72nd Annual Florida BEEF CATTLE SHORT COURSE

Adding Value Through Nutrition and Management

Florida Beef Cattle Short Course

UF

Proceedings

May 10-12, 2023

UF/IFAS Department of Animal Sciences

UF | IFAS Extension
UNIVERSITY of FLORIDA

Alto and Patricia Straughn IFAS Extension Development Center
Gainesville, Florida

UF UNIVERSITY of FLORIDA
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Department of Animal Sciences

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Welcome to the 2023 Florida Beef Cattle Short Course!

The 2023 Florida Beef Cattle Short Course Program Committee and the Department of Animal Sciences would like to welcome you to this year's Short Course. We look forward to this week every year in anticipation of delivering the premier educational event for beef cattle producers in the Southeast. We hope that you enjoy the program and take away new knowledge about the beef cattle industry's future direction, decision-aid tools, and new information about management practices that impact your beef cattle enterprise.

This year's program is focused on ***nutritional and management strategies that can assist beef producers in adding value to their production while helping manage costs***. To develop the program, we reached out to experts in several universities across the U.S., as well as to industry leaders with ample experience in the beef cattle business for our plenary sessions. On Thursday, we will conduct a series of hands-on activities in our state-of-the-art Beef Teaching Unit. We will close the event with a Research Update session on Friday featuring short presentations on the latest research conducted in beef cattle. We are fortunate to be able to attract outstanding speakers at the Florida Beef Cattle Short Course, and we appreciate their time commitment to this event.

IMPORTANT: Please let us know how much you learned from the Short Course in the survey enclosed. The surveys are one of our key mechanisms to get your feedback about the quality and content of the Florida Beef Cattle Short Course. We appreciate and take to heart the feedback that we receive, and we use to improve our future programs. Please take a minute to complete the survey and voice your opinion.

The Organizing Committee is indebted to faculty, staff, students, and volunteers that were essential in the planning and execution of this event. Likewise, partnering with our valuable Allied Industry members we work to bring you a relevant and diverse Tradeshow. Thank you for attending the 2023 Florida Beef Cattle Short Course. We hope that the program exceeds your expectations and provides you with valuable information to impact your beef cattle enterprise. We have put a lot of effort into this year's Beef Cattle Short Course, and, on behalf of the organizing committee, we truly hope you enjoy it!

Best Regards,

Nicolas DiLorenzo
Chair, 2023 Florida Beef Cattle Short Course

Florida Beef Cattle Short Course
UF

72nd Annual Florida Beef Cattle Short Course

May 10 – 12, 2023

Presented by

Department of Animal Sciences

Institute of Food and Agricultural Sciences

University of Florida, Gainesville, Florida

2023 Florida Beef Cattle Short Course Committee

Nicolas DiLorenzo, Chair
Jason Scheffler, Vice Chair
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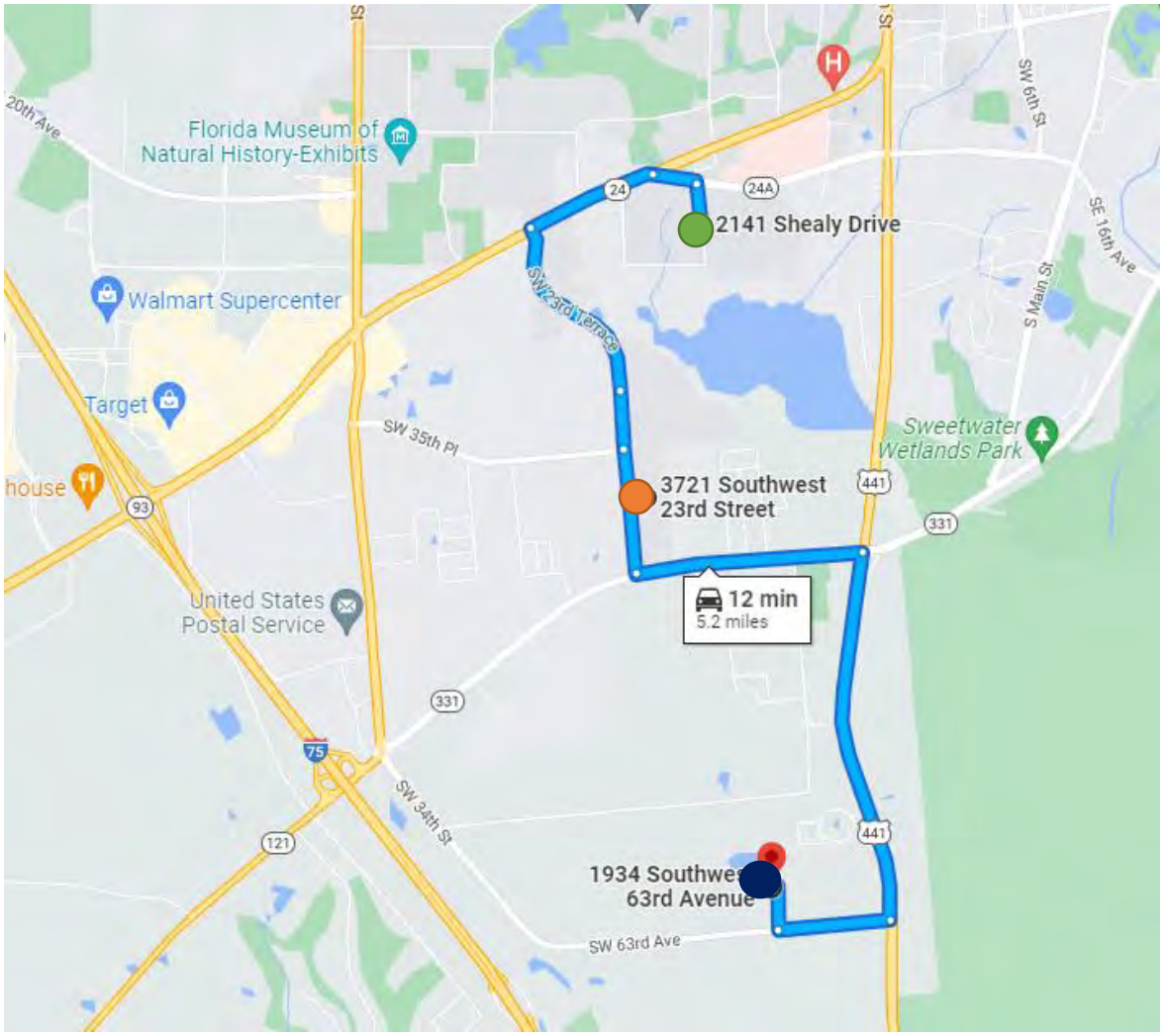

- Depart the Straughn Center, turn left on Shealy Dr. (0.02 mi)
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3721 SW 23rd St.

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- Turn right onto SW 63rd Ave/CR 23 (0.4 mi).
- Your destination is on the right. If you reach SW 21st Terr., you've gone too far.

1934 SW 63rd Ave.

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UF/IFAS Beef Teaching Unit
May 10-12, 2023

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University of Florida
72nd Annual Beef Cattle Short Course
Adding Value Through Nutrition and Management

Wednesday, May 10, 2023

12:00 Registration
1:00 Welcome
- *Dr. John Arthington*, Professor & Department Chair
- *Dr. Nicolas DiLorenzo,* Professor, University of Florida

1:15 Florida Cattleman's Association Welcome
- Rick Moyer, 2nd Vice President, Florida Cattlemen's Assoc.

1:30 Market Outlook
– *Trey Warnock, Amarillo Brokerage Co. LLC*

2:15 What do Feedlots Want from Florida Calves?
– *Alfredo DiCostanzo, University of Nebraska*

3:00 Refreshment Break
3:30 Capture More of Your Calves' True Value
- Paul Beck, Oklahoma State University

4:15 Is Cottonseed Going to Make My Bulls Infertile?
– *Lawton Stewart, University of Georgia*

LOCATION: UF/IFAS Beef Teaching Unit South

5:00 – 8:00 Cookout, Tradeshow, and Bull & Heifer Sale Preview

Thursday, May 11, 2023

8:30 Use of Brewery Byproducts in Beef Cattle Nutrition
– *Deidre Harmon, North Carolina State University*

9:10 Horn Flies and Their Impact on performance
– *Ted Burgess, University of Florida*

9:40 The True Value of Grain
– *Todd Thrift, University of Florida*

10:10 Refreshment Break
10:30 Beef on Dairy: The Dan Dorn's Perspective & Outlook
– *Dan Dorn, ABS Global Inc., Deforest, WI*

11:00 Opportunities to Add Value to Feeder Cattle
– *Jason Smith, Texas A&M University*

11:30 Travel To the UF/IFAS Beef Teaching Unit South

LOCATION: UF/IFAS Beef Teaching Unit South

12:00 Lunch
1:30 – 4:30 Rotations

1. Multibreed Herd & Cow Size – *Todd Thrift & Jesse Savell, University of Florida*
2. Liquid Feeds & Feed Delivery Equipment – *Nicolas DiLorenzo, University of Florida*
3. *Pasture Weed Management – Mark Mauldin, University of Florida*
4. *Hay Delivery Structures & Waste – Alfredo DiCastanzo, University of Nebraska*
5. *How Much Supplemental Feed do I Need? – Doug Mayo, University of Florida*
6. *Practical Feed Storage Options – Bob Simon, Furst McNess*

LOCATION: UF/IFAS Beef Teaching Unit South: UF/IFAS Horse Teaching Unit

5:00 Cocktail Hour & Tradeshow
6:00 Steak-Out & Tradeshow

Friday, May 12, 2023

8:30 Geonomics to Phenomics Integration to Predict Feed Efficiency in Beef Cattle: Year 2
– *Angela Gonella, University of Florida*

8:45 Updates on UF Brahman Project
– *Fernanda Rezende, University of Florida*

9:00 Improving Accuracy of Genomic Selection for Carcass & Meat Quality
– *Raluca Mateescu, University of Florida*

9:15 Algae as a Protein Supplement for Cattle
– *Nicolas DiLorenzo, University of Florida*

9:30 Predicting Puberty in Brahman Heifers & Bulls
– *Mario Binelli, University of Florida*

9:45 Fatty Acid Supplementation to Increase Pregnancy Rates in Multiparious Beef Cows
– *Philipe Moriel , University of Florida*

10:00 Refreshment Break

10:30 UF Gainesville Forage Breeding Updates
– *Esteban Rios, University of Florida*

10:45 Animal Performance & Methane Emissions of Cattle Grazing Stockpiled of Limpograss Under Different Supplementation Strategies
– *Jose Dubeux, University of Florida*

11:00 Impact of Individual Macronutrients on Broomsedge Densities in Bahia grass Pastures – *Brent Sellers, University of Florida*

11:15 Evaluating the Agronomic & Environmental Impacts of New FL-DEP Biosolids Rule
– *Maria Silveria, University of Florida*

11:30 Impact of Implant Strategy on Brahman Sired Steer Performance, Carcass Traits & Tenderness
– *Todd Thrift, University of Florida*

11:45 Screening of Bahia Grass Breeding Lines to Identify New Varieties for the Florida Cattle Industry – *Lynn SollenBerger, University of Florida*

12:00 Adjourn

Program Participants

Dr. John Arthington
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Market Outlook and Beef Industry Trends

Trey Warnock

Amarillo Brokerage Company LLC, Amarillo Texas

Introduction

Cattle and beef markets have been roiled recently by a variety of direct and indirect factors. Some of the drivers accelerating markets higher are related to fundamental developments, such as declining cattle supplies and sustained strong demand for cattle and beef. The head winds that may stall out current uptrend are related to macro concerns and potential economic slowdowns. Additionally, there are trends developing within the industry that are both intuitive and somewhat surprising. Consolidation continues to be a factor in every sector of the beef industry. Cattle production and processing margins have shifted substantially in recent years. Financial leverage has always been a force in the cattle business and in some spaces has increased to the detriment of producers. The type and kind of cattle desired has changed, carcass weights continue to trend higher, and days on feed has grown despite higher feed costs. Interest rates, after being an afterthought, have risen and become a real determinant of profitability in some cases. Finally, the cattle numbers have grown from our lows in 2014 to highs in 2019/2020. With larger supplies comes less volatility and seasonal markets. As we look towards shrinking numbers in front of us, leverage may shift in the producer's favor, profitability should improve, and basis should firm, but volatility could return.

Cow/Calf

Beef cow numbers have topped and are estimated to decline into early 2025. As a result of this the demand for calves and feeders will grow in the coming years. Cow/Calf operators should enjoy better than average profitability mid-term. Drought in some areas has lessened the demand for calves to graze, but other areas have received moisture and the markets are incentivizing producers to graze calves into the late summer and early fall. The downstream consolidation within the feeding space has in some cases created a less market signal sensitive operator. With this development we see feedyards remaining full and custom cattle feeders flush with investor feeders. Both factors will lead to strong calf demand as well as strong basis. We have learned over the last decade that uncertainty surrounding corn plantings are often overplayed and given the chance, the U.S. farmer can plant a lot of corn extremely quickly. Assuming we have tolerable moisture throughout the summer and fall, the corn supply should not be suppressing factor to calf and feeder values.

Cow prices for culls will be supported in the near-term by declining non-fed slaughter numbers increasing the value of lean trim. Furthermore, as we near the end of this current cattle cycle it is easy to see cull prices continuing to be supported as fed harvest increases and lean trim is being bid on by processors needing to blend grind. Replacement heifer and cow prices will inevitably increase and possibly at an aggressive pace when we see heifers being held back and supplies of quality replacement females decline. Some regions around the country are already seeing beef herd size increases but it remains tepid. We would expect that expansion begins in earnest by late 2024.

Stocker/Backgrounding

The stocker/backgrounding phase is typically the most consistently profitable sector of the business. Currently, the estimated number of feeder cattle and calves outside feedyards is the smallest since 2014 and some analysts expect the southern feeder values to move past the highs made in the 2014 market. Regionally, we are already seeing prices eclipse the 2014 move, but on average we remain below those levels. With that said the increase in calf prices may squeeze stocker margins over the next few years. Larger stocker operators have figured out ways to remain competitive and productive despite small grain or native grass grazing availability. The alignment across the industry as packers make relationships with feedyards and then feedyards form relationships with growers to secure placements has and will continue to be favorable for calf demand. This will be positively exacerbated in a market short of numbers.

Feedlot

The feedyard sector remains a necessary but challenging sector of the beef supply chain. Reductions in packing capacity in the south combined with increases in feeding capacity created a horrible leverage situation for cattle feeders in the recent past. Profitability has long been a problem for the feedyards and most recently has been worsened as processing margins soared. It was fundamentally inevitable that this was going to happen given the shift in capacity, but the extent of the move in packing margins was something many could not have ever imagined. Cattle on feed numbers remains quite large despite the market being hyper-focused on declining supplies. Prices paid for fed cattle have already surpassed the 2014 highs and are hovering near those records. Packer demand for fed steer and heifers is robust as they work to fill forward sold beef and the strong export market. Heifers on feed have not declined to a level to fully shift leverage back into the cattle feeder's hands, and dairy cross cattle being placed on feed seemingly snuck up on some market prognosticators.

Cattle feeding profitability turned into the black in August of last year and has essentially trended higher ever since. In the last 25 years the feeding business, on a cash-to-cash basis, has lost $36.00/hd. This has been a common phenomenon since company cattle feeding took over customer cattle feeding, and yardage was factored into the breakeven prices on placements. Margins should continue to improve going forward for cattle feeders and basis should strengthen.

Packer/Processing

Packers have enjoyed quite a run of extremely favorable profit margins because of a few key events and transitions that have been mentioned previously in this brief. Reducing processing capacity in the face of increasing bunk space and supplies forced positive margins into their hands. The late 2019 packing plant fire stirred up retail markets in a way that we have never witnessed. The results of the global health crisis in 2020 was the last shoe to drop and the market is just now normalizing to a degree. Every sector of the beef supply chain was disrupted and disjointed. The challenge to maintain an adequate workforce within plants was almost impossible for a sustained period. All the while, the demand for beef did not decrease but increased from hoarding and as an effect of economic stimulus. Regardless of one's outlook or position on processing margins, given these circumstances it was going to be very hard for processing margins to decrease.

Plans to increase processing capacity through the opening of new plants across the country have spiked in recent years. There are large plants being planned in the southern plains, central plains, and upper Midwest. It is unlikely that all these plants will be successfully opened and operated, however there will be some increase in hook space because of this push. The question will be, how will these plants operate differently than the large facilities we already have? Will they be able to form relationships and marketing channels to move beef and offal effectively? Will the increase in supply costs as well as interest rates change this? Finally, can these new plants survive the cattle cycle to come? In most cases the larger plants planned will likely open at or around the low water mark for fed cattle supplies.

Retail/Wholesale/Consumer

The consumption sector was equally if not more so impacted by the 2019-2020 supply chain disruptions. Some of this was an effect of market conditions and it is seemingly evident that some of it was a result of nefarious actions in the post-feeding phase. The demand for not only beef, but high-quality beef remains strong in the U.S. market space. The demand from international export markets has been extremely strong and only recently has shown some signs of slowing. If we see broad declines in domestic beef demand, it will likely result from declining U.S. economic growth and declines in international demand from sustained higher prices.

The U.S. consumer is rather fickle at times and although the beef business has enjoyed a strong uptick in consumption as well as appetite for choice/prime product, the devotion to beef as a center of the plate protein is thin for many consumers. The coming years may provide some insight into how elastic or inelastic the demand for our products is considering the cost is substantially higher than other competing proteins. Emerging economies and strong export partners will likely continue to desire U.S. beef well into the future.

Conclusion

Declining cattle numbers and robust demand will support prices in every sector of the beef industry for at least the next 3 years. Economic concerns around any level of recession will certainly be a risk for higher priced proteins. Each cattle cycle we rotate into and out of, we typically come back with a stronger herd from a performance and genetic standpoint. This allows the U.S. cattle producer, grower, and feeder to increase weights and do more with fewer cattle. At some point we will reach a critical low number that genetic advancement will not allow us to go below, but I do not think we are there yet. Finally, we have outlined the positive aspects that a liquidation phase of the cattle cycle provides to prices, margins, and leverage. It is, however, important to keep in mind that sound business decisions are still important when running our business and some form of risk management is likely necessary for producers and growers to avoid those unexpected market losses that stem from indirect and direct factors. All beef industry participants need to be monitoring market signals closely to determine when and where growth is necessary. The entire cattle and beef business is changing rapidly, the players are changing, and the standard operating procedures are evolving.

Table 1

Jan. 1 Cattle Inventory

	2016	2017	2018	2019	2020	2021	2022	2023	YOY, Hd	YOY	5 Yr Avg
All Cattle and Calves	91,888,000	93,624,600	94,298,000	94,804,700	93,793,300	93,789,500	92,076,600	89,274,100	-2,802,500	-3.0%	93,752,420
All Cows and Heifers that have Calved	39,476,200	40,539,200	40,898,300	41,044,100	40,681,300	40,286,000	39,360,100	38,320,400	-1,039,700	-2.6%	40,453,960
Beef Cows	30,163,800	31,170,700	31,466,200	31,690,700	31,338,700	30,843,600	29,983,100	28,917,900	-1,065,200	-3.6%	31,064,460
Milk Cows	9,312,400	9,368,500	9,432,100	9,353,400	9,342,600	9,442,400	9,377,000	9,402,500	25,500	0.3%	9,389,500
All Heifers 500 Pounds and Over	19,902,300	20,112,000	20,217,800	20,210,000	20,024,400	20,200,100	19,916,000	19,172,500	-743,500	-3.7%	20,113,660
For Beef Cow Replacement	6,335,200	6,363,200	6,108,200	5,884,900	5,808,900	5,803,100	5,481,500	5,163,700	-317,800	-5.8%	5,817,320
For Milk Cow Replacement	4,814,000	4,754,000	4,768,300	4,701,500	4,684,000	4,608,500	4,440,600	4,337,200	-103,400	-2.3%	4,640,580
Other Heifers	8,753,100	8,994,800	9,341,300	9,623,600	9,531,500	9,788,500	9,993,900	9,671,600	-322,300	-3.2%	9,655,760
Steers 500 Pounds and Over	16,305,400	16,373,500	16,528,200	16,757,700	16,541,200	16,787,800	16,704,700	16,131,600	-573,100	-3.4%	16,663,920
Bulls 500 Pounds and Over	2,137,400	2,243,600	2,252,300	2,253,000	2,237,400	2,210,500	2,109,600	2,029,000	-80,600	-3.8%	2,212,560
Calves Under 500 Pounds	14,066,700	14,356,300	14,401,400	14,539,900	14,309,000	14,305,100	13,986,200	13,620,600	-365,600	-2.6%	14,308,320
All Cattle on Feed	13,156,700	13,108,400	14,146,000	14,367,900	14,657,700	14,667,400	14,694,600	14,157,300	-537,300	-3.7%	14,506,720
Feeder Cattle Supply O/S Feedyards	25,968,500	26,616,200	26,124,900	26,553,300	25,724,000	26,214,000	25,990,200	25,266,500	-947,500	-3.6%	26,246,480
3-State Cattle Grazing on Small Grains	1,900,000	1,800,000	1,500,000	1,900,000	1,610,000	1,730,000	1,710,000	1,630,000	-80,000	-4.7%	1,690,000

Figure 1

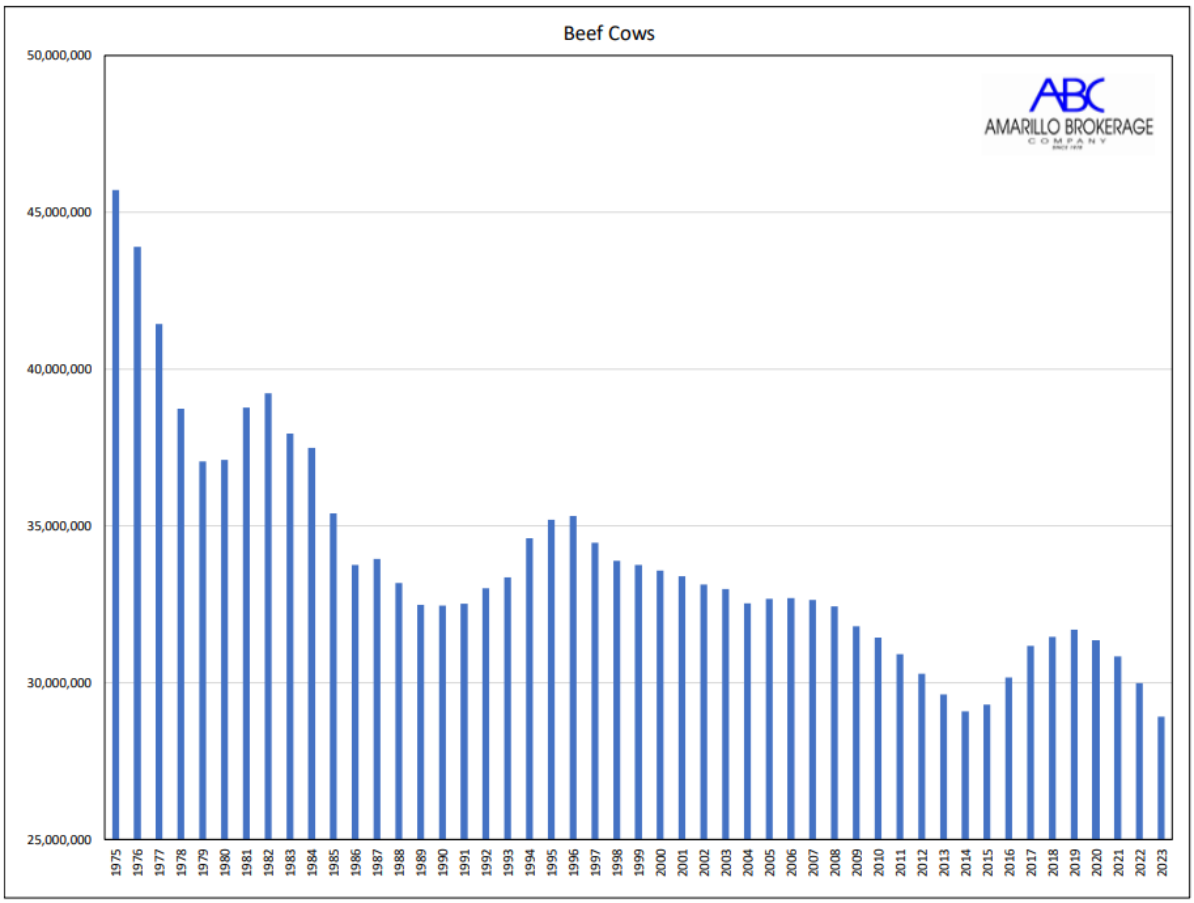


Figure 2

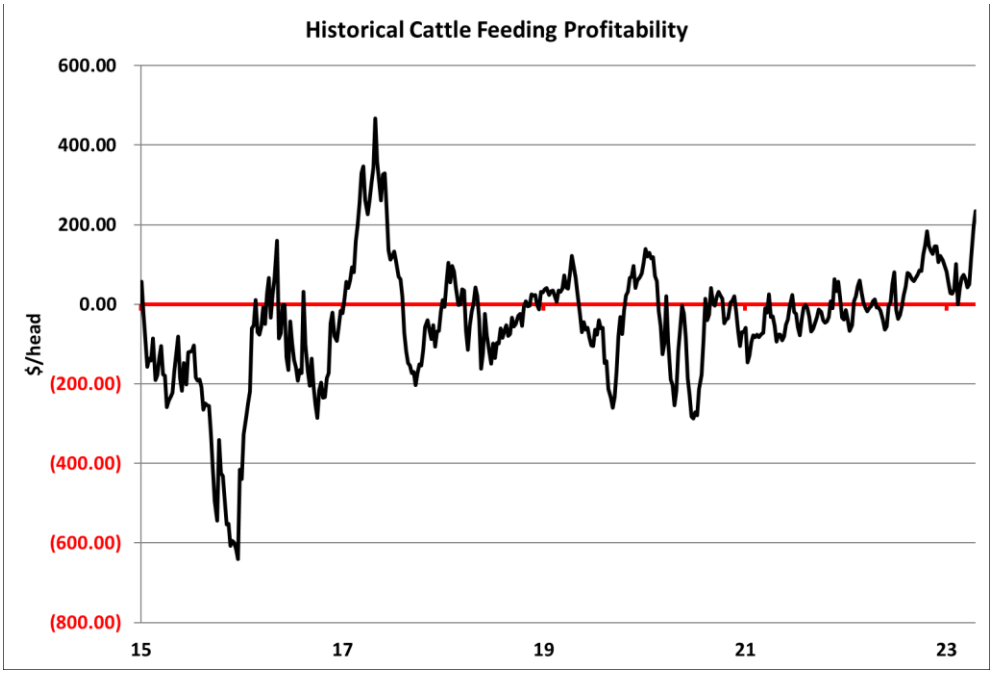
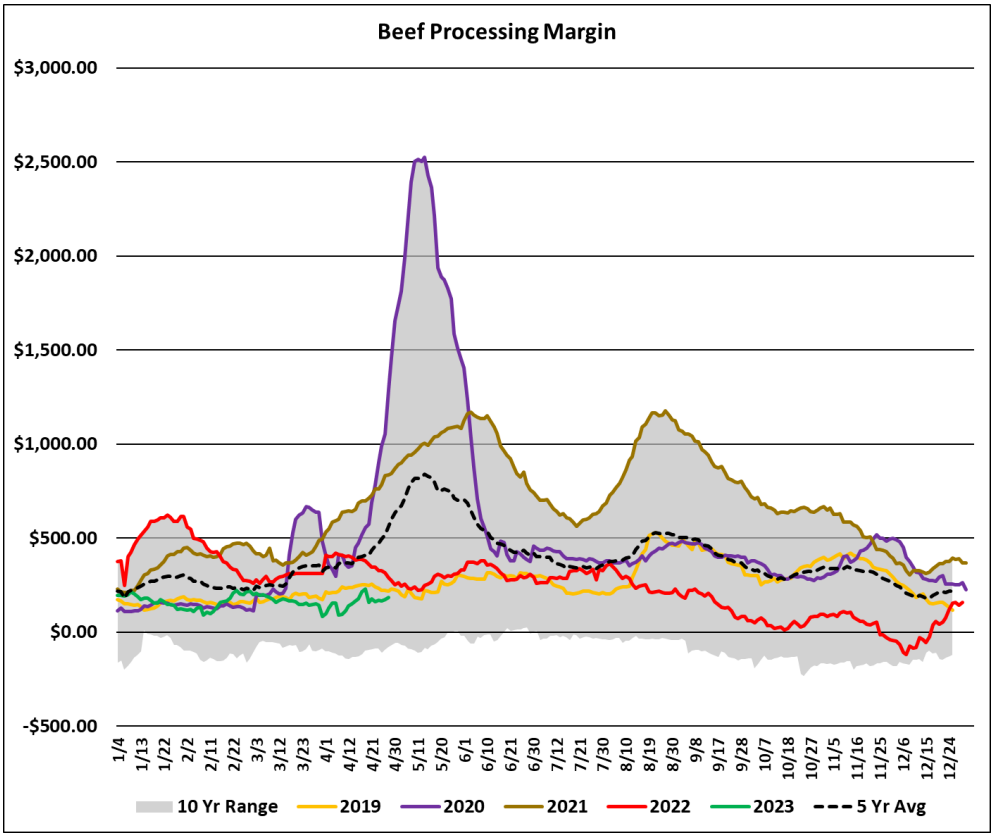


Figure 3



What do feedlots want from Florida calves?

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Introduction

Cow-calf production systems are found throughout the United States in areas where other agricultural production systems cannot thrive. Yet, there are over 700,000 cow-calf operations, which own and manage the current US beef cow inventory of 29 million cows. This means that the average cow-calf operation in the US has 41 cows.

Because of size and production conditions, nutritional and genetic background of feeder calves produced by US cow-calf operations are diverse. Also, due to the wide geographical scatter of cow-calf production regions, feeder calves must travel long distances and fit production conditions specific to cattle feeding regions of the country.

On the other hand, feedlots tend to concentrate in areas of grain production. As a result, other than smaller farmer-feeder feedlot operations in the Eastern Corn Belt, feedlots are concentrated in the Great Plains states and western states of the Midwest. Feedlot design and layout is dependent on the climate where feedlots are located but a characteristic common to most feedlots, including smaller farmer-feeder operations, is pen size. Most pens in feedlots contain from 80 to 300 head. Pen sizes housing under 80 or over 350 head are uncommon.

Yet, fewer than 70,000 operations have 100 cows or more, and only 56% of the beef cow inventory is contained in these operations. This means that nearly half of all feeder calves come from operations that have fewer than 100 cows resulting in the need to commingle calves from various sources to fill feedlot pens. Therefore, formidable challenges result from placing feeder calves of diverse nutritional and genetic background, produced by many operations, and having to travel long distances (over 700 miles) to feedlots.

Economic principles of supply and demand govern the price ultimately paid at the cow-calf production region for a given set of feeder calves. Yet, factors such as lot size, freight costs, weight loss due to transport (shrink), health status, and performance both in the feedlot and on the rail (carcass characteristics) add or subtract value from each individual transaction.

This contribution to the 72nd Florida Beef Cattle Short Course aims to emphasize how Florida cow-calf operators may leverage a greater value proposition when marketing calves to feedlots. A backward determination procedure, derived from evaluating two datasets (USDA feeder calf prices containing records of lot sizes aggregated by weight class and location for the states of Nebraska and Florida between 2018 and 2023), is used to highlight how value may be retained or enhanced. When circumstances warrant it, suggestions for overcoming seemingly unsurmountable obstacles are made.

Database and Growth Model

Two datasets were obtained through USDA My Market News website (Home | MMN (usda.gov)) from which feeder steer calf data were summarized for sales at auction barns throughout Florida or Nebraska by weight, class (medium and large frame with muscle grade of 1) and month from reports ending between January 13, 2018 and April 15, 2023. The dataset for Nebraska is an ongoing project undertaken by the author and dates to 2002. Unfortunately, a similar period for sale reports corresponding to the state of Florida does not exist.

The original report contains summaries of sales of all classes of cattle (steers, heifers, bulls, cows, cow-calf pairs, bred cows, dairy steers, and finished cattle) occurring at various sale barns in each state. Single transactions are not generally reported, instead USDA personnel report sales of drafts of cattle by class (steers, heifers, bulls, cows, cow-calf pairs, bred cows, dairy steers, and finished cattle), frame (large, medium and large, small and medium), muscling (1, moderately thick and comprised of beef breeding; 2, slightly thick with a proportion of beef breeding; 3, thing throughout with legs close together) and weight class (50-lb intervals) for a given sale barn and date.

Datasets were then summarized from the original report by selecting sales of medium and large frame steers displaying muscling score of 1 weighing from 300 to 700 lb. Data used for the current analysis pertains only to steer calves weighing 500 to 550 lb. Lots for which specific programs or characteristics were listed (natural, NHTC, “fancy”, “fleshy”, “thin”, or “not weaned”) were discarded from the analysis. Lot size, average weight and average sale price were retained in the final dataset. Lot size represents groupings of lots sold which displayed similar characteristics. Therefore, in the original dataset, large lot sizes (over 300 or more head) represent aggregated lots displaying similar characteristics. It follows that smaller lot sizes in the original dataset represent lots that could not be aggregated because of lack of similarities in weight, frame, or muscling characteristics.

A growth model which incorporates biological and economic data to predict daily gain and feedlot costs was prepared by the author for various education purposes. The model uses a daily accrual rate for each feeding and non-feeding event occurring in a simulated feedlot environment. Expenses associated with purchasing, trucking, health, yardage (labor, fuel, oil, repairs, and facilities), and feeding (ingredient costs are derived from local markets) are accrued daily through a single driver for the model: dry matter intake. Intakes are drawn from actual pen intakes recorded at local feedlots and entered into the growth model to represent cattle feeding periods consistent with those observed in the field on feeder calves or yearlings. Body weight gain results from incorporating intake records through predictive equations drawn from the Nutrient Requirements of Beef Cattle equations (NASEM, 2016). When appropriate, costs of single or multiple morbidity and mortality events are determined to assess the effect of each at any time during the feeding period on costs and net profitability. Similarly, modeling changes in growth response to intake or intake itself is possible by manipulating equation or intake entry coefficients.

Lot size

As already indicated, the US beef cow herd is held by small operations, which leads to small cattle sale drafts, when accounting for sex, genetic background, weight, and flesh condition among others. Results

from previous reports indicated that increasing lot size by one calf increased price from $0.015/lb (Parish et al., 2018) or $0.02/lb (Feuz et al., 2008). Similarly, selling groups of six or more brought $0.05/lb more than selling singles Barham and Troxel (2007).

Figure 1 displays the distribution of lot sizes from aggregated USDA sale reports for 500-lb steers sold at various sale barns in the states of Nebraska or Florida between January 2018 and April 2023. As indicated above, small lot sizes better represent actual lot sizes at time sales were conducted; extremely large lot sizes (over 1,000 head in a weight class, only reported for Nebraska, may have been aggregates of various lots at sale time). Therefore, data plotted in Figure 1 are truncated to avoid this artifact and to represent lot sizes that fit up to two semi-loads.

When reviewing Figure 1, the effects of the small US herd size on lot size are evident in both states. However, in the five years and 4 months contained in the dataset, there were 778 lots sold in Nebraska that would fill a semi-load of 5-cwt calves (between 80 and 120 head) while there were only 233 such lots sold in Florida during the same time.

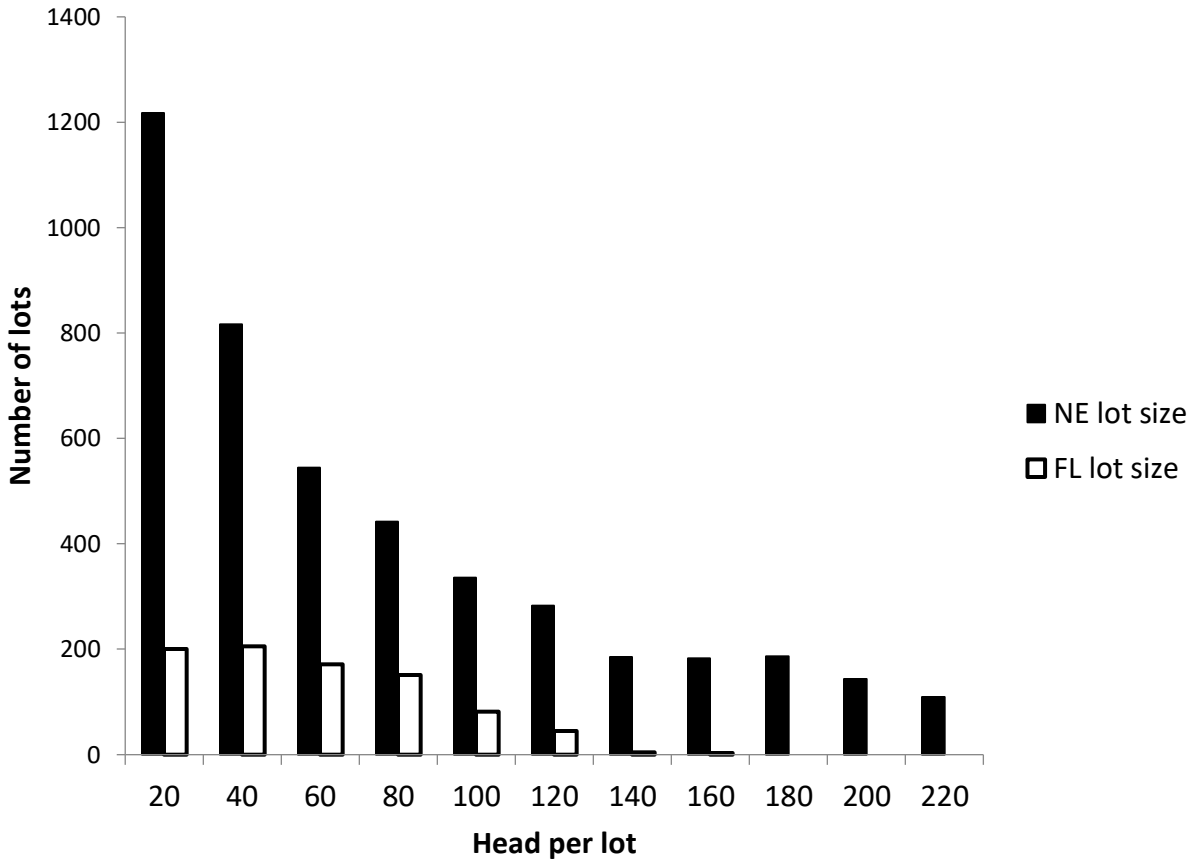

Figure 1. Distribution of lot size frequency from aggregated USDA sale reports for 500-lb steers sold at various sale barns in the states of Nebraska and Florida between January 2018 and April 2023. Lot sizes are reported along with minimum and maximum weight range and weighted average for a given sale barn and date. Number of head per lot (lot size class) are listed from 1 to 20, 21 to 40, etc. Bars represent the number of lots within each lot size class for the entire dataset within each state.

Beyond the implications on feeder price as evidenced by research referenced above, attracting feedlot owners to purchasing calves originating from Florida should include evaluation of cooperative agreements to market load lots jointly. The implications of marketing calves in lot sizes fewer than half- or a full semi-load are beyond those described in the research referenced above. Because of lot size, within-lot weight variation may be greater. Recently, a review of Superior Video Livestock sales by Merck Animal Health (Personal communication) revealed that calves weighing on average 560 lb in uneven weight lots sold at $1.84/cwt under even weight lots.

It follows that as feeder calf lots are commingled together to present larger size lots at sale time or as they arrive at a feedlot, immunity of calves is likely compromised. Therefore, considerations of grouping calves in backgrounding yards for a period no less than 56 days may contribute to reducing implications of stress of weaning, enhance immune response due to improved nutritional status, and increase adaptation of calves thus grouped to feeding and watering troughs. In the Merck-Superior Video Livestock, purchasing and feeding weaned calves for 60 days before selling brought nearly $40 more per head than calves vaccinated at 2 to 4 months of age sold at weaning. Therefore, cooperator herds considering marketing groups of calves together to increase lot size should also consider Including a short backgrounding program as lots get put together after weaning would also enhance the value of feeder calves.

Other factors affecting feeder calf price in the Merck-Superior Video Livestock included: differentials between steers and heifers, $19.26/cwt, horns, -$3.57/cwt, medium to heavy flesh, -$3.11/cwt, and Brahman-influence, $7.43/cwt.

Feeder calf price differential

Factors, such as those outlined above, and distance to feedlots affect feeder calf prices. Feeder calf prices reported by USDA from various sale barns in Nebraska and Florida should reflect these factors and distance to feedlots. Differential in feeder calf gross revenue per head for 5-cwt calves sold in Nebraska or Florida are presented in Figure 2. Data series for Florida is only consistent since 2018; therefore, no inferences can be drawn for an entire 10-year period, which would encompass the previous high in feeder prices observed in the mid 2010's.

Using the information available, a trend for a widening differential in feeder calf prices between the two states emerges. Whether this differential reflects fuel costs, which began to increase with the current administration, or some other factor cannot be deduced from this information. A trend for an increasing differential in recent months is counterintuitive: fewer feeder cattle on offer should reduce this differential. Yet, Troxel and Gadberry (2013) reported that factors leading to discounts to feeder calf price in Arkansas livestock auctions in 2000 also led to discounts to feeder calf prices in 2010 despite declining US cattle inventory in 2010. The authors emphasized that, in some cases, discounts were even greater with US cattle inventory in decline.

Regardless, the average gross revenue for a calf sold in Florida was $184/head less than for a calf sold in Nebraska with the narrowest differential of $95/head occurring in March of 2018 and the widest

differential of $314/head occurring in July of 2022. This feeder calf differential between the two states should account for differences in trucking, the effects of transporting to the feedlot on pay-weight (shrink), lot size (resulting in the need to group calves from various sources to fill a semi-load), and any perceived or observed differences in phenotypic (horns), genotypic (Brahman influence) or performance differences.

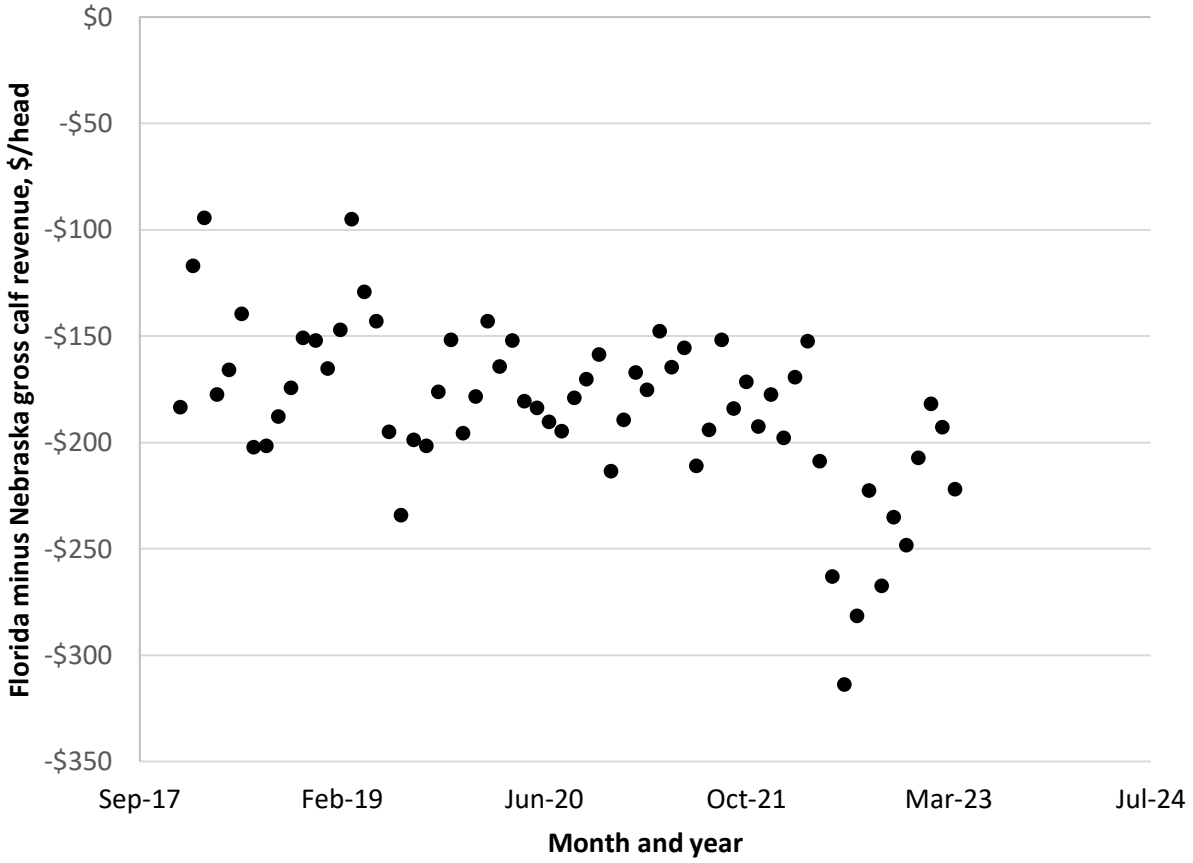

Figure 2. Price differential (Florida gross calf revenue minus Nebraska gross calf revenue, dollars per head) for 5-cwt steer calves sold in Florida and Nebraska between January 2018 and April 2023. USDA data unadjusted for trucking or shrink.

Beef cattle producers understand the effects of genetic and nutritional background on performance and carcass characteristics well. Therefore, cow-calf producers in the US have managed to produce calves that reach up to 85% USDA Choice Grade or better with acceptable USDA Yield Grade. Similarly, feeder calves produced throughout the US reach weights appropriate for harvest as dictated by beef supply and demand. Current carcass weights are over 900 lb indicating that cattle feeders can purchase cattle that, on average, perform to industry expectations.

Because 700,000 cow-calf producers in the US (the reader may substitute the term *producer* for Chief Executive Officer to understand the impact of this statement), without consulting with one another, are able to deliver a calf that has a flexible harvest date and belongs to a population of cattle that can deliver 85% USDA Choice grade or better (almost 7% Prime), this fact hints at some degree of genetic uniformity in calves produced by the US cowherd. Therefore, effects of performance differences on

profitability of cattle were modeled to determine sensitivity of financial data to changes in performance, rather than using values observed in research studies, after taking into consideration the price differential between feeder calves sold in Nebraska and Florida, trucking costs to a Nebraska feedlot from a location in Nebraska (300 miles) or a location in Florida (1,600 miles), and effects of shrink (7% sourced from Florida vs 3% sourced from Nebraska).

Net feeder calf price differential

Using trucking costs corresponding to $5/mile for loads containing 100 head of 5-cwt calves transported from either a Nebraska or Florida source to a Nebraska feedlot and assuming a 4-percentage unit differential in shrink, Figure 3 was constructed to reflect the net feeder calf price differential existing after taking these factors into consideration.

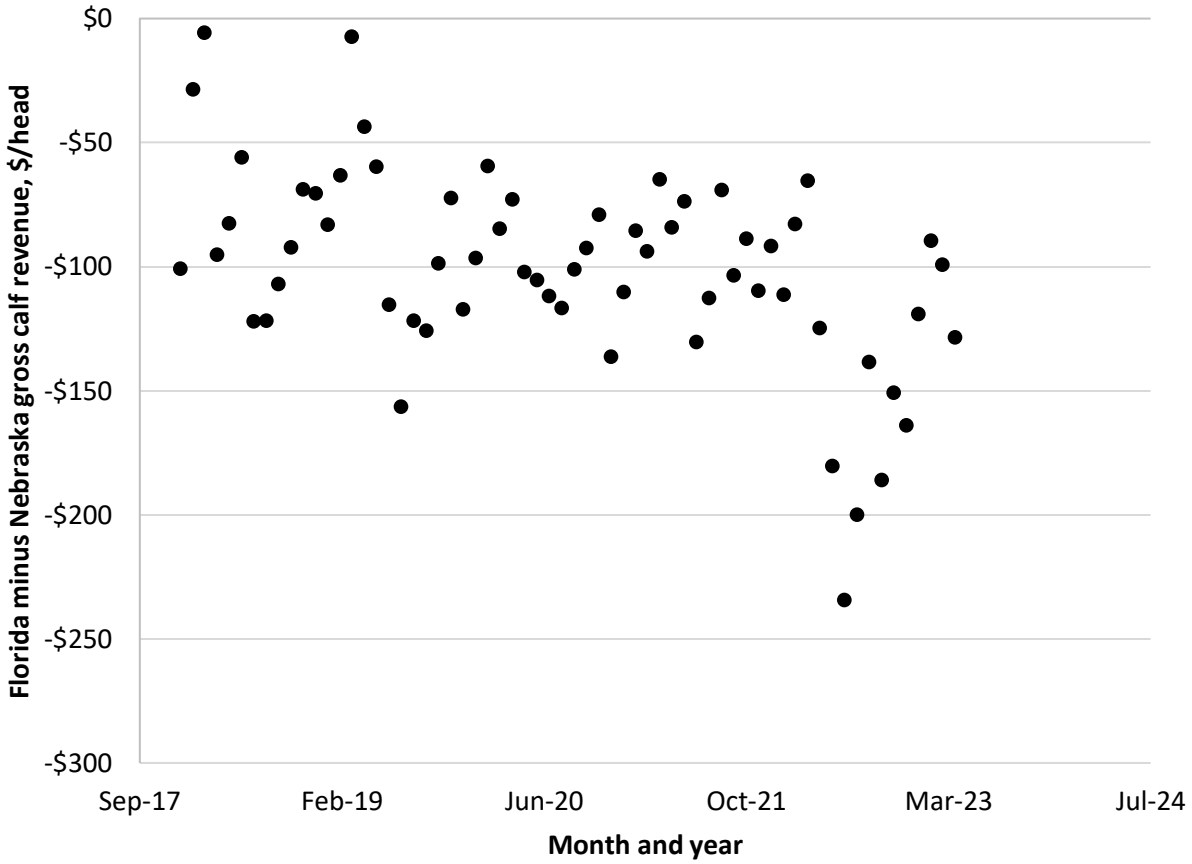

Figure 3. Price differential (Florida gross calf revenue minus Nebraska gross calf revenue, dollars per head) for 5-cwt steer calves sold in Florida and Nebraska between January 2018 and April 2023. USDA data adjusted for trucking ($5/mile; 1,600 miles from Florida or 300 miles from Nebraska) or shrink (7% from Florida or 3% from Nebraska).

Feeder calf price differential between calves sold in Florida and those sold in Nebraska existing after accounting for trucking and shrink averaged $101/head ranging from $6 to $234/head (Figure 3). Again, calves sold in March of 2018 had the narrowest margin (nearly zero) after accounting for trucking and

shrink while those sold in July 2022 had the widest margin after accounting for trucking and shrink. At this point, it is anyone's guess whether this margin will continue to widen.

Price differential between calves sold in Nebraska and those in Florida fluctuated from $95 to $314/calf (Figure 2), cost differentials associated with trucking or shrink were more consistent (data not plotted but represents the difference between data points plotted in Figure 1 and 2). Costs of trucking and shrink between the Florida and Nebraska source averaged $82/head and ranged from $76 to $94/head. One then might conclude that freight and shrink costs Florida cow-calf operations a discount on feeder calf price equivalent to $16.40/cwt. Alternatively, because this estimate of cost is relatively stable (coefficient of variation = 4.7%), one might use this figure to determine net feeder calf price differences between the two states.

One way to determine the value of a Florida calf at a feedlot in the Midwest or Great Plains is to assume that the only factors affecting value when placed at the feedlot are trucking and shrink costs. If this is the case, then a calf sold in Florida to a Midwest or Great Plains feedlot should not be discounted more than $16/cwt relative to one selling in Nebraska. Yet, the differential in feeder calf price between Florida and Nebraska averaged $37/cwt and ranged from $19/cwt to $63/cwt. This means that cattle feeders in the Midwest or Great Plains realize the value of a Florida calf, after accounting for trucking and shrink, to be from $15 to $235/head lower (average, $105/head) than that of one sourced in Nebraska.

For lots that fulfill feedlot and carcass performance expectations, this figure represents additional profit opportunities for feeder calves sourced in Florida. For lots that are expected to have diminished performance due to morbidity, mortality, or subpar growth or carcass quality, this differential may truly reflect their value.

Morbidity and mortality

It is well known that commingling cattle from different sources to create semi-load lots contributes to greater incidence of morbidity and mortality.

Results from an elegantly conducted experiment (Step et al., 2008) demonstrated that calves purchased at various sale barns in the southeastern US had greater morbidity (41.9% vs 11.1%) and mortality (3.1% and 0.0%) than those purchased from a single ranch source in Missouri. Health costs (costs associated with preventive medicine and treatment) were $13.48 vs $9.67/head, respectively, for commingled calves procured from various markets and those purchased from a single ranch.

Utilizing morbidity and mortality observations from Step et al. (2008) in the growth model developed by the author to determine the overall cost of these incidences of morbidity (only costs associated with treatment) and mortality (costs associated with procuring cattle and feeding them until the time of their death; assumed to be at the time of the third treatment as observed in Step et al. 2008), under current production conditions, resulted in an overall health and mortality cost differential of $45/head.

Clearly, morbidity costs can be potentially high in situations of high or persistent disease incidence, these costs are approximately ¼ to 1/3 the cost of mortality. Mortality costs are expected to rise as feeder calf price and freight costs rise.

In the growth model, using $5/mile and 1,600 miles to transport calves from Florida to Nebraska (versus 300 miles for Nebraska-sourced calves), mortality costs range from $11 to $24/head for every 1 percentage death loss (Figure 4). For steers procured and fed in Nebraska, one percentage death loss cost ranged from $13 to $26/head. The slight difference in mortality cost between sources reflects the difference in purchase price.

Regardless of source, it is easy to conclude that mortality of 5 to 6 head in a 100-head lot would result in a loss of $100/head. However, mortality of this degree does not occur without large incidence of morbidity. Adding morbidity costs of $3/head for every 10 percentage-unit incidence in morbidity would increase the expense of morbidity and mortality beyond $100/head for cattle remaining in the feedlot.

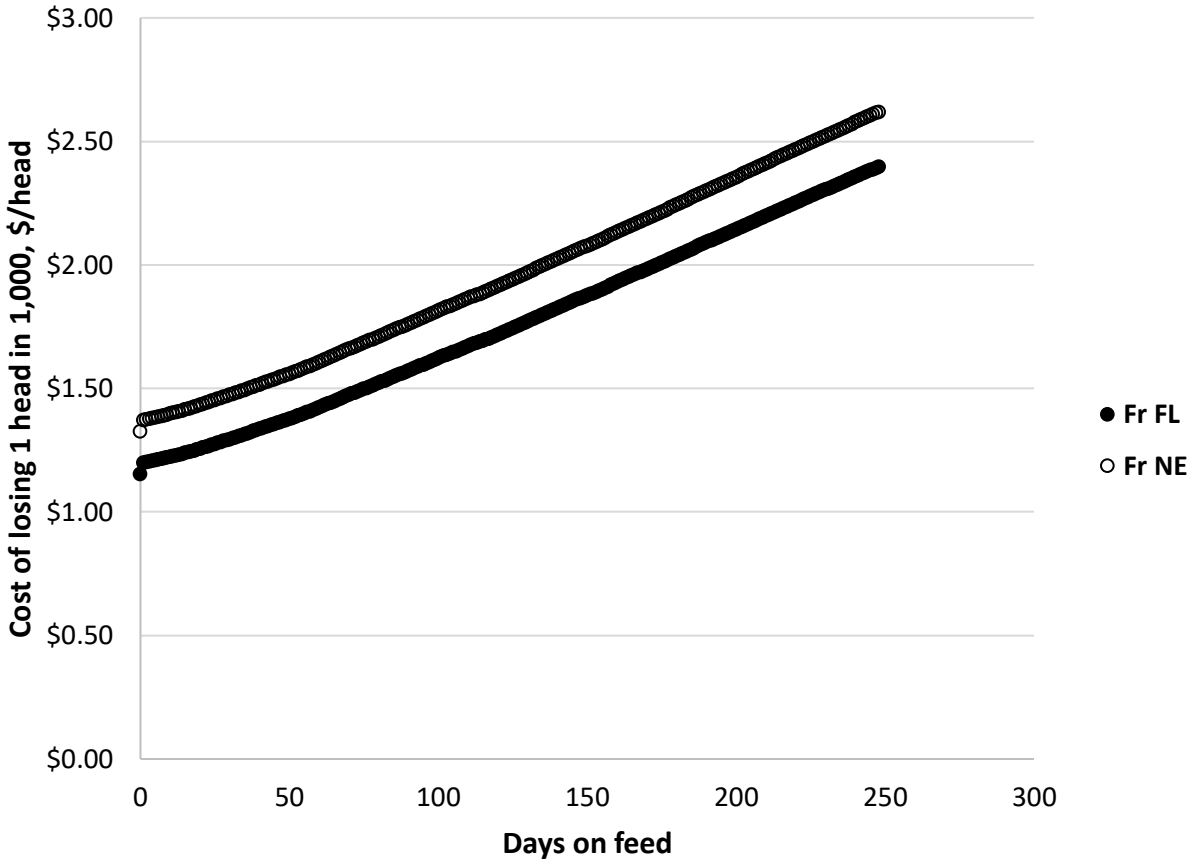

Figure 4. Cost of losing one head out of an initial population of 1,000 head for calves purchased in Florida or Nebraska and transported and fed at a Nebraska feedlot expressed as $/head for each day on feed. Therefore, one percentage death loss (10 in 1,000) up to the first 56 days on feed would be $14/head (steer purchased in Florida) or $16 (steer purchased in Nebraska).

Strategic purchasing of calves sourced from Florida would prevent calves from being exposed to inclement weather, which can increase disease incidence and mortality. Calves sourced in Florida that are expected to reach harvest weight prior to November would offer greater value as they would encounter better weather conditions at their destinations in the Midwest or Great Plains.

Incidentally, except for 2021, 500-lb calves sold in Florida between March and June brought from $2/cwt to $28/cwt more than those sold between October and December of each year (Figure 2). Less inclement weather in the fall of 2021 may be the reason Florida calves sold that fall commanded greater prices than those sold in the spring of 2021.

Feedlot performance and carcass quality

Working on the assumption that, phenotypically, feeder cattle are improving likely because of genetic improvement brough about by cow-calf operators' desire to meet clear market signals: sufficient marbling in carcasses to reach low USDA Choice grade at carcass weight ranges above 650 lb and below 1,050 lb within USDA YG 3 or below. Therefore, differences in feedlot performance or carcass quality by feeder cattle sourced amongst the various cow-calf production regions of the US is more dependent on the performance variability within each region of the country than a specific trait associated within each region of the country.

For the state of Florida, effects of heat, humidity and parasite loads on cow survival and productivity demand breeding cattle using breeds or biotypes adapted to their environment. Reliance on *Bos indicus*-based genotypes makes cow-calf production possible in many regions of the state.

As indicated above, feeder cattle observed to have Brahman influence were discounted $7.43/cwt ($41/head) in the Merck-Superior Video Livestock Auction study. It is highly likely that consumer signals represented by USDA Certified Beef Programs, of which there are 70 currently in the US, drive this discount. Of the 70 USDA Certified Beef Programs, only four (6%) have no requirement limiting the carcass maximum hump height to 2 inches. On a volume basis, it is highly likely that the proportion of beef marketed through these programs is less than 6%.

Results from Cycle V of germplasm evaluation at US Meat Animal Research Center (MARC; Cundiff et al., 2000) indicated that although Brahman-sired calves had similar dressing percentage, hot carcass weight and the proportion of carcass reaching USDA Choice grade was less than half of those derived from Angus x Hereford or Hereford x Angus calves. Using the differential of 45 percentage units in USDA Choice grade observed by Cundiff et al. (2000) with a Choice-Select price spread of $15/cwt for a carcass weighing 900 lb represents a loss in revenue of $61/head. Brahman-sired calves had 41 lb lighter carcass weight was reported by Cundiff et al. (2000). Using today's prices, selling a carcass that is 41 lb lighter would bring $119/head less revenue. These differentials in gross revenue are larger than the discount observed in the Merck-Superior Video Livestock Auction study.

Lastly, the growth model was manipulated to permit a reduction in gain to the point where the net revenue per head was similar for a 500-lb feeder calf procured in Florida (trucked at a cost of $5/mile over 1,600 miles and a 7% shrink) or one procured in Nebraska (trucked at a cost of $5/mile over 300

miles and a 3% shrink) to determine the conversion efficiency point at which the calf sourced in Florida would net the same amount as one purchased in Nebraska. A reduction in feed conversion efficiency (increase in pounds of feed per pound of gain) of 0.70 lb feed per unit gain was required to offset the differential in feeder calf price including trucking and shrink between the two states.

Assuming similar individual average dry matter intake (20 lb/day) and using the average daily gain reported for Brahman- and Angus x Hereford- or Hereford x Angus-sired calves in Cycle V of MARC data (2.54 vs 2.98 lb/day) resulted in estimated feed conversion efficiencies of 7.9 lb/lb gain and 6.7 lb/lb gain. The differential between these two estimates is greater (1.2 vs 0.7 lb/lb gain) than the breakeven point estimated above.

Conclusions

A net difference in value of $100/5-cwt calf remains, on average, for Florida calves after accounting for costs of weight loss during transport (shrink) and trucking to Great Plains states and those in western Midwest states. This difference arises from various factors discussed above and for which some strategies are outlined. Disease incidence and resulting morbidity, or performance in the feedlot or on the rail easily eat away at this differential.

Therefore, cattle feeders operating feedlots in cattle feeding regions of the country procure calves that:

- Sell in larger lot sizes
    - Because weight variation within lot is smaller
    - Because it is more efficient to fill semi-loads
    - Because health of calves in the lot is expected to be better
    - Larger lot sizes may represent professional or committed cattle producers
- Sell (in Florida) in the spring of the year
    - To feed them out throughout the summer
    - Avoiding inclement weather and possibility of greater disease incidence
- Are backgrounded for at least 60 days prior to shipment
    - Vaccinated and dewormed
    - Trained to eat out of a bunk and drink out of a water trough
    - Recovered from weaning and can mount a stronger immune response
- Display little or no Brahman-influence
    - Lower intakes
    - Lower gains
    - Lighter carcasses
    - Lower incidence of USDA Choice or better USDA Quality Grade
- Despite greater trucking costs
    - Shrink less than 7% from the source
    - Perform at par with local cattle

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Capture more of Your Calves' True Value

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Increasing the ownership period of calves will help you capture more of their true value. This can either be for the good or the bad, depending on the quality of your cattle.

A recent evaluation of the weaned calf sales from the Superior Livestock Auction data from 2021 and 2022 included 15,287 lots with over 2.5 million calves. The average lot contained 168 head and weighed an average of 559 pounds. The base average price was $1.81/pound.

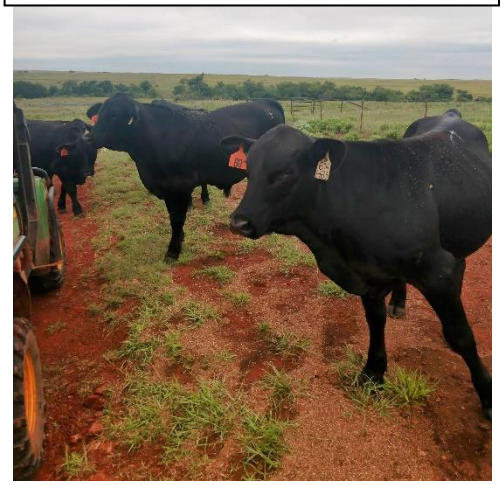
As you may suspect, calf sex had a large impact on sale price. Steers brought premiums of $19.26/cwt over the base price with heifers bringing less than the base price. There were no bull calves in this analysis, intact bull calves are known to receive discounts of $5 to 7/cwt compared to steers with discounts often reaching over $20/cwt for intact bull calves as they get larger.

Breed was also a significant factor affecting sale price in this analysis. For the national data set Brahman influenced cattle were discounted by $7.43/cwt. Brahman breeding is essential to match cows to the environment, they are known for heat and insect tolerance and provide hybrid vigor to crossbreeding programs.

Steers at the Texas A&M AgriLife Research and Extension Center at Overton. F1 Hereford x Brahman steer (left) or ¼ blood Brahman from F1 cow. These breeds are adapted to the Coastal Plains environment but are heavily discounted at auction market. [photos curtesy of Dr. Monte Rouquette, Texas AgriLife – Overton.

An example of selecting cattle for adaptation to the environment but getting discounted at the auction market is the herds at the Texas AgriLife Research and Extension Center at Overton. Over the last 11 years, these calves averaged weaning weight of 681 from 1274 pound average cow with a weaning weight ratio of 0.53. Yet, auction market evaluations show discounts for striped or spotted hides or markings up to $26.42/cwt. The black hided Sim x Hereford x Brahman calves still receive the "Brahman discount".

A set of Ultrablack steers from Southeast Texas raised as stockers in Oklahoma.



Another example we can use is the set of Ultrablack steers purchased out of and transported to Oklahoma for research in both Eastern and western Oklahoma. The discounts were not as high for these black hided steers, but the Brahman discount is still in place.

For the steers out of Overton, stocker gains on winter pasture are up to 3.5 pounds per day, while summer gains on bermudagrass were 1.5 to 2.5 pounds per day.

The Ultrablack steers gained an average of 2.25 pounds per day while grazing in Oklahoma.

Finishing performance was equally impressive on these cattle. Steers from Overton came into the feedlot averaging 799 pounds and were harvested at 1487 in 175 days with gains averaging over 3.9 pounds per day. These steers only averaged 37% Choice quality grade (Table 1). The Ultrablack steers were finished in a commercial feedyard in the fall and winter of 2021-2022. They entered the feedyard at 1010 pounds and weighed 1546 pounds after 167 days with gains averaging 3.2 pounds per day. These steers were over 87% Choice.

From the Table below, we can see that the tropically adapted cattle performed better than the industry average in some factors but not all. The Ultrablack steers gained exceptionally well on pasture but because they got so big on grass had lower performance than average during finishing. They did produce a high percentage of Choice and better carcasses. The steers from the Overton herd gained well on grass and performed exceptionally well in the feedlot, but did not have many high quality carcasses. Understanding when to market cattle live or on a carcass grid is of extreme importance in these situations.

Comparison of finishing performance of environmental adapted calves to industry average.			
Item	Overton	Ultrablack	Industry*
Bodyweight, lbs			
On feed	799	1010	748
Slaughter	1487	1546	1435
ADG, lb/day	3.91	3.22	3.56
Hot carcass wt	881	1012	904
% Choice	37%	87%	82%
*Industry average is based on KSU Focus on Feedlots report of finishing performance from February 2023 and 5-year industry average carcass quality data from USDA and a 63% dressing percentage.			

In either case, if we are selling at weaning or shortly thereafter, you will not capture as much of the true expected value of your cattle.

So, how do you capture the value for these calves?

1. Marketing – market calves in uniform truck load lots in appropriate outlets that recognize potential value of calves.
2. Value Added Programs – preconditioning, all natural, and other programs have costs but can be profitable. The base price for the Superior Auction analysis was the VAC24 program, where calves are vaccinated at 2 to 4 months of age but are unweaned at the time of the sale. Compared to these vaccinated but unweaned calves, calves in the VAC45 program received a $8.64/cwt premium. Calves enrolled in the Oklahoma VAC-45 received premium of $18.67/cwt relative to unweaned non-preconditioned calves with no indication of vaccination status.
3. Add weight on pasture – many discounts decrease as cattle get larger and closer to the end-point. The remainder of this paper will focus on how to do this.

Adding weight to weaned calves in the late summer and fall on perennial warms season pastures is often difficult and inefficient. There are several options available to increase digestible energy and crude protein intake for weaned calves during the late summer and fall.

Supplementation

Performance of growing cattle grazing warm-season pastures is often below economic thresholds. Hand-feeding 2.5 pounds per day of a dried distiller's grains based supplement to steers grazing bermudagrass pasture in both Oklahoma and Arkansas in the late summer have been shown to increase average daily gains by 0.91 pounds per day. Gains were increased from 1.26 lb/day for unsupplemented steers from mid-July to late August to 2.17 lb/day for steers supplemented with DDGS. This required only 2.7 pounds of supplement per pound of additional gain. Similar responses were seen with steers grazing native range pasture in western Oklahoma.

Cool Season Annuals

In dedicated crop fields small grains can be established using either conventional tillage methods to establish a weed free, firm seedbed or with no-tillage. Clean tilled pastures have been more common than no-till until recently, but no-till is gaining in popularity. Prior to no-till planting small grains, the area should be chemically burned down to eliminate potential weed competition.

Cool-season annuals are commonly planted into permanent warm-season pastures and this provides that largest number of acres utilized for grazing cool-season annuals in the Southeast. Because these pastures are being managed for multiple uses, productivity is generally less for each season compared with pastures managed for single purposes. For instance, because pastures are planted into existing warm-season perennial sods managed for haying or grazing, cool-season annual plantings must be delayed until the growth of warm-season pastures decreases in the fall, which decreases potential fall forage production. Also, growth of cool-season annuals during late spring will delay warm-season forage production.

<u>Cool-Season Annual Options</u>

Wheat is very popular as both a forage and grain crop. Wheat is best adapted to loam to clay loam soils with a minimum pH of 5.5. It is tolerant of cold and dry weather conditions making it suitable for some of the harsher environments found in the more western regions of production. Cereal Rye is the most cold tolerant of the cool season annual grasses with the earliest seasonal forage production. It is also the highest producer of forage biomass but, it is lower in nutritive value than other cool season annual grasses. Rye is adapted to sandy acidic soils. Oat forage has the highest nutritive value of all small grains. It is an excellent producer of early forage biomass and will perform best on lighter textured soils. The major drawback to the use of oats is cold tolerance **this is not usually a problem in the Deep South**. Recent research with oats indicate that late summer planting has potential to provide forage to fill the fall forage gap during October and November before normal wheat pastures are available for grazing.
Triticale is a hybrid cross of wheat and rye. Forage production is higher than wheat and nutritive value is greater than rye. It produces a large broad leaf that is grazed well by livestock. Triticale is a versatile crop that can be used for grazing, hay and silage. Annual ryegrass is a wonderful high quality, high producing forage grass. However, it is a pesky weed in grain producing areas. Annual ryegrass seed is small and is very easy to establish. It prefers good moisture conditions and performs well on heavier textured soils.

Warm Season Annuals

When we think of warm season annual forage crops the summer annual grasses such as pearl millet and sorghum sudan quickly come to mind. Often warm season annual forages are thought of as an emergency source of hay for their ability to produce a lot of forage quickly during periods of dry weather when other forage sources are limited. However, they are much more versatile than just providing a quick hay crop. The species considered for use as forage crops during the summer has also broadened beyond the sorghums and millets.

Sorghum Sudan and Sudangrass - These sorghum sudan hybrids are very popular due to the amount of forage that they can produce in a short period of time. Sorghum-sudan hybrids perform well over a wide range of soil textures but production may be reduced on very light textured or sandy soils. Sorghum-sudan can be established with tillage or with no-till. Sorghum-sudans should be grazed when they reach 24 inches in height to help reduce potential issues with prussic acid poisoning. Average daily gain of stocker cattle grazing sorghum sudan hybrids have been reported in excess of 2.0 lb/day which demonstrates the potential of animal gain grazing sorghum sudan.

Pearl millet - the major millet used for forage in the U.S. Other millets include proso, foxtail (German), and browntop and these are finding their way into several cover crop or hay mixtures to add diversity but, they are much lower yielding than pearl. Pearl millet does not accumulate prussic acid, but can accumulate nitrates. Pearl millet is very well adapted to light sandy soils but soil pH should be maintained above 5.0. Grazing should be deferred until pearl millet reaches a height of 18-30 inches, usually occurring 45-60 days after planting. Cattle readily consume pearl millet forage and stocker gains can be good. Regrowth of pearl millet can be delayed or eliminated if grazed too closely. The recommended grazing or haying residual height is 6-10

inches. Stocker ADG has been reported in excess of 2.00 lb/day but can be greatly influenced by stocking rate and forage availability.

Crabgrass - Stocker cattle gains on crabgrass can be very good with ADG in excess of 2.5 lb/day. Grazing of crabgrass should begin when it reaches 8-10 inches in height which under good growing conditions should occur 30-45 days after emergence. To keep the crabgrass in an actively growing vegetative stage, it should be grazed to a residual height of 3 inches.

Putting Systems Together

Plantings of warm season annual grasses can be staggered in order to provide a steady flow of forage through the summer and avoid an overabundance of forage at one point and time. They can also be creatively utilized. An example might be a late summer planting to provide quality forage to start stocker cattle on prior to the development of a cool season annual forage crop such as oats. Another variation could be to use warm season annuals to further develop stocker cattle on forage following winter pasture graze out or as a source of creep grazing for calves.

Warm season annual grasses are productive and well adapted to the region. They are also versatile in their use supplying emergency forage in dry weather conditions, a soil cover for fallow ground, quality grazing, and erosion control. As with any forage when grazed, stocking rate greatly influences both plant and animal performance. Warm season annual grasses fit well and have their place in forage systems.

A systems approach of supplementation while weaned calves graze perennial pastures in the mid to late summer, followed by grazing late summer planted warm-season annuals and early fall planted cool-season annuals in sequence can extend the grazing season and allow high gains of calves post weaning.

Answering the age-old question: Is cottonseed going to make my bulls infertile?

Dylan Davis[1], Lee Jones[2], and Lawton Stewart[1]

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Each year, bulls are typically turned in the middle of winter for fall calving herds and early spring for spring calving herds. Often, this coincides with winter supplementation, so the question comes in each year, "Can I feed whole cottonseed to my bulls or will it make them infertile?" Our answer to this question is always absolutely not IF you stay within the recommended feeding levels. Currently, the recommended inclusion rate is 0.5% of body weight or 20% of the total ration. This recommendation is made, however, due to the amount of fat in whole cottonseed (~20%), rather than the amount of gossypol, which is a common driver for concern when feeding whole cottonseed. Gossypol is a yellow pigment that is found in the stem, leaf, lint, and seed of the cotton plant but is highly concentrated in the seed. Gossypol acts as a natural defense agent for the cotton plant by promoting infertility in insects who consume it.

Gossypol has been studied extensively for years and has shown to be toxic to monogastrics (humans, pigs, mice, etc.) and pre-ruminants (calves, sheep, goats, etc who's rumen has not developed yet). Most research indicating issues when feeding whole cottonseed to bulls was conducted in the 1960's through the 1990's and included whole cottonseed at up to 40% of the diet which is much higher than the recommended level. Additionally, many researchers that reported issues were feeding Pima cotton, which is much higher in gossypol than Upland cotton and uncommon in the southeastern United States. Due to the lack of current research applicable to our area, a study was conducted at the University of Georgia to determine if whole cottonseed has an effect on performance or semen morphology of 16-18 month old beef bulls.

Over two years, forty-six Angus and Red Angus bulls were transported in the fall to a research barn in Tifton, GA. The bulls were randomly assigned to one of three treatments: DD- 7 lbs. dried distillers grain, WD- 3.5 lbs. dried distillers grain and 3.5 lbs. whole cottonseed (0.33% of BW), or WW- 7 lbs. whole cottonseed (0.7% of BW). In addition to the experimental diet, each bull received 3 lbs of pelleted soybean hulls, 4 oz of a trace mineral mix and 2 oz of calcium carbonate. Diets were delivered each morning, and each bull had access to free-choice Bermudagrass hay (13.5% CP, 58% TDN, 70% NDF, and 35% ADF).

Bulls were weighed and given a breeding soundness exam on day 0, 30, and 60. The project was scheduled for 60 days to mimic a controlled breeding season as well as to allow spermatogenesis to occur. Bulls that were fed whole cottonseed (WW) had a lower average daily gain (Table 2) than bulls fed dried distillers grain (DD; 2.12 vs 3.06 lb/d), but there were no differences in normal semen morphology. To pass a breeding soundness exam, bulls must maintain normal morphology equal to or greater than 70%. As shown in Table 1, all bulls in this study had normal morphology greater than 70%. Additionally, the diets did not affect scrotal circumference

measurements as shown in Figure 1. Scrotal circumferences were similar for all bulls on days 0, 30, and 60 but increased over time. Scrotal measurements increasing from day 0 to 60 can be explained by the natural development of bulls.

From a nutritional standpoint, whole cottonseed is an excellent feedstuff when utilized correctly and due to high levels of cotton production in Georgia, whole cottonseed is often readily available. Nutritionally, it is high in energy (95% TDN), protein (24% CP), and fat (approximately 20%) and is a great supplemental feedstuff in times of limited or low quality forage availability.

When the price of whole cottonseed allows it to be used, it can be an excellent feedstuff. If you are having issues with fertility in your bulls, make sure all the other aspects of bull management are in place (e.g. breeding soundness exam, injuries, etc.). Very rarely, if ever, will whole cottonseed cause infertility in bulls when fed properly. If you have any questions on whole cottonseed, or would like help incorporating it into your nutritional program, contact your local Cooperative Extension office.

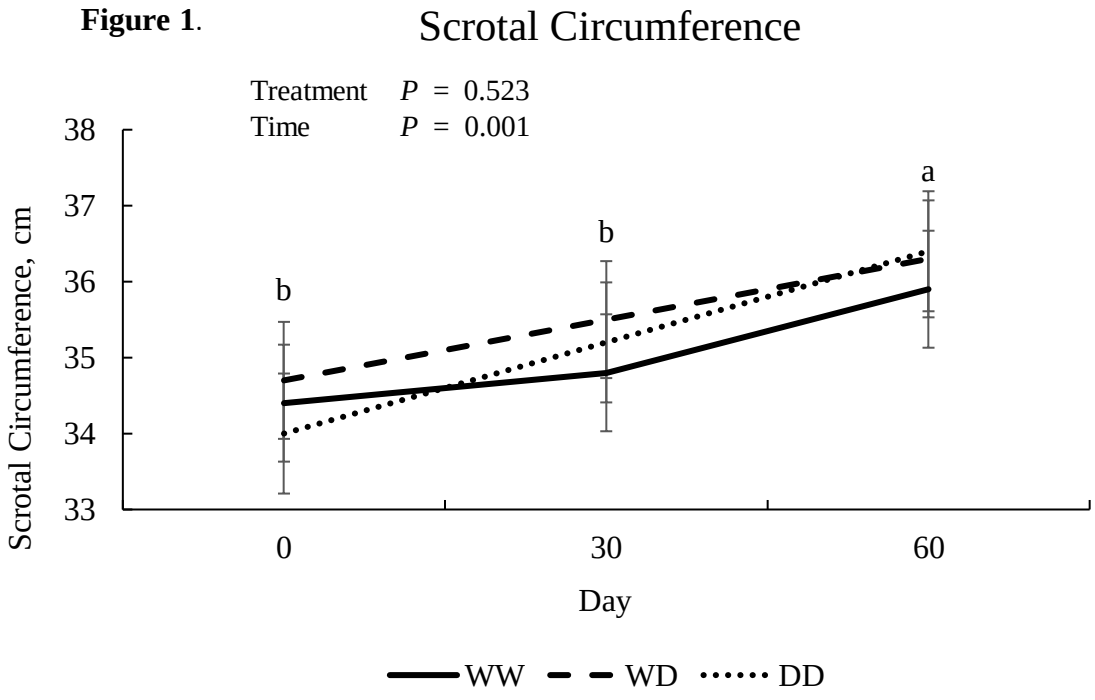
Table 1. Percentage of normal spermatozoa

	Day		
Treatment	0	30	60
DD	80 %	74 %	77 %
WD	78 %	78 %	76 %
WW	79 %	75 %	74 %

Table 2. Weights and growth performance of bulls fed differing levels of whole cottonseed

	Treatment[1]			
	WW	WD	DD	*P*-value
Variable, kg				
Initial weight	1,008	1,008	1,012	0.998
Final weight	1,138	1,173	1,199	0.581
Average Daily Gain	2.12[b]	2.71[a]	3.06[a]	0.002

Figure 1.


Scrotal Circumference
Treatment P = 0.523
Time P = 0.001
Scrotal Circumference, cm
38
37
36
35
34
33
a
b
b
0
30
60
Day
WW
WD
DD

Use Of Brewery Byproducts In Beef Cattle Nutrition

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Assistant Professor and Extension Livestock Specialist
Department of Animal Science
NC State University

The U.S. Beer Industry is estimated to be a 94.1 billion dollar industry with sales of 22,815,258 barrels (or 707 million gallons) of beer a year (Brewers Association, 2021). It employs around 405,649 full time employees that make on average an income of around $47,017 a year. The US beer industry is the second largest industry in the world with close competitors of China, Brazil, Mexico and Germany. Historically the US market share of beer has been dominated by large domestic companies like Anheuser-Busch and Miller-Coors, but in the mid 2000s, craft beer sales started to drastically increase in the U.S. Although not a lot has changed in overall beer consumption among US beer drinkers in the last 30 years, what has changed is the type of beer that is being consumed. Since the mid 2000's, there has been a rise in the craft beer industry with craft beer sales now controlling around 12% of the overall total beer sales in the US. According to the Brewer's Association, craft beer can be defined as being from a small or independent brewer with small production of less than 6 million barrels of beer a year (Brewers Association, 2022). Independent, meaning that less than 25% is owned or controlled by a beverage alcohol industry member that is not itself a craft brewer and the brewer itself has a TTB (Alcohol and Tobacco Tax and Trade Bureau) Brewer's Notice and makes beer.

The current craft beer industry can be listed into different segments such as regional craft breweries (such as New Belgium and Sierra Nevada in North Carolina), microbreweries (produce less than 15,000 barrels of beer per year), taprooms (at least 25% of beer sold onsite with no significant foodservice) and brewpubs (at least 25% of beer sold onsite with a significant foodservice/menu). Florida has a booming beer industry with an annual production of 1,332,659 barrels of craft beer produced, which ranks 3rd overall in the U.S. in states producing beer. The economic impact to Florida is estimated to be 4.1 billion dollars (5th nationally) and there are currently 28,487 full time employees earning an average income of $44,702. Since 2011, Florida has increased the number of breweries in operation, starting with around 45 in 2011 to now having 374 as of 2021, with more expected to open. Most of these breweries can be found in metropolitan areas of Tampa, Orlando, and Miami, or in popular tourist beach destinations. From a livestock perspective, having a booming beer industry in the state means a large supply of wet brewers' grains, also abbreviated as WBG. However, the problem lies that within the major clusters of craft breweries, there are relatively few head of beef cattle within a 45-mile drive, meaning that the beef cows in the state are generally not close to where the majority of the WBG are concentrated. This can cause logistical problems for both the brewery and the farm operator.

The WBG byproduct consist primarily of the pericarp, seed coat, endosperm, and husk of the barley grain. The brewing process may vary from craft brewery to craft brewery and even from beer to beer. In general, the barley grain must first go through a malting process that involves steeping in a water bath, the germination of the barley seed, and drying back down to prevent germination/sprouting from advancing. After the barley is malted, it then goes through a mashing process where it is milled, added with other grains like corn or rice, and once again mixed with water and heated. After some time, this mixture is then separated into the wort, or the liquid that goes on to make beer, and the WBG. The WBG makes up around 85% of the total waste of the brewing process and in 2016, it was estimated that the global waste, or coproduct, of WBG to be 39 million metric tonnes. This roughly estimates to be about 44 lbs WBG per 26 gallon of beer produced. Thus, the volume of WBG produced in FL is of great advantage to livestock producers.

In addition to the volume of byproduct available, WBG is also a relatively nutrient dense feedstuff. According to Dairy One Feed Composition Library (Figure 1), on a dry matter basis, WBG on average consists of 29% crude protein (CP), 74% total digestible nutrients (TDN), 10% fat, 0.34% calcium (Ca), and 0.69% phosphorus (P). The biggest downfall in nutrient content of WBG is the average 24% dry matter content, meaning that 76% of the feedstuff is actually just water. This poses great problems for many cattlemen when it comes to transportation, storage, and feeding. Besides the limitations associated with the high water content, WBG is a nutrient dense feedstuff that can be a good supplement for forage-based diets and for all classes of animals. In addition to having a high crude protein content, WBG is also a good source of rumen-undegradable protein, or protein that is untouched by the rumen microbes and passes through the rumen to be used directly by the animal in the small intestine. Much of the current research has suggested that growing cattle can be supplemented up to 0.7% of body weight of WBG and late gestation cows have had no problems when fed up to 0.5% of body weight of WBG. There is some research suggesting that the inclusion threshold may be around 30-40% of total dry matter intake, with which rumen fill at this point may become an issue with the volume of water intake.

Challenges with moisture content of WBG extends beyond that of just questioning how much water can a cow consume. There are also challenges in regards to transportation and storage. Although WBG are typically free or appear on the surface to be much cheaper by the ton than other commodity feeds, one must keep in mind the moisture content of WBG. It is not cost effective to transport water long distances and the heavy weight added by the moisture of the feedstuff can cause wear and tear on equipment. Additionally, hauling WBG may also require special trailers to prevent seepage, which is negatively viewed by the public. So when trying to figure out whether or not WBG is a good deal in comparison to other feedstuffs, make sure to account for the moisture content and associated trucking costs of hauling wet feed. Additionally, this moisture content can limit storage length of the feedstuff. In high humidity and temperature climates, WBG storage can be limited to 2-3 days before molds can start to cause problems. In the winter months, storage length can be extended, but in the spring and summer months, spoilage has been shown to start to occur in as little as 12 hours after receiving a load of WBG. Therefore, the options for

storage is to either not store it at all and feed it quickly after a load is delivered, or have a method to store it where oxygen cannot access the feed, such as in an ag bag or in a pile/pit covered with plastic. Even when storing WBG in a pit silo covered with plastic, the shelf-life of the byproduct is limited. If working directly with a brewery to pick up loads of WBG, keep in mind that a constant supply of WBG is being generated and pickup and thus feeding of WBG may have to occur daily. Nonetheless, many producers in NC have been very successful at having a concurrent stream of WBG being both fed and supplied to the farm.

The booming beer industry in FL has created a steady supply of WBG available for up-cycling by the beef industry. Although WBG are dense in nutrient content, challenges do occur with transportation, storage, and feeding due to moisture content.

Nutrient	N	Unit	Mean	Range		SD
				Low	High	
DM	6445	%	23.68	16.50	30.86	7.18
CP	3458	%	28.67	23.96	33.38	4.71
Deg. CP	2009	%	36.21	29.97	42.46	6.24
TDN	3196	%	74.19	70.73	77.64	3.45
ADF	3183	%	24.42	20.72	28.12	3.70
NDF	3182	%	49.28	49.28	55.78	6.50
Lignin	2216	%	6.73	5.49	7.97	1.24
NFC	3195	%	16.73	8.48	24.98	8.25
Fat	2442	%	9.77	8.24	11.31	1.54
Ash	2309	%	4.49	3.79	5.19	0.70
Ca	2661	%	0.34	0.21	0.48	0.13
P	2679	%	0.69	0.58	0.80	0.11

Figure 1:
Average nutrient content of wet brewers' grains submitted to the Dairy One Laboratory and taken from the dairy one feed composition library.

Literature Cited:

Brewers Association. 2021. National Beer Sales and Production Data. https://www.brewersassociation.org/statistics-and-data/national-beer-stats/ (Accessed April 13, 2022 2022).

Brewers Association. 2022. Craft Brewer Definition. https://www.brewersassociation.org/statistics-and-data/craft-brewer-definition/ (Accessed April 13, 2022 2022).

Dairy One. 2022. Feed composition library. https://dairyone.com/services/forage-laboratory-services/feed-composition-library/ (Accessed July 3, 2022).

Horn Fly Biology, Management, and Challenges

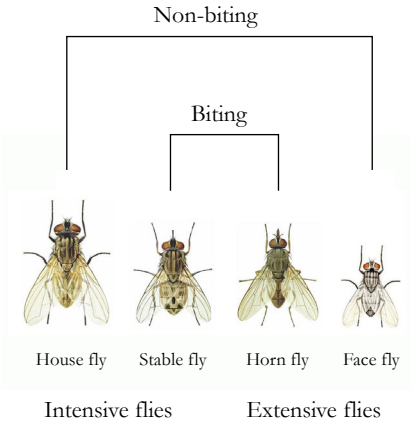
Edwin R. Burgess IV, PhD

Goals for this talk

- Identify features of horn flies that differentiate them from stable flies, house flies, and face flies.
- Identify what the active ingredient is in your chemical control products.
- Action thresholds are for horn flies (and stable flies).

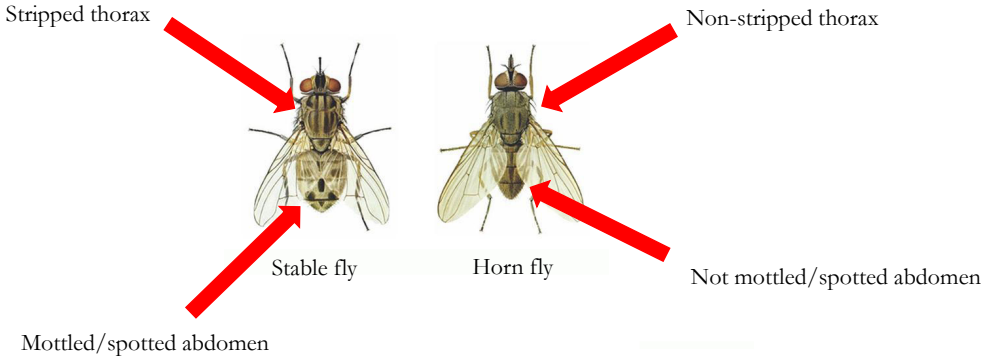
Horn flies cause significant losses in animal production

Billions (USD) in economic losses per year in the US.



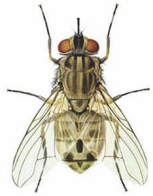
Stable fly vs. horn fly – how to know the difference pt. 1

- Likely NOT house fly – if it is, it does NOT bite.
- NOT face fly – **no** face flies south of 35 °N latitude east of the Mississippi River.



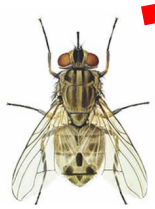
Stable fly vs. horn fly – how to know the difference pt. 2

Feeding position



Stable fly – head up

Horn fly – head down



Stable fly

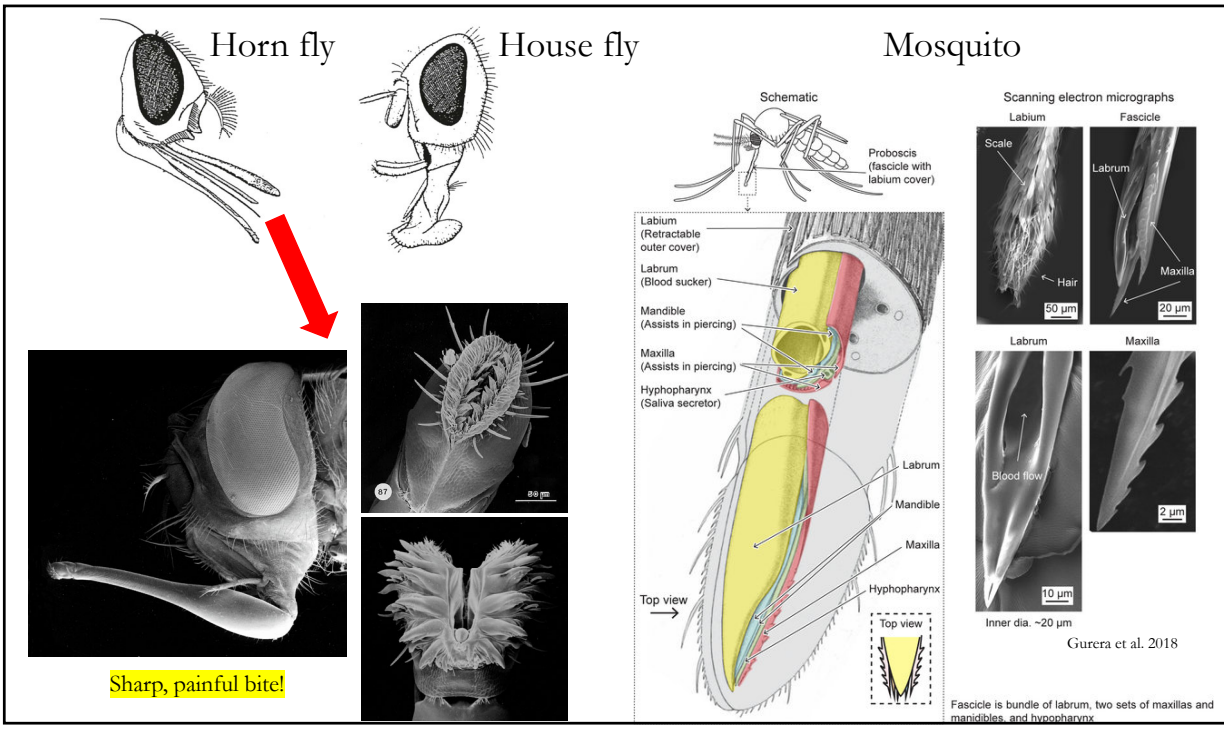
Horn fly

https://blogs.k-state.edu/kansasbugs/2021/04/16/stable-flies-emerging-as-spring-temperatures-rise/

Stable fly vs. horn fly – how to know the difference pt. 3

Stable fly

Horn fly



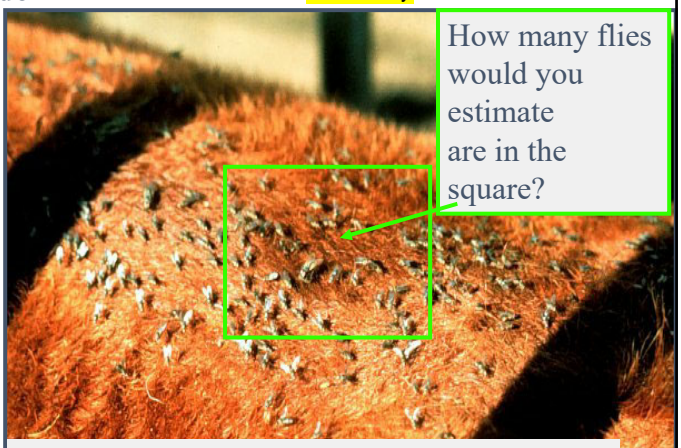
Stable fly vs. horn fly – how to know the difference pt. 4

- Count / Estimate number of flies per side
- More animals the better - min. 5 to 10

Stable fly

- *Action Guideline:*
  10 flies per animal or 5 per front leg

Horn fly



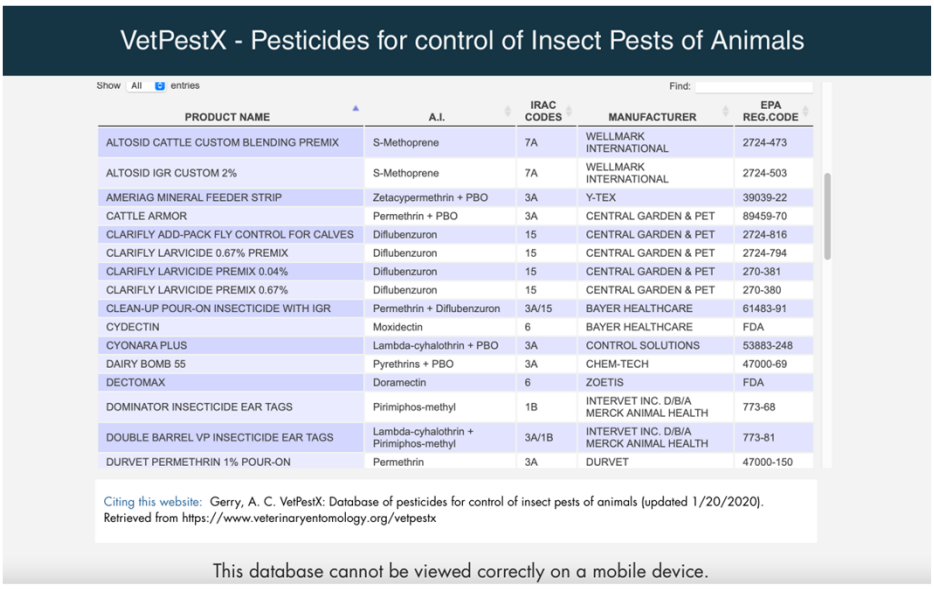
- *Action Guideline:*
  Dairy - About 50 flies per side
  Beef - About 100 flies per side

Horn fly – control methods

Veterinaryentomology.org

Horn fly – control methods

Veterinaryentomology.org



Horn fly – control methods

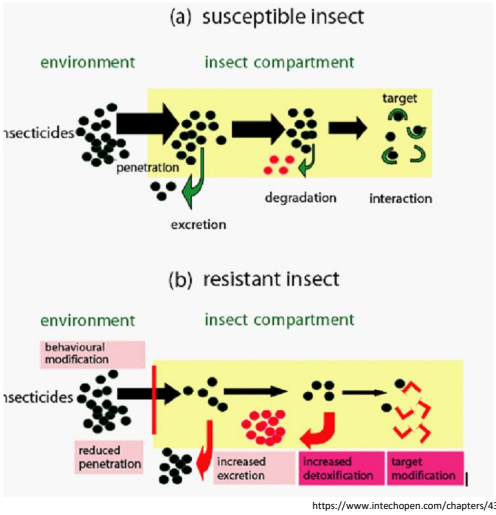
Veterinaryentomology.org

- Dust bags
- Oilers
- Pour-ons
- Ear tags
- Feed throughs
- Injectables

- Pyrethroids (example: perme**thrin**, deltame**thrin**, lambda cyhalo**thrin**)
- Organophosphates (example: chlorpyri**fos**)
- Avermectins (example: iver**mectin**, aba**mectin**, eprino**mectin**, moxide**ctin**)
- Insect growth regulators (example: diflubenzuron, S-methoprene, pyriproxyfen)

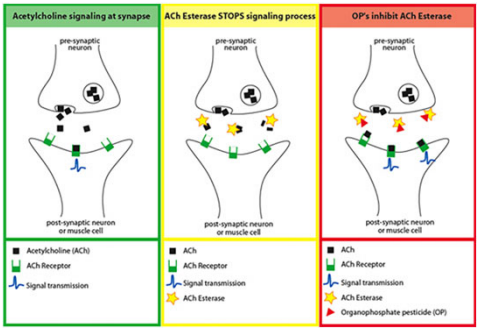
Horn fly – challenges – insecticide resistance pt. 1

Behavioral and/or physiological modifications that allow an insect (arthropod) to survive exposure to a toxicant for a duration of time.

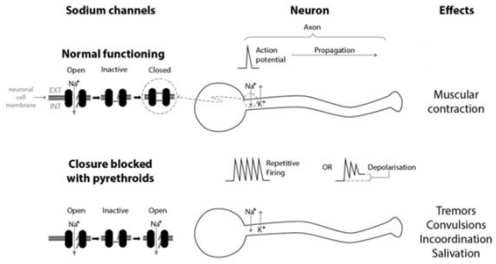


https://www.intechopen.com/chapters/43899

Horn fly – challenges – insecticide resistance pt. 2

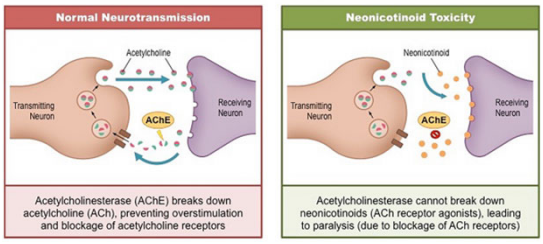


OP/carbamates



Pyrethroids/DDT

Neonicotinoids



Some insecticide modes of action

https://crops.extension.iastate.edu/encyclopedia/getting-know-popular-insecticides-used-iowa-field-crops

Thank you!

Please feel free to contact me with any questions regarding ectoparasite management

Edwin R. Burgess IV, Ph.D., Assistant Professor of Veterinary Entomology, University of Florida

edwinburgess@ufl.edu

Phone: (352) 273 – 3975 (leave a message if I do not answer)

University of Florida 72nd ANNUAL BEEF CATTLE SHORT COURSE

UF | ANIMAL SCIENCES

Beef on Dairy (Beef Cross)
Dan Dorn of ABS Global, Inc.
Perspective and Outlook

- Influence 5.2 M Head of Dairy Cows
- Sexed Semen
- Extreme Drought
  - US Cow Numbers
- Carcass and Performance
  - As good as or better than native beef?
  - Cutability
- Genetics make the difference
- Sustainability

BEEF INFOCUS

Profit from Genetic Progress ABS

2

The Progressive Approach To Dairy Genetics

Changing Dairy Genetics

High Performing Beef Cattle

Today's dairy Cow has the ability to produce 35,000 lbs. of Quality Fluid Milk and 590 lbs. of Premium Beef in one production cycle.

The Average Person in US consumes 653 lbs. Dairy products (53 people)

The Average Person in US consumes 58 lbs. Beef. (10 People)

BEEF INFOCUS

Profit from Genetic Progress ABS

Dairy Beef Production

20% of beef production in US

- US dairy trends
  - Feeding & processing dairy x dairy steers
  - Harvest Capacity Pressure

Opportunity to influence

5.23 M head

- Future of dairy beef production
- Not adding or taking away supply, it is raising the quality bar
- 80 Million New People A Year Globally

Profit from Genetic Progress

4

Influence of Dairy Business

- **Sexed semen**
- **Only need top-end cows to create replacement females**
- **Breed the balance Terminal (Beef)**

Per Hoards:
Since 2017:
dairy-breed semen sales have fallen by 6M units
beef-breed semen sales have increased in parallel (6.2 million units).

Therefore, no extra heifers for replacement purposes.
Slows expansion

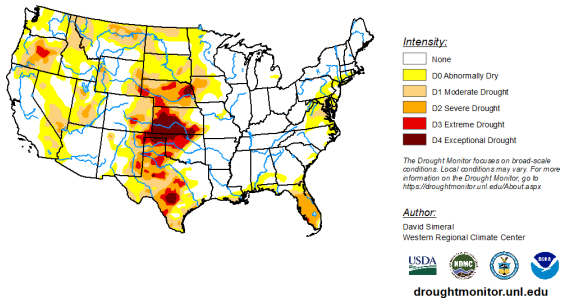
Profit from Genetic Progress

Extreme Drought, resulting in a reduced cattle inventory, has created an exceptionally strong demand of feeder calves

Lack of feeder cattle is not a short-term issue, but at least a five-year shortfall as cow/calf producers attempt to rebuild the beef herd.

The beef herd is the smallest since 1962

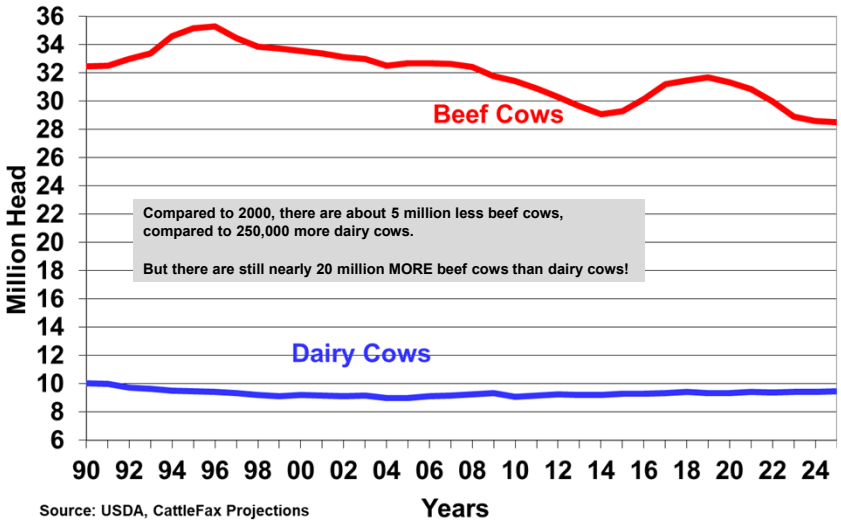
The question is how much will the beef herd build back or will it rebuild?



BEEF INFOCUS

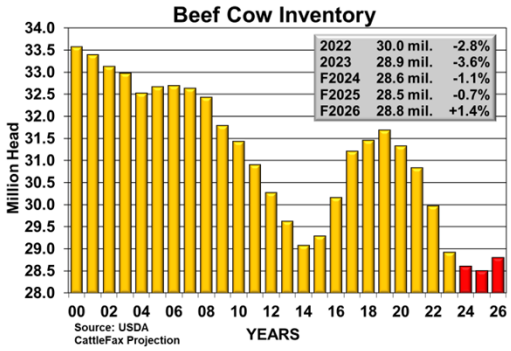
Profit from Genetic Progress ABS

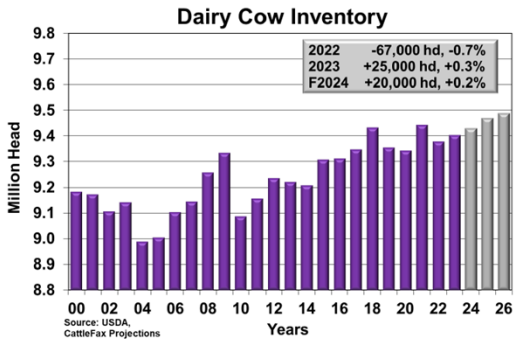
U.S. Beef and Dairy Cow Inventories



Source: USDA, CattleFax Projections

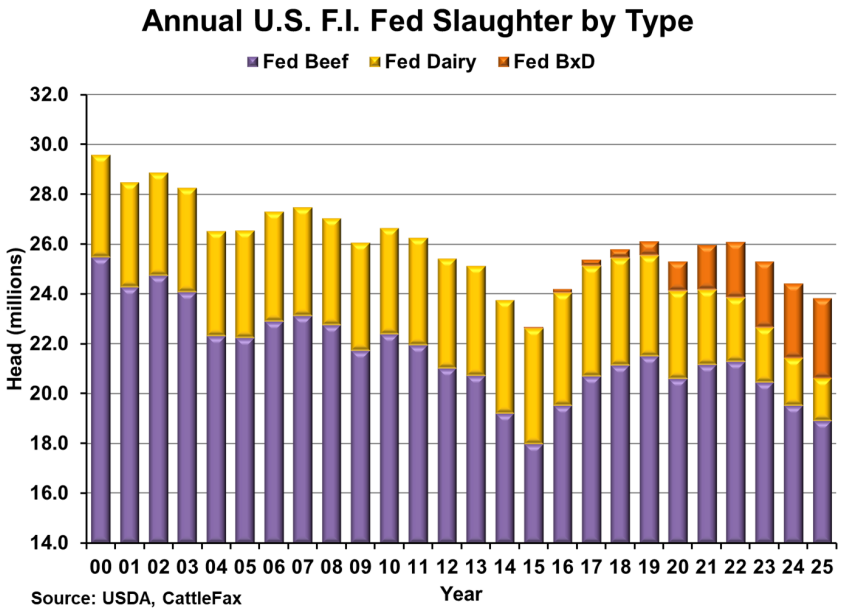
CattleFax | THE DECIDING FACTOR



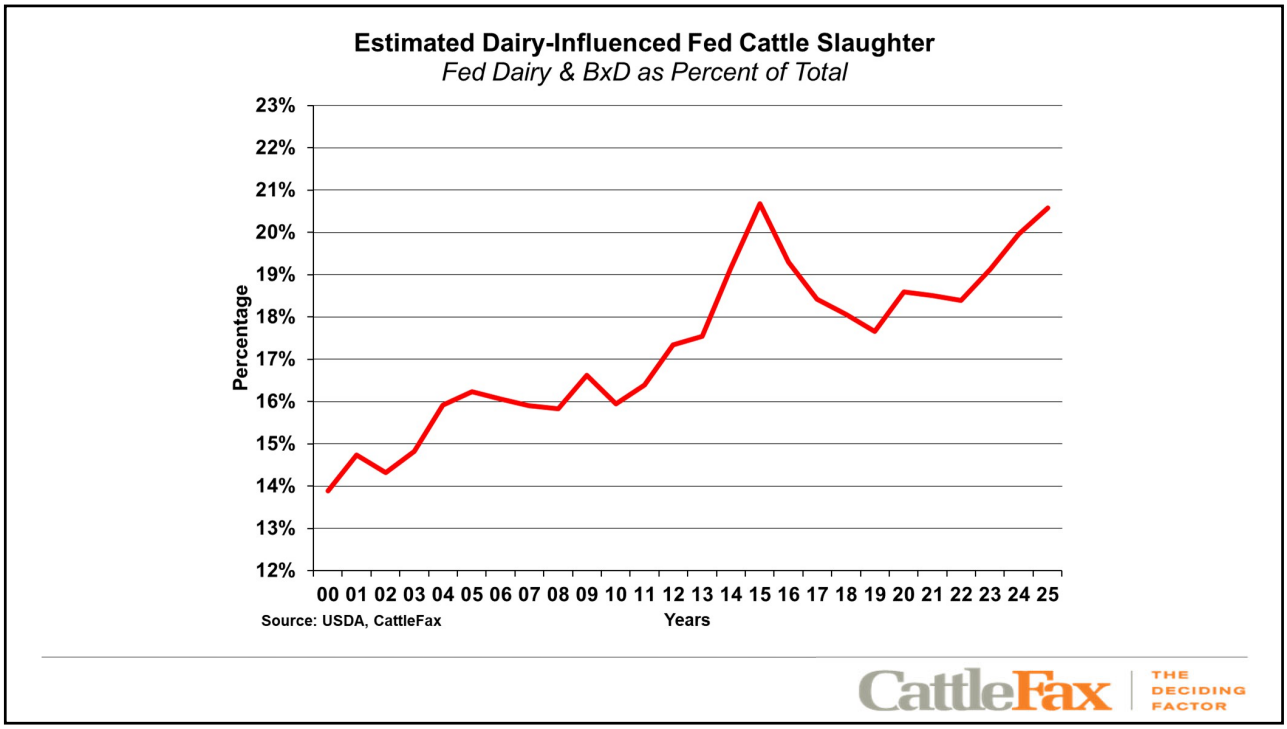


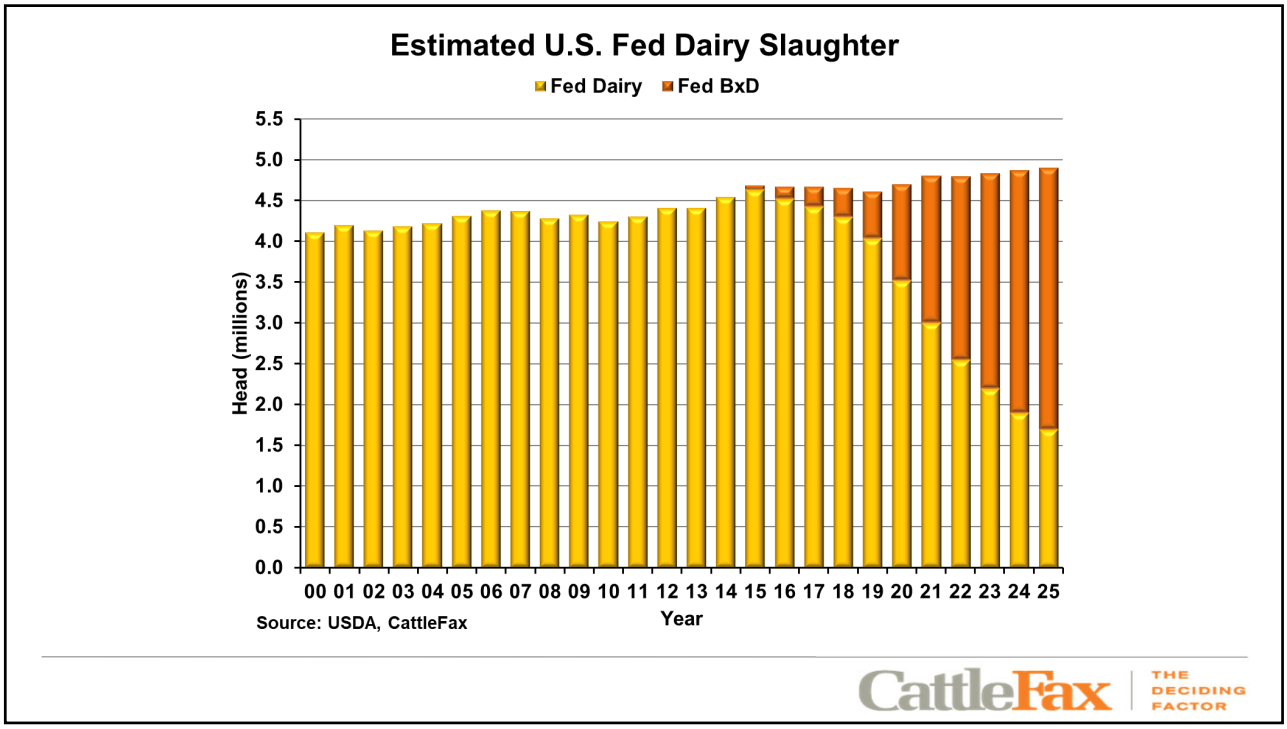
Compared to 2000, there are about 5 million less beef cows, compared to 250,000 more dairy cows.

CattleFax | THE DECIDING FACTOR



CattleFax | THE DECIDING FACTOR


Estimated Dairy-Influenced Fed Cattle Slaughter
Fed Dairy & BxD as Percent of Total
23%
22%
21%
20%
19%
18%
17%
16%
15%
14%
13%
12%
Percentage
00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25
Years
Source: USDA, CattleFax
CattleFax
THE DECIDING FACTOR


Estimated U.S. Fed Dairy Slaughter
Fed Dairy
Fed BxD
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
Head (millions)
00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25
Year
Source: USDA, CattleFax
CattleFax
THE DECIDING FACTOR

11

Reset
Volume, Quality, Alignment, Non-seasonal

- Need for Cattle:
  - 7 new plants + 1 expansion =
    ~12,000 head / day
- Quality matters more than ever
  - Prime / Choice spread reached $90/cwt in ’22
- Consistent Flow
  - Large producers – ready source of calves year around

Dairy Cows Now On Double Duty:
The beef industry now has a new source of production (BeefX steers) from what used to be considered a highly discounted biproduct (straight dairy steers/ heifers).”

BEEF INFOCUS

Profit from Genetic Progress ABS

Why Beef Crosses?

•Compared to purebred dairy calves, ‘beef on dairy' calves can provide higher-quality beef products without impacting current milk production efficiencies.

•“Beef on dairy” calves show greater feed efficiency (*compared to purebred dairy calves*), which lowers the environmental footprint associated with their production.

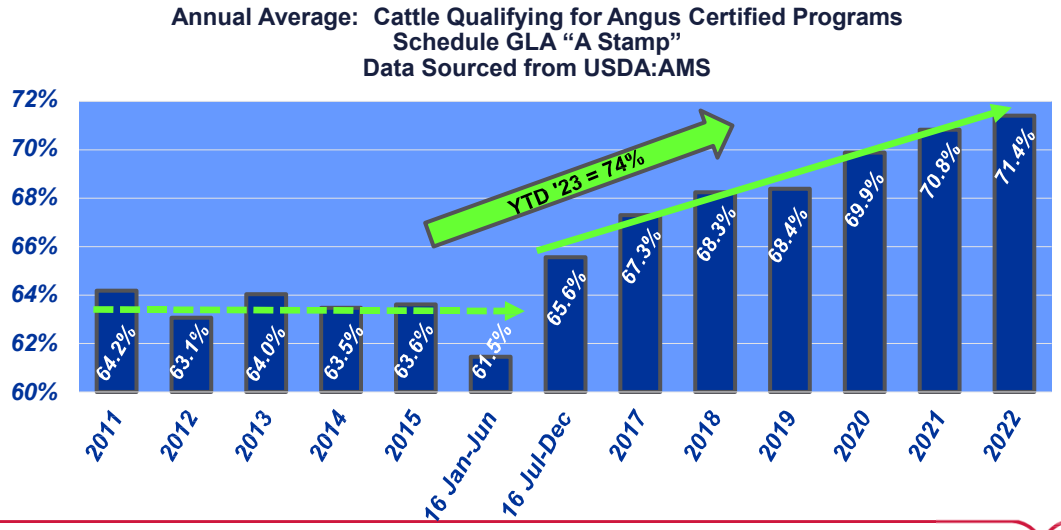
•Increased feed efficiency significantly reduces greenhouse gas (*GHG*) emissions.

•The practice benefits meat quality. ‘Beef on dairy' delivers increased volumes of higher-grading beef carcasses, providing feed yard operators more access to value-based marketing opportunities as well as pass-back — beef on dairy calves are more valuable in the marketplace for dairies than purebred dairy calves.

BEEF INFOCUS

Profit from Genetic Progress ABS

The desire for Black



BEEF INFOCUS

Profit from Genetic Progress ABS

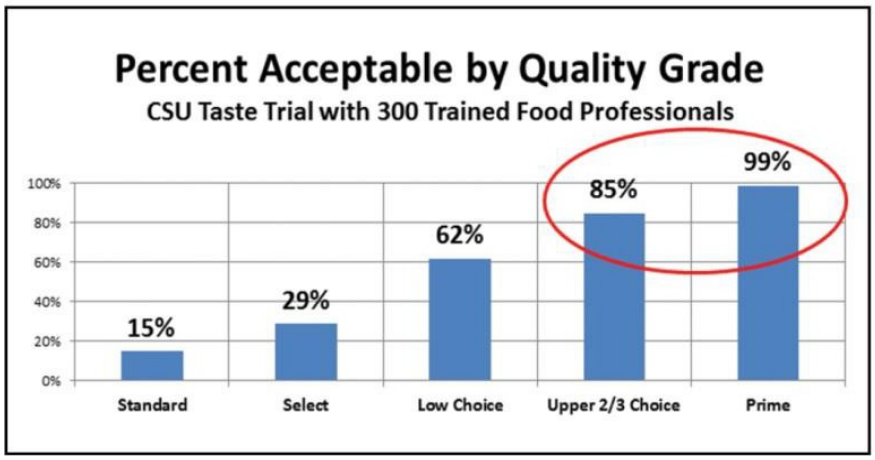
Certified Angus Beef Specifications

- 51% Black hided
- Less than 30 months of age
- REA 10-16 square Inches
- HCW of 1,100 lbs. or Less
- BF of 1.0 inches or less
- Moderately thick
- No hump exceeding 2 inches

BEEF INFOCUS

Profit from Genetic Progress ABS

Marbling Drives Value!



Colorado State University M.S. Thesis: M. R. Emerson (2011)

BEEF INFOCUS

Profit from Genetic Progress ABS

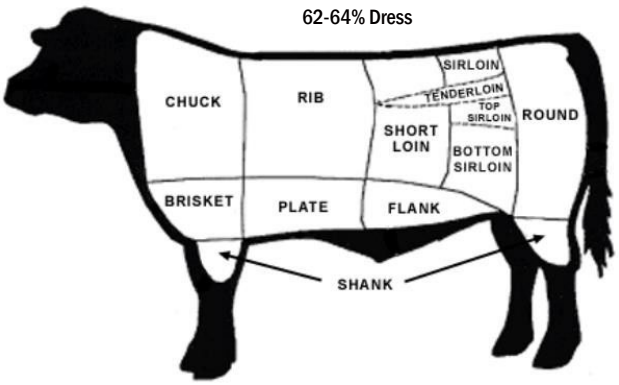
Begin With The End In Mind

Cattle Feeders Want:

- Excellent Calf Care and Management
- Validated Genetics (remove the counterfeits)
- Consistent Supply with Predictable Results
- Supported Sustainable Story

Efficient & Healthy

- Competitive Feed Conversion
- Carcass: Muscle, Marbling, Loin and Rib Shape
- Height and Frame Score (58 inch rule)
- Liver and Gut Health
- Provide a Verified ID



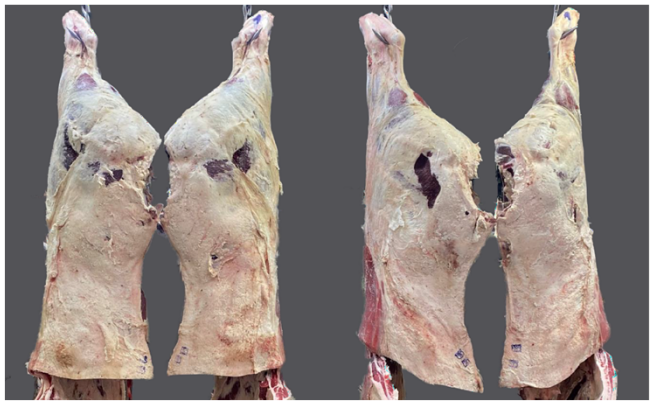
"Black" Is Not the Only Goal In Beef-on-dairy Breeding

Dairyherd.com by:- Maureen Hanson

BEEF INFOCUS

Profit from Genetic Progress ABS

Muscle and Shape Matters



The round amounts to 22.3% or 196 lbs. of the carcass

BEEF INFOCUS

Profit from Genetic Progress ABS

Muscle and Carcass Yield Matters

- ***Ribeye area*** was not entirely reflective of live animal muscularity.
- When marbling did not largely differ, phenotype expression of beef- or dairy-type had no influence on ***meat quality.***
- At slaughter endpoints representative for their cattle type, average crossbreds and conventional beef cattle yielded ***similar carcass cutout values.***
- Muscularity in the ***round*** and ***loin***, coupled with leanness in the ***rib***, most greatly differentiated cutout value among crossbreds.

Texas Tech University TTU-Lubbock

BEEF INFOCUS

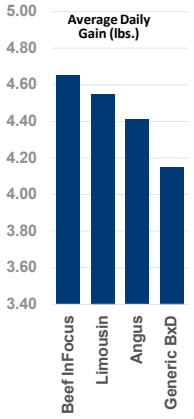
Profit from Genetic Progress ABS

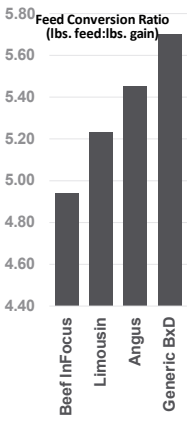
Genetics Matters

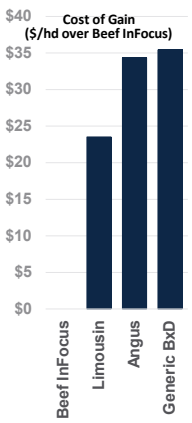
An in-progress trial to compare Beef InFocus performance to alternative competitor beef x dairy (HO) offerings shows a significant advantage for Beef InFocus genetics

Group	Number Obs	Number Sires
Beef InFocus	115	10
Limousin	106	2+
Angus	95	UNK
Generic BxD	134	UNK

Cattle evaluated between ~900 to 1150 lbs
* COG = $ cost of gain from 750 to 1400 lbs







Genetics Matters

Feeding Performance

	Heifers	Steers	Grand Total
HEAD	2405	2726	5131
AGE TO FEEDLOT, DAYS	288	286	287
FEEDLOT IN WEIGHT, LBS	758	796	778
FEEDLOT REIMPLANT WEIGHT, LBS	1197	1279	1237
FEEDLOT OUT WEIGHT, LBS	1350	1481	1450
AGE TO HARVEST, DAYS	487	479	483
HCW, LBS	872	922	899
Average of Dressing %	62.67%	62.41%	62.53%
Average of DOF	203	195	199
Average of ADG	3.06	3.39	3.24
Average of F:G (Dry)	7.37	6.82	7.07

Beef InFocus
Heifers X Holstein

Genetics Matters

Harvest Data July-2020-July 2021

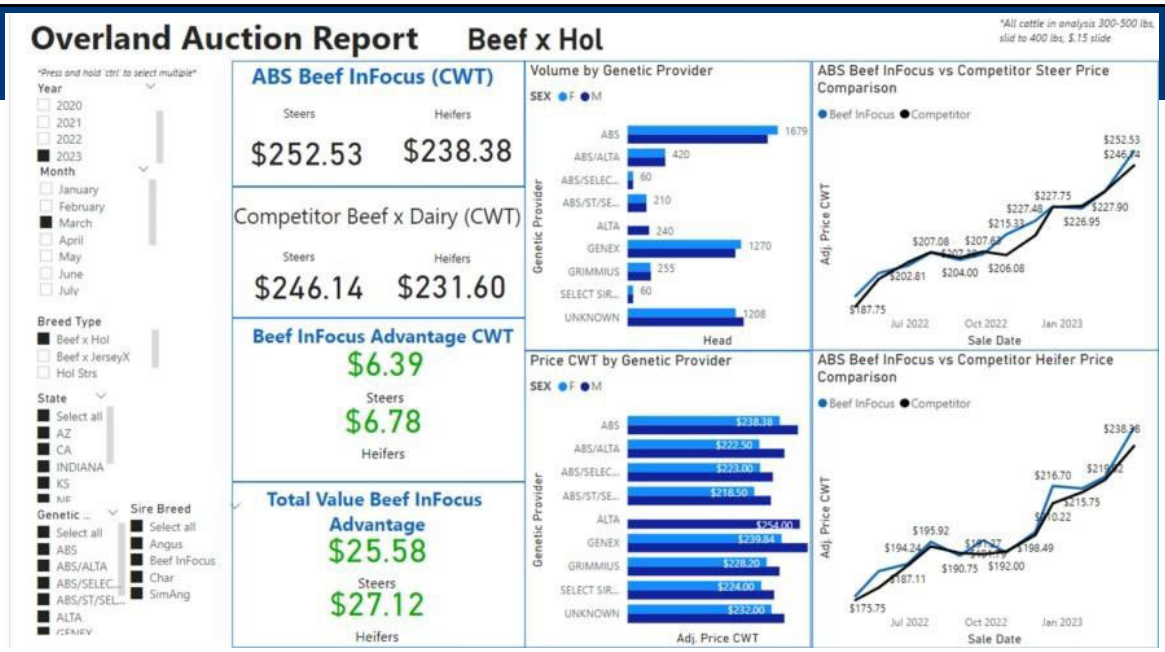
	Heifers	Steers	Grand Total
HEAD	2405	2726	5131
HCW, LBS	872	922	899
BF THICKNESS, IN	0.53	0.48	0.50
MARBLING SCORE	554	498	524
REA, IN SQ	13.89	14.06	13.98
Prime, %	10.92%	5.30%	8.11%
Choice, %	80.28%	79.37%	79.83%
Select, %	7.32%	14.74%	11.03%
Dark Cut, %	0.12%	0.05%	0.09%
No Roll, %	1.36%	0.34%	0.85%
YG 1, %	2.54%	2.29%	2.40%
YG 2, %	27.37%	30.12%	28.88%
YG 3, %	48.32%	49.93%	49.20%
YG 4, %	19.41%	16.25%	17.68%
YG 5, %	2.36%	1.41%	1.84%
Average of Dressing %	62.67%	62.41%	62.53%
Average of CAB %	43.04%	33.24%	37.54%
Average of Choice+ %	90.06%	85.01%	87.15%

BEEF INFOCUS

Profit from Genetic Progress

ABS

Genetics and Brand Matters



BEEF INFOCUS

Profit from Genetic Progress

ABS

Customer-Centric Thinking: Reverse Traditional Value Chain

Commodity Focus

- **Traditional Approach = Commodity Orientation:**
  - Start with production and then move downstream through marketing channels and finally to the consumer.
  - Unresponsive to consumer!
- **Consumer-centric Approach = Value-Added Focus**
  - Bottom-up: start with the customer and then adapt the value chain around:

Shift to Value-Added Focus

- **Quality**
- **Consistency**
- **Transparency**
- **Attributes**
- **Efficiency**
- **Volume**

Genetics – Nutrition – Management - Sustainability

- Genetics Matters
- Nutrition and management are key
- Market Access
- Traceable with Verification (Digitally or 3rd Party)
- Sustainability
  - Animal Welfare
  - Feed Conversion
    - Methane Emissions
    - Carbon

"If you want value out of your byproducts, you need to stop treating them like a byproduct."

Thank you!

Any questions?

308.830.8008 | Dan.Dorn@genusplc.com
www.ABSglobal.com | 800.ABS.STUD

Opportunities to add value to feeder cattle

Dr. Jason Smith
Assistant Professor and Extension Beef Cattle Specialist
Department of Animal Science
Texas A&M AgriLife Extension – Amarillo

Maximizing the profit potential of feeder cattle requires striking the optimal positive balance between added revenue and expenses. There are a number of general management practices that add value to feeder cattle. Many of these practices are capable of adding value to calves that will be sold at weaning, following weaning and preconditioning, or following a more extensive backgrounding period. Similarly, some opportunities may only add value under certain circumstances. Additionally, there are management practices that add value, but may do so at the expense of net profit because they require direct and indirect (opportunity) costs that outweigh the added revenue. Potential return on investment is key and should be a major consideration when deciding to adopt or forgo a practice. Specific management practices with the greatest potential to add value to feeder cattle and that are available to most producers are briefly outlined in this document and will be discussed in detail throughout the presentation using practical, real-world examples. **Please note that genetic factors also impact the value of feeder cattle, often to a substantial degree, but are beyond the scope of this presentation. In a general sense, these include breed composition (or at least physical appearance of breed types, color, pattern, etc.), muscle scores, frame size, and group uniformity/variation. This presentation will focus on management decisions that can be applied to an existing calf crop or group of feeder cattle.*

Weaning and preconditioning

Weaning and preconditioning are often thought of as the "original" value-added programs for feeder cattle. When cattle are marketed appropriately, weaning and preconditioning often results in gross premiums of roughly $40 to $80 per head (Zimmerman et al., 2012; Hutcheson et al., unpublished; personal observation), and roughly $60 to $100 per head when marketed through allied groups or regional marketing alliances (personal observation). This equates to approximately $3,840 to $9,600 per 48,000-lb load-lot of 5-weight calves. It is important to note that weaned and preconditioned calves need to be marketed in a way that will capture the potential premium. Otherwise, weaning and preconditioning will generally not result in a premium, and as a result will become an expense rather than an investment. Major marketing factors that should be considered are 1) is there an established market for weaned and preconditioned calves of similar size and value, 2) will there be enough weaned and preconditioned calves for buyers to have access to multiple complete loads, and 3) will there be enough buyers to create demand and thus competition for the calves?

Reluctance to wean and precondition is often due to the perception that the "juice is not worth the squeeze." In other words, the perception is often that the premium, or added revenue, is not great enough to outweigh the cost, effort, and/or risks associated with weaning and preconditioning, which has limited the adoption of these practices. One of the factors that limits the value that weaning and preconditioning creates in feeder cattle is that the preconditioning phase often does not extend beyond the minimum amount of time required by the program or marketing channel. Because of this, calves often only recover the weight that they lost as a result of the weaning process, and therefore gain very little, if any at all, additional weight throughout a relatively short 34- to 45-day preconditioning phase.

The preconditioning phase is an opportunity to add value through both premiums and weight gain. In most situations it will require some period of time for calves to recover their initial shrink and additional

weight loss that occurs throughout the first week or two of the weaning process. As a consequence of this, post-weaning gain is often "backloaded" to some degree following weaning. In some situations, the initial post-weaning weight recovery period may require as little as a week or two, but in many others, it may require 3 to 6 weeks. However, once recovered, calves generally experience a considerable period of improved efficiency and rapid growth. Extending the preconditioning phase from 34 to 45 or 45 to 60 days or more may be a means of increasing the total amount of added value for many operations. Make weaning and preconditioning as economical as possible through being mindful of input costs and minimizing cost of gain. This generally requires access to high quality forages or relatively cheap feed resources. Nonetheless, economical weight gain throughout weaning and preconditioning has the ability to substantially increase the net value added to feeder cattle and make "the juice worth the squeeze."

Other value-added programs

In addition to weaning and preconditioning, there are many other value-added programs available to cattlemen. Listing all of them in this document would be nearly impossible, and undoubtedly some would be unintentionally omitted. Rather, most program options available to cattlemen are focused on source (origin) and age of cattle, type or source of genetics, management practices (required and/or prohibited), or some combination thereof. Values reported from analysis of Superior Livestock Auction (Odde et al., 2019; Hutcheson et al., unpublished; personal correspondence with IMI global, 2023), Western Video Market (personal correspondence with IMI Global, 2023), and other southeastern feeder cattle market (Burdine et al., 2014) sale results suggests that gross premiums associated with these programs have ranged from roughly $20 to $75 per head over the past few years.

It is critically important to recognize that a specific dollar amount of added value does not necessarily equate to the same dollar value increase in net profit. Costs associated with value-added programs are often overlooked or underestimated, especially for operations that market 100 head or less through a specific program. These costs include direct costs associated with program enrollment, verification, and identification (tag purchase), other direct costs associated with meeting program requirements, as well as the indirect opportunity costs associated with the restriction of certain production practices, such as the use of ionophores or growth-promoting hormone implants. Ignoring any of these costs results in an overestimation of the added profit potential associated with participating in the value-added program.

One major exception to this is the expected cost of source and age verification, which has been reported to cost $3.50 or less per head, but to yield a premium of roughly $5 to $20 per head (Zimmerman et al., 2012; Burdine et al., 2014; personal correspondence with IMI global, 2023), and as such is expected to offer a positive return on investment. Nonetheless, enrollment and verification costs should not be expected to be the same across different programs. Costs should be expected to be greater for non-hormone treated cattle (NHTC)- and natural-type programs, as well other production practice-specific process verification programs (personal correspondence with IMI global, 2023), but premiums should also be expected to be greater (Hutcheson et al., unpublished; personal correspondence with IMI global, 2023) if cattle are marketed accordingly. Per head enrollment costs should also be expected to be inversely related to number of head marketed. Because fixed enrollment and verification costs are spread across more cattle, expect the per head cost to decrease as head count increases.

Nonetheless, opportunities exist where value-added programs are capable of increasing net profit at the cow-calf and stocker-backgrounding levels. It is critical to ensure that the added revenue outweighs the direct and indirect costs of the program. Consider all aspects of the added revenue, as well as the required expenses of various programs or combinations of programs and the required or restricted management practices to determine the best option. In this situation, the best option is the one that results

in the greatest net profit after all direct and indirect costs have been adequately accounted for. This concept will be covered in detail with specific examples throughout the presentation.

Additional general management practices

Castration and dehorning are generally included as requirements of most weaning and preconditioning programs. Best completed as young as possible, and preferably prior to 300 lbs, castration has historically influenced the value of feeder cattle (steers vs. bulls) to a substantial degree; arguably as much or more than most other direct management practices. Regardless of the choice to wean and precondition, castrating bulls adds value because it helps to mitigate some of the health and production risks associated with newly received feeder cattle.

Discounts for bulls relative to steers in Oklahoma City auction markets have recently ranged from approximately $50 to $150 per head (USDA AMS, 2023). A $100 per head discount equates to approximately $9,600 missed opportunity in a load-lot of 5-weight steers. Castration is expected to cost no more than a few dollars per head for labor, equipment, and supplies (if necessary) in most situations and often represents a relatively large portion of the profit potential for many stocker and backgrounding enterprises. Considering its incredibly low cost, castration offers a substantial potential return on investment, potentially as high as ~50:1. Regardless of method used, castration is easily learned and requires very little time to perform. Increasing discounts for bulls relative to steers over the past few years (USDA AMS, 2019-2023) suggest decreased demand and/or increased cost of gain expectations for un-castrated bulls relative to steers.

Similarly, the presence of horns also generally results in a discount to the overall value of feeder cattle. Recently, the discount for horned cattle marketed in Oklahoma City auction markets has ranged from approximately $10 to $20 per head (USDA AMS, 2022), which equates to roughly $960 to $1920 per load-lot of 5-weight steers. While there are a number of methods available to dehorn, utilizing polled genetics is without question the simplest and most economical. Polled genetics are also readily available nationwide. Because the polled phenotype is dominant, it requires only one mating decision to generate a 100% polled calf crop out of a 100% horned cow herd. Nonetheless, physically dehorning calves that are horned is expected to result in a positive and worthwhile return on investment; estimated at approximately 3:1 to 4:1.

Feeding and nutritional management

Various aspects of feeding and nutritional management are capable of influencing feeder cattle value. As should be expected, weight gain has the potential to substantially increase the value of feeder cattle. While specific nutritional management strategies are beyond the scope of this presentation, focus should be on adoption of feeding and nutritional management strategies that minimize cost of gain. Only strategies that are expected to yield a positive return on investment and keep cost of gain below value of gain should be considered.

It is important to factor in price slide (decrease) associated with increasing weight when estimating and weighing value of gain against cost of gain. Simply stated, value of gain declines (albeit at a decreasing rate) as calf weight increases. It is also important not to overlook the impact of normal market trends on calf value. Consider the state of the cattle cycle, seasonal trends in feeder cattle value, and finishing costs when making decisions that may influence the size of cattle and duration of time required prior to marketing.

Additionally, care should be taken to avoid discounts associated with cattle being perceived as overly full and fleshy in certain markets. Targeting postweaning average daily gains of less than 2.5 to 3 lbs/head/day over extended time periods of time (> 60 days) is generally successful at minimizing the risk

of cattle being discounted for fleshiness. Gains of 2.5 to 3.5 lbs/head/day over periods of 60 days or less are not expected to result in cattle being discounted for fleshiness unless they were "fleshy" to begin with. Avoid extended feed and water restriction during times leading up to marketing (gathering, transport to facility, etc.) to minimize the risk of cattle overeating or overdrinking and potentially being discounted for fill and its associated shrink.

Growth-promoting technologies

The major growth-promoting technologies available for use in the cow-calf and stocker-backgrounding sectors include ionophores and hormone implants. These technologies have tremendous potential to add value to cattle through added weight gain and decreased cost of gain, and are generally expected to result in substantial positive returns on investment.

Ionophores, such as monensin [Rumensin (Elanco Animal Health) or Monovet (Huvepharma)] and lasalocid [Bovatec (Zoetis)], are antimicrobial drugs administered to cattle through medicated feeds. They add value predominantly through additional weight gain by altering the rumen microbial population and ruminal fermentation in a way that promotes feed efficiency. Ionophores also add value to growing cattle through bloat mitigation and their role as a coccidiostat. For approximately $0.02 to $0.03 per head per day (assuming approximately a 180 to 200-mg/head/day dose), ionophores are expected to result in approximately a 10 to 12% increase in average daily gain (Bretschneider et al., 2008; Gadberry et al., 2022) for growing cattle consuming a forage-based diet. As a result, the potential return on investment for growing cattle (using $230/cwt. base price for 5-weight steers) is generally expected to fall within the range of approximately 5:1 to upwards of 26:1, depending upon baseline level of performance and product cost.

Growth-promoting hormone implants (commonly just referred to as "implants") add value through stimulating additional weight gain that would have otherwise been unachievable, primarily through improving feed efficiency. A single calfhood implant [Ralgro (Merck Animal Health), Synovex C (Zoetis), or Component E-C with Tylan (Elanco Animal Health)] administered approximately 100 days prior to weaning is expected to increase weaning weight by approximately 5 to 6% [adapted from Selk (1997) and Mathis (2010) using data from 58 trials], which translates to an average of an additional 28 lbs per head for a 5-weight calf, or the equivalent of a little more than 5 calves per load-lot. At a total cost (product + administration) of $2 to $3 per dose, and a single dose administered per animal, the potential return on investment is generally expected to fall within the range of 10:1 to 20:1, depending on baseline performance and market values. In a $230/cwt. 5-weight feeder calf market, where the additional weight is worth $2.16/lb (rounded, slid 6%), the implant nets approximately $57.54 per head after deducting the $3 per head cost of implant and administration.

Implants work through separate modes of action from ionophores. As a result of this, their effects are additive (Bretschneider et al., 2008), meaning that use or the effect of one does not influence the effect of the other. For this reason, it is recommended to use both ionophores and implants, rather than only one or the other. Nonetheless, implants and ionophores are far underutilized at both the cow-calf and stocker-backgrounding levels. Unfortunately, many (but not all) value-added marketing programs also prohibit their use. However, from strictly an economic standpoint, use of an implant in suckling calves remains one of the greatest opportunities to add substantial value to feeder cattle.

Administration of an implant does not decrease the price ($/cwt.) that buyers are willing to pay for non-program cattle (Rogers et al., 2015), but does increase their total value through added weight. Although published reports of premiums associated with NHTC or natural branded programs are limited, a combination of published (Odde et al., 2019) and anecdotal evidence (Hutcheson et al., 2023; personal correspondence with IMI Global, 2023; personal observations) suggests that premiums associated with

the NHTC component (the portion that prohibits the use of an implant) of such value-added programs has ranged from approximately $2 to $7 per cwt., which equates to $10 to $35 per head for a 500-lb calf, or approximately $960 to $3,360 for a load-lot of 5-weight calves.

Given the limited premiums, implanting is often expected to be the most economical option even prior to considering the cost of NHTC or natural program enrollment and verification. After considering these costs, which are estimated to range from approximately $5.00 (~500 head marketed) to $25 or more (~50 head marketed) per head (cost estimates obtained from IMI Global, 2023), the economics should generally be expected to favor implanting. That economic advantage is further strengthened by the added weight form administering another implant at or soon after weaning to calves that will be preconditioned or backgrounded. The following documents provide an overview of best management practices for implanting, as well as outline implant options available at the cow-calf level.

Conclusions

Substantial opportunity exists to add value to feeder cattle, both at the cow-calf and stocker-backgrounding levels. Some practices add value through influencing aspects of perceived value, risk, or costs of the cattle, while others add value through added weight. Weaning and preconditioning are management options that should be considered if not already being practiced. There is no question that they are the right thing to do for the industry. Emphasis should be placed on economical gain and duration of the preconditioning phase to maximize net return on time, labor, and monetary investments. Marketing strategy will determine if weaning and preconditioning, as well as participation in other value-added programs will yield positive returns on their investments or will merely contribute to overall expenses. Castration and dehorning offer quick and easy value gains and have little risk when practiced early in life at the cow-calf level. Other value-added marketing options should certainly be considered; however, it is important to consider the direct and indirect costs that will be incurred for cattle to check the required boxes and receive the corresponding premiums. The exception to this is source and age verification, which appears to be an economically viable option under most production scenarios. Finally, ionophores and implants are technologies that are far underutilized but have the potential to add a substantial amount of value to cattle and require very little investment.

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Best management practices and considerations for beef cattle implant programs

J.K. Smith[1], J.P. Banta[2], M.J. Hersom[3], R.L. Stewart, Jr.[4], and J.D. Rhinehart[5]

Growth-promoting hormone implants offer a substantial return on investment to beef cattle producers through increased rate of weight gain and improved feed efficiency. Implants have no withdrawal period and are safe and effective when used in accordance with the product label. Cattle managed on an adequate to high plane of nutrition that are not experiencing significant health challenges are expected to yield the most favorable responses from the implant. The following management practices and guidelines should be followed to maximize implant efficacy.

Preparing to implant

- Read and understand the entire label for any implant product that you plan to use.
- Do not administer an implant to any animal or within a production phase for which the specific product has not been approved, as indicated by the animal or production phase listed on the label.
- Do not administer implants to bulls or heifers to be retained or marketed for breeding purposes.
- Do not use expired implants, and store implants according to the specifications outlined on the label.
- Plan implanting to coincide with other management events that require cattle to be processed.
- Each product line requires its own applicator. Be sure to have the proper equipment that is completely functional prior to implanting. Also have a backup applicator on hand in case one fails or becomes inoperable, as well as extra needles in case one becomes dull or extremely dirty.

Administering the implant

- Wear disposable latex or nitrile gloves while handling implants, handling, and cleaning implanting equipment, and while administering implants to cattle. Gloves will help to keep implants, implanting equipment, and the animal's ear clean, while also reducing the risk of exposure to zoonotic diseases through contact with blood.
- Sanitation of equipment is important to minimize the risk of infection at the site of implant administration. The implant needle should be disinfected between each individual implant administration by wiping the needle across a sponge soaked in disinfectant solution (e.g., chlorhexidine; one ounce per gallon of clean water). Never dip or soak the needle of a loaded applicator in disinfectant solution as the liquid in the needle may cause the implant to begin to dissolve. A paint tray works well to hold a rectangular sponge and approximately ½ to ¾ of an inch of disinfectant solution. The sponge can then be flipped over or replaced as needed.
- The animal's ear should be clean and free of dirt, mud, manure, or other debris. If necessary, clean the ear by first scraping it with a blunt edge, then using a brush to remove any remaining debris, and finally by chemically disinfecting the implant site by scrubbing with a sponge soaked in disinfectant solution. Then dry the ear as best as possible prior to administering the implant.
- The needle on the implant applicator should be clean, sharp, free of burrs, and securely attached to the applicator. Change needles that become dull, develop a burr, or become extremely dirty. The cost of a new needle is far less than the revenue lost by a single implant not being administered correctly due to an issue with the needle.
- The animal's head should be adequately restrained to simplify the implanting process.
- Implants are administered subcutaneously (beneath the skin) in the middle portion of the back of either ear. If necessary, select the ear that contains the fewest number of ear tags, tattoos, or notches.

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- To administer the implant:
  1) Make sure an implant dose is loaded in the applicator and ready to be administered.
  2) Grasp the ear to be implanted with one hand.
  3) Hold the applicator at an angle that is slightly elevated from parallel to the backside of the ear with the other hand, with the needle point making direct contact with the skin. Some prefer the needle opening pointed out and away from the ear, while others prefer it to be pointed toward the ear.
  4) Pierce the skin with the needle and slightly lift the skin to avoid piercing the cartilage, while also taking care to avoid major blood vessels. If necessary, use your fingers to support the ear.
  5) Decrease the angle of the needle to parallel with the ear while fully inserting the needle beneath the skin of the ear. The needle will form a space for the implant to reside once withdrawn.
  6) Once the needle is fully inserted, withdraw it the approximate length of the complete implant dose if the applicator does not have a self-retracting needle. If the applicator has a self-retracting needle, skip this step. The space created by partially withdrawing the needle or its self-retraction helps to ensure that the entire implant dose is retained in the ear, and not bunched or crushed.
  7) Depress the trigger, then withdraw the needle from the ear. The implant pellet(s) will be deposited in the space created by the needle. Gently feel for the row of pellets or single pellet to ensure that the implant was deployed and placed properly in the ear. Improper implant placement can decrease the efficacy of the implant or increase the likelihood of infection.
  8) Clean and chemically disinfect the applicator needle prior to implanting the next animal.

After implanting

- Store implants in a cool, dry place, but not in a freezer. Avoid locations that will be exposed to freezing or hot temperatures. Only refrigerate opened implant packages if instructed to by the label. Many products should not be refrigerated.
- Clean and allow the implant applicator to dry prior to storage. Soak the needle in a chemical disinfectant solution and allow it to dry. Avoid dulling the needle. Store needles in dedicated containers that will keep them clean, but also prevent them from becoming dull or developing burrs.
- Once clean and dry, store the implant applicator and needle(s) in a clean, sealed, dry plastic bag.

Factors that may reduce or negate implant efficacy

- If the implant applicator was not loaded, or the implant dose was not chambered prior to administration, this would result in no implant being administered to the animal.
- Crushing the implant pellet(s) prior to or during administration may result in the implant not delivering the expected level of hormone(s) over the expected duration.
- Bunching of the implant resulting from not fully inserting the needle into the ear or not partially withdrawing a needle that does not self-retract during implant deployment may result in limited absorption of the hormone(s).
- Pushing the needle through the ear and depressing the trigger results in the implant not being administered to the animal.
- Administering the implant into the cartilage rather than subcutaneously reduces or negates absorption of the hormone(s).
- Local infection (abscess) at the implant site due to the implant needle, implanter's gloves, or the animal's ear not being clean and properly disinfected limits or negates absorption of the hormone(s)

Utilizing growth-promoting hormone implants improve beef cattle growth and feed efficiency in a way that is safe and cost effective. Implanting cattle using these best management practices will help to maximize implant efficacy. Contact your local Extension office for more information or assistance with implementing these practices into your beef cattle operation.

Growth-promoting hormone implant programs for cow-calf operations

J.K. Smith[1], J.P. Banta[2], M.J. Hersom[3], R.L. Stewart, Jr.[4], and J.D. Rhinehart[5]

Growth-promoting hormone implants add value to calves through increased weight gain. Implants administered to suckling calves are typically expected to increase weaning weight on most operations by approximately 3 to 5%, which equates to roughly 15 to 30 lbs per calf. Similarly, an additional implant administered at weaning will increase rate of weight gain during the growing phase (e.g., preconditioning or stocker). Multiple implants are available for use on cow-calf operations, therefore understanding the options and how to properly implement them will help to maximize return on investment. This document contains pertinent information for each of the growth-promoting hormone implant products that are currently approved and available for use during the suckling and growing phases and outlines programs that can be utilized by cow-calf operations.

Always read, understand, and follow the current product label when implanting cattle. This document does not contain complete label information for each product. Labels can change and are the means through which those changes are required to be communicated to the end user. Implants should only be used in cattle that belong to the production class or stage of production listed on the label. Note that no implants are currently approved or recommended for use in bulls intended for reproduction, replacement heifers after weaning, dairy animals that will be used for dairy production purposes, veal calves, market cows, or market bulls. Regardless of age or size, do not implant cattle that are intended to be retained or marketed for breeding purposes.

- Implants that are approved and available for use in suckling calves prior to weaning, listed in no particular order, include the following:
    - Ralgro is approved for use in calves, regardless of sex. Ralgro is not approved to be used in replacement heifers before 30 days of age or to be reimplanted within a production phase.
    - Synovex C and Component E-C with Tylan are approved for use in both steer and heifer calves that are at least 45 days old and weigh up to 400 lbs. These implants are not approved to be reimplanted within a production phase.
    - Compudose and Encore are approved for use in steers only and can be reimplanted after 200 and 400 days, respectively. However, the age at which calves are typically weaned negates the value of reimplanting with these implants prior to weaning.

- Implants that are approved and available for use in weaned calves during the growing phase (prior to finishing), listed in no particular order, include the following:
    - Ralgro is approved for use in weaned calves, regardless of sex. Ralgro is not approved to be reimplanted within a production phase.
    - Revalor G, Component TE-G with Tylan, and Synovex One Grower are approved for use in both steers and heifers managed on pasture. These implants are not approved to be reimplanted within a production phase.
    - Synovex S, Component E-S with Tylan, Compudose, and Encore are approved for use in steers only. Synovex S and Component E-S with Tylan are not approved to be reimplanted during the growing phase and are only approved to be administered to steers weighing more than 400 lbs.
    - Synovex H and Component E-H with Tylan are approved for use in heifers weighing 400 lbs or more. These implants are not approved to be reimplanted within a production phase.

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Potential implant programs for suckling and weaned calves

The following implant programs were designed to maximize return on investment to cow-calf operations that market calves prior to the finishing period. Weaned calves that will be preconditioned or undergo an extended growing phase should be implanted again at the time of weaning, even if they were not previously implanted. The recommended options listed below appear in no particular order.

The following implant options are available to be administered prior to weaning:

- Bull calves not intended to become breeding bulls should be implanted with one dose of Ralgro 70-100 days prior to marketing or weaning. It is highly recommended that they be castrated at the time of implanting if they have not already been castrated.
- Steer calves should be implanted with one dose of Ralgro, Synovex C, or Component E-C with Tylan 70-100 days prior to marketing or weaning, or with one dose of Compudose 160-200 days prior to marketing or weaning.
- Heifer calves not intended to become replacements should be implanted with one dose of Ralgro, Synovex C, or Component E-C with Tylan 70-100 days prior to marketing or weaning.

The following implant options are available to be administered at or following weaning and during the growing phase, but prior to entry into a confined finishing phase:

- Bull calves not intended for breeding should be implanted at weaning with Ralgro. It is highly recommended that bull calves be castrated prior to weaning.
- Steer calves should be implanted with one of the following implants at weaning:
    - Ralgro, Revalor G, Component TE-G with Tylan, Synovex S, or Component E-S with Tylan are appropriate options for steers that will be preconditioned or grown for 100 days or less before marketing.
        - Revalor G and Component TE-G with Tylan can only be used in calves managed on pasture.
        - Synovex S and Component E-S with Tylan can only be used in steers weighing more than 400 lbs.
    - Compudose or Synovex One Grower are appropriate options for steers that will be grown for 100 to 200 days before marketing.
        - Compudose should be administered no sooner than 200 days following the most recent dose for cattle that were previously implanted with Compudose.
        - Synovex One Grower can only be administered to calves managed on pasture during this phase, and calves that are 2 months of age or older.
    - Encore is an appropriate option for steers that will be grown for more than 200 days.
- Heifer calves not intended to become replacements should be implanted with one of the following implants at weaning:
    - Ralgro, Revalor G, Component TE-G with Tylan, Synovex H, or Component E-H with Tylan are appropriate options for heifers that will be grown for up to 100 days or less before marketing.
        - Revalor G and Component TE-G with Tylan can only be used in calves managed on pasture.
        - Synovex H and Component E-H with Tylan can only be used in heifers weighing more than 400 lbs.
    - Synovex One Grower is an appropriate option for heifers that are 2 months of age or older that will be grown on pasture during this phase for 100 to 200 days before marketing.

Contact your local Extension office for more information on implant programs for cow-calf operations or for assistance with implementing these programs on your operation.

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1. Are you a:

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If other was selected, please explain:

2. Please indicate the number of cattle in your operation:

☐ No cows ☐ 1 – 49 ☐ 50 – 99 ☐ 100 – 299 ☐ 300 – 499 ☐ 500+

3. How would you rate the information provided at this year's Beef Cattle Short Course?

☐ Excellent ☐ Good ☐ Fair ☐ Poor

4. Did you learn anything new or gain any useful ideas by attending the Beef Cattle Short Course?

☐ Yes ☐ No

If yes was selected, please explain:

5. Do you plan to make any changes in your operation as a result of the information presented?

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Presenters	☐	☐	☐	☐	☐
Presentation topics	☐	☐	☐	☐	☐
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