The Effect of Pre-Grazing Herbage Mass on Milk Production and of Dairy Cows in Mid-Lactation

Mary McEvoy
Teagasc, Ireland

M. O'Donovan
Teagasc, Ireland

Tommy M. Boland
University College Dublin, Ireland

Luc Delaby
INRA, France

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The effect of pre-grazing herbage mass on milk production and of dairy cows in mid-lactation

M .McEvoy[1,2], M .O Donovan[1], T .M .Boland[2] and L .Delaby[3]
[1] Dairy Production Research Centre ,Teagasc ,Moorepark ,Fermoy ,Co .Cork ,Ireland .[2] School of Agriculture ,Food Science and Veterinary Medicine ,UCD ,Belfield ,Dublin 4 ,Ireland .[3] INRA ,UMR Production du Lait ,35590 ,St Gilles ,France . E-mail : mary .mcevoy@teagasc .ie

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Introduction Grazed grass is the cheapest feed available .As feed costs continue to rise ,increasing the proportion of grass in the diet of the dairy cows is now a major objective in grazing dairy systems .A number of sward factors including herbage mass have been shown to influence the rate of herbage intake and milk production in grazing animals .Stakelum (1986) reported increased intake as herbage mass increased .In contrast ,Hoogendoorn (1992) reported the rate of intake is more closely related to green leaf mass than sward height ,resulting in increased milk production when cows grazed low pre-grazing HM swards .The objective of this experiment was to investigate the effect of a high and low pre-grazing herbage mass (HM) on mid-lactation milk production of spring calving dairy cows offered two levels of daily herbage allowance (DHA) .

Materials and methods Sixty-eight (20 primiparous and 48 multiparous) spring calving Holstein Friesian dairy cows (mean calving date 10 Feb ; s .d .15 .8 days) were blocked on lactation number ,pre-experimental milk yield ,bodyweight and body condition score .The experiment was a randomised block design with a 2 × 2 factorial arrangement of treatments .The treatments were low (L-1600 kg DM/ha) or high (H-2200kg DM/ha) pre-grazing HM and low (16-16kg DM/cow/day) or high DHA (20-20kg DM/cow/day) .The four treatments were L16 ,L20 ,H16 and H20 .Treatments were imposed from 4th April until the end of July .Fresh herbage (>4cm) was allocated daily to each treatment following morning milking .Herbage mass and sward density were measured twice weekly in each grazing area by cutting four strips per grazing area .Pre and post-grazing sward heights were measured daily .Herbage removed (HR) was calculated using the following equation : (Pre-post height) × density × area/ (no .cows × 10000) .

Results Pre-grazing HM was 1595kg (s .e .362 .5) and 2234 kg DM/ha (s .e .460 .9) for the low and high HM treatments ,with pre-heights of 12 .2 and 15 .2cm (s .e .2 .92) ,respectively .Post-grazing heights were 4 .1 (L16) ,4 .8 (L20) ,4 .1 (H16) and 5 .2cm (H20) (s .e 0 .69) .Offering the low DHA significantly increased (P<0 .001) herbage utilisation (1 .00) in comparison to the high DHA treatments (0 .90) .Herbage mass had no effect on sward utilisation .There was no interaction between pre-grazing HM and DHA throughout the experimental period .Milk production results are presented in Table 1 .Herbage mass had no effect on milk yield or composition .Increasing DHA significantly (P<0 .05) increased milk yield .Animals offered the high DHA (783 .7g/kg) had increased (P<0 .001) milk protein yield in comparison to animals offered 16kg DHA (739 .2g/kg) . Animals offered the high DHA also had significantly greater (P<0 .05) milk lactose yields (+52 .6g/kg) in comparison to the low DHA treatments (1002 .7g/kg) .Average bodyweight was 14 .2kg greater (P<0 .001) for animals on the high HM (526 .9kg) than those on the low HM (512 .7kg) .The high HM treatments had greater (P<0 .01) BCS (2 .69) than those offered the low HM treatment (2 .58) ,There was no effect of DHA on BCS during the experimental period .Increasing DHA resulted in a significant increase (P<0 .001) in DMI (+2 .0kg/cow/day) according to the HR method in comparison to animals offered 16kg DHA (15 .8kg/cow/day) .

Table 1 *Effect of pre-grazing herbage mass and daily herbage allowance on milk production of mid-lactation dairy cows .*

HM kg DM/ha	1600kg		2100kg				
DHA kg DM/cow/day	16	20	16	20	SED	HM	DHA
Milk yield (kg/day)	22 .6	23 .6	22 .5	23 .4	0 .67	NS	*
Milk fat content (g/kg)	37 .6	37 .3	38 .5	37 .8	1 .07	NS	NS
Milk protein content (g/kg)	32 .6	33 .1	32 .5	33 .0	0 .65	NS	NS
Milk lactose content (g/kg)	44 .9	45 .2	44 .9	45 .3	0 .37	NS	NS
SCM yield (kg/day)	20 .2	21 .1	20 .4	21 .1	0 .50	NS	*
Bodyweight (kg)	502[a]	523[b]	528[b]	525[b]	5 .7	***	*
BCS change	-0 .27	-0 .15	-0 .20	-0 .20	0 .066	NS	NS
Herbage removed (kg/cow/day)	15 .7	17 .9	15 .8	17 .7	0 .33	NS	***

[a-c] Means within a row with different superscripts differ (P<0 .05) .* ,P<0 .05 .NS=not significant .
HM=Herbage mass ; DHA=daily herbage allowance ;GDMI=grass dry matter intake .

Discussion and conclusions Grazing swards at lower levels of HM (1600kg DM/ha) had no effect on DMI or milk yield per cow , but resulted in increased (+5 .2%) milk solids/ha during the mid-lactation period relative to the high HM (2300kg DM/ha) , which agrees with the findings of Hoogendorn et al .(1992) .At the high level of DHA sward utilisation increased with animals offered the low pre-grazing herbage mass in comparison to the high pre-grazing HM swards during the mid-lactation period .Results indicate that during the mid lactation period grazing low HM swards while offering a high DHA (20kg DM/cow/day) will achieve high sward utilisation and high milk output per hectare .