dead herbage accumulation. By contrast, stem and seedhead development was little influenced by lax grazing, resulting in rank pastures dominated by uneaten stem and dead herbage (Table 1).

The higher leaf area index at 95% light interception in hard grazed pasture (Table 1) indicated that dead herbage and ryegrass stems in rank pasture intercepted considerable amounts of light, shading photosynthetic tissue. The greater amount of base shading, which can reduce tillering (Davies 1977), partly explains the lower vegetative tiller density in lax grazed pasture (Figure 1). Tiller density may have also been reduced in rank pasture by uneaten and virtually leafless (but green) stems utilising assimilate which otherwise would have been available for tillering.

A further effect of lax late spring grazing is to reduce the nutritive value of pasture in summer. Rattray (1978) found that an increased proportion of dead herbage in the sward reduced the *in vitro* digestibility. Also animal performance on rank stemmy pastures has been shown to the poorer than on

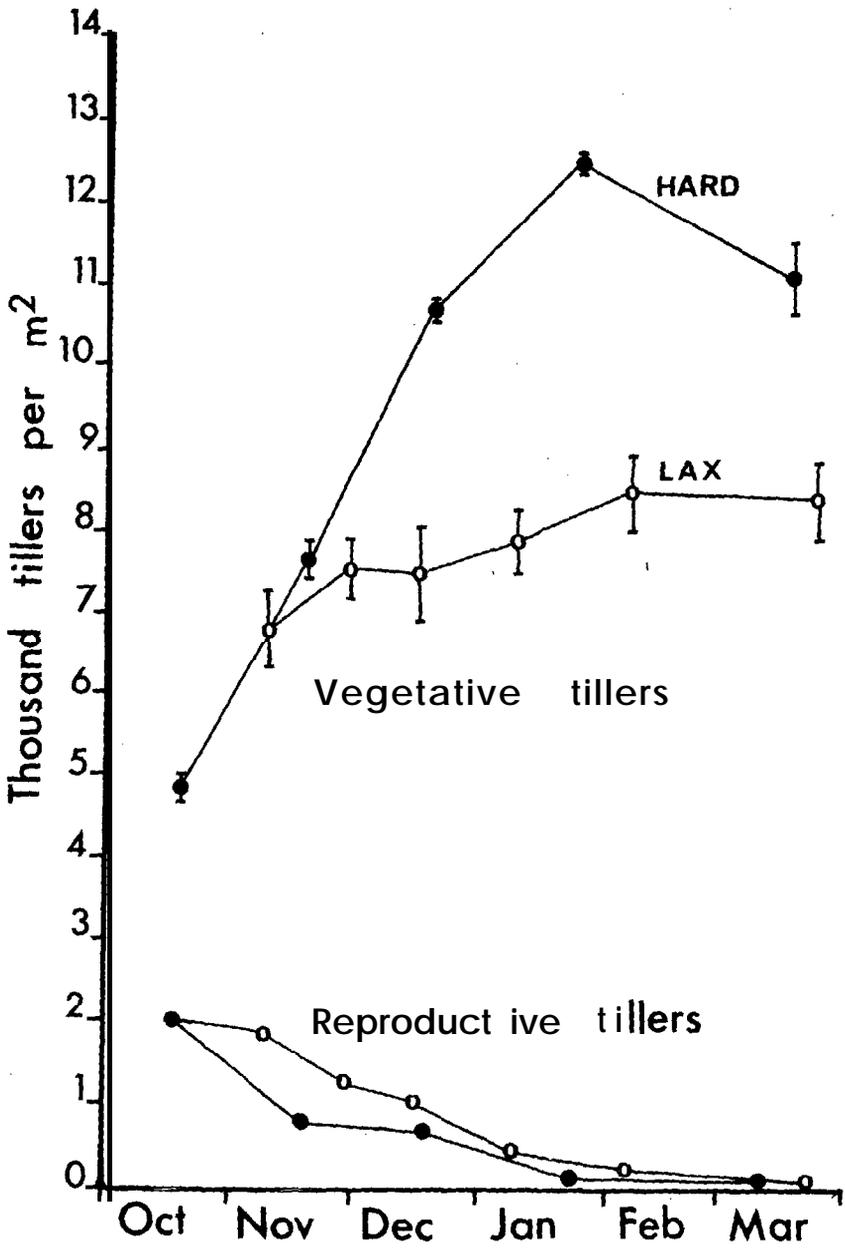


FIG. 1: Ryegrass tiller density at each grazing measured in fixed frames. Reproductive and vegetative tillers were respectively tillers with and without visible stem elongation.

leafy pastures. Lewis & Cullen (1973) for example found that lambs gained significantly more weight on dense leafy pasture than on coarse, stalky, open swards lacking in leaf.

This experiment showed that controlling late spring growth by close grazing increased **herbage** accumulation in the subsequent dry summer and autumn, without reducing late spring accumulation (Table 2). It may not be possible or sensible to try and close graze the whole farm in late spring, even on highly stocked dairy farms, cows are unable to consume all late spring/early summer growth. However, spring growth can be controlled by a combination of close grazing, conservation and topping to achieve dense leafy nutritious pasture for summer.

Control of spring growth basically aims to prevent **ryegrass** flowering, by removing the apical meristem from reproductive tillers. One close grazing of each paddock, provided it is at the right time, will kill the majority of flowering tillers. The optimum timing of this close grazing depends on season and paddock, but is normally during October or early November.

As only part of the farm can be closely grazed during this critical time conservation is important. Closing paddocks for conservation forces livestock to graze more closely on the rest of the farm. Also regrowth from hay and silage paddocks is normally leafy with few reproductive tillers.

Mechanical topping during October can be used to kill flowering tillers if grazing is not close enough. However, topping in December or January to remove rank **stemmy** growth indicates that insufficient area was closed for conservation early in the season.

In conclusion, failure to control late spring growth in **ryegrass** dominant pasture reduces pasture quality and production subsequently. As discussed, spring growth can be controlled by a combination of close grazing, conservation and topping. It is important to examine the reproductive tillers in the sward to determine when these operations can be most effective.

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