Utilizing Forages to Program Steer Growth Patterns to Achieve Consistent Quality Beef

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Utilizing forages to program steer growth patterns to achieve consistent quality beef

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Introduction Many options are available for programming stocker cattle growth patterns through forage selection. In semi-arid south Texas rapid growth rates can be achieved by grazing irrigated small grains (oats, wheat and ryegrass) and slow growth rates are possible grazing native range pastures. Ryegrass (RG) nutrient quality indicates potential gains greater than 1.0 kg/d for steers, while typical winter native range (NR) pasture indicates gains of 0.45 kg/d or less. The purpose of this experiment was to quantify the impact of different programmed growth patterns on beef retail product especially size, marbling and tenderness.

Materials and methods Over 3 years, 153 steers were utilized to compare rapid versus limited post weaning growth systems. Calves comprised known tropically adapted*temperate genotypes (Angus, Bonsmara, Braunvieh, Hereford, Senepol, and Tuli breeds) and were stratified by genotype to grazing treatment. Steers were weaned on October 12 and held in a preconditioning lot until approximately December 10 of each year, and then allotted to their respective grazing regime. Ultrasound measurements of backfat and rib eye area (REA), weight, visual body condition score (BCS-1=thin, 9=fat), and frame score (1=short, 9 =tall) were taken at initiation and termination. Grazing terminated May 10 of each year, after termination steers were fed a high concentrate ration in a commercial feedlot. Steers were harvested at a targeted backfat thickness of 10 mm. Standard USDA carcass traits were collected and one 50 mm thick steak (*longissimus dorsi muscle)* was excised from $12^{th}/13^{th}$ rib for Warner-Bratzler shear force (WBS) determination (mean of 6, 12.5 mm cores/steak).

Results Limited growth rate steers on NR had more variation in growth rate, marbling score and WBS (Table 1) than those programmed to grow faster. For each year, steers grazing NR had lower ($p<0.05$) end weight, BCS, grazing ADG, ultrasound backfat and REA, but their gain in the feedlot was similar ($p>0.05$) and, as planned, their carcass backfat was similar ($p>0.05$) to steers grazing RG (Table 2). Only in Yr 3 was WBS affected ($p<0.05$) by grazing treatment with steers programmed for rapid growth being 12 % tougher.

Table 1 Variation in grazing ADG, marbling score and WBS across 3 years[a]

	Rapid			Limit			% Increase
	High	Low	Range	High	Low	Range	
Grazing ADG, kg/d	0.86	0.68	0.18	0.59	0.34	0.25	28
Marbling score	462	424	38	462	386	76	50
WBS, kg	6.25	5.26	0.99	6.95	4.73	2.22	66

[a] Least squares means from model $\hat{y}$ = calf sire

Table 2 Steer characteristics during grazing phase and their effect on carcass traits and tenderness[a]

	Yr 1			Yr 2			Yr 3		
Forage	Rapid	Limit	s.e.	Rapid	Limit	s.e.	Rapid	Limit	s.e.
N	32	25		28	20		24	24	
Start wt, kg	259	258	8.4	279	267	9.2	280	274	4.6
End wt, kg	338*	295	9.7	371*	316	6.0	395*	364	5.9
End BCS, 1-9	5.3*	4.5	0.1	5.8*	3.8	0.2	5.8*	5.2	0.1
End backfat, mm	7.0*	4.9	0.31	8.8*	2.9	0.2	4.3*	3.5	0.01
End REA, cm^2	59.3*	51.5	1.4	78.7*	59.4	2.3	64.2*	53.8	1.2
GrazingADG,kg/d	0.86*	0.40	0.04	0.68*	0.34	0.02	0.76*	0.59	0.02
Slaughter wt, kg	505	522	10.0	542*	503	11.1	563*	531	9.7
Hot carcass wt, kg	304	319	9.4	343*	310	6.9	350*	330	5.9
Backfat, mm	9.7	10.9	0.72	14.5	13.4	0.6	12.5	12.5	0.04
Marbling score	433*	462	10.3	462	441	23.6	424	386	22.7
FeedlotADG, kg/d	1.59	1.62	0.06	1.35	1.32	0.06	1.44	1.42	0.05
Days on feed, d	111*	141	6.5	126*	143	3.7	121	117	3.0
WBS, kg	6.25	6.95	0.37	5.26	5.17	0.36	5.29*	4.73	0.22

[a] Least squares means from model $\hat{y}$ = calf sire
* Least squared means within yr and row differ at $p<0.05$

Conclusions Steers programmed for a slow rate of post-weaning growth were older at harvest having been fed a high concentrate ration longer in the feedlot, and more variable in carcass quality having about twice the variation in marbling and 66% more variation in WBS. Production systems designed for rapid, controlled growth may produce more consistent quality beef than those dependent upon more extensive, less controlled, discontinuous growth rate systems.