



Commentary by **Steve Suther**

As the beef industry evolved in the last couple of decades, research looked into shortening the time from birth to harvest. It was an agenda put forth by Continental breeds that got too big for the system as traditional yearlings. Early studies reported a quality grade advantage for yearlings instead of “calf-feds,” or calves placed on feed shortly after weaning. That would be a challenge in today’s increasingly calf-fed, value-based market — if it proved true. It hasn’t.

When calves are born, environment and management are more likely to harm their beef quality potential than enhance it. Given enough rope, er, time, nature will hang their ability to hit a premium target. To start out, the typical owner has no plan for the calves beyond successful weaning. There’s little concern for when or even if they will be placed on a finishing ration, much less how they will grade. Enduring unknown challenges and weather extremes, they join millions of other commodity cattle.

As producers begin to create and manage calves for target markets, they find the most premiums associated with higher quality grades. Premiums may soon go to calf-feds as well, with increasing world demand for more youthful beef. Even without that bonus, the shift in price favoring grain instead of forage

and the time value of money add weight to recent evidence that there is no reason to subject any but the smallest-frame calves to a yearling phase.

When calves of known genetics and management go to a finishing ration shortly after weaning, they end up producing more tender, juicy and flavorful beef than that from yearling contemporaries. Research at the University of Nebraska shows calf-feds have a full marbling score advantage, with about the same yield grade as yearlings fed to a constant end point.

Data and trends

The industry has a hard time confirming changes in the balance of calf-fed vs. yearlings placed on feed. Only in-weights are reported in most systems, and as one Cattle-Fax analyst remarked, there are 700-pound (lb.) calves and 500-lb. yearlings.

However, the Certified Angus Beef LLC (CAB) Feedlot-Licensing Program (FLP) tracks age by description as well as weight. The FLP database of more than 780,000 head (see Fig. 1) shows a dramatic five-year movement from yearlings to calf-feds within the network of 80 licensed feedlots in 16 states. Moreover, the calf-feds outgrade yearlings in these predominantly Angus-influence cattle, with

20% more of them achieving *Certified Angus Beef*® (CAB®) brand acceptance at an average USDA Yield Grade (YG) of 2.64 for calves and 2.53 for yearlings.

The industry still blames much of the seasonal variation in quality grade on a shift to the calf-fed harvest. Such cattle predominate in April through June, when USDA Choice, Prime and CAB brand supplies dip. The logic fits, but the cause-effect relationship may have less to do with age than with environment and management.

Because of previous bias, many producers assumed the calf-fed route was only feasible with the largest-frame Continental breeds. The Angus breed is known for its ability to produce the most valuable beef carcasses in the industry, but that’s rarely due to carcass weight. As calf-fed incentives mount, some Angus producers are adding more traits to their balance beam — rapid early growth and early marbling deposition. Ultrasound data and coordinated management with feedlot partners may help.

Frame still delivers heavier carcass weights, but many of today’s Angus and Angus-influence cattle are competitive as calf-feds, considering quality grade grid premiums.

Research and resources

Land-grant colleges tend to research ways to make the most of local resources.

In the eastern Corn Belt, Ohio State University and University of Illinois animal scientists have not studied yearling beef production lately. Instead, they have developed programs for early weaning and placement directly on grain.

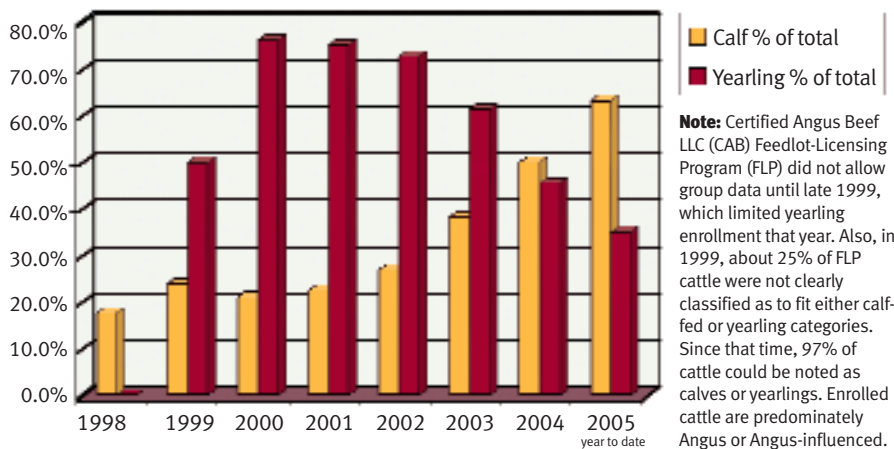
Conversely, University of Nebraska researchers have searched for ways to better use crop residues and forage resources in a slower route to the packinghouse. Studies have shown that British-breed heifers, managed as yearlings, can match marbling scores with Continental-base, calf-fed steers.

That could be construed as proof that just as calves can be managed for higher marbling, yearlings can be managed to not realize their marbling potential. What happens when we compare apples to apples?

Results of a two-year study of $\frac{3}{4}$ -British, $\frac{1}{4}$ -Continental herdmates fed to a constant finish were published in the 2004 *Nebraska Beef Cattle Report*. Calf-fed marbling scores averaged 454.1 vs. 346.1 for yearlings (Small = 400-499), with an average yield grade of slightly less than 3.5 across the board (see Table 1).

To study tenderness, strip steaks from all were aged seven, 14 and 21 days before freezing and later cooking to a uniform degree of doneness. After the shortest period of aging — similar to that found in the retail supermarkets — calf-feds had an advantage

Fig. 1: In the CAB database of 1.1 million predominantly Angus-influence feedlot cattle, this decade has seen a clear preference for calf feeding instead of yearlings.



in tenderness (see Table 2). The calf-fed 7.27-lb. Warner-Bratzler shear force (WBSF) value at seven days declined favorably to 6.15 lb. after 21 days, the amount of aging required for yearling beef to reach the 7.5-lb. mark.

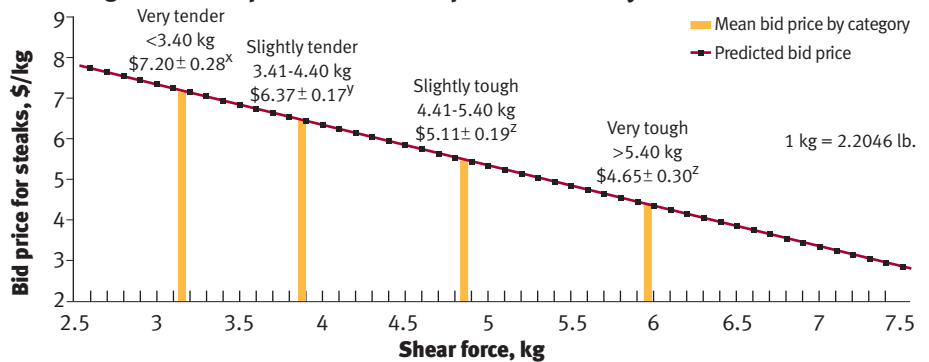
Retail perspective

What do those numbers mean? The study uses a broad WBSF range between 6.6 lb. and 10.5 lb. as “intermediate,” with scores below that range called tender and those above it tough. By that yardstick, there was little difference, but the study calculated a probability table for tender to tough, aged seven to 21 days, for calf-feds and yearlings (see Table 3).

In that retail world of seven-day aging, yearling beef was 15 times more likely to produce a tough steak than the calf-fed herdmate. Even after 21 days, calf-fed beef was more than three times more likely to yield a tender steak than that from yearlings. Although the study cites earlier work that did not find such a problem with toughness, it refers to that 1995 study with obvious breed differences.

Moreover, a 2004 Colorado State University study that linked consumer willingness to purchase with WBSF values found that samples below 7.5 lb. were considered very tender, while those above 9.7 lb. were considered slightly tough (see Fig. 2; note 1 kg = 2.2046 lb.). By that yardstick, the Nebraska WBSF values take on a new significance. And,

Fig. 2: Least squares mean bid price for steaks stratified by Warner-Bratzler shear force marketing classes and predicted mean bid price for steaks by mean WBSF value



^{x,y,z}Means that do not have a common superscript letter differ (P<0.05).

Source: “Effects of marbling and shear force on consumers’ willingness to pay for beef strip loin steaks,” 2005, Colorado State University.

even when quality grade was held constant, a consumer taste panel rated the calf-fed beef more acceptable overall in the Nebraska study.

Clearly, when cattle are not specifically intended for either a calf-fed or yearling route, yearlings lose the quality game. But what about profitability? And what about herds managed for certain targets? Again, some of the answer comes from Nebraska.

Economics

In a three-year study published (2005) in the *Journal of Animal Science*, Nebraska calf-fed steers from a cow herd reliant on harvested feed were compared to yearling-fed steers from a more extensively managed herd. Other than management, the cows were similar composites mated to Hereford-Angus-cross bulls.

In the real world, of course, producers may pursue goals that bring differences from

ability to adapt to a system. They also may choose to calf-feed steers from either type of system. That’s a significant point, because calves from the lower-input herd in this study that go on to become yearlings begin with a 5¢ lower breakeven in the financial analysis.

There’s an economic- and financial-basis crunch of the numbers. The latter shows a higher cost of production for calf-feds that may not exist for all herds. In the economic analysis, based on market opportunity costs, the main difference is final weight. Yearlings fed to the same finish as calf-feds ended up with a 250-lb. weight advantage that gave them the profit advantage in the live cash market.

However, when calf-feds were sold on a value-based grid, they were not at a disadvantage to yearlings. Data from two of the three years in the most recent Nebraska study show an overwhelming quality grade increase for calf-feds (see Table 4).

They graded so much better as to overcome that 155-lb. carcass weight deficit. In the feedlot they did not gain as rapidly, but they gained more efficiently as a tradeoff.

The bottom line? Yearlings still work on the ranch, often returning as much or more than the alternative rush to the feedlot. But, that may not hold water in the long run, as the industry becomes more responsive to consumer demand. Today’s data says the more you focus on premium value targets, the more it makes sense to take the calf-fed route.

Table 1: Carcass characteristics from calf- and yearling-finished steers

Trait	Calves	Yearlings
Hot carcass weight, lb.	695.7	828.0
Fat thickness, in.	0.55	0.51
Adjusted fat thickness, in.	0.59	0.56
Ribeye area, in.	11.28	12.56
Kidney, pelvic and heart fat, %	2.33	2.07
Yield grade	3.49	3.46
Marbling score ^a	454.1	346.1

^aMarbling score: Modest = 500-599; Small = 400-499; Slight = 300-399.

Source: “Carcass Traits and Palatability Attributes of Herdmates Finished as Calves or Yearling Steers,” 2004 Nebraska Beef Cattle Report.

Table 2: Warner-Bratzler shear force values, in lb., for steaks aged 7, 14 or 21 days from calf- and yearling-finished steers

Age, days	Calves	Yearlings
7	7.27	9.00
14	6.76	8.24
21	6.15	7.49

Source: “Carcass Traits and Palatability Attributes of Herdmates Finished as Calves or Yearling Steers,” 2004 Nebraska Beef Cattle Report.

Table 3: Risk probability for Warner-Bratzler shear force values of strip steaks from calf- and yearling-finished steers (percentages)

Age, days	Calves			Yearlings		
	Tender	Intermediate	Tough ^a	Tender	Intermediate	Tough
7	41.00%	57.08%	1.92%	8.11%	62.68%	29.20%
14	52.81%	46.52%	0.67%	12.67%	75.44%	11.89%
21	69.68%	30.30%	0.02%	21.08%	74.90%	4.02%

^aShear force rate: <6.6 lb. = tender; 6.6 to 10.5 lb. = intermediate; >10.5 lb. = tough.

Source: “Carcass Traits and Palatability Attributes of Herdmates Finished as Calves or Yearling Steers,” 2004 Nebraska Beef Cattle Report.

Table 4: Quality grade of calf-feds vs. yearlings

Quality grade	Calves (n = 74)	Yearlings (n = 83)
Prime, %	1.4	0.0
Premium Choice, %	31.1	1.2
Low-Choice, %	33.8	14.5
Select, %	33.8	77.1
Standard, %	0.0	7.2

Source: 2005 Journal of Animal Science.