

## The effect of forage: concentrate ratio on the performance of bulls slaughtered at a range of liveweights

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### Introduction

Previous studies (Steen 1995) have clearly illustrated that finishing male cattle entire increases animal performance and food conversion efficiency. Post implantation of the Mid Term Review of the Common Agricultural Policy, in the absence of subsidy, there is renewed interest in finishing beef cattle entire. Also with the expected contraction of the suckler herd post MTR of CAP there will be a reduced number of cattle available for finishing. Feed is one of the main variable costs of finishing beef cattle. Consequently the objective of the present study was to evaluate the effect of forage:concentrate (F:C) ratio and weight at slaughter on the animal performance of  $\frac{3}{4}$  or more continental bred bulls from the beef herd.

### Materials and methods

Grass silage was ensiled on 8 May after a 48 hour wilting period. The concentrate consisted of 400, 230, 170, 170, 30g/kg of barley, maize, sugar beet pulp, soyabean and molasses. The diets consisted of 50:50: forage concentrate and *ad libitum* concentrate supplemented with 1.2 kg silage DM. Each animal received 100g mineral and vitamin mixture per day daily. The diets were offered to 120,  $\frac{3}{4}$  or greater, continental bull weanling calves (mean initial liveweight of 358 kg [s.d. 47.5]). Equal numbers of cattle per treatment were slaughtered at random after either 191, 218, or 254 days on experiment. Total diet digestibility was determined using four animals per treatment. These data were analysed using Genstat regression procedures with a model including the factor treatment and slaughter weight as an independent variable, and their interaction. Predicted values were calculated for each treatment at a range of slaughter weights.

### Results

The silage had a high feed value with DM concentration and predicted D-value and intake potential of 238g/kg, 775g/kg DM and 84g/kg  $W^{0.75}$  respectively. Slaughter weight did not affect ( $P>0.05$ ) daily liveweight or carcass gains which were 1.60 and 0.86 kg/d respectively. There were no treatment by liveweight at slaughter interactions ( $P>0.05$ ) on food intake or animal performances. The effect of weight at slaughter on animal performance is presented in Table 1. Increasing the weight at slaughter increased daily food intake, carcass weight, marbling score and food conversion ratio (FCR), and did not alter carcass conformation, food intake and fat classification. The effect of dietary treatment on animal performance is presented in Table 2. Decreasing the F:C ratio increased food intake, kill-out proportion, carcass weight, carcass gain and decreased the FCR but did not alter liveweight gain, carcass gain, carcass fat classification or conformation, marbling score or FCR.

**Table 1:** Effects of slaughter weight on animal performance (prediction\*)

	Slaughter weight (kg)							SEM	Sig
	500	550	600	650	700	750	800		
Total intake (kg DM/d)	8.2	8.4	8.6	8.7	8.9	9.1	9.3	0.17	*
Carcass weight (kg)	299	325	352	378	404	431	457	2.8	***
Conformation <sup>1</sup>	3.6	3.7	3.7	3.7	3.8	3.8	3.9	0.092	NS
Fat classification <sup>2</sup>	2.99	3.01	3.03	3.05	3.07	3.10	3.12	0.081	NS
Marbling <sup>4</sup>	1.30	1.50	1.69	1.89	2.08	2.28	2.47	0.111	***
FCR (kg feed/kg carcass) <sup>3</sup>	9.5	9.7	9.9	10.2	10.4	10.6	10.8	0.193	*

**Table 2:** Effect of forage: concentrate ratio on animal performance (prediction\*)

	Forage : Concentrate ratio		SEM	Sig
	50:50	0:100		
Total intake	8.7	9.0	0.10	*
Kill out (g/kg)	574	584	3.0	*
Carcass weight (kg)	394	401	2.0	*
Liveweight gain (kg/d)	1.60	1.60	0.016	NS
Carcass gain (kg/d)	0.83	0.89	0.013	*
Fat classification <sup>2</sup>	3.14	3.00	0.058	NS
Conformation <sup>1</sup>	3.8	3.8	0.08	NS
Marbling <sup>4</sup>	2.13	1.94	0.079	NS
FCR (kg feed/kg carcass) <sup>3</sup>	10.5	10.1	0.19	*

\*Values predicted from regression analysis. <sup>1</sup>EUROP scale: 5,4,3,2,1, respectively. <sup>2</sup>EU Fat classification: where 5 = fat, 1 = lean. <sup>3</sup>Food conversion ratio. <sup>4</sup>Eight point scale: 1 = leanest, 5 = fattest.

## Conclusions

Slaughter weight did not alter liveweight gain or carcass gain of young bulls slaughtered within the weight range of 500 to 800 kg liveweight. However food conversion ratio increased with increasing slaughter weight. Replacing 0.50 of the *ad libitum* concentrate diet with high feed value grass silage did not alter daily liveweight gain but decreased carcass gain by 0.06 kg/d and FCR by 0.4 kg feed DMI/kg carcass. Provided there is a market outlet, bulls from the beef herd can be taken to heavy weights efficiently.

## Acknowledgement

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## References

Steen, R.W.J. (1995). The effect of plane of nutrition and slaughter weight on growth and food efficiency in bulls, steers and heifers of three breed crosses. *Livestock Production Science* 42: pp1-11.