The relationship between growth performance and feed intake of bulls and steers at pasture.

D.L. Burnham[1], R.W. Purchas[2] and S.T. Morris[1]
[1] Institute of Veterinary, Animal and Biomedical Sciences, Massey University, Palmerston North, New Zealand.
[2] Institute of Food, Nutrition and Human Health, Massey University, Palmerston North, New Zealand.
(Funded By MeatNZ)

Sixty Hereford x Angus cross cattle (30 bulls and 30 Steers) were allocated to treatments in July 1998 based on their 100 day liveweight gain up to approximately 9 months of age. The slowest growing 20 (average 0.48±011 kg/d - 100 d LWG) were allocated to the Restricted Slow (RS) treatment while the fastest growing 40 were randomly assigned to the Fast (0.60±0.12 kg/d) or Restricted Fast (RF) groups (0.64±0.11 kg/d). The Fast treatment cattle were grown rapidly to achieve slaughter weight of 550kg and 522kg, for bulls and steers respectively, at 16-18 months of age. The RS and RF treatments were restricted in growth to achieve similar slaughter weights at approximately 26-28 months of age. Organic matter intake (OMI) measurements were taken using the chromium controlled release capsule technique at approximately 9, 14, 17, and 25 months of age (OMI 1 – 4 respectively). Full and 16-hour fasted liveweights were taken pre- and post-intake measurement period. Feed conversion efficiency (FCE) was calculated for the periods 5-9months for the 1st, 9-14 months for the 2nd, 14-17 months for the 3rd and 17-25 months for the 4th intake respectively using fasted liveweight gains. Data was analysed using SAS (SAS, 1985) General Linear Model and correlation procedures.

Only during the 1st 100 days were the Fast group run with the 2 restricted groups hence OMI and FCE data for the RF and RS groups only, are shown in Tables 1 and 2. Intake 1 contains the only comparable data between these groups and the Fast group. Data from intake 1 indicates that although the Fast group had lower OMI than the RF group (3.78 vs 4.27 kg OMI/d), the FCE was not significantly different (0.26±0.02 vs. 0.30±0.02 kg LWG/kg OMI). This intake reflects the lower 100 day growth rate (0.60 vs 0.64 kg/d) of the Fast group due to random allocation of treatments. The two restricted treatments were run together until intake 4 when they were grazed as separate groups.

There were no significant differences between bulls and steers in FCE however OMI was significantly different at 17 months (4.69±0.14 vs. 4.07±0.14, P<0.001) and 24 months (5.97±0.20 vs.5.10±0.20, P<0.01) for bulls and steers respectively. No significant interaction between treatment and sex was found.

Table 1. Organic matter intakes of bulls and steers at 9, 14, 17 and 25 months of age
(kg OMI/d)

	RF Group	RS Group	P Value
9 mo	4.27±0.15	4.22±0.14	ns
14 mo	5.21±0.25	5.05±0.18	ns
17 mo	4.23±0.20	4.20±0.15	ns
25 mo	6.20±0.23	4.87±0.17	0.01

Table 2. Feed Conversion Efficiency of bulls and steers at 9, 14, 17 and 25 months of age
(kg LWG / kg OMI)

	RF Group	RS Group	P Value
9 mo	0.30±0.02	0.20±0.02	0.005
14 mo	0.24±0.02	0.20±0.01	ns
17 mo	0.27±0.02	0.24±0.02	ns
25 mo	0.31±0.06	0.26±0.06	ns

There was no significant difference in FCE under restriction despite trends towards FR groups having higher FCE. During intake 1 the FCE was significantly higher for the Restricted Fast treatment when both groups were *ad lib* fed. This suggests that restricting diet suppresses any natural tendency toward more efficient feed conversion.

There were significant correlations between FCE and LWG (0.67 to 0.86). Correlations between FCE and OMI were not significant (-0.24 to -0.46). This suggests that liveweight gain has a greater influence on FCE than intake.

In summary, naturally faster growing cattle exhibit a higher FCE under *ad lib* conditions that naturally slow growth cattle, however this advantage is reduced under restricted feeding. Liveweight gain is more highly correlated with subsequent FCE than OMI.

SAS. 1985. SAS User Manual, Cary, SAS Institute inc.
(Reprinted with permission of Asian-Australian Association of Animal Production Societies (AAAP)Vol 13 page165. 2000.)