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STUDIES OF LATE SPRING GRAZING
MANAGEMENT IN PERENNIAL RYEGRASS
DOMINANT PASTURE

A thesis presented in partial
fulfilment of the requirements for the
degree of PhD in Agronomy at
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ABSTRACT

Two grazing experiments and a mowing experiment were conducted to obtain information on the patterns of herbage accumulation and the tiller dynamics of "Grasslands Nui" perennial ryegrass (*Lolium perenne*) dominant pasture under a range of defoliation regimes during late spring/early summer. Defoliation intensity and defoliation interval were defined in terms of plant physiological criteria, that is, light interception and stage of reproductive growth.

The effect of four late spring/early summer grazing intensity treatments, based on residual leaf area index (LAI), and two grazing interval treatments, based on light interception, were compared in the first grazing experiment. Net herbage accumulation was greatest when grazing was hard (LAI = 0.1-0.6) and least when grazing was lax (LAI = 1.5-2.5) in late spring (16.5 and 13.6 t DM/ha respectively). Grazing at 95% light interception reduced green herbage accumulation compared with grazing two weeks after 95% light interception (14.0 and 15.8 t DM/ha respectively). With lax grazing stemmy rank herbage developed, whereas with hard grazing dense leafy pasture with a higher ryegrass tiller density developed. The grazing interval treatments did not significantly affect ryegrass tiller density.

The second grazing experiment compared the effects of the timing and intensity of spring grazings on herbage accumulation and ryegrass tiller dynamics. Interrupting reproductive growth of ryegrass at the head emergence stage, compared with at the start of culm elongation, did not increase herbage accumulation significantly although it resulted in a higher proportion of stem and a lower proportion of lamina accumulating. As in the first experiment, hard grazing in late spring increased herbage accumulation compared with lax grazing. Hard grazing appeared to increase herbage accumulation by reducing herbage death and decay, not by increasing herbage growth.

Ryegrass tiller density was greater in hard grazed swards than lax grazed swards in summer. This difference was mainly due to a higher tiller appearance rate in hard grazed swards. The difference was still apparent in winter although all treatments were grazed similarly during late summer and autumn. Herbage accumulation was greater in

autumn where grazing had been hard the previous spring/summer, partly due to the higher tiller density.

Interrupting reproductive growth at the head emergence stage markedly reduced the density of vegetative tillers compared to interrupting reproductive growth at the start of culm elongation. Due to rapid tillering after interruption of reproductive growth this difference quickly disappeared.

The effects of the time of cutting to control reproductive development and the subsequent cutting interval on herbage accumulation and tiller dynamics of ryegrass pasture were examined in the mowing experiment. Herbage accumulation was reduced by more frequent mowing and where reproductive growth was prevented. Tillers present at the start of each rest period contributed most herbage because new tillers were relatively small. After the first mowing, new tillers were generally of similar weight to older tillers at the end of rest periods. It appeared that during summer, under conditions of adequate moisture and nutrients, the tiller dynamics of perennial ryegrass swards were little influenced by mowing frequency.

It was concluded that the objective for late spring grazing management should be to encourage leafy vegetative pastures and to prevent rank stemmy pasture developing. Dead culms in rank pasture reduced the digestibility of herbage and shaded photosynthetic tissue. Leafy swards had higher accumulation rates 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.

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