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**COMPARISON OF TWO METHODS OF  
HERBAGE PRODUCTION MEASUREMENT IN  
CONTINUOUSLY GRAZED HILL PASTURES**

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

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## ABSTRACT

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Herbage production of continuously grazed hill country pastures has traditionally been measured using grazing exclusion cages and a trim technique. Herbage production values obtained via this system differ from those of the surrounding grazed sward due to differences in sward structure. Herbage production of four farmlets with differing fertiliser treatments was measured by two methods over a full year. The first method involved a computer model which calculated herbage production from dry matter intake and cover change. Secondly, herbage production was measured via frame cuts, and the results of the two methods compared.

The model measured less herbage production than the frames on an annual basis in all four fertiliser treatments (0.77 of frame average for the four fertiliser treatments). The ratio of model to frame herbage production varied widely during the year, with maximum ratios of model to frame herbage production of 1.6 occurring in autumn, and the minimum of -0.02 in winter.

More herbage was produced under the frames in spring than in the grazed sward as a result of increased expression of reproductive tillers under the frames than in the grazed sward. Frames appear to underestimate herbage production in dry conditions as the trimming off of herbage at the placement of frames leads to lower levels of plant available water when compared to the surrounding sward.

The low ratios are a result of the large amounts of dead material which build up in grazed hill pastures over summer and the rapid breakdown of this material when conditions are right, in this case in early-late winter. The results suggest that there are large differences in the annual, and seasonal pattern of herbage production between that measured off grazed swards and that measured via frames. This suggests that anyone wishing to calculate expected pasture supply using frame cut information must modify frame cut values to determine production of a continuously grazed sward.

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## LIST OF ABBREVIATIONS

%	percentage
°	degree
°C	degree Celsius
CH <sub>2</sub> O	carbohydrate
cm	centimetre
d	day
DM	dry matter
DMD	dry matter digestibility
<i>et al</i>	and others
ha	hectare
HFRO	hill farming research organisation
ie.	that is to say
kg	kilogram
LAI	leaf area index
M/D	MJME/kg/DM
ME	metabolisable energy
MJ	megajoule
mm	millimetre
m <sup>2</sup>	square meter
N	nitrogen
P	phosphate
<i>pers comm</i>	personal communication
<i>pers obs</i>	personal observation
SSH	sward surface height
su	stock unit