Pasture Intake and Milksolids Production of Different Strains of Holstein-Friesian Dairy Cows

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Introduction Cows of high yield potential require high daily dry matter intakes (DMI) to meet their increased energy demand. For this reason, DMI may be constrained in a pasture-based system. Daily milksolids yield and DMI of three strains of Holstein-Friesian dairy cows farmed at low and high feeding level during season 2002-2003 are reported.

Materials and methods Three strains (S) of Holstein-Friesian dairy cows [High breeding worth (merit) cows of overseas (OS90) or New Zealand (NZ90) origin and a 1970 NZ Friesian strain (NZ70)] were farmed in a range of feeding systems (self contained farmlets, 15-20 cows each). Feeding level (FL) in the systems ranged from 4.5 to 7.0 t DM/cow per year based on different stocking rates, supplement inputs (maize grain and silage) and the different adult liveweight of the strains (Rossi *et al*., 2004). Daily milksolids production, body condition score (BCS) and DMI were recorded. Intake was estimated using the *n*-alkane and the $\delta^{13}C$ techniques (Dove & Mayes, 1991; Garcia *et al*., 2000). Data collected in spring and autumn from the lowest (pasture only) and highest (pasture only in spring but supplemented in late lactation) FL is presented. Data were analysed as a mixed model (SAS) with S, FL and their interactions as fixed effects and cow as a random effect.

Results The NZ90 and OS90 strains had greater milksolids yield (P<0.001) and intake (P<0.05) than the NZ70 in spring (Table 1). In autumn, both high merit strains received more supplement at the high FL. Milksolids yields were higher (P<0.001) for them and an S*FL interaction for total DMI (P<0.05) was measured. There was a trend for a larger DMI for the NZ90 than for the OS90 in spring (P=0.07) but similar in autumn. In addition, the OS90 lost more BCS in early lactation (during September) (P<0.001). Milksolids yield and DMI were similar between FL in spring, however in autumn, milksolids yields were greater at the high FL (P<0.05). Pasture DMI across all strains was reduced at high FL in autumn (P<0.001) due to supplementation, however total DMI increased for the NZ90 and OS90.

Table 1 Daily milksolids yield and DMI (both in kg/cow) during early and late lactation

S	NZ70		NZ90		OS90					
FL	Low	High	Low	High	Low	High	sed	S	FL	S*FL
FL per cow (t DM /year)	4.5	6.0	5.0	6.5	5.5	7.0				
Early Lactation (spring)										
Milksolids yield	1.41	1.53	1.92	2.01	1.88	1.94	0.13	***	NS	NS
Pasture DMI	13.04	13.77	15.89	14.88	14.47	14.57	0.79	**	NS	NS
BCS change	-0.14	-0.15	-0.28	-0.12	-0.39	-0.38	0.10	***	NS	NS
Late Lactation (autumn)										
Milksolids yield	0.94	0.93	1.19	1.42	1.03	1.21	0.14	***	*	NS
Pasture DMI	12.64	9.78	14.05	11.14	14.42	10.04	0.83	*	***	NS
Supplement DMI	-----	3.00	-----	6.74	-----	6.64	0.80	***	-----	-----
Total DMI	12.64	12.78	14.05	17.88	14.42	16.68	1.06	***	***	*

sed: maximum; S: strain; FL: feed level. *P<0.05; **P<0.01; ***P<0.001.

Conclusions Although both NZ90 and OS90 produced similar milksolids yield in early lactation, the greater pasture intake of the NZ90 provided a higher proportion of their daily requirements, which was associated with a lower loss in BCS. In late lactation, all the strains ate less pasture when supplemented, however, a lower reduction in pasture DMI was observed in the NZ90 strain. These results indicate a greater constraint for the OS90 strain under a New Zealand pasture-based system.

References

Dove H. & R. W. Mayes (1991). The use of the plant wax alkanes as marker substances in studies of the nutrition of herbivores: a review. *AustralianJournal of Agricultural Research*, 42, 913-952.

Garcia S.C., C. W. Holmes, J. Hodgson, & A. Macdonald (2000). The combination of the n-alkanes and ^{13}C techniques to estimate individual dry matter intakes of herbage and maize silage by grazing dairy cows. *Journal of Agricultural Science*, 135, 47-55.

Rossi J.L., K. A. Macdonald, B. S. Thorrold, C. W. Holmes, C. Matthew, & J. Hodgson (2004). Milk production and grazing behaviour during early lactation of three strains of Holstein-Friesian dairy cows managed in different feeding systems. *Proceedings of the New Zealand Society of Animal Production*, 64, 232-236.