Effect of compensatory growth on production of carcasses to specification

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Compensatory growth is utilised in both Australian and New Zealand cattle production systems as an important means of optimising animal growth from a seasonal pattern of pasture availability. (Poppi and McLennan, 1996; Nicol and Kitessa, 1997). However, results from the present experiment, indicate that, during the compensation phase, animals may be less efficient at converting feed to liveweight gain (Muir et al., 1997). It was unclear whether the poor efficiency of feed utilisation was related to deleterious changes in carcass characteristics.

The design of the experiment is outlined in Muir ***et al.*** (1997). Briefly, 28 Angus and 28 Simmental steers were purchased as weaners and allocated to two groups containing 14 steers of each breed. Group 1 steers were transferred to a feedlot and adjusted to a concentrate diet of 70% grain and 30% pasture silage, offered ***ad libitum.*** Group 1 steers were slaughtered when growth had ceased (80 1 and 948 kg, respectively). Group 2 steers grazed together on pasture until the Angus and Simmental steers had achieved liveweights of 557 and 605 kg, respectively. They were then transferred to the feedlot, adjusted to and given the same ***ad libitum*** diet as Group 1. Group 2 steers were slaughtered when they reached the same estimated carcass weight as Group 1 steers.

Although there was a clear breed effect, there were no significant differences in carcass weight between ***ad libitum*** and compensating steers (Table 1). Steers that had undergone compensatory growth were significantly leaner, as indicated by both subcutaneous fat depth and Japanese marbling scores at the 12th rib (Table 1). Combined weights of commercially important cuts (Topside and Silverside; Butterfield and May, 1966) were significantly heavier ($P < 0.00$ 1) in compensating animals, indicating that growth path can affect the proportion of high value cuts in the carcass. Moreover, the variability associated with carcass weight and individual cut weights tended to be greater in animals that had undergone compensatory growth than in animals fed ***ad libitum*** (Table 1). There was also a trend for Simmental steers to be more variable than Angus steers (Table 1).

Compensatory growth may result in leaner carcasses which benefits producers under the current grading systems but reduced marbling levels may also impact on future quality grades for Asian markets. Moreover, the present results suggest that compensatory growth may reduce the consistency of carcass quality, reducing returns for producers that supply to contract. Growth path also has significant implications for meat processors and exporters in terms of supply of carcasses and cuts to consumer specification.

References

Butterfield, R.M. and May, N.D.S. (1966). *Muscles of the Ox*. University of Queensland Press. 164 pp.

Muir, P.D., Smith, N.B. and McCall, D.G. (1997). Effect of compensatory growth on feed intake and feed conversion efficiency of heavyweight steers. In: *Recent Advances in Animal Nutrition in Australia* (this publication).

Poppi, D.P. and McLennan, S.R. (1996). Protein and energy utilisation by ruminants at pasture. *Journal of Animal Science*. **73**, 278–290

Nicol, A.M. and Kitessa, S. (1997). Influence of compensatory growth on production systems in New Zealand. In: *Proceedings of the Growth and Development Workshop.*

Table 1 Mean liveweights (± SD), carcass weights and combined weights of topside and silverside of Angus and Simmental steers grown to heavy weights via two widely differing growth paths by varying diet.

	Carcass wt (kg)	Fat depth at 12th rib (mm)	Marbling score score	Weight cuts (kg)	Weight cuts (% of side wt)
Ad lib. Angus	487.2 (33.95)	60.7 (15.01)	6.5 (1.08)	18.8 (1.47)	7.7
Compensating Angus	465.2 (42.76)	34.7(9.81)	5.3 (0.86)	21.8 (1.93)	9.3
Ad lib. Simmental	564.9 (33.74)	46.8 (12.94)	5.9 (1.00)	24.6 (2.54)	8.7
Compensating Simmental	567.5 (57.78)	41.2 (20.84)	4.2 (1.08)	27.2 (3.18)	9.6