

Differences in Utilization of Low-Quality Hay Between Cattle Selected on Growth Rate After Weaning

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Significant variation in liveweight gain has been reported in cattle weaned onto low-protein pastures in northern Australia. The source of variation may include factors which variably impact on feed intake between moderate and low growth cattle. For instance, Egan (1977) found that a low supply of amino acids relative to energy absorbed from the gastrointestinal tract led to a reduction in feed intake. The higher growth rates may reflect a capacity by some animals to maintain higher intake in the presence of low protein content in the diet. Variability in feed intake responses to low-protein diets has been shown in sheep selected for production, with higher-producing sheep maintaining intakes for longer (Adams *et al.*, 2000; Kahn *et al.*, 2000).

The objective of this experiment was to determine whether the differences in growth rate of weaner steers selected for low and moderate growth rate post-weaning, could be explained by differences in their intake, digestion or nitrogen metabolism when provided with a common low-quality diet. Brahman crossbred steers (n=100; average liveweight 182±2.3 (SE) kg) were weaned in July 2007 onto a common area of low-quality black spear grass (*Heteropogon contortus*) dominant native pasture and given a molasses-urea supplement at Swans Lagoon Research Station, north Queensland. After 90 d they were weighed and selected on growth rate post-weaning so that 8 lowest (Low) and 8 highest (High) growth rate steers were paired on initial weight; the average liveweight and growth rates were 172±3.5 kg and -70 g/d for Low, and 197±4.3 kg and 210 g/d for the High groups, respectively. The steers were transported to the Centre for Advanced Animal Science at Gatton in south-east Queensland and offered a low-quality Mitchell (*Astrelba* spp) grass hay (4% CP). They were fed *ad libitum* in pens for the first 21 d and then at 90% of their *ad libitum* intake (calculated from days 7-21) over a further 7 d collection period in metabolism crates. Intake was recorded for days 7 to 21 and DM digestibility calculated from faecal output during the collection period. Rumen fluid samples were taken *per os* using a stomach tube 3 h after feeding on d 28 and rumen ammonia concentration measured.

Table 1. The liveweight (LW), dry matter (DM) intake, DM digestibility and ammonia concentration in rumen fluid for Low and High post-weaning growth rate steers offered a low-quality Mitchell grass hay

	LW (kg)	DM intake (g DM/kg W/d)	DM digestibility (g/kg)	Ammonia-N concentration (mg/L)
Low	168.5 ^a	17.9	422	16
High	188.2 ^b	17.3	430	18
SEM	4.22	0.60	11.2	2.55

^{a,b} Means in the same column with different superscripts are significantly different (P=0.05)

Liveweight at the end of the grazing phase was significantly different between the two groups (P<0.01). However, there were no significant differences between the two groups in intake, digestibility or rumen ammonia concentrations. It appears that the differences in liveweight gain of the steers at pasture post-weaning were not related to differences in these aspects and that other factors are involved. These may include differences in maintenance energy requirement, as has been proposed as the possible reason for differences in residual feed intake of different lines of Angus cattle selected for growth (Oddy *et al.* 1998).

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