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A STUDY OF THE ACCEPTABILITY OF *HOLCUS* SPP. TO PERENDALE

SHEEP

A Thesis presented in partial fulfilment of the requirements
for the degree of

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ABSTRACT

Various characters are reputed to reduce the acceptability of Yorkshire fog grass (*Holcus lanatus*) to sheep. The relative importance of these characters in determining the acceptability of Yorkshire fog to sheep was investigated in summer, autumn, and early-winter of 1978, using standardised regression, and based upon a phenotypically diverse collection of spaced plants from fifty-three seed populations. A clump defoliation score was used to assess sheep preference.

Cluster analysis of ratios of the standardised partial regression coefficients from individual genotype populations generally confirmed the results obtained from the standardised partial regression coefficient ratios of pooled genotype populations.

Sheep rejected plants exhibiting a high proportion of inflorescences, dead leaf and sheath material and crown rust infection. The presence of inflorescences and crown rust were respectively 1.5 and 0.86 times as important as clump greenness over all genotype populations, in the summer period. Leaf pubescence was only 0.13 times as important as clump greenness and was therefore considered relatively unimportant in determining sheep preference. Leaf tensile strength, leaf width, clump height and diameter, clump erectness, leaf flavanol level and soluble sugar level, were also considered unimportant in this study, and ranged from 0.57 to 0.019 times as important as clump greenness in determining sheep preference. However only 20-25% of the variation in sheep preference was explained by the characters examined in the three seasons of this study. The unexplained variation may have been due to a high level of amongst sheep preference variance or to unassessed plant characters.

The phenotypic variation of each character was partitioned using a split-plot-in-time model. Broad-sense heritability estimates for all characters examined were low and ranged from 34% to 0.4%. It was suggested from these results that the acceptability of Yorkshire fog grass to sheep, by reduction of inflorescences and crown rust infection, and by removal of excessive dead leaf and sheath material, was largely under the control of grazing management (i.e. an aspect of the environment). However, some progress might be achieved by selection and breeding for genotypes with reduced levels of inflorescences ($\hat{h}^2 = 34\%$) and crown rust infection ($\hat{h}^2 = 29\%$).

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