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# FEEDLOT AND CARCASS DATA: MAKING "CENTS" AND MAKING DECISIONS

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## INTRODUCTION

Sixty-two percent of calves are sold within 30 days of weaning (47% at weaning; McBride and Mathews, 2011). In the last decade, marketing of finished animals has shifted to selling on value-based systems. In 2012, nearly three times more cattle were sold in a value-based system compared to a traditional cash method. However, those two marketing methods accounted for nearly equal percentages of cattle sold as recently as 2006 (Mike Kasten, RBCS 2013). Therefore, carcass merit is a larger driver of value today compared to when the majority of cattle were sold on a live weight basis. How are feeder calf producers gaining information about their calves post weaning?

Retained ownership programs are an information feedback system that allows producers to learn about their calf crop as well as factors that influence value beyond the weaned calf phase of beef production. These programs are not contests or breed comparisons, rather they provide producers with feedlot performance and carcass characteristics for their enrolled calves. While the specific name varies from Calf Value Discovery, Ranch to Rail to Retained Ownership programs, the programs are managed similarly: calves/yearling can be enrolled, animals are fed to a finish weight, and carcass characteristics are collected. At the conclusion of the feeding period, producers are provided with feedlot performance, carcass characteristics and economic parameters for their calves. These programs are successful only if producers utilize the information received when making management decisions.

Disclaimer: I am not an economist and I do not profess to understand all of the economic and financial interactions and how they interact with the biological realities contained in this topic. Additionally, I am a not feedlot specialist, however, I have an understanding of the biological principles related to feedlot management as well as understand various signals that influence cow/calf management decisions.

The objective of this paper is to outline the benefits of using Retained Ownership Program(s) and provides some indicators for management changes. This paper has limited feed efficiency and dry matter intake since all animals are assumed to be at the same biological maturity when calculating these parameters. Limited cost information is included due to yearly changes in input costs and price variation.

## RETAINED OWNERSHIP PROGRAM STRUCTURE

Producers enroll calves in the retained ownership program; the minimum number of calves that can be enrolled is five. At the conclusion of the feeding period, cattle are marketed and the consignor receives the profit minus feed, yardage, and health costs. Financing for the feeding period expenses vary by each program. Animal performance (live weight and average daily gain) throughout the feeding period, feed intake, and carcass data (quality grade, yield grade, marbling, ribeye area, backfat, KPH (kidney, pelvic and heart)) is provided for each animal consigned.

## PRICING OF FEEDER CALVES

Feeder calf buyers base the purchase price on weight and expected future performance. The normal slide is higher price per pound received for lighter calves and price per pound decreases with increasing weight. Feedlot owners retain records that tie the feeder calf owners to the calf performance and carcass quality. These records can influence future price offers for the cattle; inferior animals may not receive a bid while superior animals will be purchased at the lowest possible price.

## RETAINED OWNERSHIP PERFORMANCE RESULTS

Published results from numerous Retained Ownership programs can be found online or in various journals. One example is the Iowa Tri-County Steer Carcass Futurity program which evaluated the effect of origin of calves on feedlot performance and carcass characteristics. The results show differences between the calves originating in the Southeast versus Midwest (Table 1; Busby, 2014). This paper shows differences between cattle origin, however, this information has limited value for management by a specific producer. Additionally, Busby et al. (2004) reported reduced feedlot gain and quality grade with calves treated two or more times compared to untreated calves (Table 2). These differences in feedlot performance indicates the importance of developing a good vaccination program with your veterinarian.

## INDIVIDUAL ANIMAL DATA

Livestock producers are aware that animals vary due to sire and dam, healthiness, environment, and management plus other factors. These differences become more apparent when cattle are sold on a grid or value-based system. Within the SDSU Calf Value Discovery (CVD) program, net return varied within the pen by $300 or more per head (Walker and Rusche, 2014). In 2015, the net carcass value between producers' groups was $324. However, when comparing animals consigned by each producer, differences between the low and high net carcass value range from $172 to $813 (Figure 1, Walker unpublished); the difference for the pen was $1,056. The consistency between enrolled calves varies greatly within the pen as well as by individual producers' calf group, indicating the management decisions required to develop a uniform group of calves varies by producers.

**EXAMPLE FROM CALF DISCOVERY PROGRAM**

Table 3 is data from one producer in 1992-1993, these calves were grouped by sire. Since this data is from 1992-1993, animal performance and carcass traits do not reflect current production levels. However, this data illustrate how the Retained Ownership program can be utilized to evaluate sires and assist producers in narrowing the selection of bulls. According to this producer, his initial statement when receiving his first Retained Ownership result was "I need to sell some cows", because these cows did not add value to his operation. These differences in profit (loss) caused him to change the direction of his operation.

One key factor when evaluating data is understanding the producers' production goals. If all of these calves would be retained for the first time without previous knowledge of performance, what would the results be? Thirteen of the 25 animals were choice, they averaged 52% Choice. In the early 1990's limited technologies (EPDs, ultrasound and genomics) were available for use in management decisions. Based on the Retained Ownership program results, this producer could direct some of his management decisions. What is the "best" sire based on the calf performance and carcass characteristics from their progeny? Below are some production scenarios.

1) Calves sold on quality grid – Sire 3 is all choice animals, while Sire 1 had 80% choice, but HCW was 17 pounds lighter than Sire 3 calves. Carcasses from Sire group 2 would receive discounts for the select carcasses.
2) Finished steer sold on live weight (more pounds) - Sire groups 4 and 2 had the heaviest live and carcasses weights; however, higher percentage of choice carcass with group 4 compared to group 2, thus shifts the preference to Sire 4.
3) Selling at weaning – Sire group 4 has the heaviest in weight (feeder calf weight) at 588 pounds followed by group 2 at 572 pounds. The limited number of calves does not allow determination of that these weights are significantly different; however, the feedlot owners would prefer the Sire group 4 with a higher percentage choice if they are using any quality grids.

Two sire groups (4 and 5) finished 14 days earlier than the Sire groups 1-3; high feed costs could make these animals more profitable especially Sire group 4 with 704 pounds HCW, highest ADG and 60% Choice. There are no simple answer to management decisions. The 1992-1993 producer continues in the beef business selling high quality animals due to the information gathering began more than 20 plus years ago. Today he has achieved a 950-980 pound HCW, yield grade 3 Prime carcasses with animals reaching 6 lb/d ADG and converting at 5 lbs of feed/lb of gain. He continues to gather animal performance and carcass characteristics on his calves to continue to improve provide a quality end-product.

The next three examples come from SDSU CVD program. Observing calves from Producer X over a three years period (Table 4), shows increases in hot carcass weight, ribeye area (REA) and a decrease in the percentage of Certified Angus Beef (CAB). Based on the 2012-2013 year, the producer decided his cattle met the quality grade (80% Choice), however, needed more muscle. Using the estimate of ribeye area and carcass weight as an indicators of muscling, a 768 pound carcass would need a ribeye area of ~13.0 sq. in. (750 lb carcass = 12.8 sq. in.). Carcass average REA was 12.2 sq. in, thus bull

selection was shifted to heavier muscled animals. Year 2014-2015 showed animals with larger REA and heavier carcasses. The quality grade is similar between years; however, the average marbling score was lower in 2014-2015 (marbling scores 506 and 456 for 2012-2013 and 2014-2015, respectively). A marbling score of 400 is equal to small$^0$, which is the bottom end of choice. Does the increase of 90 pounds of hot carcass weight offset the premium received from higher Choice lighter carcasses?

Producer Y enrolled a high percentage of his steer calves into the CVD program over several years. His calves' performance was: ADG = 3.39 lb/d, HCW = 767 lbs, REA = 11.85 in$^2$, marbling score = 405, quality grade = 66.2% Choice (11.8% CAB), and yield grade = 2.91 for 2011-2012 feeding period (Table 5). Looking at quality grade, is 66.2% Choice high enough? The marbling score of 405 suggests that the majority of these animals are low choice which is supported by the 11.8% CAB or high choice. The next factor to consider is muscling (pounds to sale); HCW of 767 lbs is 56 pounds less than the mean from the 2011 National Beef Quality Audit. Remember that the National Beef Quality Audit includes carcass information from across the United States. Estimating ribeye area by carcass weight as used for calculating yield grade, a REA of ~13 in$^2$ would not receive a negative adjustment to yield grade, however, these calves averaged 11.85 in$^2$ REA. Based on the results from the CVD program, these calves could be improved in muscling and marbling. The producer choose to move his cattle to a two-phase feeding program which fits with his management goals.

Producer Z is managing for more moderate cow size and holding more bull calves for sale. What effect does this management goal have on steer calves retained through the finishing phase? Hot carcass weight decreased by 40 pounds over four years along with a 0.7 in$^2$ reduction in REA (Table 6). However, quality grade slight increase from 60% to 66% over that same period. What is the cost of 40 fewer pounds to sell? Using a value of $200/cwt dressed weight that 40 pounds is $80 per carcass.

These are a few examples of how management decisions affect the carcass characteristics for individual operations. Decisions made on cow/calf operations impact the feedlot performance and carcass traits, which can influence the bids and quality of bids received for calves.

**COMMENTS FROM PRODUCERS**

Busby (2014) described the "common traits of Tri-County Steer Carcass Futurity consignors which are: 1) early adopters of genetic evaluation tools, 2) utilize a team of advisors to adopt available technologies to improve calf health and performance, 3) tired of someone else benefiting from their efforts in genetics, health and management, and 4) believe in working together and sharing information with other producers."

The SDSU Calf Discovery program began in 1990 under the direction of Dr. John Wagner. It has continued to provide producers with the opportunity to gather information on their calves. Below are a few comments from producers as to how it has influenced their operation.

1) "Retained Ownership program provided a baseline for my herd. Retained Ownership changed the whole direction of my operation for the better."

2) “The Calf Value Discovery program is an opportunity to put the calves into that same situation, except I get a whole lot of data back and use it to make nutritional, medical, and genetic management decisions that will impact the profitability of the calves that I raise. Marbling was also something I need to improve in my calves. I plan on decreasing the use of bulls whose offspring had low marbling. For my lowest marbling cows, I plan on using only high marbling bulls to give them a boost. Heifers out of low marbling cows and bulls will be much less likely to be retained in the breeding herd than heifers with more potential.”
3) “We have used the CVD program data to help drive our AI program in our commercial cow herd. The better carcass EPD sires have been our more profitable steers. The first year we took steers to CVD we selected what we thought would be a cross section of steers to figure out how our herd would perform on the rail. When we got the first data we knew we wanted to increase ribeye, carcass weight and marbling. So with that information we have been using stronger carcass sires that still maintain good maternal traits to increase the value of our steers and the genetic potential of our replacement heifers. Our goal is to add value to our cattle whether we sell them as high performance feeder cattle or keep them through finish. CVD allows us to continue to test a few steers that we think should move us toward our goals and also test new genetics in our herd.”

The A to Z Retained Ownership, Inc. program reported various comments on the usefulness of these type of program:

1) “It gives me an overall idea of the entire cattle business. You follow your animals all the way and it gives you a vision of the whole process.”
2) “Our cattle are pretty uniform, but the carcass value of our calves varied by up to $150. We didn’t realize these was that much difference.”
3) “I’ve changed bulls to improve my quality grade without sacrificing average daily gain.”
4) A purebred Hereford breeder uses the information to determine how well his bulls are doing and which bloodlines to use.
5) “This is a way for a smaller producer like me to keep track of where my herd is going.”
6) A rancher used his calves’ performance data to help sell calves via satellite video auctions.
7) “The value-based pricing of the individual carcasses emphasized the importance of quality cattle.”

**IMPLICATION**

Pricing of feeder calves are based on weight as well as the expected future performance. Feedlot owners/managers are tracing superior and inferior animals to the previous owners and future bids depend on animal quality. Retained Ownership program provides producers with knowledge of feedlot performance and carcass characteristics for a minimum number of animals, which can be used to improve the quality of animals to meet the producers’ production goals and cattle demanded by feedlots. These programs are available to all sized producers, however, they are more beneficial for smaller producers with limited abilities to develop collaborations with feedlots due to number of animals. The key of a successful Retained Ownership program is using the

information received to develop management decisions that ensure safe, high quality end-products which is profitable to their operations.

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## FIGURES

Figure 1. Average net carcass value by producer and differences between each producers' low and high value animals.

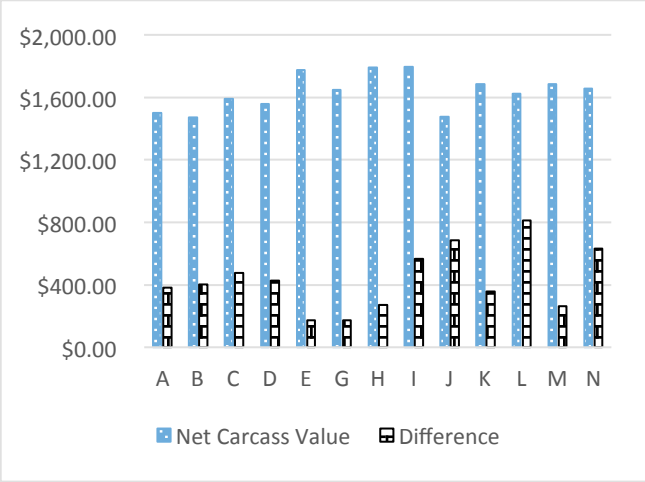

Table 1. Comparison of Southeast and Midwest calves on feedlot performance, carcass characteristics and profit.

| Item | Southeast Calves | Midwest Calves |
|---|---|---|
| # of Head | 31,155 | 16,371 |
| In wt., lb | 649[a] | 629[b] |
| Days of age | 320[a] | 255[b] |
| Final wt., lb | 1,174[a] | 1,177[b] |
| DOF | 167[a] | 174[b] |
| Harvest Age, d | 488[a] | 430[b] |
| Overall ADG, lb | 3.18 | 3.18 |
| Feed to Gain | 6.92[a] | 6.76[b] |
| | | |
| Morbidity Rate, % | 15.81[a] | 22.11[b] |
| Treatment cost, $/hd | $5.53[a] | $8.49[b] |
| Mortality Rate, % | 1.35[a] | 1.81[b] |
| | | |
| HCW, lb | 723[a] | 725[b] |
| Backfat, in | 0.45[a] | 0.44[b] |
| REA, $in^2$ | 12.33[a] | 12.46[b] |
| Calculated Yield Grade | 2.86[a] | 2.80[b] |
| | | |
| % Yield Grade 1 & 2 | 57.28[a] | 62.42[b] |
| % Yield Grade 3 | 40.20[a] | 35.84[b] |
| % Yield Grade 4 & 5 | 2.52[a] | 1.74[b] |
| | | |
| Marbling Score | Small 26 | Small 25 |
| % Prime | 1.08[a] | 0.80[b] |
| % Choice & Choice + | 14.94[a] | 14.34[b] |
| % CAB | 18.43[a] | 16.91[b] |
| % Choice- | 50.32[a] | 52.93[b] |
| % Select | 30.99[a] | 29.41[b] |
| % Standard | 2.68[a] | 2.52[b] |
| | | |
| Profit, $/hd | $37.34[a] | $23.79[b] |

Busby, 2014

[a,b] Values within a factor without a common superscript differ ($p < 0.05$).

Table 2. Effect of the number of times calves were treated for disease conditions on animal performance and carcass quality grade.

| | Number of treatments | | |
|---|---|---|---|
| | 0 | 1 | ≥ 2 |
| ADG, lb/d | 3.06[a] | 2.93[b] | 2.87[b] |
| Feed to gain | 7.11[a] | 7.23[b] | 7.26[b] |
| | | | |
| Quality Grade | 6.45[a] | 6.65[b] | 6.87[c] |
| Prime | 1.86% | 1.05% | 0.93% |
| Choice | 70.27% | 62.89% | 57.96% |
| Select | 25.28% | 30.14% | 30.56% |
| Standard | 2.59% | 5.92% | 10.56% |

Quality Grade scale, Prime = 3, Choice$^{+}$ = 4, Choice$^{-}$ = 5, Select$^{+}$ = 7, Select$^{-}$ = 8, Standard$^{+}$ = 9, Standard$^{-}$ = 10

Busby et al., 2004

[a,b] Values within a factor without a common superscript differ ($p < 0.05$).

Table 3. Feedlot and carcass information by sire groups from 1992-1993.

| | In Wt., lb | End Wt., lb | DOF | ADG, lb | HCW, lb | Quality Grade | Calc YG | REA, in$^2$ | Backfat, in | Profit (Loss) $ |
|---|---|---|---|---|---|---|---|---|---|---|
| Sire 1 | 490 | 1078 | 180 | 3.03 | 644 | Select | 3.20 | 11.40 | 0.60 | 24.44 |
| Sire 1 | 518 | 1060 | 180 | 2.78 | 609 | Choice | 2.53 | 10.80 | 0.35 | -18.26 |
| Sire 1 | 500 | 1036 | 180 | 2.75 | 638 | Choice | 3.43 | 10.60 | 0.60 | 32.77 |
| Sire 1 | 506 | 1176 | 180 | 3.46 | 714 | Choice | 3.27 | 12.00 | 0.60 | 78.99 |
| Sire 1 | 520 | 1192 | 180 | 3.47 | 701 | Choice | 3.67 | 11.00 | 0.65 | 51.43 |
| Ave | 507 | 1108 | 180 | 3.10 | 661 | 80% Ch | 3.22 | 11.16 | 0.56 | 33.87 |
| | | | | | | | | | | |
| Sire 2 | 584 | 1196 | 180 | 3.13 | 727 | Select | 3.93 | 10.80 | 0.65 | 40.65 |
| Sire 2 | 572 | 1122 | 180 | 2.81 | 712 | Select | 3.37 | 11.60 | 0.55 | 47.83 |
| Sire 2 | 548 | 1100 | 180 | 2.82 | 653 | Select | 3.74 | 10.20 | 0.65 | -1.38 |
| Sire 2 | 578 | 1204 | 180 | 3.21 | 761 | Select | 2.63 | 12.60 | 0.35 | 82.54 |
| Sire 2 | 580 | 1046 | 180 | 2.36 | 650 | Select | 3.30 | 11.00 | 0.50 | -2.30 |
| Ave | 572 | 1134 | 180 | 2.87 | 701 | 0% Ch | 3.39 | 11.24 | 0.54 | 33.47 |
| | | | | | | | | | | |
| Sire 3 | 504 | 1118 | 180 | 3.16 | 708 | Choice | 3.77 | 10.60 | 0.55 | 88.60 |
| Sire 3 | 514 | 1132 | 180 | 3.18 | 721 | Choice | 3.69 | 10.00 | 0.50 | 98.15 |
| Sire 3 | 502 | 1066 | 180 | 2.90 | 654 | Choice | 2.52 | 12.40 | 0.40 | 45.09 |
| Sire 3 | 522 | 1074 | 180 | 2.83 | 644 | Choice | 3.25 | 9.60 | 0.35 | 22.16 |
| Sire 3 | 504 | 1104 | 180 | 3.09 | 663 | Choice | 3.28 | 10.60 | 0.50 | 45.51 |
| Ave | 509 | 1099 | 180 | 3.03 | 678 | 100% Ch | 3.30 | 10.64 | 0.46 | 59.90 |
| | | | | | | | | | | |
| Sire 4 | 608 | 1156 | 166 | 3.02 | 703 | Choice | 3.87 | 11.40 | 0.70 | 17.23 |
| Sire 4 | 618 | 1176 | 166 | 3.08 | 725 | Select | 2.79 | 13.50 | 0.50 | 23.03 |
| Sire 4 | 558 | 1116 | 166 | 3.09 | 676 | Choice | 2.86 | 11.60 | 0.40 | 15.12 |
| Sire 4 | 588 | 1176 | 166 | 3.26 | 712 | Choice | 2.80 | 12.20 | 0.40 | 33.40 |
| Sire 4 | 570 | 1154 | 166 | 3.24 | 704 | Select | 2.87 | 12.20 | 0.40 | 21.09 |
| Ave | 588 | 1156 | 166 | 3.14 | 704 | 60% Ch | 3.04 | 12.18 | 0.48 | 21.97 |
| | | | | | | | | | | |
| Sire 5 | 542 | 1114 | 166 | 3.18 | 663 | Select | 3.12 | 11.40 | 0.50 | -0.08 |
| Sire 5 | 536 | 1102 | 166 | 3.14 | 648 | Select | 2.75 | 11.20 | 0.35 | -6.19 |
| Sire 5 | 540 | 1078 | 166 | 2.98 | 671 | Choice | 3.28 | 11.30 | 0.50 | 40.48 |
| Sire 5 | 562 | 1110 | 166 | 3.03 | 678 | Select | 3.56 | 10.20 | 0.50 | 15.82 |
| Sire 5 | 542 | 1070 | 166 | 2.92 | 595 | Select | 2.55 | 10.50 | 0.30 | -62.67 |
| Ave | 544 | 1095 | 166 | 3.05 | 651 | 20% Ch | 3.05 | 10.92 | 0.43 | -2.53 |

Wagner, J. unpublished 1992-1993

Table 4. Effect of mating heavier muscled bull(s) on progeny for weight gain and carcass traits.

| Year | In Wt., lb | End Wt., lb | DOF | ADG, lb/d | HCW, lb | REA, $in^2$ | Ribfat, in | QG | YG | |
|---|---|---|---|---|---|---|---|---|---|---|
| 2013 | 607 | 1,250 | 198 | 3.2 | 768 | 12.2 | 0.50 | 80% Ch | 2.8 | 50% CAB |
| 2014 | 731 | 1,368 | 193 | 3.2 | 846 | 12.1 | 0.52 | 90% Ch | 3.2 | 50% CAB |
| 2015 | 756 | 1,388 | 182 | 3.1 | 859 | 14.2 | 0.41 | 80% Ch | 2.7 | 20% CAB |

Table 5. Producer Y 2011-2012 calf performance and carcass characteristic summary.

| Item | Ave Performance |
|---|---|
| In Wt., lb | 575 |
| End Wt., lb | 1,265 |
| DOF | 196 |
| ADG, lb/d | 3.39 |
| HCW, lb | 767 |
| REA, $in^2$ | 11.85 |
| Ribfat, in | 0.52 |
| Marbling score | 405 |
| Quality Grade | 66.2% Ch |
| Yield Grade | 2.91 |

Table 6. Producer Z's steer performance and carcass traits over 4 years.

| Year | In Wt., lb | End Wt., lb | DOF | ADG, lb/d | HCW, lb | REA, $in^2$ | Ribfat, in | QG | YG |
|---|---|---|---|---|---|---|---|---|---|
| 2012 | 666 | 1,387 | 203 | 3.4 | 863 | 14.8 | 0.40 | 60% Ch | 2.0 |
| 2013 | 612 | 1,327 | 199 | 3.5 | 801 | 13.8 | 0.35 | 57% Ch | 2.4 |
| 2014 | 650 | 1,344 | 210 | 3.2 | 820 | 13.5 | 0.32 | 65% Ch | 2.5 |
| 2015 | 645 | 1,341 | 197 | 2.9 | 823 | 14.1 | 0.40 | 66% Ch | 2.6 |

**NOTES**