

PASTURE INTAKE AND UTILISATION BY COWS OFFERED HIGH LEVELS OF A SILAGE-GRAIN MIX IN A TROPICAL PASTURE SYSTEM

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Dairy production in northern Australia is restricted by poor nutrient content of tropical pastures and high heat loads which reduce feed intake and production. Concentrate supplements increase production but may lead to the pasture being under-utilised. Providing a high quality mixed ration on a shaded feed pad to reduce exposure of cows to heat and increase nutrient intake could also permit more intensive stocking to make better use of pasture and increase farm output. Before we can confidently recommend any of these management systems we have to understand better the factors controlling intakes of cows grazing these tropical pastures.

A 10 week study in March-May 2004 at Mutdapilly Research Station in sub-coastal SE Qld examined the intake and utilisation of grazed pasture by cows supplemented with a silage-grain mixed ration (SGM) when stocking rate was adjusted accordingly. Thirty fresh calved cows and 12 heifers were stratified on milk yield and parity in a randomised block experiment with 6 levels of SGM (12 MJ ME/kg DM, 17% CP and 26% NDF) offered on a feed pad during the day (Moss *et al.* 2006) plus 2.3 kg DM rolled barley-sorghum grain/cow in the dairy (Table 1). Rhodes grass pasture (*Chloris gayana* cv. Callide) was strip grazed at night on an area adjusted for SGM based on modelled estimates of supplement/pasture substitution. Grass on offer and residue in strips was measured weekly by pasture cuts and botanical sorting. Faecal markers - slow release alkane capsules for pasture (Dove and Mayes 1991), and grain treated with lanthanum oxide in SGM (Shaver *et al.* 1986) - were used in weeks 3-6 to measure intake. Pasture, feed and faeces were sampled on days 29-40 and analysed by wet chemistry for proximate nutrients, alkanes and lanthanum to calculate intakes of the components.

Mature autumn pasture had 7 t DM/ha and 30-25% green leaf, with 7.1 MJ ME/kg DM, 7% CP and 65% NDF in leaf and 5.2 MJ ME/kg, 2.5% CP and 73% NDF in the stem. Increasing SGM reduced grass intake from 12 to 4 kg DM/cow.day (Table 1) with no difference in total feed intake ($P>0.05$). Cows ate 70 (± 6)% of green leaf and 30 (± 7)% pasture DM offered, for a pasture diet of 51% leaf, but utilisation did not differ with treatment ($P=0.117$). Nutrient intake and milk yields increased as SGM increased, and corresponding animal outputs (maintenance, milk, live weight, exercise) accounted for 98 (± 0.009)% of ME intake (NRC 2001). Calculation of pasture disappearance by repeated measures for daily strips did not estimate pasture intake by grazing animals very successfully. However, intakes of pasture and supplements when calculated using markers corresponded with field measurements and could be verified by reverse calculation from feed standards and milk yield.

Table 1. Pasture on offer and effect of level of SGM and stocking rate on feed intake and milk production

SGM offered (kg DM/cow.day)	5.2	6.8	8.4	9.95	11.1	12.3
Stocking rate (cows/ha)	2.8	3.1	3.6	3.9	4.3	4.9
Grass on offer (kg DM/cow.day)	28.3	22.4	19.7	19.5	16.8	16.6
Leaf on offer (kg DM/cow.day)	5.7	4.5	4.5	4.5	3.9	3.8
SGM intake (kg DM/cow.day) – Lanthanum oxide	5.1	6.9	8.6	9.8	10.9	11.8
Pasture intake (kg DM/cow.day) – Alkane capsules	11.8	8.0	8.7	7.0	5.6	4.2
Barley-sorghum grain at dairy (kg DM/cow.day)	2.3	2.3	2.3	2.3	2.3	2.3
Total intake (kg DM/cow.day)	19.2	17.2	19.6	19.1	18.8	18.3
Utilisation of pasture DM offered (%)	42	36	44	36	33	25
Diet ME content (MJ ME/kg DM)	8.2	8.9	8.9	9.3	9.6	9.9
Crude protein (%)	10.1	11.6	11.9	12.7	13.4	14.1
Neutral detergent fibre (%)	53	46	45	41	38	35
4% fat corrected milk yield (kg/cow.day)	17.1 ^a	16.1 ^a	20.6 ^b	21.3 ^b	21.8 ^b	21.9 ^b
Total ME intake (markers) (MJ/cow.day)	157	153	174	178	180	181
ME output (MJ/cow.day)	154	147	170	175	178	176

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