THE EFFECTS OF AGE, DATE ON FEED AND CORN PROCESSING ON CARCASS CHARACTERISTICS

W.J. Hill[1], F. T. McCollum[2], D.R. Gill[3], H.G. Dolezal[2] and C.A. Strasia[4]

Story in Brief

Yearling steers (117 hd) and fall born calves (112 hd) were used to determine the effects of age (Calves vs Yearlings), date on feed (July vs September) and corn processing (dry rolled vs steam flaked) on carcass characteristics. Yearlings entering the feedlot in July had grazed tallgrass prairie for 100 days; calves entering in July were placed directly on feed without grazing.. In September, yearlings had grazed for 156 days and calves had grazed for 56 days during late summer. Carcasses from calves when compared with yearlings had less backfat, smaller ribeyes and fewer grading choice. Corn processing alone had no effects on the measured carcass characteristics. However, due to age x corn processing and starting date x corn processing interactions, steam flaking increased backfat and yield grade more for yearlings than calves and increased backfat more for cattle started on feed in July than in September. The parameter having the greatest effect on carcass traits in this trial was age. Calves had poorer carcasses primarily due to insufficient finish.

(Key Words: Cattle, Grazing, Feedlot.)

Introduction

Many different backgrounding programs are used in the beef cattle industry. Consequently, cattle enter the feedlot and subsequently enter the packing plant with differences in age, previous ration and length of time on feed. Time on feed is related to length of previous backgrounding or grazing programs. If the industry moves to a value based marketing system, value will be assessed primarily on carcass merit. If producers are to take full advantage of a value based system, they must understand the genetic and environmental (i.e., management) factors that can affect carcass traits. The objectives of this research were to determine how chronological age (calves vs yearlings), previous background or grazing program (July vs September) and corn processing (dry-rolled vs steam-flaked) affect carcass characteristics.

[1]Graduate Assistant, [2] Professor, [3] Regents Professor, [4] Area Livestock Specialist, Guymon OK

Materials and Methods

One hundred seventeen yearling steers and 112 fall born-calves were used to determine the effects of age, date of entry into the feedlot (length of grazing), and corn processing method on carcass characteristics. Spring-born crossbred yearling steers (British and British x exotic) from western Kansas were received at the Pawhuska research station in March 1993. The yearlings had been on wheat pasture for 30 to 60 d prior to shipment. Upon arrival, cattle were weighed, ear tagged, treated with Ivermectin® (MSD Ag Vet Merck, Division of Merck & Co, Inc. Rahway, NJ) and vaccinated against Clostridial organisms (sc), IBR, PI3, BRSV and Leptospirosis (im). During the receiving period, cattle were fed 2 lb/d of a 38% CP supplement and had ad libitum access to prairie hay and water. After the 28-d receiving period, yearlings were re-vaccinated and placed on tallgrass prairie pastures. On July 27, after 100 days of grazing, the yearlings were weighed and assigned randomly either to continue grazing for the remainder of the season (SEPT) or placed in a feedlot (JULY) at Panhandle State University feedlot (Goodwell, OK) for the feedlot phase of the study.

Fall-born weanling calves (exotic and exotic x Brahman) were purchased in June from northern Texas. The 28 d backgrounding procedure was similar to that used for yearlings. After the receiving period, calves were assigned randomly to either graze with the remaining yearlings until September (SEPT) or to go directly to the feedlot (JULY) without grazing. On September 21, the remaining calves and yearlings on pasture were shipped to the feedlot. All cattle were implanted approximately every 60 days with Synovex S® (Syntex, West Des Moines, IA) until approximately 100 days from slaughter at which time they were implanted with Revalor® (Hoechst-Roussel Agri-Vet, Somerville, NJ).

Upon arrival at the feedlot, cattle within both ages and backgrounding regimes were stratified by weight coming off pasture into heavy, medium and light weight replications and assigned randomly to pens. Within each age background and weight replication, pens were assigned randomly to either a steam flaked corn (SF) or dry rolled corn (DR) diet. There was a total of 24 pens (1 pen per age, background, diet replication). Rations were identical except for the corn processing method. Ration composition was described by Hill et al. (1993).

The cattle were slaughtered in one of three groups when a commercial packer buyer deemed that they were adequately finished. Cattle were slaughtered at the Excel packing plant in Dodge City, KS. Hot carcass weights were determined immediately following slaughter. After the carcasses were chilled for 48 hours, the following measurements were obtained: 1) longissimus muscle area, measured by direct grid reading of the longissimus

muscle at the 12th rib; 2) subcutaneous fat over the longissimus muscle at the 12th rib, taken at a location 3/4 the lateral length from the chine bone end; 3) kidney, pelvic, and heart fat (KPH) as a percentage of carcass weight, and 4) marbling score.

This study was a 2 x 2 x 2 factorial arrangement of treatments with two ages, two backgrounds and two diets. Data were analyzed by the GLM procedure of SAS (1988) with the main effects being age, starting date and corn processing plus interactions of these three factors.

Results and Discussion

Age. Carcass traits for the main effects of age are summarized in Table 1. Compared with carcasses from yearlings, calves had lower (P<.05) marbling scores, and fewer carcasses graded choice than yearlings. Less backfat (P<.05), coupled with lower (P=.08) numerical yield grade and lower quality grades, suggests that calves were slaughtered prematurely. In previous studies when calves were fed for a longer period, they had higher marbling scores, a higher percentage of choice carcasses, and higher numerical yield grades than yearlings (Lunt et al., 1986; Sindt et al., 1991; Hickok et al., 1992). Calves had smaller (P<.05) ribeye areas than yearlings, agreeing with work by Hickok et al. (1992). In contrast, Lunt et al. (1986) observed no difference in ribeye area between calf and yearling heifers. Part of the reason for lighter weight underfinished cattle in this trial was due to an attempt to market cattle in the seasonally high March and April fat cattle market.

Starting date. Carcasses from JULY cattle had more (P<.11) backfat, most likely due to being fed 15 days longer, on average. A age x starting date interaction (Table 2) for yield grade, ribeye area, and ribeye area per cwt of carcass was detected (P<.05). Compared with JULY calves, SEPT calves had higher (P<.05) yield grades, smaller ribeye areas and ribeye area/cwt carcass. The reason for inferiorcarcasses of SEPT is not clear. In contrast, no differences were detected between JULY and SEPT for yearlings. The lack of differences in carcass traits for JULY and SEPT yearlings is consistent with the results of Gill et al. (1993a).

Grain processing. Grain processing alone had no effect on carcass characteristics. But an age x diet interaction (P<.05) was detected for backfat and yield grade (Table 3). Compared with dry rolling, steam flaking increased (P<.05) backfat and yield grade for yearlings but had no effect on these traits for calves. Calves may chew their food more thoroughly so that grain processing will be less beneficial for calves than yearlings. Steam flaking increased (P<.05) backfat for JULY cattle but not for SEPT cattle (Table 4). These results follow the same trend noted for cattle performance (Hill et al.,

1993). The reason for the starting date x diet interaction is not clear, but may partially attributable to predominantly winter feeding of SEPT cattle, which due to excessive cold wet conditions may have negated any advantage steam flaking might have had.

Overall differences in carcass traits were predominantly associated with age. However, due to under feeding it doubtful that age, per se, plays a significant role in affecting carcass traits. Reduced carcass weights, over finished, low yeilding carcasses reported in other studies are more likely due over feeding light weight cattle irregardless of age.

Literature Cited

Gill, D. R. et al. 1993. Okla. Ag. Exp. Sta. P-933:197.

Hickok, D. T. et al. 1992. Kansas Cattlemen's Day Rep. p. 64.

Hill, W.J. et al. 1993. Okla. Ag. Exp. Sta. P-933:210.

Lunt, D. K. 1986. McGregor Field Day Report, Texas A&M Technical Report 86-1. p. 111.

Sindt, M. et al. 1991. Nebraska Beef Cattle Rep. MP-56:42.

Table 1. Carcass traits for calves and yearlings.

Item	Calves	Yearlings	SEM	OSL[b]
Carcass wt, kg	313	325	3.2	.02
Marbling[c]	379	434	9.09	.001
Choice, %	34	70	6.58	.01
Select, %	62	28	6.23	.01
Backfat, cm	.89	1.12	.03	.001[ar]
Yield grade	2.30	2.49	.07	.09[ad, ar]
Yield grade 4's, %	2.69	.83	1.30	.33
Ribeye area, in^2	12.4	12.8	.12	.01[ad]
Ribeye area, cm^2	80.6	83.2	.78	.01[ad]
Ribeye area/cwt of carcass, in^2/cwt	1.80	1.79	.02	.78

[ad] Age x starting date interaction (P<.05).

[ar] Age x diet interaction (P<.05).

[b] OSL = observed significance level.

[c] 300, 400 = slight and small degrees of marbling, respectively.

Table 2 Carcass traits for calves and yearlings entering the feedlot in July (JULY) or September (SEPT)[c]

	Calves		Yearlings		
Item	July	Sept	July	Sept	SEM
Yield grade	2.14[a]	2.45[b]	2.62[b]	2.37[ab]	.10
Ribeye area, in^2	12.7[b]	12.0[a]	12.8[b]	12.9[b]	.16
Ribeye area, cm^2	82.6[b]	78.0[a]	83.2[b]	83.8[b]	1.04
Ribeye area/cwt of carcass, in^2/cwt	1.85[b]	1.74[a]	1.80[ab]	1.78[ab]	.03

[a,b] means with different superscripts are (P<.05) different.

[c] age x starting date interaction (P<.05).

Table 3.Carcass backfat and yield grades for calves and yearlings fed rations containing dry-rolled (DR) or steam-flaked (SF) corn[b].

	Calves		Yearlings		
Item	DR	SF	DR	SF	SEM
Backfat, cm	.35[a]	.34[a]	.40[a]	.48[b]	.02
Yield grade	2.37[a]	2.23[a]	2.35[a]	2.64[b]	.10

[a,b] means with different superscripts are (P<.05) different.

[b] age x ration interaction (P<.05).

Table 4.Carcass backfat for cattle entering the feedlot in July (JULY) or September (SEPT) fed rations containing dry-rolled (DR) or steam-flaked (SF) corn rations

	July		Sept		
Item	DR	SF	DR	SF	SEM
Backfat, cm	.84[a]	.1.07[b]	.84[a]	.84[a]	.05

[a,b] means with different superscripts are (P<.05) different.

[c] starting date x ration interaction (P<.05).