EFFECTS OF FEEDING SILAGE AND EXTENDING LACTATION ON THE PASTORAL DAIRY SYSTEM

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ABSTRACT

It is a common practice in the New Zealand seasonal dairying system to dry-off the herd at an earlier date in order to prevent excessive loss of body condition and average pasture cover. Thus, short lactation length is one of the main reasons for the low milk yield per cow in New Zealand. An experiment was carried out in April and May 1995 (54 days) at the Dairy Cattle Research Unit (DCRU), Massey University in order to measure the effects of extending the lactation, and feeding silage on the dairy farm system. On the 4th April, 54 of the lower yielding cows of the herd (118 cows) were dried-off and divided into two equal herds (D or control system). The remaining 64 cows were also divided into two equal herds, and milked for another 54 days (M system). Each of the four herds was grazed on a self-contained farmlet, at 2.9 cows/ha stocking rate. D herds received only grazed pasture (16 kg dry matter (DM)/cow/day allowance), while M herds received pasture (30 kg DM/cow/day allowance) plus silage (5.5 kg DM/cow/day). All of the replicated farmlets were feed budgeted to common targets of 2,000 Kg DM/ha pasture cover and condition score 5.0 at 29th May. At the end of the experiment the M system had produced 57.7 kg milksolids (MS, fat+protein) per cow, but had lower ($P<0.01$) average pasture cover (by 584 kg DM/ha) and body condition scores (by 0.33 units/cow) than the D system. The target conditions were achieved by the D system, but not by the M system (deficits of 400 kg DM/ha pasture cover and 0.38 units CS/cow). When the feed required to overcome the deficits (when compared with the D system) in pasture cover and condition score of the M system was added to the silage fed, and these were all expressed in terms of their "pasture equivalences", a *total marginal response* to the silage feeding and extra days in milk of 116 g MS/kg equivalent pasture DM was calculated. Findings of this and previous farm system studies show that milk production response to late lactation (autumn) supplementary feeding is higher than was commonly believed, provided that it is associated with extra days in milk. Nevertheless, feed planning and management must be specially vigilant to ensure that the extended lactation does not cause reduced body condition score and pasture cover at the start of the next season.

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LIST OF ABBREVIATIONS

A	Ayrshire
AHDMI	apparent herbage dry matter intake (kg DM/cow/day)
APC	average pasture cover (kg or t DM/ha)
BI	Breeding index
B_i	regression coefficient
BR	rate of biting (bites/min)
cm	centimetres
CP	Crude protein (%)
CS	cow body condition score (scale 1 to 10 units/cow)
CSΔ	condition score change
°C	Celsius degrees
D	Dried-off treatment
DG	Deferred grazing
DM	dry matter
DMD	digestibility of DM (%)
DOM	digestible organic matter (%)
DOMD	dry organic matter digestibility (%)
Eq.	Equation
FCE	feed conversion efficiency
g	grams
G	grazing activity
h	hours
ha	hectares
HDMA	herbage dry matter allowance (kg DM/cow/day)
HDMD	herbage dry matter disappearance (kg DM/ha)
HF	Holstein-Friesian
HM	herbage mass (kg DM/ha)
IVDDM	*in vitro* digestibility of dry matter (%)
J	Jersey
kg	kilograms

k_g	efficiency of utilization of ME for LW gain (%)
k_l	efficiency of utilization of ME for milk production (%)
k_m	efficiency of utilization of ME for maintenance (%)
l	litres
LC	Late control
LW	live weight (kg/cow)
LWΔ	live weight change
$LW^{0.75}$	Metabolic size (kg/cow)
m	metres
M	Milked (plus silage feeding) treatment
M/D	Metabolisable energy content of the dry matter (MJ ME/kg DM)
ME	Metabolisable energy (MJ)
MF	milk fat
min	minutes
MJ	Megajoules
mm	milimetres
m^2	square metres
MP	milk protein
MS	milk solids (milk fat plus milk protein)
M-S	M treatment when silage was given
M-U	M treatment when silage was not given
n	number of observations
N	Nitrogen
NE	Net energy (MJ)
NH_3	ammonia
ns	statistically non-significant
O	other (no feeding related) activities
OM	organic matter
P	Phosphorus
pH	Potential of Hydrogen
PGHM	pre-grazing herbage mass (kg DM/ha)
PMR	Plate meter readings

R	ruminating activity
R^2	coefficient of determination
RHM	residual or post-grazing herbage mass (kg or t DM/ha)
S	silage eating activity
s.d.	standard deviation
SD	stocking density (cows/ha)
s.e.	standard error of mean
sig	statistical significance
SR	stocking rate (cows/ha)
SSFR	Spring-summer fast rotation
t	test of Tukey
t	tonne
TADMI	total apparent dry matter intake (kg DM/cow/day)
TAMEI	total apparent metabolisable energy intake (MJ ME/cow/day)
vs	versus