Evaluation of Cattle Earning Top Grid Premiums

Understanding how to create the highest-valued animals in the beef industry

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Introduction. As price premiums become more commonplace in the U.S. beef industry, producers of high-quality cattle are finding opportunities to earn greater returns. With approximately 70% of all fed cattle now marketed on carcass-merit grids and formulas, superior cattle now capture sizable premiums above the average market price---no matter whether that base market price is high or low. The fed cattle market has become structured such that it rewards the best cattle and discounts the worst. More dollars are paid for cattle producing carcasses that best meet packer brands and consumer demands. Lower quality cattle net fewer dollars when grid premiums and discounts are tallied. Today's fed cattle pricing system does an admirable job rewarding above-average cattle, while also creating a direct financial incentive for improvement in both genetics and management.

More telling is that feedyard managers are no longer surprised when some of their cattle earn a $50 to $75 per head premium over the grid/formula base price. With the right genetics and management, premiums this large (or even larger) are not only possible, they occur every day across our industry. Impressive carcass premiums can indeed be 'the icing on the cake' when matched up with good health, high rates of gain, and favorable feed efficiency in the feedyard.

What does it take to earn a large premium on today's grids and formulas? The obvious answer is high-quality cattle. However, not all producers understand what that means. The purpose of this study is to analyze cattle that earned a $100 per head or larger premium when sold on an industry grid. Such elite cattle have a story to tell and a lesson to teach. What these cattle did right is worth understanding. It can help most producers create more valuable cattle. An oft-quoted phrase says to "learn from the best." That is the precise purpose of this research.

Methods. Grid results on fed cattle earning $100 or more per head above the live market at the time of harvest were obtained from a variety of industry sources. These include feedyards, seedstock and cow-calf producers, one breed association, and one producer/packer organization. Data was drawn from the standard "kill sheet" results accompanying each group of cattle sold on a grid or formula. Besides the $100+ per head grid premium requirement, qualifying cattle must have been marketed in groups containing at least 30 head. Steers, heifers, and mixed-sex groups were accepted. Only conventionally fed cattle harvested from 2011 though 2014 were included in the research. Natural and non-hormone-treated cattle (NHTC) were excluded.

The collected data was entered into standardized fields by category, making it suitable for various types of evaluation. All statistical analysis and summarization was conducted by the authors.

Data Overview. A total of 146 groups of cattle (15,164 head) were represented in the final database used for evaluation. Mean group size was 104 head, ranging from a low of 32 to a high of 533 head. Steers comprised 47.3% of the total groups, with heifers at 37% and mixed groups 15.7%. Cattle were marketed on numerous different grids to four major packers throughout the Central Plains region.

The table below presents a summary of the database by category. Overall average values across all cattle in the dataset along with highs and lows for each data field are shown.

Cattle contained in the analysis earned a very impressive average premium of $125.04 per head versus the live market at the time they were harvested. This equates to a 7.2% value-per-head advantage compared to the average market. Such a sizable premium suggests these cattle ranked in the top few percentage points (likely the top 1%) for most valuable animals produced in the U.S. beef industry during recent years.

Top Grid Cattle Evaluation: Overall Data Summary

Category	Units	Average/Total	Maximum	Minimum
Date Harvested	mm/dd/yy	7/4/2013	10/2/2014	10/25/2011
Head Count	head	15164	533	32
Live Weight	pounds	1326	1584	1062
Hot Carcass Weight	pounds	863	1013	692
Dressing Percentage	%	65.10	67.73	61.00
Dressing Percentage Advantage	%	1.81	4.11	-2.18
Prime	%	12.15	90.55	0.00
Combined Prime & Choice	%	90.13	100.00	53.02
Certified Angus Beef*	%	42.14	75.10	4.65
Low Choice Branded	%	15.87	65.83	0.00
Select	%	9.87	46.98	0.00
Standard	%	0.23	4.84	0.00
Hardbone	%	0.17	3.97	0.00
Dark Cutter	%	0.17	4.05	0.00
Yield Grade 1	%	3.77	22.92	0.00
Yield Grade 2	%	31.38	74.46	2.68
Yield Grade 3	%	49.29	73.04	12.77
Yield Grade 4	%	14.01	39.83	0.00
Yield Grade 5	%	1.53	13.84	0.00
Light Weight Carcass	%	0.07	1.88	0.00
Heavy Weight Carcass	%	1.84	26.82	0.00
Total Premium	$ per head	125.04	196.98	100.24
Choice/Select Spread	$ per cwt.	10.77	21.65	1.10

*Includes a small number of other upper 2/3 Choice brands.

Results. A review of the traits/characteristics that propelled this elite group of cattle to the top of the market distills into four major observations. These top grid-performing cattle demonstrated:

      (1)   Superior quality grades and quality-oriented brand premiums
      (2)   Above average dressing percentages
      (3)   Industry average yield grades at best
      (4)   Small percentage of non-conforming carcasses (other than Yield Grade 4s)

These results are consistent with the structure of virtually all industry grids. Sizable premiums are paid for high overall quality grades, as well as for specific premium brands, like Certified Angus Beef. Prime-grade carcasses garner significant premiums, some of the largest in fact, to be found on any grid. Lower numeric yield grades also pay premiums, though the extra value obtainable on cattle with a high percentage of Yield Grade 1s and 2s is typically less. Furthermore, the discount on Yield Grade 4s has become smaller over the past 10 to 15 years. Non-conforming carcasses, such as dark cutters, Standards, lights, and heavies are discounted substantially (often $20 to $30 per cwt.). Thus, keeping the percentage of these "outs" low is beneficial to the overall value of the group.

These factors are discussed individually in the sections that follow.

(1) Quality Grade. A major characteristic of top grid premium cattle is exceptionally high quality grades. Prime percentages are often 2 to 4 times higher (or more) than industry norms, which hover near 4% to 5%. Cattle in this study averaged 12.2% Prime grade carcasses. Prime carcasses bring $10 to $25 per cwt. over Choice, so the premium dollars add up quickly on the upper end of the quality grade spectrum.

Certified Angus Beef® percentages are also high in cattle earning premiums of $100 or more per head on the grid. With an average of 42.2% qualifying for this well-known branded beef program, top-grid cattle evaluated here were well above the average Certified Angus Beef acceptance rate of 26% on black-hided cattle.

Across all 146 groups in the study, combined Prime and Choice grades averaged 90.3%. Select grade carcasses came in just under 10%. Standards were miniscule at 0.23%. The U.S. beef industry averages from 68% to 73% Prime and Choice. Select grades represent 24% to 29%. Standards generally run from 4% to 6%. Thus, top grid premium cattle, on average, were approximately 20-percentage points better for the top two quality grades compared to average cattle.

Marbling is an important key to unlocking grid marketing success!

Another way to evaluate the impact of high quality grades on overall grid premiums is to make comparisons on cattle within the database compiled for this study. All of these cattle deserve a purple ribbon, but some did earn larger premiums than others. The table

below profiles the top 30 groups with the highest grid premiums against the lowest 30 lots. This is like comparing a group of college football players (exceptional athletes) to professional players (super-elite athletes). The bottom 30 lots graded well---87.3% Prime and Choice---and they earned $102.44 per head grid premium. Not bad by any perspective. Yet the top 30 lots did even better, earning a huge premium of $163.62 per head. Note that average quality grades among the top 30 lots were higher as well. They had more Primes (18.3% vs. 10.2%) and more Certified Angus Beef qualified carcasses (47.7% vs. 41.2%). They also had fewer low Choice carcasses and fewer Selects and Standards.

Top Grid Premium Earning Cattle (2011-2014) ------Highest and Lowest Premium Cattle in the Overall Dataset------		
	Top 30 Lots	Bottom 30 Lots
Total Lots	30	30
Total Head	1730	3689
Average Lot Size	58	123
Live Weight	1320	1321
Hot Weight	864	856
Dress Percent	65.40	64.81
Dress Percent Advantage	1.84	1.79
Prime	18.33	10.12
Choice & Up	96.37	87.32
Certified Angus Beef	47.72	41.21
Other Branded	18.24	16.02
Low Choice	30.32	35.99
Select	3.63	12.68
Standard	0.06	0.35
Hard Bone	0.03	0.16
Dark Cutter	0.00	0.21
YG1-YG3	87.15	84.51
YG1	2.99	3.11
YG2	32.63	30.97
YG3	51.53	50.44
YG4	11.72	14.10
YG5	1.13	1.29
Lights	0.12	0.08
Heavies	2.00	2.52
Non-YG4 "Outs"	3.34	4.60
Live Premium (per head)	**$163.62**	**$102.44**

The takeaway message is that high quality grades are closely associated with winning on the grid. Cattle with superior marbling genetics are much more likely to earn significant premiums. They have what the market pays extra dollars to get.

Choice/Select Spread. Variability in the Choice/Select spread impacts the "reward" received when harvesting high-grading cattle. When the Choice/Select spread is wide, premiums on Choice-grade carcasses will be larger. Conversely, when the spread is narrow, grid premiums on high-percentage Choice cattle are smaller. Some industry participants have used this fact to argue against putting major emphasis on marbling in genetic selection. Sometimes marbling pays and sometimes it does not, according to this line of thinking. No reason to make a big deal out of it.

Data on the 146 groups of cattle in this evaluation point to a different conclusion. First, the statistical correlation between grid premiums and the Choice-Select spread is +0.18. This is a positive relationship, but not especially strong.

Further insight can be gained by dividing the database into a wide-half and narrow-half for the Choice/Select spread. How much difference in grid premium can be observed between cattle that sold when the Choice/Select spread was at its widest 50% versus those selling when the spread was in the narrowest 50%? The answer is some, but not too much (see table below). Cattle that sold when the Choice/Select spread was fairly wide at $14.57 per cwt. earned only $7.25 additional grid dollars compared to those selling when the spread was not so wide ($6.96 per cwt.).

Premiums When the Choice/Select Spread is Wide versus Narrow		
	Average Choice/Select Spread (cwt.)	Average Grid Premium (per head)
Wide Choice/Select Spread*	$14.57	$128.67
Narrow Choice/Select Spread*	$6.96	$121.42
*Each group represents 73 lots, or exactly half the cattle in the database.		

Also worth recognizing: 22 of the 146 (15%) groups studied here earned a $100 or more per head premium when the Choice/Select spread was less than $5 per cwt. This illustrates that high-grading cattle can pay quite well, even when the price difference between Choice and Select is not especially wide.

How can cow-calf producers use this information to make their cattle more valuable?

Answer: By building high-marbling genetics into their herds.

(2) Dressing Percent. Feedyard managers appreciate cattle that produce high dressing percentages, which is defined as carcass weight as a percentage of live weight. The cattle in this study beat the grid base dressing percentage by an average 1.81 percentage points. They dressed at 65.1% versus a base of 63.29%. With a live weight of 1,326 pounds, that dressing percentage advantage amounts to an 'extra' 24 pounds of carcass weight. See table below. Those additional pounds add value to the bottom line when marketing finished cattle on a grid, and contribute significantly to the premium cattle earn compared to if they had been sold on a live weight basis.

Evaluation of Superior Dressing Percentage			
	Dressing Percent	Live Weight (pounds)	Carcass Weight (pounds)
High-Premium Cattle*	65.10%	1326	863
Average Cattle (grid base)	63.29%	1326	839
Difference	1.81%	0	24
*All 146 lots in current study.			

Higher than average dressing percentages are favorable, but the more difficult question is figuring out how to obtain them. Dressing percentage is different than a trait like marbling, because there are a number of different genetic and management factors (many of which are not under the cow-calf producer's control) that determine whether the final outcome is favorable or not.

Below is a list of factors that positively influence dressing percentage:

    (1)   Adequate time on feed—more days on feed is beneficial
    (2)   Lighter placement weights
    (3)   Muscle—more muscle is helpful
    (4)   Degree of finish—adequate finish is necessary
    (5)   Beta agonists
    (6)   Limited feeding prior to harvest, which reduced fill loss
    (7)   Pencil shrinks—influence the mathematical outcome
    (8)   Moderate bone size

Feedyards control many of these factors, and they know how to manage them for a positive advantage. For example, we see very few grid cattle marketed without enough days on feed. The near ubiquitous use of beta agonists also speaks to cattle feeders' desire for greater efficiency, heavier carcass weights, and higher dressing percentages. Cow-calf producers can be confident that whoever feeds their cattle will work very hard to maximize live and carcass value in every reasonable way they can. This is true whether or not the rancher has retained ownership.

So how can cow-calf producers use this information to make their cattle more valuable?

Genetic selection for heavier muscling is an obvious starting point. A good rule of thumb is to select muscling in the top half of the bell curve within each respective breed when purchasing bulls. For lighter muscled breeds, staying in the top 25% could be advantageous. Selecting bulls with superior ribeye area expected progeny differences (EPDs) can add muscle and favorably impact dressing percentage.

Another positive action is to avoid extremely heavily-boned animals in breeds that are larger-boned to begin with. Medium bone size is almost always the right target. Fine-boned cattle are discriminated against by most feedyard operators, because their time-tested perception is that such cattle lack performance. On the other end of the spectrum, very large-boned cattle often produce less carcass weight per pound of live weight, because the legs and head are removed before the carcass is weighed. Thus, middle-of-the-road bone size is most favorable.

The final consideration for producers is to sell feeder cattle before they get too big. Cattle feeders get concerned that they can not feed heavy yearling feeder steers long enough to get them to reach a suitable dressing percentage. The well-founded thinking is that these cattle will get too big before they have enough days on feed to make them dress adequately. How big is too big for feeder cattle? Many feedyards draw the line at 900 to 950 pounds for steers, and that holds true only for cattle with strong growth genetics. The boundary for heifers is roughly 100 pounds less (800 to 850 pounds). Lower-growth cattle should be placed on feed at lighter weights, allowing them to be fed for enough days before they reach what will invariably be a lighter finish weight compared to cattle with better growth genetics.

(3) <u>Yield Grade.</u> USDA stopped reporting cattle yield grades at the end of 2010. The high-premium cattle in this study were harvested from October 2011 to October 2014. A direct benchmarking of yield grades, therefore, is not possible for the appropriate time slot. The chart below illustrates how the high-premium cattle match up with industry-wide yield grades for the entire year of 2010. Conversations with packers suggest that overall yield grades have not improved during recent years. They have probably worsened somewhat as corn prices have declined. Because of this trend, the comparison versus 2010 likely shows larger and differences than would be the case if industry-wide yield grade data was available from recent years.
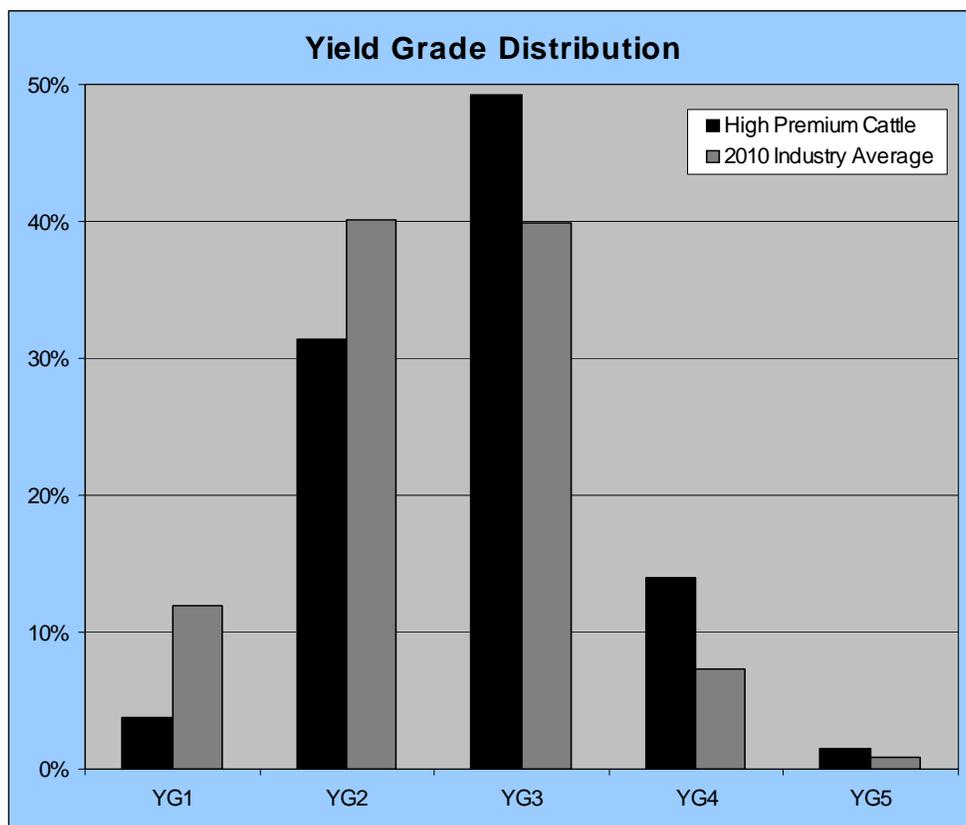
Very clear, however, is that the high-premium cattle in this study were not superior for yield grade. They produced fewer Yield Grade 1s and 2s and more Yield Grade 3s, 4s, and 5s. The observable 'bell curve' is shifted in a less favorable direction (rightward) versus industry average in 2010. Only 33 of the 146 high-premium lots (23%) had more than 52% combined Yield Grade 1s and 2s, which was the average in calendar year 2010.

Why did this occur? This is an important question, because cattle feeders have significant control over yield grades on cattle they market from week to week and month to month. If they encounter too many yield grade 4s and are being discounted too much

on the grid, they can reduce days on feed and fix the problem in short order. Later groups of cattle they sell will not experience as many discounts for yield grade. It is a managable 'problem' to have a yield grade distribution that is shifted unfavorably. Simply shorten days on feed.

However, that did not happen here. The high-premium cattle in this analysis were fed longer for a specific purpose. Their yield grade results were intentional.

The ideal carcass endpoint for cattle selling on grids is reached with three to four more weeks on feed compared to cattle sold on a live weight basis. This results in a less than ideal yield grade profile, but it improves dressing percent, adds saleable pounds of carcass, and helps insure maximum quality grade potential is reached. Cattle feeders have concluded that the benefits of this added time on feed outweigh the costs, with one of those costs being fewer Yield Grade 1s and 2s and more Yield Grade 3s and 4s. For cattle possessing high marbling potential (like those in this study), a longer feeding period offers greater value creation and profit-maximization opportunity, even though the result is a less favorable yield grade mix.

Yield Grade Distribution

Legend:
- High Premium Cattle
- 2010 Industry Average

Yield Grade	High Premium Cattle	2010 Industry Average
YG1	~4%	~12%
YG2	~31%	~40%
YG3	~49%	~40%
YG4	~14%	~7%
YG5	~1.5%	~1%

How can cow-calf producers use this information to make their cattle more valuable?

As discussed in the previous section, selecting cattle with above-average muscling is beneficial. Cattle with more inherent muscle can be fed longer without creating as many

yield grade discounts. Light-muscled cattle, even if they have high marbling potential, can be problematic on grids. They must be marketed with fewer days on feed, and at lighter weights, to avoid excessive Yield Grade 4s.

Small-framed cattle are also difficult to manage from a yield grade standpoint, and should therefore be avoided. These cattle finish at weights too light to make them fit standard feedyard practices. Over-feeding and significant yield grade discounts are common with smaller-statured animals. This happens because cattle feeders face the financial difficulty of trying to make them heavy enough to attain a reasonably low breakeven. Smaller, quick-finishing cattle grouped in a feedlot pen with mostly average-size cattle are also problematic. They must be sorted off early and sold, or yield grade problems are almost certain to arise.

(4) <u>Non-Conforming Carcasses</u>. Avoiding discounts is an important part of earning a large grid premium. Excluding Yield Grade 4s, which are not discounted as much as other non-conforming carcasses, the 146 premium-dollar lots in this study had 4.0% "outs." Average cattle often run 6% to 10% for the same categories of non-conforming carcasses.

> *The correlation between grid per head premium and non-conforming carcasses in this research was -0.18. Premiums get smaller as non-conformance rises*.

Large discounts are applied to carcasses classified as Standards, heavies, lights, dark cutters, hard bones, and stags/bulls. Such discounts normally generally range from $20 to $30 per cwt. on a carcass weight basis, which is equivalent to $200 or more per head in most cases. Such large value subtractions add up quickly and can hurt the premium potential of any pen of cattle unless kept to a minimum.

Sorting cattle at the feedyard is one effective method to combat some types of non-conformance. Weight sorting at the time of placement and/or later in the feeding period can help avoid heavy and light carcasses, as well those that would become excessively fat and be discounted for inferior yield grade. The percentage of Standards (carcasses with near-zero marbling) can sometimes be helped by sorting systems that insure every animal is adequately finished.

Among the many feedyards regularly marketing cattle on grids and formulas, a variety of sorting and management practices designed to reduce non-conformance are utilized. Some approaches are simple, others very sophisticated and technical, but the goal is always to avoid discounts. Dark cutters are stress-induced, and can often be minimized by using low-stress cattle handling and assuring short stand times prior to harvest.

Cattle feeders can effectively manage many categories of non-conformance, but there are limits. They cannot change cattle age, nor can they add genetic marbling potential. Cow-

calf producers also play a role in helping to avoid carcass discounts, even though they may have sold their cattle months earlier.

Four actions individual cow-calf producers can take:

---Create as much weight and frame-size uniformity as possible in groups sold off the farm/ranch. This can be accomplished through shorter calving seasons, standardized genetic inputs, and sorting prior to when the feeder calves are sold.

---Positive selection for marbling will help minimize Standard grade carcasses.

---Selection for growth traits coupled with good nutrition and management allows calves and feeder cattle to reach acceptable market weights well before they run the risk of producing "aged" carcasses subject to discounts.

---Select and propagate good-disposition cattle. Docile cattle run a lower risk of producing dark cutting carcasses.

These factors will not solve all the problems associated with non-conformance, but can assist feedyards in avoiding big discounts.

Summary/Conclusion. Why would a cow-calf producer want to produce cattle capable of earning a large grid premium like those discussed here? The obvious answer is that they too can be paid more. Cattle feeders bid aggressively on feeder cattle and calves they know will perform well in the feedyard and earn significant premiums on the grid. Further, there are a growing number of marketing programs that can help producers capture higher prices for their certified-superior feeder calves.

The feeder cattle and calf market is not perfect. But more and more, premiums received at the fed cattle level are being passed directly back into the feeder and calf market. Today's cattle market is getting better aligned from top to bottom, with superior cattle bringing the highest prices throughout the supply chain. Look for this to improve further in the years ahead. The rewards are destined to grow for cow-calf farmers and ranchers that produce truly superior calves.

The elite grid-premium cattle analyzed in this study provide a template for creating industry-topping value. In the simplest terms, the high-premium cattle researched here possessed (1) extreme marbling, (2) good muscling, and (3) a healthy dose of uniformity. These cattle were obviously produced by ranchers and farmers who understand the traits and characteristics needed to win big in today's market place. We can now follow the trail they have blazed and make it a well-traveled highway.

Appendix

What About Cow Traits? Many will ask if it is possible to maintain a functional, range-adapted cowherd, while simultaneously producing calves that excel both in the feedyard and on the grid. An adapted female is clearly the foundation of cow-calf profitability. We need cows that maintain body condition and breed back on time year after year. However, added revenue and profit opportunity can be gained by building on that foundation through simultaneous selection for positive growth and carcass traits.

In today's beef industry, there is no need to consider maternal and terminal traits as an either/or proposition. By utilizing the available genetics tools and making wise selection and mating decisions, it is quite possible to build cattle that perform well in all areas of economic importance. Maternally-oriented cows producing calves genetically programmed to succeed in the rest of the beef supply chain? Yes, it can be done.

For example, consider the package of traits offered by the Angus bulls shown in the table below. These seven sires were selected from the Angus offering of a major A.I. company. Emphasis was placed on calving ease, moderate mature size, and top-shelf growth and carcass traits. Results are worth studying. On average, these sires deliver terminal traits (captured by the American Angus Association's $Beef index) in the top 5% of the breed, while ranking high for calving ease *AND* holding mature cow size in check. Heifers by these sires would mature smaller than average for both weight and height (for some producers, they might be smaller than desired). Their steer mates, on the other hand, would go into the feedyard and gain fast and efficiently before hanging up well-above average carcasses. They would very likely earn a solid grid premium as well.

Angus 7-Sire Average*	Average EPD/Index	Breed Rank
Calving Ease EPD	11	Top 10%
Mature Weight EPD	-5	Bottom 12%
Mature Height EPD	-0.1	Bottom 10%
Heifer Pregnancy EPD	10	Top 37%
$Beef Index	$112.33	Top 5%
*Milk EPDs ranged from the top 1% to bottom 5%.		

Further, these bulls offer Milk EPDs ranging from the bottom 5% to the top 1% of the Angus breed. Along with moderate mature sizes and excellent terminal traits, daughter's milking ability can be matched appropriately to available feed resources, whether scarce or abundant.

Other breeds offer many of these EPDs as well. So there is little need to sacrifice maternal ability for terminal traits, or vice versa. Creating cattle that perform on the ranch, in the feedyard, and on the grid is fully within the reach of U.S. cow-calf producers.

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