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**A COMPARATIVE STUDY OF DEFOLIATION IN
HOLCUS LANATUS AND *LOLIUM PERENNE*
PASTURES GRAZED BY SHEEP**

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ABSTRACT

Objectives of this study were (i) to extend limited information on the assessment of relative defoliation of grass and legume components in mixed ryegrass/white clover and yorkshire fog/white clover pastures, (ii) to test whether the balance of preference between ryegrass and clover differed from that between yorkshire fog and clover, and (iii) to compare the behaviour and the potential reaction of the two grass species under grazing conditions.

Observations were made on plots of ryegrass/white clover and yorkshire fog/white clover grazed by sheep at high (12% live weight) and medium (6% live weight) herbage allowance. There were four replicates of each treatment, which were grazed in rotation over a four week period. Detailed sward measurements were made before and after grazing. Measurement of herbage mass, sward height, sward components, pasture structure and defoliation are reported.

Sward surface heights were very similar for the two swards both before and after grazing. The sown grasses formed the dominant proportions in both swards, while white clover proportions were similar. The proportion of dead material was higher for yorkshire fog/white clover pasture than ryegrass/white clover pasture both before and after grazing.

Tiller populations were higher for yorkshire fog than ryegrass (10355 vs. 6505 \pm 919 m²). Mean stem length was greater for yorkshire fog than ryegrass (62.3 vs. 35.0 \pm 2.8 mm), and the distribution of stem length showed a stronger positive skew. Yorkshire fog had a shorter leaf length than ryegrass. The population density of white clover nodes was similar in the two swards. White clover nodes in the two swards were quite similar in leaf weight, number and area both before and after grazing.

The defoliated heights for clover in ryegrass/white clover and yorkshire fog/white clover swards (3 cm and 5 cm respectively) were similar at both low and high grazing allowance. The proportion of grass in the grazed stratum was higher for ryegrass than for yorkshire fog pasture before grazing, but the proportion of white clover was lower.

Three parameters estimated from pre- and post-grazing measurements on individual grass tillers and clover nodes were used in the interpretation of pasture defoliation: namely defoliation frequency, defoliation severity and defoliation pressure (frequency \times severity). In ryegrass/white clover pastures, the defoliation of leaf was significantly higher for ryegrass than white clover for all three parameters. In the comparison within yorkshire fog/white clover pastures, the defoliation frequency was not different between grass and clover, but the severity of defoliation and defoliation pressure were significantly higher for grass than clover. Ryegrass stem was grazed more severely than white clover petiole in ryegrass/white clover pastures. Defoliation parameters for yorkshire fog stems and white clover petioles in yorkshire fog/white clover pastures showed smaller and not significant differences. There was a highly significant effect

of allowance on leaf defoliation in ryegrass/white clover pastures, but the effect was less marked in yorkshire fog/white clover pastures.

More ryegrass leaf was grazed per day than yorkshire fog leaf. The proportion of leaf removed and the pressure of defoliation were higher in ryegrass than in fog. When white clovers were compared between the two swards, there were no differences in any of the three defoliation parameters. Leaf defoliation effects were greater at medium allowance than at high allowance. For all parameters, allowance effects were greater for grass than clover.

The fact that grasses were defoliated more severely than the companion clovers in both swards reflected the effects of vertical distribution of sward components. However, the much lower defoliated height for clovers in both swards strongly suggested that sheep actively selected clover in the mixed swards despite the fact that clover was distributed much lower in the sward canopies. The greater defoliation of ryegrass than yorkshire fog leaf was attributed to greater preference of the animal for ryegrass than yorkshire fog in comparison with the companion clover.

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CHAPTER 1. INTRODUCTION

Perennial ryegrass (*Lolium perenne*) is a dominant grass species in New Zealand pastures. However, much effort has been made during the past decade to find viable alternatives to ryegrass pastures which could have a greater pasture/animal production in seasons and environments where ryegrass productivity is limited. Yorkshire fog (*Holcus lanatus*) is one of such alternative candidates.

During recent years, the importance of yorkshire fog in association with other species, especially in wet or peaty areas and in hill pastures, has been recognized. In some of the high-producing pastures in New Zealand, yorkshire fog persists as a minor component. Researches have shown that there is clearly a need for more information about the value of yorkshire fog for animal performance, and animal reaction/preference when grazing on yorkshire fog. This could lead to a better understanding of grazing management in mixed pastures containing this species.

In the autumn of 1992, an experiment was set up to provide a comparison of sheep grazing grass/clover swards based on either yorkshire fog (cv 'Massey Basyn') or perennial ryegrass (cv 'Grasslands Nui'), each grown with white clover (cv 'Grasslands Tahora') at two grazing pressures.

The experiment was designed to compare and contrast the reactions of grazing animals to yorkshire fog/white clover and perennial ryegrass/white clover pastures especially in winter, to extend the limited information in the assessment of relative frequency and severity of defoliation of grass and legume components in each treatment, and to test whether the balance of preference between yorkshire fog and clover differed from that between ryegrass and clover.