STARTING AGE AND BACKGROUND: EFFECTS ON FEEDLOT PERFORMANCE OF STEERS

D.R.Gill[1], M.C.King[2], H.G.Dolezal[3], J.J.Martin[4] and C.A.Strasia[5]

Story in Brief

At 3 months of age, 140 steers of uniform age and genotype were allotted to one of five management schemes: 1) early weaned and placed into a feedlot at 3.5 months; 2) weaned and placed in a feedlot at 7.9 months; 3) weaned at normal age but grazed wheat pasture for 112 days prior to placing in a feedlot at 11.6 months, 4) weaned at normal age but wintered on dry native range and then grazed on early intensively managed native range for 68 days prior to placement in a feedlot at 15.4 months; 5) weaned at normal age, wintered on dry native range and then grazed native range for 122 days prior to placement in a feedlot at 17.4 months. Starting feedlot weights were 314, 540, 765, 848 and 918 pounds. Daily gains tended to be lower for early weaned calves (2.93, 3.22, 3.70, 3.36 and 3.02 lb/day). To reach a similar rib fat cover (.5 inches), the cattle placed into a feedlot when younger were fed longer (287, 198, 134, 123 and 101 day) and were heavier. Slaughter weights, adjusted to a dressing percentage of 64%, were 1154, 1178, 1259, 1259 and 1222. Feed/gain greatly favored the early weaned cattle (5.3 pounds of feed per pound of gain) over older cattle (feed/gain of 8.4 for those that grazed native range the full season).

(Key Words: Steers, Age at Slaughter, Feedlot, Carcass Traits.)

Introduction

In recent years the age that a typical feedlot steer enters the feedlot has been declining. As cowmen improve breeding and management

[1]Regents Professor [2]Graduate Student [3]Associate Professor [4]Panhandle State University [5]Area Livestock Specialist

programs a higher and higher percentage of just weaned calves achieve weights too heavy for traditional stocker programs and find their way to feedlots as weaning calves. Some just weaned calves when placed on feed at that time become too large before achieving adequate finish and are discounted at slaughter for overweight carcasses. This study was designed to examine the effect of age when cattle are placed on feed with ages raging from 3 mo to nearly 18 mo of age.

Materials and Methods

All calves were from crossbred Angus dams and sired by Angus bulls with 70 steers from each of two different ranches in Oklahoma. Pasture conditions on these two ranches differed and the cattle differed in milk production and mature size.

The background of the 5 groups of cattle is presented in Table 1. Treatments included EW (early weaned and placed directly in a feedlot), NW (weaned at 8 mo and placed in a feedlot), WP (weaned at 8 mo and grazed

Table 1. Background and characteristics of animal groups.

Treatment	Early weaned (EW)	Normal weaned (NW)	Wheat pastured (WP)	Early grazed (SG)	Season grazed (LG)
Grazing	None	None	Wheat	Native range	Native range
Number of head	28	28	28	28	28
Weaning age, mo	3.5	7.9	7.9	7.9	7.9
Feedlot entry					
Age, mo	3.5	7.9	11.6	15.4	17.4
Weight, lb	314	540	765	848	918
Days fed	287	198	134	123	101
End wt,lb[a]	1154	1178	1259	1259	1222

a Calculated as hot carcass weight/.64.

wheat pasture for 112 d before being placed in a feedlot), SG (weaned at 8 mo wintered on dry native range and then on intensively managed native range for 68 d prior to being placed in a feedlot) and LG (weaned at 8 mo, wintered on dry native range and then on growing native range for 122 d before being placed in a feedlot). Steers were allotted randomly to one of the five treatments, each containing 28 steers (14 from each ranch) with 7 head per pen.

During the feedlot phase, all steers were continuously fed the same feedlot diet containing 12.4% protein (Table 2; Diet 4) except for EW calves.

Table 2. Percentage composition of feedlot diets. (DM Basis).

Feedlot diet	1	2	3	4
Corn, dry rolled	52.97	59.25	73.79	79.61
Alfalfa hay, ground	7.8	6.58	4.65	5.02
Cottonseed hulls	10.00	10.00	7.00	3.90
Molasses, cane	3.75	3.75	3.75	4.38
Soybean meal 44	23.02	18.22	8.32	
Cottonseed meal				3.55
Meat & Bone meal				1.42
Distillers grains				.87
Calcium carbonate	1.25	1.50	1.34	.35
Urea			.50	.30
Dicalcium phosphate	.83	.33	.29	
Salt	.30	.30	.30	.35
Ammonium sulfate				.21
Rumensin 60 g/lb	.02	.02	.02	.018
Vitamin A-30	.02	.02	.02	
Vitamin A&D				.00375
Vitamin E-226800	.02			
Trace mineral premix	.01	.01	.01	.014
Tylan 40	.01	.01	.01	.01
Calculated analysis				
NEm	87.1	88.7	92.4	94.6
NEg	55.0	56.0	59.0	60.4
Crude protein	18.0	16.0	13.4	12.4

From 3 to 5 months of age, these calves were fed an 18% protein diet (Diet 1), from 5 to 6 months of age they were fed a 16% protein diet (Diet 2), and from 6 to 7 months of age they were fed a 13.4% protein diet (Diet 3), before being fed the 12.4% protein diet (Diet 4) at 8 months of age. Cattle were adapted to their 91% concentrate diets in 14 days through a series of four starting diets in which alfalfa hay and cottonseed hulls (2 to 1 ratio) replaced corn to achieve 50%, 60%, 70% and 80% concentrate levels. For EW calves, the 60% and 70% concentrate levels were deleted from the workup phase.

The WP steers grazed clean tilled wheat pasture (Pioneer 2157) for 112 d; they received no supplement other than free choice access to a commercial mineral mixture. Cattle were weighed every 28 d; average daily gain and feed efficiency were calculated.

At weaning, all cattle were processed, vaccinated with IBR-PI_3 (modified live virus; IM) 7 way clostridial bacterin and injected with ivermectin. The EW calves also received a Nasalgen injection one week after arrival at the feedlot. All cattle were implanted with Synovex S. The EW calves received their first implant after being fed 101 d and thereafter every 84 d, NW calves received their first implant at approximately 8 months of age and every 84 d thereafter. The WP, SG and LG cattle received their first implants before going to wheat or grass and were re-implanted approximately every 84 d thereafter, except for the LG (season long) cattle which received implants before grass but not were re-implanted in the feedlot due to an oversight.

Steers were slaughtered when the average steer in each 7-head pen reached .50 in of fat cover as appraised visually. Prior to slaughter, steers were fasted for approximately 12 hr, weighed and transported to either the OSU Meats Lab or a commercial plant and hot carcass weights were measured. Carcass and economic data are presented in another paper in this report.

Specific statistical contrasts included a comparison of EW with all other steers, NW vs grazed steers (WP, SG & LG), WP vs steers that grazed native range (SG & LG) and SG vs LG to test effects of duration of native pasture grazing. The main effects are presented except when a ranch source by treatment interaction was detected. Such interactions are discussed in the text.

Results and Discussion

Mean initial weights, days fed, and slaughter weights calculated as hot carcass weight divided by .64 (the average dressing percentage) are presented in Table 1.

Least square means for daily gain, feed intake and feed efficiency are presented in Table 3. Steers that had grazed wheat pasture before entering the feedlot had the highest average daily gain while in the feedlot. This is consistent with findings of Ridenour et al. (1982) and typical reports from feedlots. Cattle that were backgrounded either on wheat or grass (WP, SG, and LG) had higher feedlot daily gains ($P < .02$) than cattle that went directly into the feedlot (EW and NW) at weaning although feedlot gains of LG cattle were much lower than expected. This contradicts the findings of Bertrand and Johnson (1988) who reported that steers fed a high concentrate diet directly after weaning had higher average daily gains than backgrounded cattle.

Cattle that were grown on wheat had higher ($P < .04$) daily gains than cattle that were backgrounded on native range. Steers that had grazed native range for a shorter time had higher ($P < .05$) daily gains than steers that grazed the full summer.

Average daily feed intake whether expressed as amount per day or percent of mean or of metabolic body size, was lower for EW and NW cattle than for cattle that had grazed. This is due partly to their lighter mean feedlot weight. Based on feedlot lore, these cattle probably had smaller gut capacity because their gut had not been stretched by forage during growth.

Table 3. Least square means for feedlot performance.

	Treatment				
	EW	NW	WP	SG	LG
ADG, lb/d[abcd]	2.93	3.22	3.70	3.36	3.02
Mean feedlot wt, lb	734	859	1012	1053	1070
ADF, lb/d[ab]	15.59	18.20	23.35	25.36	25.11
ADF, % BW[ab]	2.12	2.12	2.31	2.41	2.35
ADF, % MBS[ab]	11.06	11.47	13.01	13.71	13.42
Feed/gain[ac]	5.33	5.66	6.32	7.55	8.36

[a] EW differs from other groups ($P<.02$).

[b] NW differs from pastured groups ($P<.09$).

[c] WP differs from steers that grazed native range ($P<.04$).

[d] SG differs from LG ($P<.05$).

Steers that were placed directly into the feedlot consumed much less feed than those that were backgrounded before entering the feedlot. Bertrand and Johnson (1988) also reported that steers backgrounded on grass before entering the feedlot had higher feed consumption than steers placed in the feedlot directly after weaning.

The EW steers had the most desirable feed efficiency (5.33 lb feed/ lb gain). If cattle consume more feed per unit of weight or metabolic mass, they usually are more efficient (Ensminger, 1965; Lusby et al., 1981). However, when dry matter intake of these different groups of cattle is expressed per hundred pounds body weight or per unit of metabolic mass, cattle that went directly into the feedlot (EW and NW) had lower feed and energy intakes. This means that the energy intake explanation cannot explain the differences in feed efficiency. The EW and NW cattle had much better feed efficiencies when compared to those cattle that were backgrounded before being placed into the feedlot. Additionally, cattle that had grazed wheat pasture had more desirable feed efficiencies than cattle that had grazed native range.

For feed efficiency, a cattle source by treatment interaction was detected for the LG cattle. Due to differences in pasture conditions or genetics (milk potential or stage of maturity), one group had superior feed efficiency (feed/gain of 7.53 vs 9.19). Calves thinner when entering the feedlot, progeny from dams with lower milk production or those larger in frame size would be expected to be more efficient.

The differences in feed intake and efficiency noted in this study for calves with different nutritional history are quite similar to many reports in the literature and previous research reports. Several factors may be involved in the differences in rate and efficiency of gain among these cattle groups. Age alone may explain some of the differences. Yearling cattle generally eat more feed and gain more rapidly than calves. This may relate partly to differences in capacity of the digestive tract. As cattle age, concentrations of hormones change and extent of chewing of feed decline. As hormones may alter body composition and less chewing can reduce digestibility of incompletely processed diets, aging can reduce energetic efficiency. Hormonal implants probably are much more important for yearlings than for calves. Differences in background and grazing also may have altered feeding patterns, extent of chewing and body composition which in turn could alter feed efficiency. Again, extent of feed processing may be much more important for yearlings than for calves. Further research is needed to detect the reasons for and find solutions to the poorer feed efficiencies by cattle that had grazed.. Until then, feedlot operators should carefully monitor the age and background of incoming cattle in order to detect feed efficiency problems. Feedlot managers should be certain that implant and re-implant systems and feed processing mechanisms are adequate to maximize feed efficiency of cattle entering the feedlot at an older age.

Literature Cited

Bertrand, J. E., and D. D. Johnson. 1988. Animal performance and carcass characteristics of beef steers finished without backgrounding versus backgrounding prior to finishing. In: Florida State University Animal Sci. Res. Rep. pp 144-150.

Ensminger, M. E. 1965. The Stockman's Handbook, 3rd ed. Danville, IL., Interstate Printers and Publishers.

Lusby, K. S., et al. 1981. Effects of early weaning calves from first-calf heifers on cow and heifer performance. J. Animal Sci. 53:1193.

SAS. 1985. SAS User's Guide: Basics. SAS Inst., Inc., Cary, NC.

Ridenour, et al. 1982. Feedlot performance and carcass characteristics of beef steers grown and finished under different nutrition and management programs. J. Animal Sci. 54:1115.