

Traits of Cattle That Hit the Quality Target
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Overview

Acceptance rates for cattle qualifying for the *Certified Angus Beef*[®] (CAB[®]) brand have been in a gradual decline for several years, along with a nationwide drop in beef carcasses reaching the USDA Low Choice quality grade. In 1999, CAB[®] acceptance rates stood at nearly 20% of all predominantly black-hided slaughter cattle harvested at CAB[®] licensed packing plants. In 2005, those rates have dropped four and one-half percentage points to 15.5%. Likewise, the percentage of cattle grading USDA Low Choice or better have declined from 96.9% in 1986 to 62.8% in 1996 to 60.3% in 2005. Concomitantly, the number of USDA Yield Grade 4 carcasses has increased by forty percent. Many of the reasons why these phenomena has occurred in the industry are covered by a white paper by Larry Corah, vice-president and Mark McCully, director of supply development at Certified Angus Beef LLC. However, we also wanted to examine the factors that affect CAB[®] acceptance rates within our own database of carcass characteristics, production records, and financial indicators that separate high CAB[®] acceptance rate cattle (>30% CAB) from low acceptance rate cattle (<10% CAB).

Materials and Methods

Detailed carcass and production data from nearly 12,000 head of slaughter steers and heifers representing 134 lots of cattle harvested throughout 2005 were analyzed in this study. Heifers made up 14% of the total; steers 51%; and the remaining 35% were mixed sex lots. Seventy percent were classified as calves, and 30% as yearling cattle. The average lot size was 87 head, and there were 2.2 kill groups per lot. Cattle originated from 23 different states, with the majority (62%) coming from Kansas, Missouri, Nebraska, Oklahoma, and Texas. Data were sorted by CAB[®] acceptance rate classes. These classes were: Low (L), 0 to 9.9% CAB[®]; Medium (M), 10.0 – 19.9% CAB[®]; High (H), 20.0 to 29.9% CAB[®]; and Very High (VH), 30.0% and higher CAB[®]. We also looked at the effects of sire and dam, number of times implanted, potency of implants, sex, and weaning status.

Table 1. Effect of Sire Breed on CAB[®] Acceptance Rates.

	<u>Sire Breed</u>				
	<u>Solely Angus</u>	<u>Predominantly Angus</u>	<u>Brangus</u>	<u>Other Breeds</u>	<u>Unknown</u>
CAB[®] Acceptance Rate	27.5% ^a	18.7% ^b	10.6% ^b	13.8% ^{a,b}	11.3% ^b

^{a,b}Means with unlike superscripts differ, P<0.01

Table 2. Effect of Breed of Dam on CAB® Acceptance Rates.

CAB® Acceptance Rate	Breed of Dam			
	<u>Straight Angus</u>	<u>Angus Based</u>	<u>Non-Angus</u>	<u>Unknown</u>
	28.4% ^a	19.5% ^b	5.9% ^{a,b}	15.0% ^b

^{a,b}Means with unlike superscripts differ, P<0.01

It is clear that in fed cattle, those with the most Angus influence have a much greater probability of reaching the Modest⁰ marbling requirement to be accepted into the Program. Similar work at Iowa State University Extension’s Tri-County Steer Carcass Futurity has demonstrated that CAB® acceptance rates are more than 2.5 times greater in cattle that are more than 75% Angus, compared to those that are ¼ blood or less, and are nearly twice as likely to reach the marbling requirements as those that are between 26% and 75% Angus.

Effect of Implants on Quality Grade

Implants can adversely affect marbling deposition, but the degree to which it does may depend upon the number of times implanted and the potency of the implants used, timing, age of the animal at the time of implant administration, age at weaning, nutritional status, etc. We categorized implants in terms of “aggressiveness”, which effectively ranks implants by dosage and active ingredients. The implants were sorted with assistance from Dr. Chris Reinhardt, Kansas State University extension feedlot specialist, in following manner:

None – No implant given

Low – Ralgro, Synovex C, Component EC, Ralgro Magnum = potency score of 1

Medium – Synovex S,H, Component ES, EH, etc. = potency score of 2

Medium High – Finaplix S,H; Revalor IS, IH, Synovex Choice = potency score of 3

High – Revalor S,H; Component TES = potency score of 4

Very High – Syovex Plus; Revalor 200 = potency score of 5

A mean potency score was determined by assigning a potency score to each implant administered, adding the scores together (if multiple implants were given) and then divided by the number of times implanted. Example: if a steer were given Synovex S (score =2) followed by a Synovex Choice (score of 3), then $2 + 3 = 5/2 = 2.5$

To arrive at a “total implant potency score”, we multiplied the number of times implanted by the mean potency of the implant(s) used. Using the above example would result in a total implant potency score of 5 (2.5 mean implant potency score x 2). Tables 3 and 4 show these effects:

Table 3. Number of Times Implanted and the Effect on CAB[®] Acceptance Rates.

CAB [®] Acceptance Rate	Number of Times Implanted			
	0	1	2	3
	37.0% ^a	19.1% ^b	21.2% ^b	16.7% ^b

^{a,b}Means with unlike superscripts differ, P<0.05

Table 4. Total Implant Potency Score Effect on CAB[®] Acceptance Rates.

Total Implant Potency Score	CAB Acceptance Rate Group			
	0-9.9%	10.0-19.9%	20.0-29.9%	>30%
	4.31 ^a	4.19 ^a	4.17 ^a	2.53 ^b

^{a,b}Means with unlike superscripts differ, P<0.05

Carcass Merit

In terms of carcass characteristics, there were no significant differences among CAB[®] acceptance rates in hot carcass weight (P=0.48) or dressing percent (P=0.80). Ribeye area as measured in square inches, were smaller (P<.10) in the VH cattle than the L group, (Table 5), but did not differ from the M or H groups. The H cattle exhibited greater 12th/13th rib fat thicknesses than L and M, but were not different from the VH group, statistically. As a result, H had a greater percentage of Yield Grade 4 and 5 carcasses in the harvest mix. However, there were no differences between the L, M, and VH classes in those same measurements (Table 5). Marbling scores obviously increased in a linear fashion from lowest to highest acceptance rate groups (P<.10). It is worth noting that among the Yield Grade 4 and 5 carcasses, 43% of the H cattle and 61% of the VH group had enough marbling to otherwise have qualified to earn the CAB[®] brand. This may indicate that these cattle could have been harvested at lighter weights and fewer days on feed and received a premium rather than a discount. Only 18% and 22% of the two lower acceptance rate groups had enough marbling to otherwise qualify for the CAB[®] program.

Table 5. Carcass Characteristics

Item	CAB Acceptance Rate Groups			
	0-9.9%	10.0-19.9%	20.0-29.9%	>30.0%
Hot Carcass Wt., lbs	781.1	791.5	782.4	772.3
Dressing %	63.20	63.24	62.97	63.13
Fat Thickness, inches	0.51 ^a	0.52 ^a	0.60 ^b	0.56 ^{ab}

Rib eye area, sq. inches	13.15 ^a	13.10 ^{ab}	12.90 ^{ab}	12.78 ^b
Marbling Score*	1000 ^a	1030 ^b	1063 ^c	1102 ^d
% YG 4&5	11.3	9.9	19.1	11.0

*900 = Slight⁰, 1000 = Small⁰, 1100 = Modest⁰, 1200 = Moderate⁰, etc.

^{a,b}Means with unlike superscripts differ, P<0.10

Feedlot Performance

In the feedlot, most performance factors were similar among acceptance groups. In-weights, out-weights, and days on feed (DOF) were not different (P>.10). Likewise, average daily gains (ADG) and feed efficiencies (F:G) were the same (P>.10). The highest CAB[®] acceptance rate group had a lower cost of gain (P<.10), at 47.56 cents per pound of gain than the lowest acceptance rate group. The fact that these figures are statistically significant, may be surprising in some respects as the misconception often exists that higher quality-grading cattle must be on feed more days, and gain more slowly, becoming less efficient, and thus more expensive to feed. Table 6 below summarizes the data:

Table 6. Feedlot Performance

Item	CAB Acceptance Rate Groups			
	<u>0-9.9%</u>	<u>10.0-19.9%</u>	<u>20.0-29.9%</u>	<u>>30.0%</u>
In-weight, lbs	726.8	708.5	671.7	669.0
Final weight, lbs	1235.8	1245.9	1242.4	1223.2
Days on Feed	158	168	174	177
ADG	3.31	3.23	3.36	3.33
F:G	6.19	6.19	6.17	6.43
Cost of Gain, cents/lb	50.08 ^a	48.59 ^{ab}	48.59 ^{ab}	47.56 ^b

^{ab}Means with unlike superscripts differ (P<.10).

Summary:

- High percentage Angus genetics are more likely to achieve higher CAB[®] acceptance rates than are low-percentage Angus cattle. The effect of sire and dam on CAB[®] acceptance rate is significant.
- Implant potency and frequency of implants can and does negatively affect marbling scores, and subsequently, CAB[®] acceptance rates.

- Performance at the feedlot level (DOF, ADG, and F:G) does not differ among high- and low- CAB[®] acceptance rates in Angus-influenced cattle. High acceptance rate cattle perform similarly to low acceptance rate cattle, and have cheaper cost of gain.
- Carcass weight and dressing percent is similar among all CAB[®] acceptance rate groups. Rib eye area is slightly smaller in the highest acceptance rate group than the lowest acceptance rate group, but did not differ from the other two groups.
- CAB[®] acceptance rates may be improved by marketing cattle of known, high-percentage Angus genetics at fewer days on feed to avoid YG 4 discounts and, in turn, capture CAB[®] premiums.