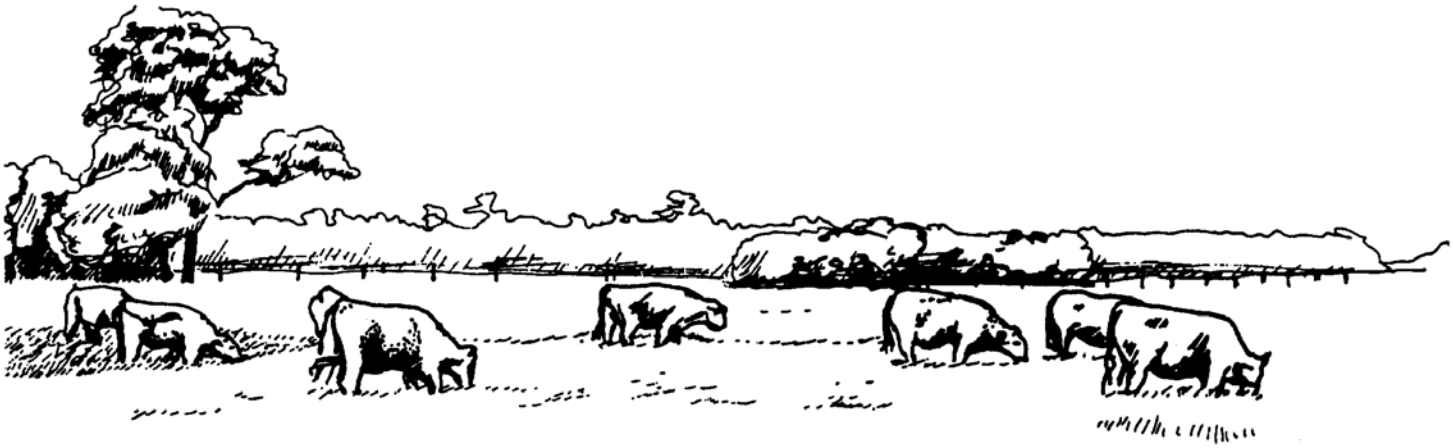
Celebrating the Fifty-second Annual

Beef Cattle Short Course

PROCEEDINGS

"Staying Ahead of the Cattle Cycle"



Gainesville, Florida
April 30 - May 2, 2003

UNIVERSITY OF FLORIDA
Institute of Food and Agricultural Sciences
Department of Animal Sciences
Cooperative Extension Service

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Beef Cattle Short Course

April 30 - May 2, 2003

Sponsored by

Department of Animal Sciences
Cooperative Extension Service
Institute of Food and Agricultural Sciences
University of Florida, Gainesville

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Bill Price
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Bob Sand
Cindy Sanders
Todd Thrift
Jerry Wasdin

TABLE OF CONTENTS

2003 Beef Cattle Short Course

Program Schedule

Staying Ahead of the Cattle Cycle

Wednesday, April 30, 2003

AM

11:00 **Registration** *(Sheraton Hotel)*

PRESIDING: *F. Glen Hembry,* Department of Animal Sciences, UF, IFAS, Gainesville, FL

PM

1:00 **Welcome**

1:15 **Remarks**
- *Wayne Godwin,* President, Florida Cattlemen's Association, Zolpho Springs, FL

1:35 **Market Outlook For 2003 And Beyond**
- *Walter Prevatt,* Auburn University, Auburn, AL

2:25 **Refreshment Break**

PRESIDING: *Cindy Sanders,* Alachua County, UF, IFAS, Gainesville, FL

2:45 **Evaluating Opportunities to Market Feeder Calves**
- *Walter Prevatt,* Auburn University, Auburn, AL

3:30 **Negotiating a Grazing or Feeding Contract**
- *Bob Bliss,* Consultant, Amarillo, TX

4:15 **Ranchers Who Have Retained Ownership After Weaning** - Panel Discussion
- *Kay Richardson,* Richardson Brothers, Evinson, FL
- *Wade Grigsby,* Alico Inc., LaBelle, FL
- *Wes Williamson,* Williamson Cattle Co., Okeechobee, FL
- *Herman Laramore,* Bar L Ranch, Marianna, FL

5:00 **Florida Beef Cattle Improvement Association Super Cow Awards**
- *Bob Sand,* Department of Animal Sciences, UF, IFAS, Gainesville, FL

5:05 **Allied Industry Trade Show and Reception**
- Several companies will have exhibits and representatives to answer your questions. Hors d'oeuvres provided compliments of the exhibitors. A cash bar is available for your enjoyment.

Thursday, May 1, 2003

Managing Factors Influencing Income

PRESIDING: *John Arthington*, Range Cattle Research and Education Center, UF, IFAS, Ona, FL

AM

8:15 **Do I Have the Cow That is the Most Efficient Producer for My Environment/ Management Level?**
- *Chad Chase* and *Sam Coleman*, ARS/STARS, Brooksville, FL

9:00 **Cactus Feedyard's Experience with Feeding Florida Cattle**
- *Paul Coleman*, Cactus Feeders, Amarillo, TX

9:45 **Refreshment Break**

PRESIDING: *John Arthington*, Range Cattle Research and Education Center, UF, IFAS, Ona, FL

10:00 **Preparing Florida Calves for the Feedlot: Repairing Our Reputation**
- *Karen Rogers*, DVM, VRCS, Greeley, CO

10:45 **Country of Origin Labeling (COOL): Implications of Policy on Cow/Calf Producers**
- *John Van Sickle*, Food and Resource Economics, University of Florida, Gainesville, FL

11:30 **Update on the Florida Voluntary Johne's Control Program**
- *John Crews*, Cesar Ruiz, and Ashby Green, Florida Department of Agriculture, Tallahassee, FL

12:00 **Leave for Lunch at Beef Research Unit** (Sponsored by **Farm Credit Associations of Florida**) (Transportation provided)

PRESIDING: *Jerry Wasdin*, Department of Animal Sciences, UF, IFAS, Gainesville, FL

PM

2:00 **Demonstrations and Discussions**

A. Grazing Management
- *Lynn Sollenberger* and *Lawton Stewart*, Department of Agronomy, UF, IFAS, Gainesville, FL

B. Grazing Early Weaned Calves
- *John Arthington*, Range Cattle Research and Education Center, UF, IFAS, Ona, FL and *Lynn Sollenberger*, Department of Agronomy, UF, IFAS, Gainesville, FL

C. How Do We Control Johne's in Florida Herds?
- *Owen Rae*, College of Veterinary Medicine, Gainesville

D. Chute Side Health and Quality Assurance for Florida Calves
- *Karen Rogers*, VRCS, Greeley, CO

4:30 **Adjourn**

6:00 **Cattlemen's Steak-Out** (Horse Teaching Unit Arena) - Transportation on your own

Friday, May 2, 2003

Cutting Corners Without Compromising Future Ranch Performance

PRESIDING: *Bob Sand*, Department of Animal Sciences, UF, IFAS, Gainesville, FL

AM

8:15 **Should I Modify My Herd Health Program When Considering Retained Ownership**
- *Hal Phillips*, DVM, Williston, FL

8:45 **Utilizing a Terminal Sire Breeding Program – An Economic Evaluation**
- *Todd Thrift*, Department of Animal Sciences, UF, IFAS, Gainesville, FL

9:15 **Should I Purchase Replacement Females?**
- *Tom Anton*, Range Cattle Research and Education Center, Ona, FL

9:45 **Refreshment Break**

10:00 **Economic Options to Increase the Value of Your Ranch Lands**
- *Alan Long*, School of Forest Resources and Conservation, UF, IFAS, Gainesville, FL

10:30 **Supplemental Income Sources for the Ranch** - Panel Discussion
- *George Kempfer*, Kempfer Cattle Company, St. Cloud, FL
- *Dean Hendrick*, Hendrick Family Farm, Mayo, FL
- *Arnie Sarlo*, Ranch Manager, Babcock Wilderness Adventures, Punta Gorda, FL
- *Wayne Godwin*, Westby Corporation, Zolfo Springs, FL

11:30 **Question and Answer Session with Morning Speakers**

11:40 **Closing Comments**
- *F. Glen Hembry*, Department of Animal Sciences, UF, IFAS, Gainesville, FL

11:45 **Adjourn**

Market Outlook for 2003 and Beyond

Walter Prevatt
Department of Agricultural Economics & Rural Sociology
Auburn University
Auburn, Alabama

U.S. cattle producers begin 2003 with a much brighter outlook. Declining cattle inventories, lower beef production, possible improvements in beef export markets, and improvements in domestic beef demand should contribute to higher beef cattle market prices during 2003. Improving cattle market prices suggest profits will be realized by all segments of the beef cattle industry during 2003.

The brighter cattle outlook is no doubt a welcome change from 2002. Record level beef production of 27.1 billion pounds was realized during 2002. The large numbers of cattle on feed and record carcass weights resulted in the record level of U.S. beef production. This record level of beef production exceeded the expectations of most analysts and caused beef prices to plummet. In addition, a widespread drought and the forced liquidation of cattle added much frustration for many cattle producers attempting to expand their operations. These conditions coupled with large levels of pork and poultry production and a poultry trade dispute pressured cattle prices lower during most of the year and resulted in substantial losses in the stocker and fed cattle sectors and only marginal profits for many cow-calf producers.

Declining Meat Production in 2003

The expectation of improving beef cattle market prices during 2003 is based on a number of variables, but particularly the level of meat production. Beef production is expected to decline between 700-900 million pounds (about 2.5%) to approximately 26.2 billion pounds. Pork production is projected to decline about 2%. Poultry production is forecast to remain about level. Thus, total meat supplies should decline resulting in an improvement in meat prices.

2002 was not all bad. 2002 total per capita meat consumption of all red meat and poultry by U.S. consumers is expected to set a new record of approximately 218 pounds (retail weight). This would amount to a 2.5% increase in U.S. per capita meat consumption over 2001 and was achieved with increased consumption levels of all three major meats (beef, pork, and poultry).

In addition, the demand for beef has shown much improvement since its low in 1998. Changes in consumers' perceptions of beef coupled with the introduction of more consumer-friendly beef products have contributed to the improvement in beef demand. Further increases in beef demand are expected as companies add new beef products and the U.S. economy strengthens. Also, beef exports are poised for a potential increase during 2003 as Japanese consumers begin to return to beef following food safety concerns with Japanese beef.

Cattle Cycle Disrupted

The cattle cycle, which is normally about 10-11 years in length, has been disrupted. A cattle cycle is measured from the lowest inventory of cattle and calves to the next lowest over time (trough to trough). We are now in the 14th year of this cattle cycle. Weather will be the wild card this year as cattle producers determine if there will be adequate moisture for grass production and herd expansion. However, if widespread dry

weather continues, the inventory of cattle and calves could post another decline in 2004. If this happens, the level of beef production could decline further and probably result in higher cattle market prices during 2004.

The inventory of cattle and calves reported by USDA as of January 1, 2003 totaled 96.1 million head of cattle and calves. This estimate was down almost 1% (about 600,000 head) from a year ago. Cattle on feed were down 7% (about 944,000 head) from a year ago. However, calves and other heifers and steers grazing small grain pastures in Kansas, Oklahoma, and Texas were substantially higher (about 900,000 head) at 3.7 million head. Thus, feeder cattle coming off wheat pastures during February, March, and April will be much larger than normal. Beef and dairy cow replacements were each up 1% (about 47,000 and 44,000 head, respectively) from a year ago.

The current cattle cycle is the longest cycle in the past 65 years. This cycle is evenly split between seven years of expansion and seven years of liquidation. It is believed that the expected expansion in cattle and calves inventory during the last two years did not develop due to lower cattle prices and widespread drought conditions. If widespread drought conditions continue during 2003, more cows are likely to be sold for slaughter or to new owners in states with adequate feed supplies.

The number of cattle operations in the United States has plummeted during the last 27 years. Since 1975, the number of U.S. cattle operations has decreased from 1.9 to 1.1 million operations, representing a decrease of approximately 816,000 operations (44%). The largest decline, 353,000 operations, was during the 1979-90 cattle cycle. Since 1990, the United States has lost about 252,000 cattle operations. Significant declines have been realized in both beef and dairy operations. As a result, the average size of a cattle operation is increasing. A continued modest decline in the number of cattle operations is expected for the future due to rising production costs, lack of profitability, and risk.

Weather Conditions Affect Cattle Markets

Typically in March it is the cold, wet weather that impacts cattle performance, weights, and market prices. Recent reports about severe weather conditions in the Plains could adversely affect cattle performance and reduce slaughter weights, thereby affecting slaughter cattle prices. Also, cold weather in Oklahoma and Texas has added some uncertainty about when feeder cattle will move off of wheat pasture. If large areas of wheat pastures have been frost damaged, it could cause more wheat grazeout and delay the placement of feeder cattle in feedlots. This scenario would likely result in feeder cattle being placed in feedlots over a longer time period than if wheat producers pulled cattle off of wheat pastures under normal conditions (first hollow stem, Feb/Mar) to harvest wheat for grain. Thus, cattle placements and expected market levels during second and third quarters are still uncertain due to the weather at the time this paper is being written.

Additionally, dry conditions in a large area of the country may further impact cattle markets. Continued drought has affected water supplies (wells, reservoirs, streams, ponds, etc.) in many western areas. Likewise, tight forage supplies and limited stored feedstuffs are beginning to affect cow slaughter in some areas. The higher cow slaughter during the first quarter of this year and the ongoing drought could push any opportunity for herd rebuilding into 2004. Weather conditions during the next several months will be a major factor that helps determine if herd rebuilding will take place during 2003. Depending on the location of the drought, this could be another year where continued liquidation occurs in the West and expansion in the South.

Furthermore, a portion of the major corn production region is also being affected by dry weather conditions. Weather analysts have documented that the drought has expanded into the western Corn Belt during this winter. A less than large corn crop coupled with a small corn carry over could result in a significant rise in corn prices. Presently, corn planting expectations suggest there should be more acres planted to corn this year. However, if weather is a factor, the size of the corn crop is still uncertain. For every $0.50/bushel increase in corn price, feeder cattle prices are expected to decline $6 to $8/hundredweight. Whether you are selling feeder cattle or feeding feeder cattle, a watchful eye on the corn market this year could pay significant dividends.

Cattle Prices

2003 beef cattle prices at all levels are expected to average higher than last year. Fed cattle prices are expected to average in the mid $70s. Seven-weight feeder cattle are projected to average close to $80. And five-weight feeder calves are forecast to average in the low to mid $90s. Cull cow and bull prices are also expected to increase 2-4% this year due to lower levels of beef production. However, beef cattle prices will likely fluctuate widely during 2003. These fluctuations will result primarily due to smaller numbers of fed cattle marketed during the first quarter and a very large number of fed cattle marketed during the third quarter of 2003.

The larger numbers of fed cattle marketed during the summer of 2003 are expected from large early spring feedlot placements of feeder cattle coming off of wheat pastures during February, March, and April. Thus, we are likely to see a wider spread in beef cattle prices from the spring highs to the summer lows in 2003. Fed prices should follow the seasonal decline in the spring and summer, but the magnitude of the price decline will depend on the feeder cattle placement pattern during the late winter and early spring. The fourth quarter of 2003 should support improving beef cattle prices if adequate widespread moisture is realized and beef exports are not interrupted due to war, food safety, trade disputes, etc. Overall, 2003 should provide profits for all sectors of the beef cattle industry.

The impact of the war in Iraq on the cattle market is difficult to predict. No one has any idea of how long or how substantial this war could become. We did have similar beef supply conditions during Desert Storm and we saw beef prices increase. This war did not significantly affect beef demand or supply. However, at present, the two primary areas to watch are domestic beef demand and export beef demand. If the war is long and substantial and causes domestic beef demand and/or export beef demand to weaken, it could have a very negative impact on cattle market prices. Alternatively, should the war with Iraq be short and of minimal interaction, it will likely have little impact on either domestic or export beef demand.

Summary Remarks

There are two sets of factors to consider when looking at the 2003 U.S. cattle market – the bearish factors and the bullish factors. The bearish factors to consider include adverse weather conditions, higher input prices, large beef imports, trade agreements and disputes, and slow economic growth. The bullish factors to consider include a declining cattle and calves inventory, lower levels of beef production, declining levels of competing meats, improving beef demand, and growth in beef exports. The outcome of these factors will determine 2003 cattle market prices.

As we look ahead to the next cattle cycle, we as cattle producers need to stay focused on the level of beef production, food quality, and food safety. There are numerous issues affecting the beef cattle industry today. Without trying to be exhaustive in the listing,

a few of these include vertical integration, packer concentration, captive supplies, feedlot concentration, NAFTA, irradiation, alliances, grid marketing, beef checkoff, country of origin labeling, national animal identification system, monetary exchange rates, and others. The resolution of these issues will ultimately affect the beef producer and consumer. However, in my opinion, the level of beef production, food quality, and food safety are the most important.

Consumers vote with their dollars for the type of beef product they want (price and quantity associated with a given quality) and beef producers respond to their price signal with a level of supply that will pay the producer for his factors of production. In the recent past, many cattle producers have not been paid for their full factors of production. Thus, we have witnessed a significant decline in the number of U.S. cattle operations and the inventory of cattle and calves.

The current supply-side of the cattle cycle is still experiencing herd liquidation. Holding other things constant, lower beef supplies should boost cattle prices in all sectors. This improves the chances for profits in all sectors as well. However, this temporary improvement in beef prices and profits will not last long enough for most cattle producers to earn a reasonable return on their investment. Thus, cattle producers should be prepared to evaluate how much it cost them to deliver beef of a given quantity and quality and compare it with the price the consumer is willing to pay. If consumers really want a high quality, safe beef product, then higher cattle market prices are apparently needed. Herein possibly lies the rub.

Are consumers willing to pay a market price for a high quality, safe beef product that will cover the full factors of production for cattle producers? The recent improvements in domestic beef demand that have reversed a nearly 20-year decline in beef demand suggest that consumers may be willing to pay. If this is the case the next question is, will the various segments of the cattle industry agree to deliver this beef product and will they share enough of the retail market price with the cattle producer to pay his full factors of production? Only time will determine the answer to this question.

The next cattle cycle will no doubt have many challenges and opportunities. Identifying these opportunities and carefully evaluating them to determine what will pay the cattle producer is paramount. A watchful eye on the level of beef production, food quality and safety, and cattle market prices will alert cattle producers about these future potential profits.

Figure 1. Inventory of U.S. cattle and calves, 96.1 million head, January 1, 2003.

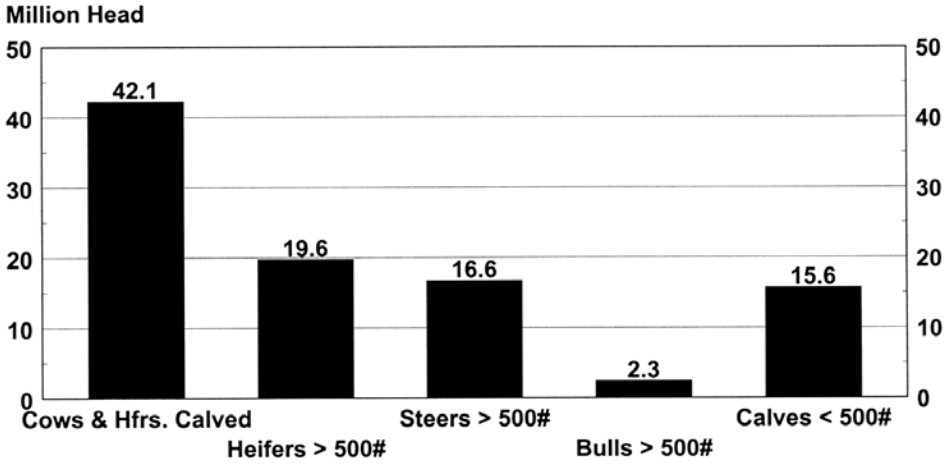


Figure 2. Inventory of U.S. cattle and calves, January 1, 2002 and 2003.

Class	2002	2003	Percent Change From 2002
	Million Head		
Cattle and Calves	96.7	96.1	- 1 %
Cows and Heifers That Have Calved	42.2	42.1	0 %
Beef Cows	33.1	33.0	1 %
Milk Cows	9.1	9.2	0 %
Heifers 500 Pounds and Over	19.7	19.6	0 %
For Beef Cow Replacement	5.6	5.6	1 %
For Milk Cow Replacement	4.1	4.1	1 %
Other Heifers	10.1	9.9	- 2 %
Steers 500 Pounds and Over	16.8	16.6	-1 %
Bulls 500 Pounds and Over	2.2	2.3	0 %
Calves Under 500 Pounds	15.8	15.6	-1 %
Cattle on Feed	13.9	12.9	- 7 %
FC Outside Feedlots	28.8	29.1	1 %

Figure 3. Inventory of U.S. cattle and calves, January 1, 1990 and 2003.

Class	1990	2003	2003 as a % of 1990
	Million Head		
Cattle and Calves	95.8	96.1	100 %
Cows and Heifers That Have Calved	42.5	42.1	99 %
Beef Cows	32.5	33.0	102 %
Milk Cows	10.0	9.2	91 %
Heifers 500 Pounds and Over	17.3	19.6	114 %
For Beef Cow Replacement	5.3	5.6	106 %
For Milk Cow Replacement	4.2	4.1	98 %
Other Heifers	7.8	9.9	127 %
Steers 500 Pounds and Over	15.5	16.6	107 %
Bulls 500 Pounds and Over	2.2	2.3	104 %
Calves Under 500 Pounds	18.4	15.6	84 %
Cattle on Feed	11.6	12.9	111 %
FC Outside Feedlots	30.1	29.1	97 %

Figure 4. Inventory of U.S. cattle and calves and average calf price, 1949-2003.

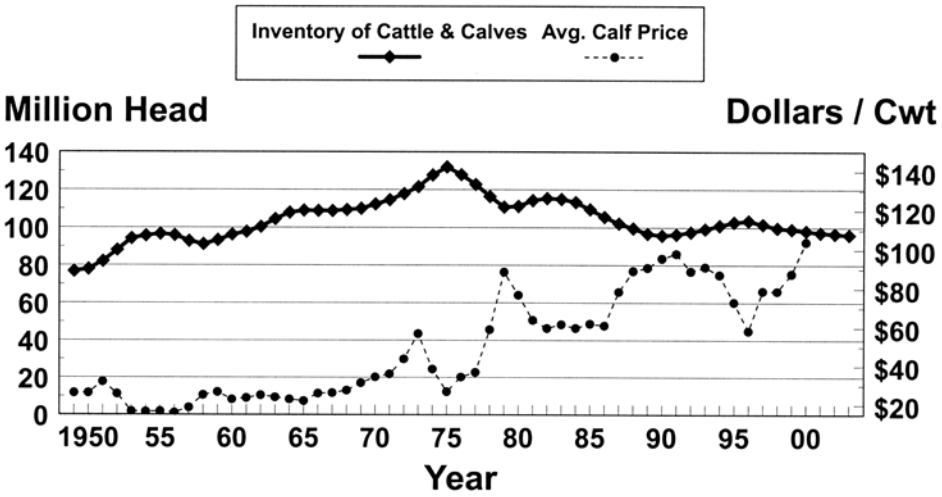


Figure 5. U.S. Drought Monitor.

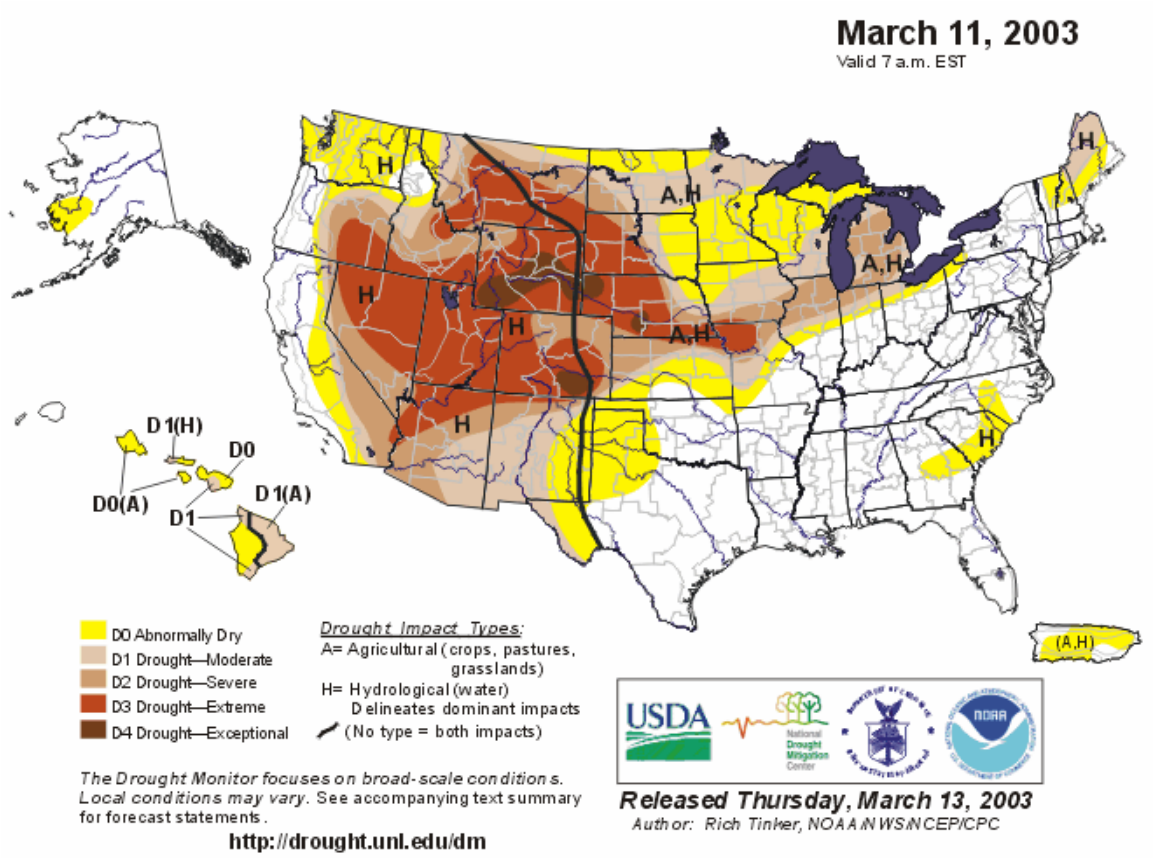


Figure 6. Beef replacement heifers, July 1, 1985-2002.

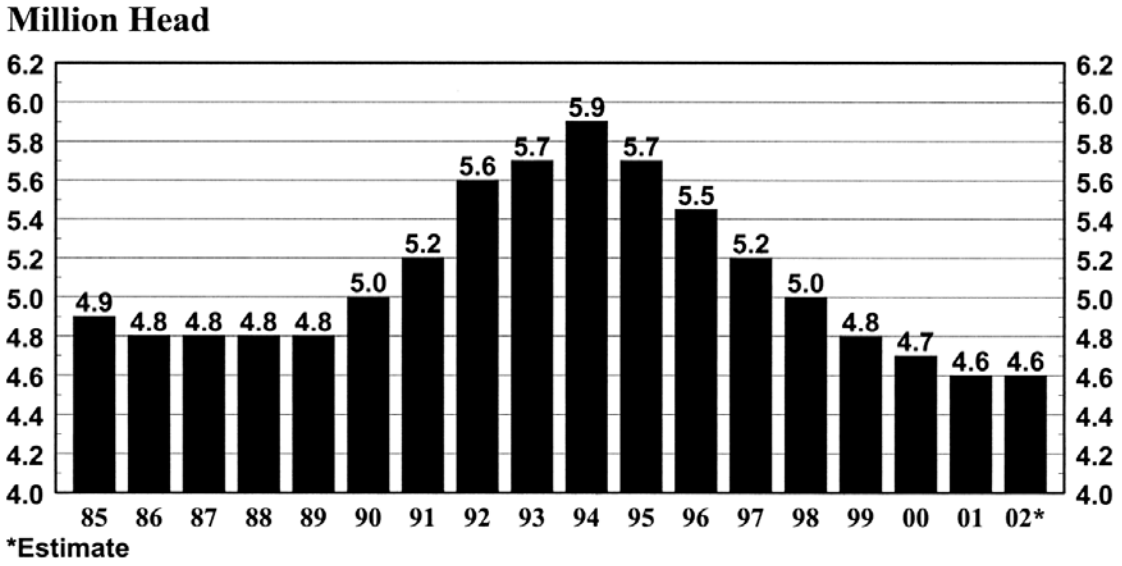


Figure 7. Heifers as a percent of total feedlot placements, 1980-2002.

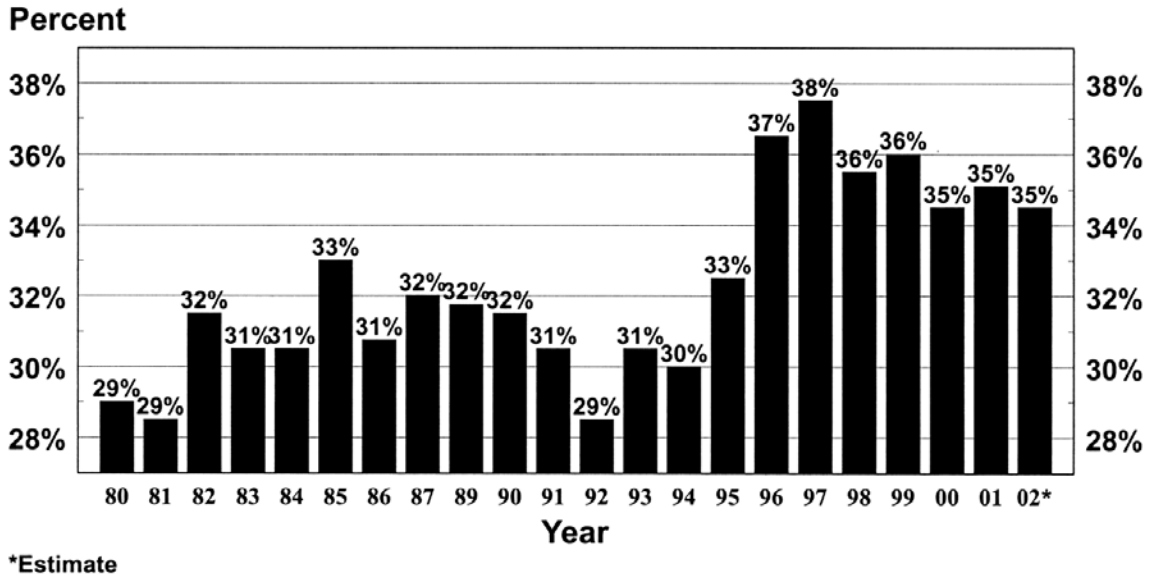
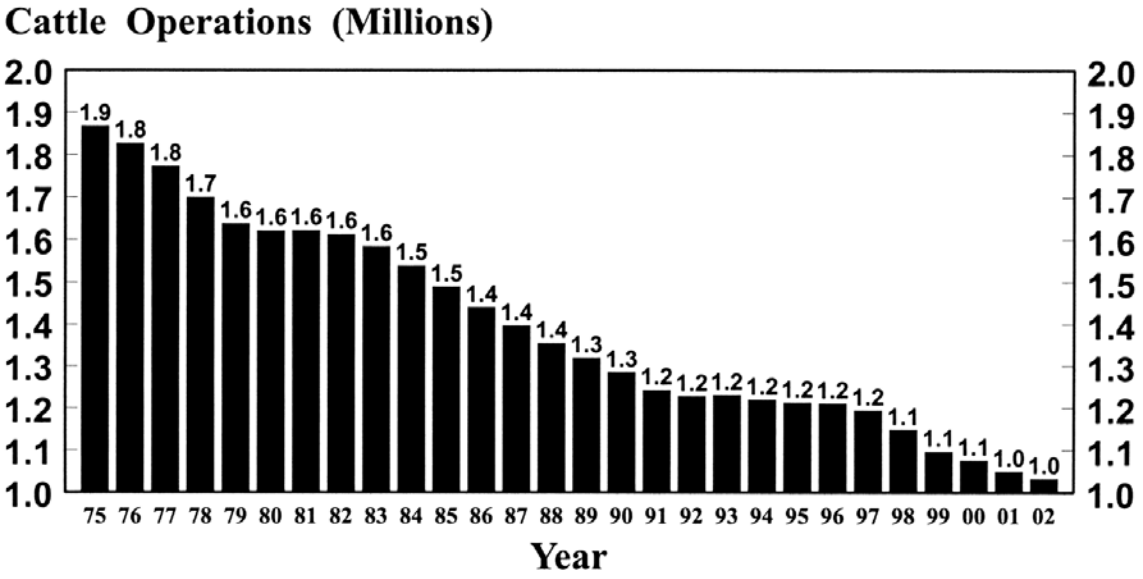
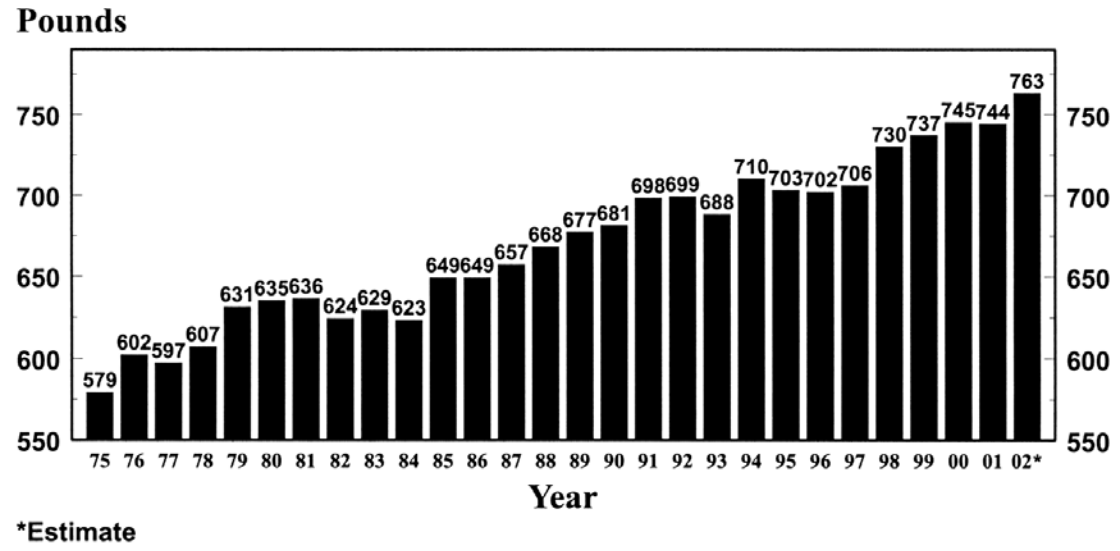


Figure 8. U.S. cattle operations, number by year, 1975-2002.



Source : USDA

Figure 9. U.S. average cattle carcass weights, 1973-2002.



*Estimate

Figure 10. U.S. carcass beef production, 1975-2002.

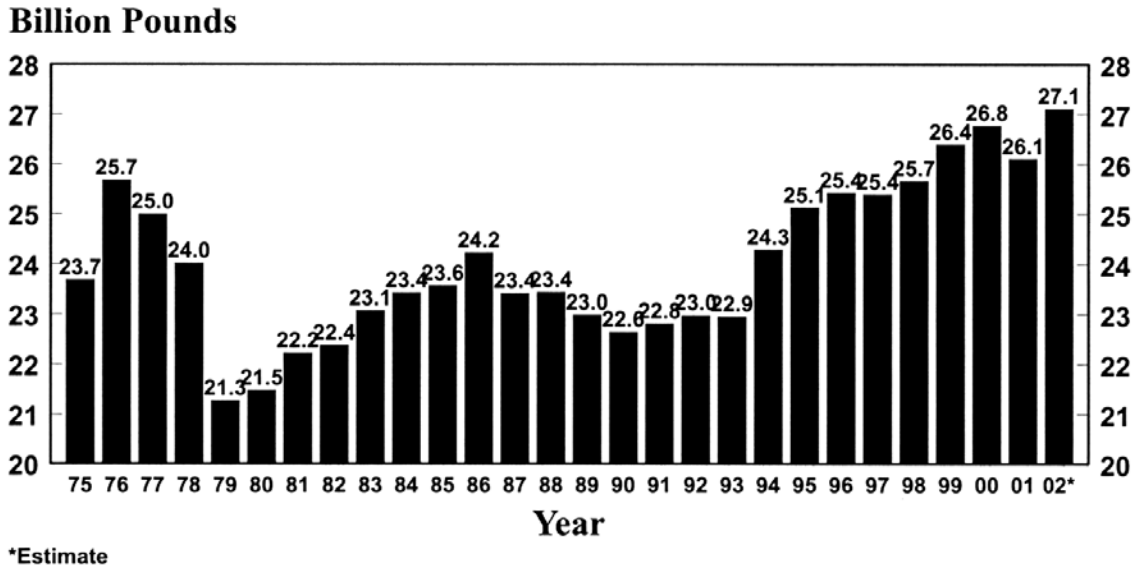


Figure 11. Retail choice beef demand index, 1981-2002.

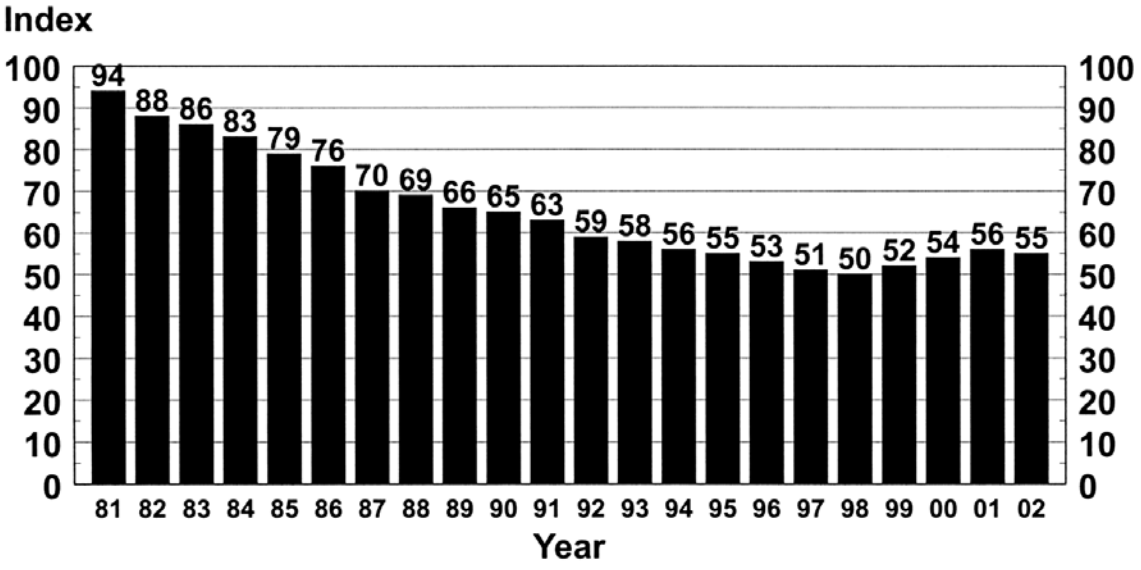


Figure 12. Beef as a percent of total meat per capita spending, 1986-2001.

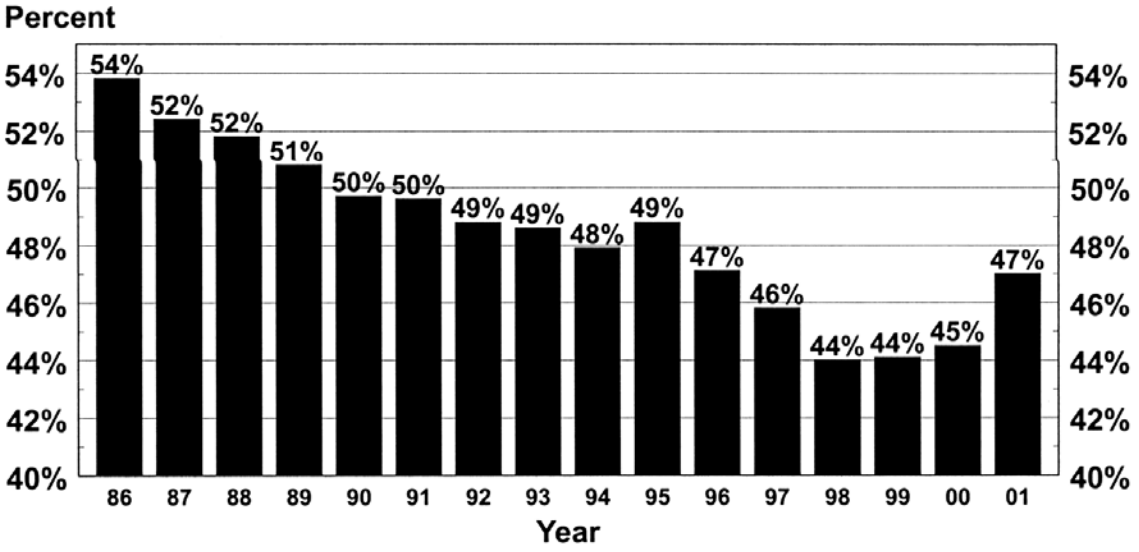


Figure 13. U.S. beef imports and exports, 1970-2002.

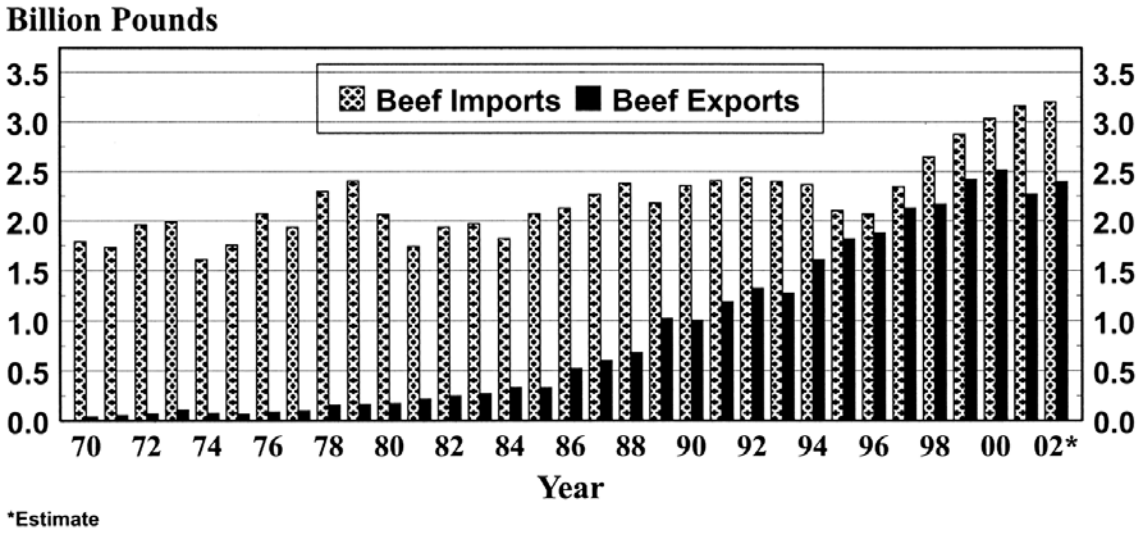


Figure 14. Alabama feeder calf prices; Steers, medium and large, #1, 1990-2002.

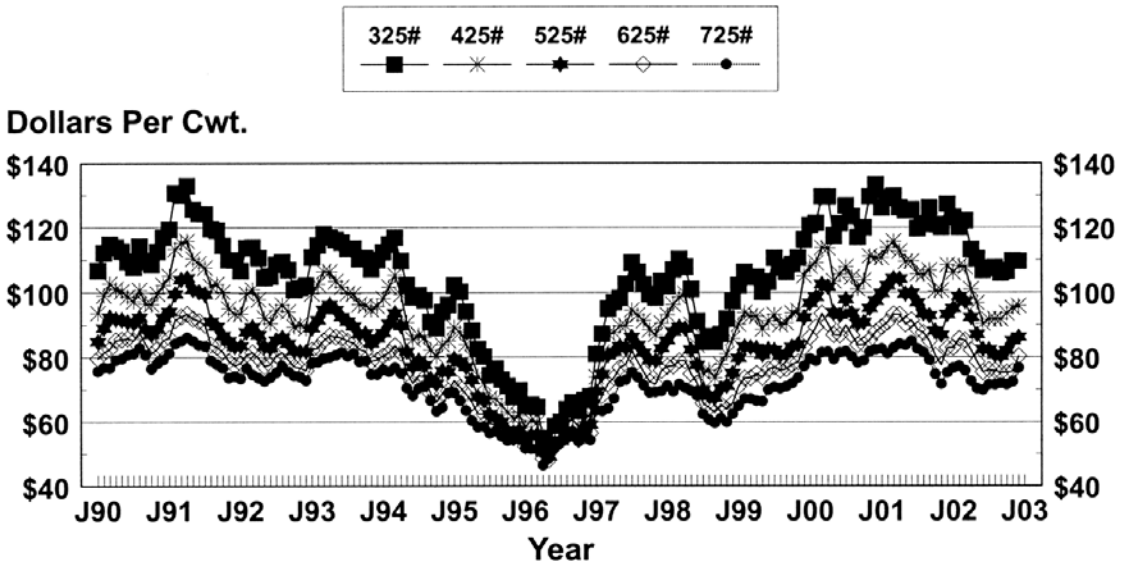


Figure 15. Overview of factors affecting the 2003 cattle outlook.

- **Bearish Factors To Consider**
  - Weather Conditions
  - Higher input prices
  - Large beef imports
  - Trade agreements/disputes
  - Slow economic growth

- **Bullish Factors To Consider**
  - Cattle inventory decreases
  - Lower levels of beef production
  - Smaller total meat supplies
  - Improvement in beef demand
  - Beef export growth

Figure 16. Projected profit trends by cattle industry segments during the four phases of the cattle cycle.

Phase	Cow-Calf	Stocker	Feedlot
Up Cycle (2000 thru 2005?)	Significant Profits	Profits	Profits
Downward Transition (2006 thru 2007?)	Declining Profitability, Profits/Losses	Losses	Significant Losses
Down Cycle (2008 thru 2009?)	Significant Losses	Marginal Losses/Profits	Marginal Losses/Profits
Upward Transition (2010 thru 2011?)	Improving Profitability, Profits/Losses	Significant Profits	Significant Profits

Notes:

Notes:

Evaluating Opportunities to Market Feeder Calves

Walter Prevatt[1] and Tom Anton[2]
[1]Auburn University, Auburn, Alabama
[2]Range Cattle Research and Education Center, University of Florida, Ona, Florida

Are you a cow/calf producer worrying if this year's gross revenues will be enough to cover production expenses and leave you something for family living withdrawals? Would you like to find a way to evaluate the opportunities to market your feeder calves so that you can determine which marketing opportunity allows you to cover your expenses, provides for family living withdrawals, and perhaps even lock in a profit? Your chances of achieving this lofty goal will be greatly improved if you can identify and implement the right cattle marketing strategy.

Marketing is usually the most difficult management task that the cattle producer has to perform. Proper marketing can make the difference between profit and loss in the cattle business. Most cattle producers spend much of their time and effort on improving production practices, while spending very little time on the marketing of their product. However, time spent marketing cattle in today's complex economic environment can pay equal or larger dividends than time spent on improving certain production practices.

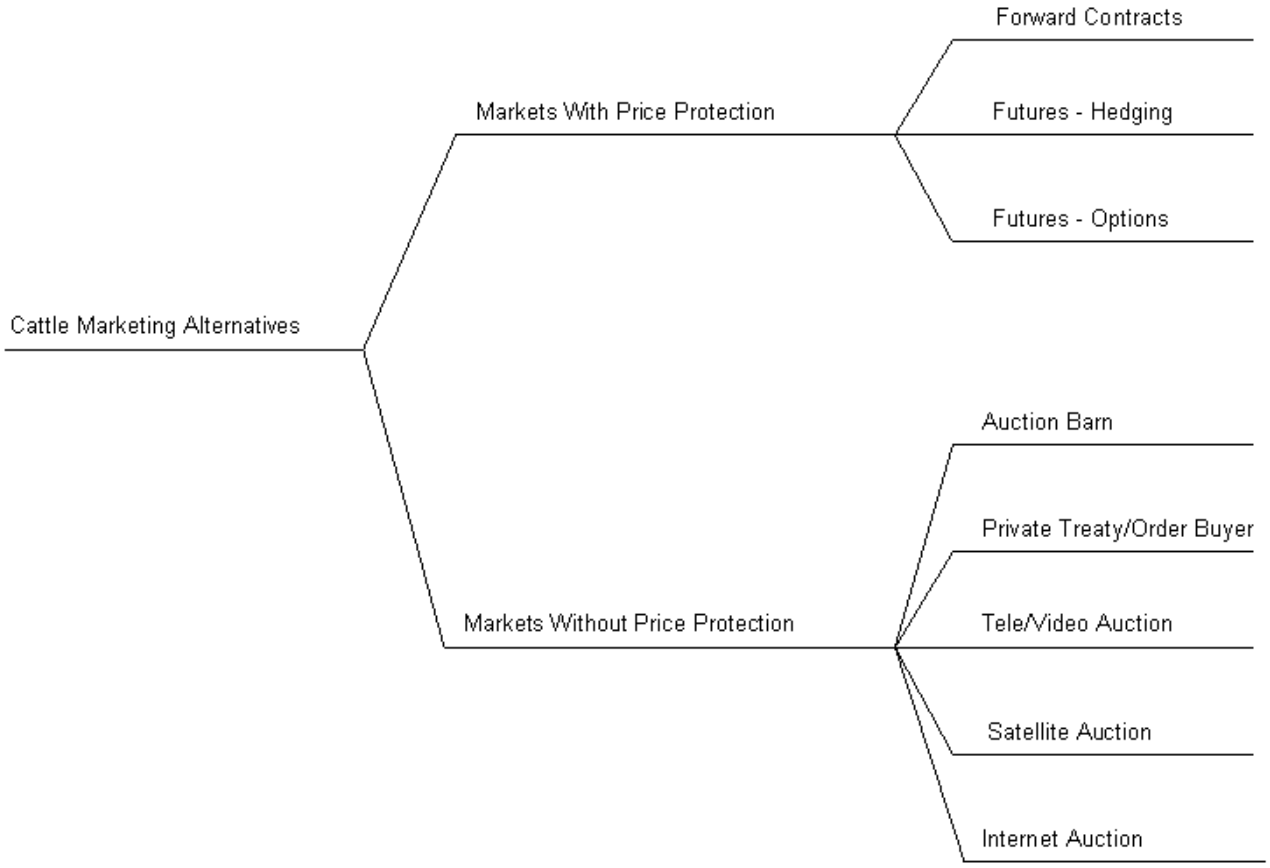
Today, feeder cattle producers have more flexibility in marketing than they often realize. There are numerous marketing alternatives available to cattle producers. In fact, each marketing alternative is defined by both the management and marketing programs that you select. For example, if a cow/calf producer chooses to sell his feeder calves during August in a satellite video auction after weaning and implementing a VAC 45-day program, he has defined both a production program and marketing program. Most cattle producers do not think of it this way, but your production program is part of your marketing program.

Market Outlet

A key component of the marketing program is the market outlet chosen to sell the cattle. Currently, there are at least eight viable market outlets for cattle (Prevatt, 1994). They include the auction barn, private treaty (individual or order buyer), telephone and video auction (board sale), satellite video auction, internet auction, forward contracts, futures markets – hedging, and futures markets-options. The expanded number of market outlets coupled with the frequency of sales and numerous sale locations provides a wide range of market opportunities for today's cattle producer.

In addition, each market outlet has unique features. The primary features that may be used to describe these cattle markets include competitive bid price, market knowledge, convenience and simplicity of sale arrangement, marketing cost, market planning, and market price protection. Each of these items should be given consideration when selecting a market outlet to sell cattle. A quick review of the goals and objectives for your cattle operation will usually help producers select the best market outlets for their operation. Additionally, cattle producers may choose one or more market outlets to sell their cattle (i.e. cull cows and bulls, feeder calves, feeder cattle, slaughter cattle, open and bred replacement heifers, replacement cows, breeding bulls). These market outlets should provide the opportunity to obtain the most profitable price for each set of cattle. Please note this may or may not mean the highest price.

Figure 1. Alternative cattle marketing outlets.



A feature that is becoming increasingly important to cattle producers is price protection. Cattle markets may be divided into two price protection categories: markets with price protection and markets without price protection (Figure 1). The use of markets with price protection allows the seller to manage price risk and "choose to accept a price" that will meet a given price objective (break-even price, production costs plus profit, etc.). In sharp contrast, the distinguishing feature of markets without price protection is that the seller "willingly accepts the going price" when he or she is ready to sell cattle.

The Cattle Cycle and Seasonal Cattle Price Trends

Are you familiar with the "cattle cycle" and where we happen to be on it? Do you know the "seasonal cattle price trends?" Knowing about the cattle cycle can help you plan for production levels that will be profitable over the life of your business. Understanding the seasonal beef price trends can help you plan when to market your cattle (Prevatt, 2003).

The cattle cycle is measured from the lowest inventory of cattle and calves to the next lowest over time (trough to trough). It is generally believed that the cattle and calves inventory increases over time due to higher market prices (profits) and then declines due to lower market prices (losses from over supply, etc.). Thus, the cattle cycle typically appears to be a mound shape over time. The last five cattle cycles have ranged in length from 10-14 years (1949-58, 1958-67, 1967-79, 1979-90, 1990-?). As you might expect, the inventory of U.S. cattle and calves and U.S. average calf prices move in opposite directions. As cattle inventory builds, average calf prices decline. Likewise, as cattle

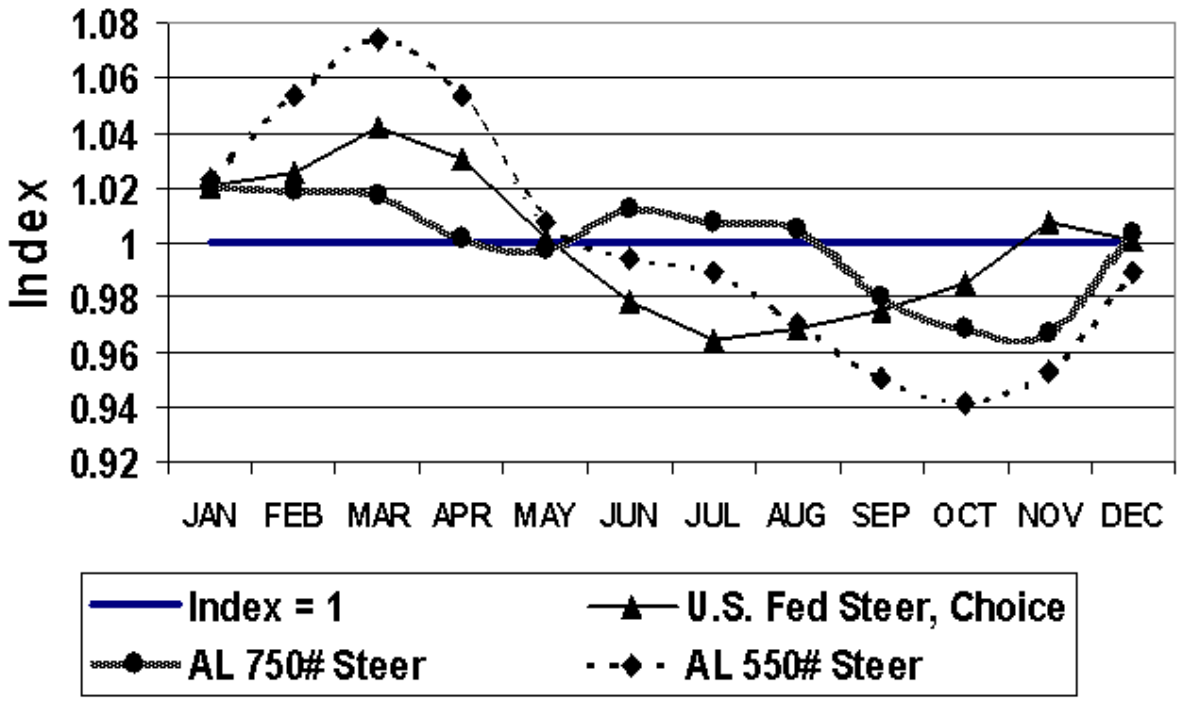
inventory numbers decline, average calf prices increase.

During periods of declining market prices in a cattle cycle, cow/calf producers may need to reduce their inventory in order to lower their unit cost of production (adjust inputs and keep the most productive cows) and improve profit levels. Likewise, stocker operators and feedlot finishers may need to fine tune their production and marketing programs to ensure their cost of gains are lower than the value of gain realized from putting additional weight on cattle. Alternatively, during periods of steady and/or rising market prices, cow/calf producers may expand their cowherds and/or put additional weight on feeder calves by retaining ownership in a backgrounding or stocker program to sell later as 600-800 pound feeder cattle. They may also choose to custom finish them in the feedlot to slaughter weights of 1,000-1,300 pounds.

These changes in the cattle cycle also affect seasonal cattle price trends. The seasonal cattle price variability reflect changes in beef supply and demand conditions (due to changes in cattle inventory, per capita beef consumption, exports, cost of production, weather, trade relationships, substitute meat products, food safety, etc.). Although monthly cattle market prices vary from month to month and year to year, cattle market prices do develop seasonal price patterns or trends over a number of years. By averaging cattle market prices we can develop a price index that describes the seasonal price trends. Figure 2 shows a comparison of seasonal cattle price trends for Choice, U.S. fed steer, 750-pound steer (Alabama, medium and large frame, number one muscle score), and 550-pound steer (Alabama, medium and large frame, number one muscle score) during 1993-2002. The base index of 1.00 represents the 10-year average market price. The seasonal price index describes the average monthly cattle price trend and may be expressed as a percent of the 10-year average cattle market price. For example, the highest price index for the Choice, U.S. fed steer was during March and the lowest price index was in July (Cattle-Fax and USDA). The highest price index for the Choice, U.S. fed steer was 1.04 or 4% higher than the 10-year average price. Correspondingly, the lowest price index was about 0.96 or 4% lower than the 10-year average price. Thus, an 8% price range was realized between the lowest (July) and highest (March) average monthly cattle price. Assuming a 10-year average cattle price of $70/hundredweight, this represents an average annual price range of about $5.40/hundredweight or $65/head. Please note this is the average price range over the previous 10-year period. Thus, during some years the price range will be larger and some years it will be smaller. This is where cattle marketing skills become extremely important. Which direction will prices move this year? What is the potential movement in prices this year? Those who can successfully answer these two questions will be able to identify profitable marketing opportunities.

The next obvious question for cattle feeders is when should I try to target to sell my finished cattle? Figure 2 documents that average monthly prices for Choice, U.S. fed steer are above the 10-year average price from January through April. This seems like a reasonable target to sell finished cattle provided that reasonable input costs (value of feeder animal and production costs) and cattle performance are possible. Most fall calving operations are in a position to make this production and marketing program work. However, spring calving operations are usually lower cost producers and can be profitable even though they would market finished cattle during other quarters of the year. Additionally, be mindful that the folks feeding cattle today include cow/calf/stocker producers, corn producers, feedlot owners, packers, investors attempting to make a profit, investors attempting to move taxable money into a different tax year, and possibly others.

Figure 2. A comparison of seasonal fed and feeder cattle price trends.



Thus, during any given time period, the collective bidding by these groups may provide or eliminate an opportunity for the cow/calf producer to finish cattle.

Figure 2 also shows the seasonal price trends for the 750-pound (gray line with dots) and 550-pound steer (dashed line with diamonds). The 550-pound steer price index ranges from 0.94 to about 1.07, while the 750-pound steer price index ranges from 0.97 to about 1.02 of the 10-year average price. Thus, the 750-pound steer monthly average price is less variable and often a desirable marketing endpoint for many Southeastern cattle producers with adequate forage supplies. The average monthly price indexes, during the first three quarters (January – August), for the 750-pound steer is either at or above the 10-year average price. These seasonal price trends for the 550- and 750-pound feeders provide a lot of flexibility to southern cattle producers with abundant, high quality forages and/or low cost, quality feedstuffs. Lastly, the months of September through November reflect the lowest price indexes. This is a time period when a large portion of feeder calves are marketed because cattle producers do not have the resources (land, labor, capital, management, etc.) to retain these animals. Herein lies a marketing opportunity to move these lightweight cattle from a low market price window (4th quarter) to a higher market price window during the next three quarters (1st, 2nd, and 3rd quarters) while adding weight gain to them. We will explore this opportunity later.

By knowing the seasonal price trends, we are ready to evaluate some marketing alternatives. Let's assume we are working with a fall calving cow/calf operation that can put together truckload units of cattle. Their goal is to make as much profit as they can from their cattle. They have the resources and are willing to own the cattle as long as they can show a profit. Seven basic marketing alternatives have been outlined in Table 1 for this operation.

Table 1. A description of seven basic cattle marketing alternatives associated with a fall calving operation.

Marketing alternative number	Description of marketing alternative
(1)	Gather cows and calves. Pen, sort, group, and load calves. Sell same day, 6/15/03.
(2)	VAC 45 days. Sell 7/30/03.
(3)	VAC 45 days. Background 75 days. Sell 10/13/03.
(4)	VAC 45 days. Custom background 75 days. Sell 10/13/03.
(5)	VAC 45 days. Background 75 days. Custom feed 150 days. Sell 3/11/04.
(6)	VAC 45 days. Custom background 75 days. Custom feed 150 days. Sell 3/11/04.
(7)	VAC 45 days. Custom feed 200 days. Sell 2/5/04.

Another way to view or describe marketing alternatives is by using a decision-tree. Figure 3 provides a decision-tree for seven basic marketing alternatives associated with a fall calving operation. Note that associated with each decision point is the opportunity to sell the animal or keep and define one or more production and marketing programs that the cattle producer would like to evaluate (Prevatt, 2002). These production and marketing programs must be fully understood by the cattle producer and accurately estimated. Also, they need to be frequently monitored as conditions change during the time period. There is little room for error.

Table 2 provides a financial evaluation of seven basic marketing alternatives associated with a fall calving operation. The first six rows describe the performance and production information assumed in the financial evaluation: date sold, days post weaning, pounds of gain, gross weight, shrink, and sale weight. Row seven indicates the type of futures market contract used for price protection. In this study, it was assumed that hedging with a futures market contract would be used to manage price risk. FC denotes a feeder cattle futures contract (50,000 pounds of 700-849 pounds, feeder steers) and LC denotes a live cattle futures market contract (40,000 pounds of 55% choice, 45% select USDA live steers averaging 1,100 to 1,300 pounds). Short (sell) futures market contracts were initiated at the beginning of production phase and offset with the opposite futures market contract (long or buy back) when the cattle were sold in the cash market. Thus, the futures market contracts simply provided a way to manage price risk. Row eight describes the futures contract month and year (corresponds with the end of the production program), while row nine denotes the futures contract price associated with the contract month and year which was attained by competitive bidding in the trading pits on the futures exchange floor of the Chicago Mercantile Exchange (CME). Row ten denotes an estimation of the basis for the futures market contract. Basis is simply the difference between the local cash market price received and the futures market price when the futures contract is offset (local cash price – futures price equals basis). As you might expect, we use historical basis information (usually a 3- to 5-year average) to provide an estimate of the expected basis for a given contract. By adding rows nine and ten (futures

contract price plus basis) we get the expected cash price for the cattle. Row eleven multiplied by row six (expected cash price times sale weight) equals row 12 (the revenue per head). Subtracting rows 13, 14, and 15 from row 12 equals row 16 (the net return for each marketing alternative). The net return per head is based on the production and marketing program specified in Table 1. The net return per head for marketing alternatives 2-7 includes the cost of the feeder calf from marketing alternative one. Thus, the net return per head for each marketing alternative is exclusive of each other. Row 17 ranks the net returns from row 16 in descending order (highest =1, lowest=7). Row 18 is the combined net return, which is the sum of the net return from marketing alternative one and the net return of each of the remaining marketing alternatives (2-7). Row 19 ranks the combined net returns from row 18 in descending order (1=highest, 7=lowest).

Sell at weaning, marketing alternative one, resulted in the greatest net return ($109). The VAC 45-day program, marketing alternative two, shows only a very marginal net return ($11). However, this program is highly important for all other marketing alternatives since it prepares the feeder calf for future production programs (backgrounding, grazing, feedlot, etc.) and improves cattle performance. Unfortunately, the net returns from retaining ownership in marketing alternatives 2-7 in this data set are presently very small. The net returns and rankings of these marketing alternatives will change from year to year, as well as, during the marketing period. Thus, it is important to monitor market prices daily and analyze any movements in the market.

Figure 3. A decision-tree for seven basic marketing alternatives associated with a fall calving operation.

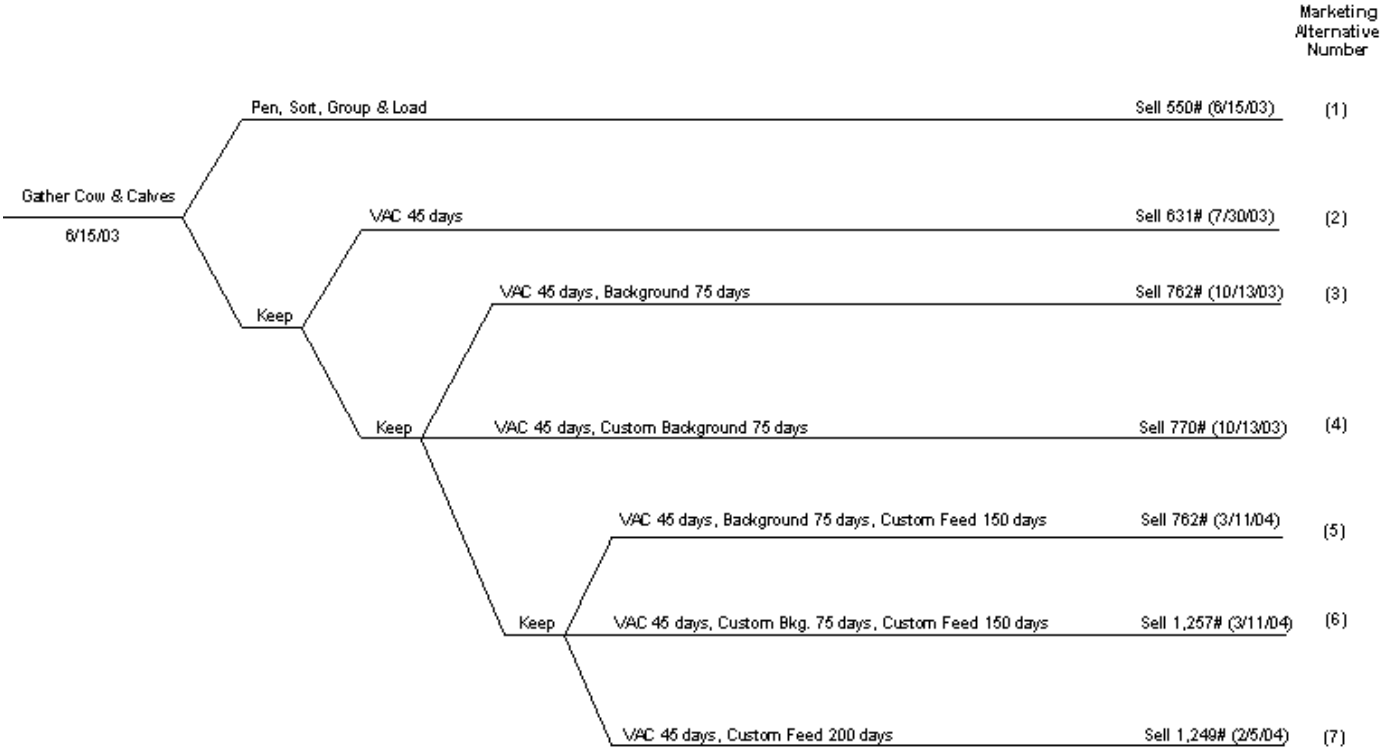


Table 2. A financial evaluation of seven basic marketing opportunities associated with a fall calving operation.

		Marketing alternative number						
Row	Item	(1)	(2)	(3)	(4)	(5)	(6)	(7)
1	Date sold	6/15/03	7/30/03	10/13/03	10/13/03	3/11/04	3/11/04	2/5/04
2	Days post weaning	0	45	120	120	270	270	235
3	Pounds of gain, lb/head	0	81	212	220	700	707	699
4	Gross weight, lb	550	631	762	770	1,250	1,257	1,249
5	Shrink, %	2.00%	2.00%	2.00%	2.00%	4.00%	4.00%	4.00%
6	Sale weight, lb	539	618	747	754	1,200	1,207	1,199
7	Futures contract	FC	FC	FC	FC	LC	LC	LC
8	Futures contract month	Aug-03	Aug-03	Nov-03	Nov-03	Apr-04	Apr-04	Feb-04
9	Futures contract price, $/cwt[1]	81.10	81.10	81.65	81.65	72.90	72.90	72.77
10	Estimated basis, $/cwt	5.03	0.32	-6.56	-6.56	-0.69	-0.69	-1.04
11	Expected cash price, $/cwt	86.13	81.42	75.09	75.09	72.21	72.21	71.73
12	Revenue/head, $/head	464	503	561	566	866	872	860
13	Feeder value, $/head	0	464	464	464	464	464	464
14	Production cost, $/head	355	28	74	84	338	340	349
15	Transportation costs, $/head	0	0	0	0	50	50	40
16	Net return, $/head	109	11	22	18	15	17	6
17	Rank	1	6	2	3	5	4	7
18	Combined net return, $/head	109	120	132	128	124	126	115
19	Rank	7	5	1	2	4	3	6

[1]CME futures contract price as of 3/28/03.

The combined net return is simply the sum of the net return of sell at weaning plus the net return associated with each of the retained ownership marketing alternatives. The largest combined net return was realized from keeping the weaned calf, implementing the VAC 45-day program, and backgrounding for 75 days ($109 + $11 + $22 = $132/head). In this particular example, all of the marketing alternatives (2-7) resulted in combined net returns that were greater than sell at weaning (marketing alternative one). Obviously, this is not always the case. In some market situations, retaining ownership can result in lower net returns than selling at weaning. This is why following the market on a routine basis allows the cattle producer to assess marketing opportunities in advance and hopefully avoid those losses.

Factors to Consider When Seizing Marketing Opportunities

Knowing which marketing opportunities to seize and which to forgo is the art of management. In addition, rarely do you make one change in an operation without causing one or more items to also change. Thus, some advantages and disadvantages are listed in Table 3 for your consideration.

Concluding Remarks

There are an infinite number of marketing opportunities available to today's cattle producer. Each one of these marketing opportunities has potential advantages and disadvantages. Therein lies the challenge for cattle producers. Does the market opportunity fit with the goals of your cattle operation? Do the advantages outweigh the disadvantages? Does the market opportunity allow you to attain your profit objective?

Identifying marketing opportunities is not easy work. It takes time, research, and commitment. Also, none of the marketing opportunities will provide the highest cattle price or profit year after year. Therefore, to take advantage of market opportunities, the cattle producer must become a market watcher and an analyst. Watching the market will require 15-30 minutes each day to gather and evaluate the market information. Of course, as the cattle producer becomes interested and successful, he will spend more time on this aspect of the operation. This small investment of time can pay large dividends and help avoid catastrophic market situations and losses.

Anyone can sell cattle, but few producers market cattle with skill. Profit in many years is the difference between employing a well-researched marketing strategy verses simply accepting what the cash market will provide. When developing cattle marketing strategies, the cattle producer should strive to understand the production and marketing requirements of each market opportunity. In addition, an assessment of the potential boundaries of expected price movements is essential.

In most instances, bad markets cannot be blamed for financial losses. A thoughtful cattle producer offsets the hazards of bad markets by following well-laid plans and safe marketing practices. Reliable and effective marketing practices do not come to a person naturally – they must be learned through study and experience. There are no magical formulas for making a profit with cattle, but a thorough examination of market opportunities in the various market outlets will increase the chances of realizing a profit. Good luck and may your marketing efforts be rewarded.

Table 3. Advantages and disadvantages of the seven example cattle marketing alternatives for a fall calving operation.

Marketing alternative number	Description of marketing alternative	Advantages	Disadvantages
(1)	Gather cows and calves. Pen, sort, group, and load calves. Sell same day, 6/15/03	Requires less effort, knowledge, and time to sell cattle in this manner.	Significant shrink left in the cowpen and/or market outlet. Limits producers' ability to take advantage of genetic improvements.
(2)	VAC 45 days. Sell 7/30/03.	Adds value to the animal (trained to eat and drink from a trough, calm around people, improved health program, etc.).	Requires adequate facilities to wean and feed calves. Requires more effort, knowledge, and time to market cattle.
(3)	VAC 45 days. Background 75 days. Sell 10/13/03.	Adds value to the animal (trained to eat and drink from a trough, calm around people, improved health program, etc.).	Seasonal price trend is typically the lowest during this time period. Must monitor cost of production, performance, and market prices frequently. Requires more effort, knowledge, and time to market cattle.
(4)	VAC 45 days. Custom background 75 days. Sell 10/13/03.	Adds value to the animal (trained to eat and drink from a trough, calm around people, improved health program, etc.).	Seasonal price trend is typically the lowest during this time period. Must monitor cost of production, performance, and market prices frequently. Requires more effort, knowledge, and time to market cattle.
(5)	VAC 45 days. Background 75 days. Custom feed 150 days. Sell 3/11/04.	Seasonal price trend is usually the highest during this time period.	Must monitor cost of production, performance, and market prices frequently. Affects cash flow and Federal and State Income Tax reporting during first year.
(6)	VAC 45 days. Custom background 75 days. Custom feed 150 days. Sell 3/11/04.	Seasonal price trend is usually the highest during this time period.	Must monitor cost of production, performance, and market prices frequently. Affects cash flow and Federal and State Income Tax reporting during first year.
(7)	VAC 45 days. Custom feed 200 days. Sell 2/5/04.	Seasonal price trend is usually the highest during this time period.	Must monitor cost of production, performance, and market prices frequently. Affects cash flow and Federal and State Income Tax reporting during first year.

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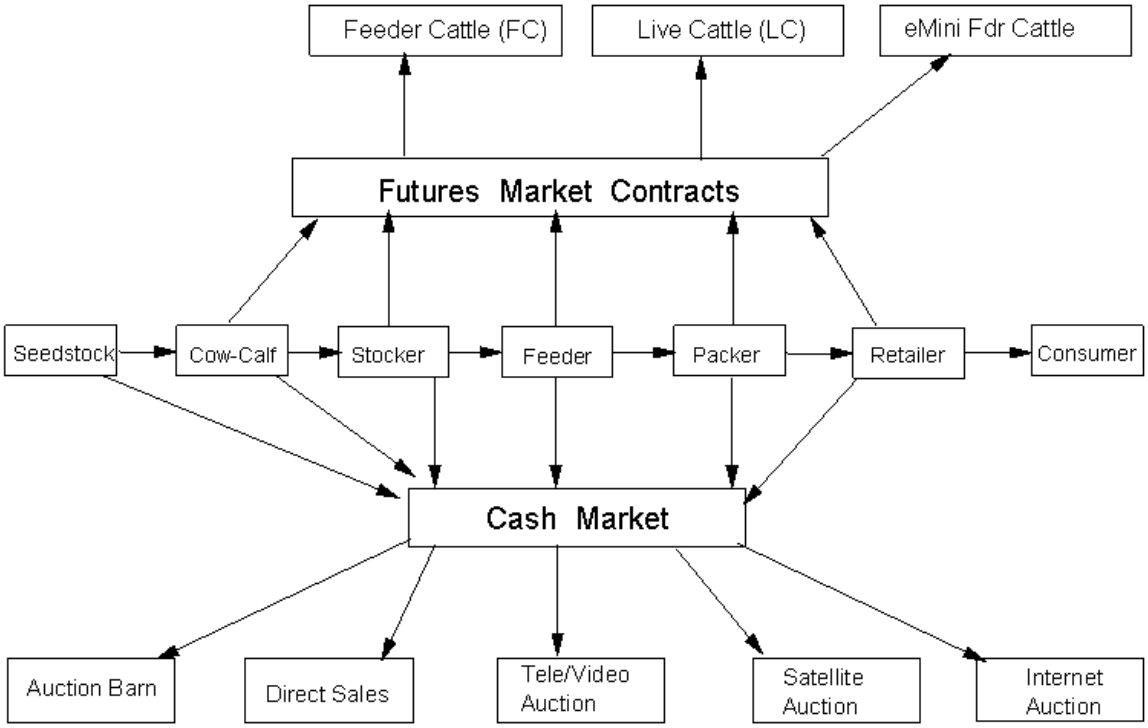
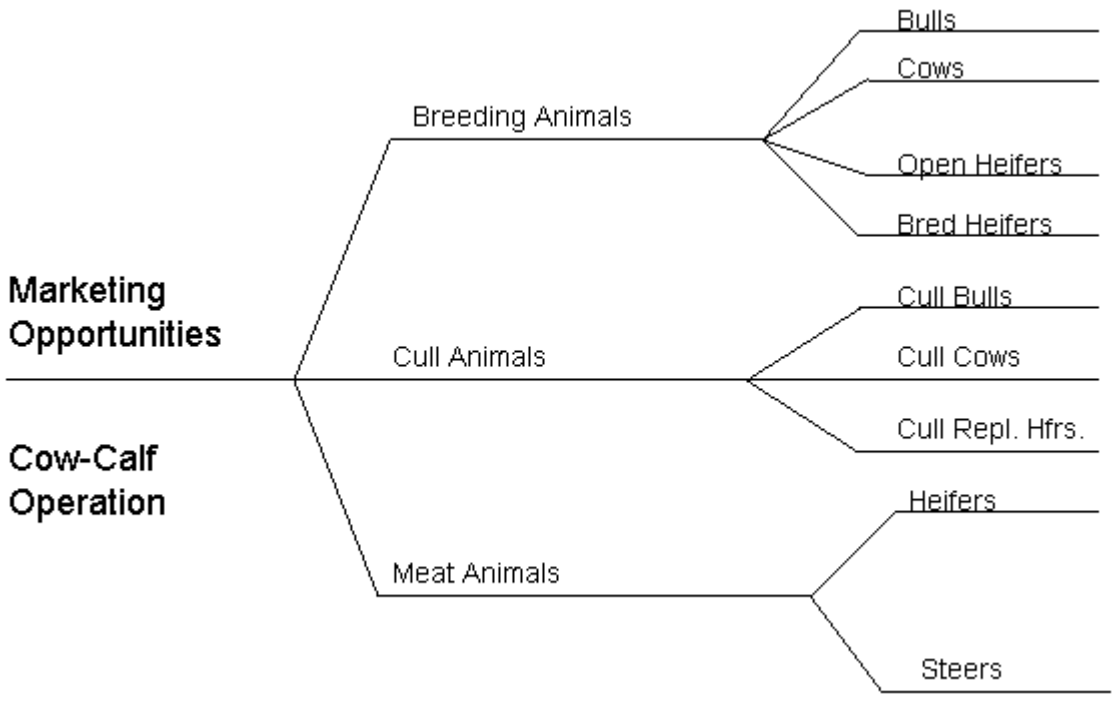
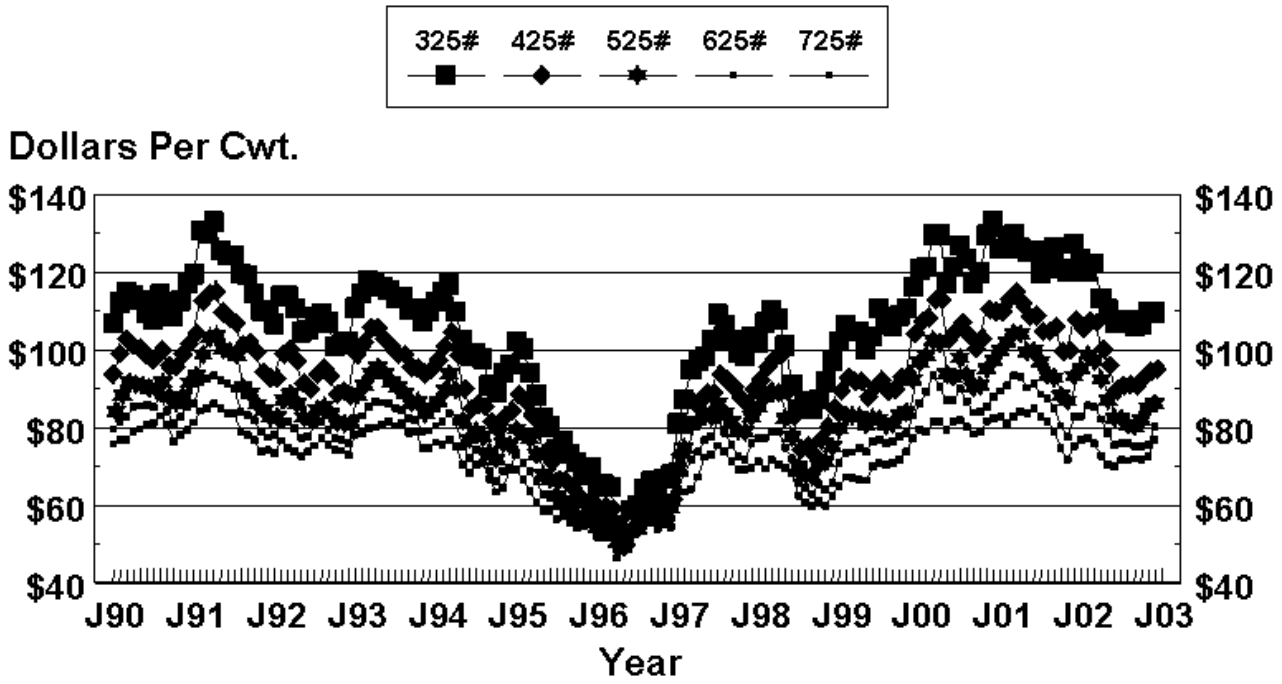
Appendix Figure 1. U.S. beef production and marketing system.



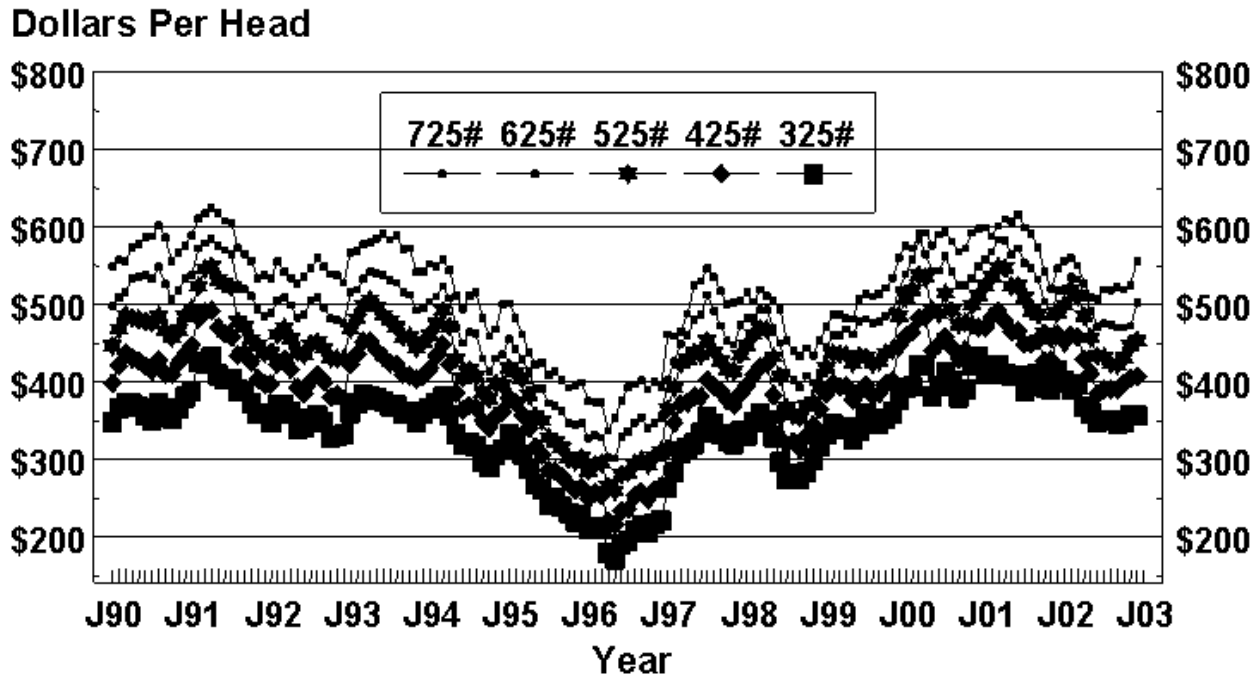
Appendix Figure 2. Marketing opportunities of the cow/calf operation.



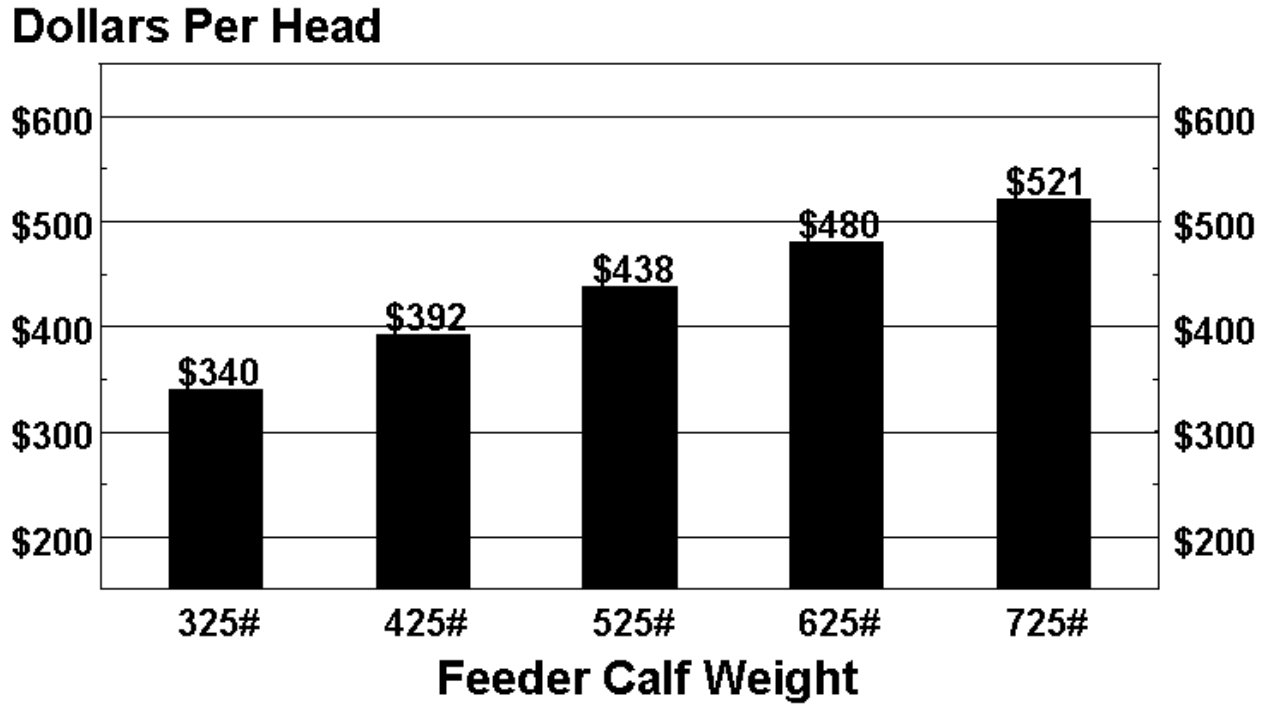
Appendix Figure 3. Alabama feeder calf prices; steers, medium and large, #1, 1990-2002.



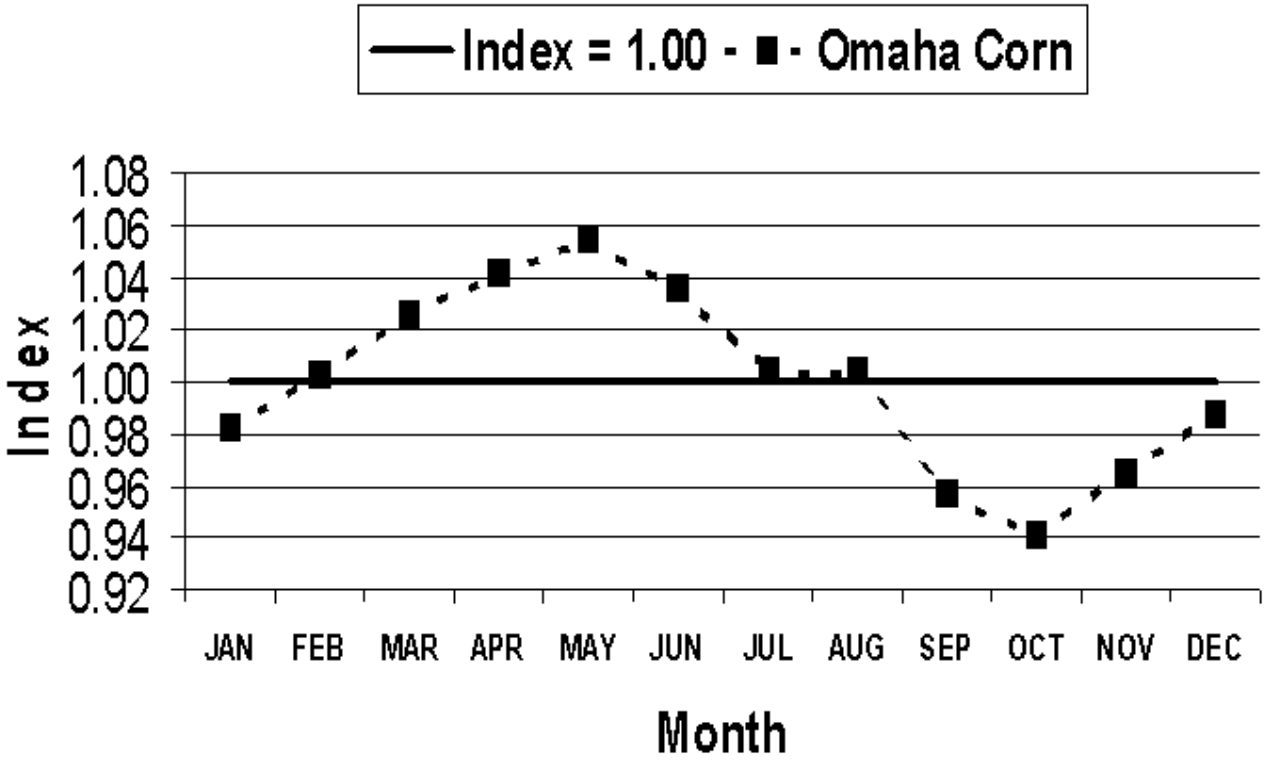
Appendix Figure 4. Alabama feeder calf prices; steers, medium and large, #1, 1990-2002.



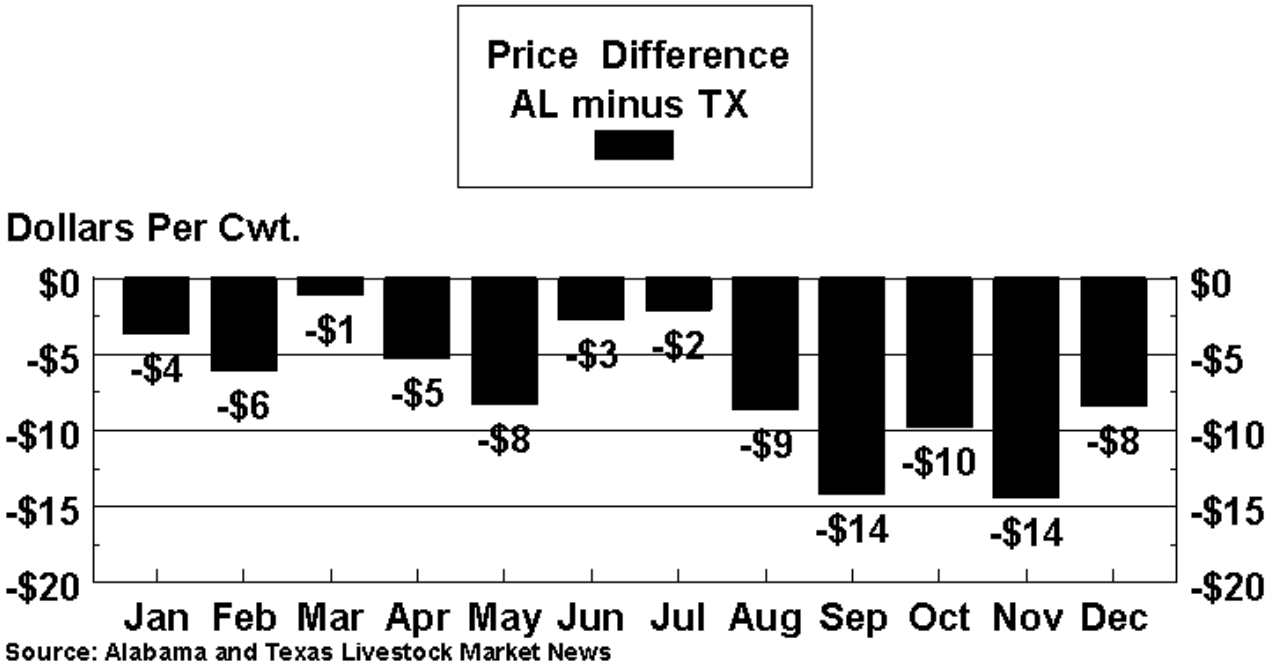
Appendix Figure 5. Thirteen year average feeder calf values; steers, medium and large, #1, Alabama, 1990-2002.



Appendix Figure 6. A seasonal price trend index for Omaha corn.



Appendix Figure 7. Feeder steer price difference, Alabama minus Texas, 400-500 pounds, 2002.



Notes:

Notes:

Negotiating a Grazing or Feeding Contract

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The theme of the afternoon program refers to retained ownership of calves and/or yearlings through a grazing and/or feeding program. Those of you that sat in on the January Cattle-Fax meeting in Nashville, heard Randy Blach's closing remark: "Those producers who do not retain ownership beyond the weaning of the calf crop are leaving money on the table most years."

Those producers that retained ownership of last years calf crop are currently enjoying well above-average gains on wheat pasture and those who have been, or are currently, selling fat cattle at these levels are enjoying substantial profits.

To make best use of the time allocated and to best address the subject matter that was assigned, we will look at your concerns as a producer when you elect to retain ownership through a grazing or feeding program.

Working with producers for several years, our management service has identified those concerns to include: comfort with the decision to retain ownership, frequent and reliable communication, development of credible performance projections, meaningful progress reports, the availability of financing so as to offset some of the interruption of cash flow, implementing a risk management program that has some flexibility, developing a marketing program that is tailored to the quality, kind, weight and time of year, and a comparison of performance of your cattle with others of like quality in a similar program.

Grazing programs are divided into winter and summer although they will sometimes overlap. For instance, Florida calves make best use of a winter grazing program on wheat or rye grass, but because they are weaned 60 or 75 days before the winter grass is ready, we have a need to find summer grass or a preconditioning yard to care for the calves in the interim. The strength of the grass and/or the energy level of the ration in the preconditioning yard need to match the flesh condition of the calves.

A satisfactory grazing program begins with the selection of the pasture operator. The pasture operator must own or have leased the acreage we intend to graze, live on or near the pasture being used, be actively engaged in operating their personal grazing program, and be financially able to perform contractual obligations.

If we are not familiar with the pasture that is offered (have not grazed it before) we will make a visual inspection to determine: (1) if the pasture has had sufficient moisture to produce early growth; (2) if there is sufficient turf (in the case of grass pasture) or sufficient stand (in the case of wheat pasture) for the intended carrying capacity; and (3) if pasture in this geographic area historically produces in excess of 200 pounds of gain for the season. If the above criteria cannot be met, we need to look elsewhere.

The grazing agreement spells out the responsibility of both parties. The length of agreement is determined and on/off dates are established. The weight, sex, and quality of the cattle to be furnished by the owner, the weighing conditions to generate the weight going on pasture, and the weighing conditions to determine the weight off pasture are provided for in the agreement.

The pasture rate (cost/pound of gain, cost/hundredweight/month, or cost/head/ month) is agreed upon. The amount of front money or partial pay is established. The pasture operator may ask for these funds to be in his hands before the cattle arrive at the pasture.

The pasture operator is to stand all death loss over 2%, but give him the option to reject any animal that appears to be sick on arrival. The animal is marked and the responsibility for the death of that animal is with the owner for the first 30 days. The owner will be notified immediately of any death loss. Such death loss will be verified by a hide brand or photo of the dead animal that clearly shows ownership. If the death loss exceeds 2%, the original value of the additional death loss is to be deducted from the final payment to the pasture operator.

The head count is guaranteed. The market value of any cattle short, or unaccounted for at the time of delivery back to the owner, will be deducted from the final payment to the operator. Any front-money or partial payments made during the pasturing period will be deducted from the final payment. The pasture operator has the right to request a wire transfer of funds before the cattle leave his pasture.

It is necessary that the pasture agreement be signed by both parties before the cattle are shipped to the operators pasture.

Once value of the calf crop, based on the weight leaving Florida, has been decided and including all costs of production, freight to the pasture and/or growyard, pasture, feed, care, medicine, death loss, and interest; we can develop a reliable performance projection as to the marketing date, weight, and breakeven selling price as the calves come off pasture. Any changes in the inputs affecting the performance should be communicated immediately. If the calves have gained well and the feeder market is unusually strong, the producer may elect to sell the calves as they come off pasture. One of the reasons for us to favor pasturing wheat in Oklahoma is the strength of the feeder market in this state which is supported both by order buyers for feedlots in Kansas, Nebraska, and the Oklahoma City auction market.

Summer grazing in Kansas, Oklahoma, Texas, and New Mexico offers unique opportunities depending on the availability of stocker calves as to their weight and preconditioning. Both the Kansas Bluestem country and the Oklahoma Osage will provide exceptional gains for a 90- to 120-day period beginning in mid April for those stockers that have been thoroughly preconditioned and are ready to go. These cattle will come off pasture in July and August and market as November/December fats. The New Mexico grass is usually available by early May and the season runs into October. These cattle will market in February and March. Historically, the fat cattle market is at its highest levels during these months.

While most producers favor placing cattle on a cost of gain/pound basis, we sometimes see good opportunities to place cattle by the hundredweight/month or by the head/month.

The selection of a feedlot, whether for placing cattle as they are shipped from Florida or as they come off a grazing program, deserves careful consideration. During the past two years, as we worked our way thru some burdensome numbers, the feedlots ability to get the cattle sold to the best advantage was our paramount concern. The ability of the feedlot to care for and manage the health of the cattle is of equal importance, particularly if the cattle have not been thoroughly preconditioned.

The cost of not preconditioning in the terms of greater death loss, increased cost of medicine, increased cost of gain, and higher percentages of chronics is well documented by

the data collected over the past several years by the Texas A&M Ranch to Rail program. Producers who have gone to the expense to thoroughly precondition their calves before offering them for sale have been, at times, disappointed by the buyers reluctance to pay a premium for this service. Some of this reluctance is based on the fact that occasionally calves have been misrepresented as to the thoroughness of the preconditioning program.

We work with producers who: (1) send us calves that are loaded on trucks as they are stripped from the cows with no exposure to creep feeding and without a vaccination program while on the cow that was specific for the respiratory disease complex; (2) send us calves as they are stripped from the cows, but have had access to feed (they do know how to eat feed) and have been vaccinated against the respiratory diseases while still on the cow by the use of a killed product; (3) send us calves that have been vaccinated with a killed product while on the cow, boosted with a modified live product the day that they are weaned and then held on a ranch pasture for a few days until they get past the walking and bawling stage and have had some exposure to dry feed; and (4) some producers, mostly those who have experienced the costs of a semi-preconditioning effort, will go the extra mile and implement both vaccination programs, teach the calves to eat and hold them for 30-45 days before shipping. We work with some producers who cannot or do not want to do the preconditioning themselves, but will send the calves to a stocker operator here in Florida and have it done for them. A word of caution is needed concerning the use of highly medicated feed in the preconditioning program. It is probably good practice for a few days after weaning, but the usage needs to be tapered off and scaled down to zero before the cattle are shipped.

Once we have selected a feedlot for its ability to care for the cattle we need to look at how that feedlot goes about marketing the cattle. If we are working with a feedlot that is involved with an alliance, such as Ranchers Renaissance, the marketing will be decided jointly by the packer and the feedlot that is involved. For the most part, we favor using those feedlots that make best use of the grids offered by several packers. Not all feedlot managers have the ability to select that grid that will net the most return for a particular pen of cattle. We work with those managers who have the ability to estimate the hot yield (dressing percent), quality grade, and yield grade of the cattle, and if needed due to the difference in the genetic make up of the cattle in the pen, sort the cattle and offer the sorted cattle to that grid that will provide the most return. The higher grading cattle, that usually finish first and at lighter weights, will be offered to that grid with the greatest premiums for quality grade. The balance of the pen, normally those with more Brahman or Continental influence, will be offered to that grid with the greatest premiums for yield grade and the least discount for the quality grades. This grid is offered by the nation's largest packer to generate a supply of carcasses that are used to produce a pre-packaged product for the nation's largest retailer of beef and that product comes from select grade carcasses. Cattle that produce carcasses with a high percentage of yield grade 1s and 2s and do not grade a high percentage of choice, are well marketed using this grid.

The schedule of premiums and discounts of most grids favor the packer. It is the responsibility of the manager (either feedlot or hired) to see to it that we have as few as possible of those carcasses that carry the greatest discount, namely discounts for over and under weight carcasses and for yield grade 4s. The discount for dark cutters is equally severe and while we cannot control it as easily as the others, most feedlot managers work closely with the packer to coordinate the shipping so that the cattle leave the home pen at the feedlot and walk on the kill floor with the least amount of waiting time.

Once we have eliminated the problem cattle before shipping, marketing the cattle using the grid that fits the cattle, will usually show a substantial premium to the cash market. This winter and spring, when the choice to select spread has been in the $5.50 area, the premiums for yield grade 1s and 2s, as well as those paid for prime and Certified Angus Beef carcasses, have more than offset the discounts of the choice to select spread. There is a time of the year however, when the spread between choice and select grades widens to a point where marketing using the grids needs a closer look. If the cattle are projected to market during this time of the year, are estimated to have a less-than-average quality grade, and not be able to offset this discount with premiums for yield grade, the producer and the manager need to look at forward contracting the cattle for future delivery.

Again we need to look for that feedlot that has a good track record for their ability to get the contract made with the best possible basis and to flat price the cattle at the most opportune time. These contracts are best negotiated early in the feeding program. As the cattle near finishing, the manager needs to work closely with the packer/buyer to select that week during the contract month to ship the cattle. Shipping too early will result in a lower yield and lower percentage of choice and prime; shipping too late can result in an increase in the cost of gain, over weight carcasses and yield grade 4 problems.

If the feedlot we have selected has the ability to satisfy all of the above concerns, we need to look at the cost of ration and the grain position. Normally there is not a great deal of difference in the dry matter cost of the ration and the difference is usually associated with the energy level of the ration. The rapid and unexpected run up in grain prices last fall, particularly the future contracts, resulted in some of the feedlots pricing grain a good deal higher than others. This caused us to limit the placing of cattle with those feedlots until their cost of the ration came back in line. For those producers that have a concern about the price of the ration throughout the feeding period, we can forward contract the grain with the feedlot or a local grain supplier, or take a position for that period with a futures contract with the Board of Trade.

If a producer has historically sold the calf crop at weaning, retained ownership may cause some problems as to the interruption of cash flow. To offset this problem, most of the feedlots we work with have “in-house” financing available on a pen by pen basis that is easily accessed and does not require a great deal of information as to current financial statements and past years tax returns. If we can arrive at an agreed on market value for the cattle, most feedlots are willing to partner with the producer. They will pay him for half of the cattle as they arrive at the feedlot, pay their share of the feedlot charges as they occur, work with the producer to develop the most favorable marketing plan, and share in the profit or loss at the end of the feeding program. We have been able to go the extra mile for some producers by selling a one-half interest in the cattle to the feedlot and gaining financing by the feedlot for the one-half interest retained by the producer.

Once all of the input values have been determined, we can develop a performance projection that, when including all feedlot charges, estimated death loss, and interest charges, indicates the date of marketing and the break even selling price. Based on this projected selling price, we can work to develop a risk management program using the futures contracts offered by the Chicago Mercantile Exchange. During the past 24 months, outside factors have had more effect on the price of fed cattle than the simple supply-demand relationship and those cattle that were protected by a futures position during this time period were somewhat insulated from the change in the market.

Some producers will be satisfied to buy an out of money put that will protect the equity dollars. Others will want to buy a more expensive put that is close to the projected breakeven selling price and offset some of the cost of this put by selling a call. If the futures contract for the projected marketing month is trading at a level that will provide for a satisfactory feeding profit, we may elect to trade that position to cover all or part of the risk. We need to be reminded that a change in the projected breakeven selling price due to increased feeding costs or an unfavorable basis at the time that the cattle are sold will detract from the value of the position. If you do not have an established account with a commodities broker we suggest that you do so. There is no cost to establish the account. You may never use it, but if the need arises, you need to be able to act quickly.

As the cattle progress thru the pasturing or feeding program the producer needs to maintain close communication with whoever is managing or looking after your interests. We find that some prefer a simple phone call updating the progress of the cattle, others who may be pressured with other business interests, would rather have a written update faxed or emailed to them that they can review at a more opportune time. If a change occurs that needs attention it is important that you know about it as soon as possible.

We give close attention to and provide the most frequent communication for the first 30 or 45 days the cattle are on feed or on pasture and again for the 2 or 3 weeks prior to the shipping or marketing of the cattle. Inspections as to the progress of the cattle are made on regular basis and the findings are communicated immediately.

As soon as the cattle are sold any existing futures position needs to be lifted. When the cattle have been shipped and all of the feedlot charges have been determined, a detailed close-out is produced that relates to both the physical performance of the cattle (average daily gain and dry matter feed conversion) as well as to the financial performance of the feeding or pasture program.

If the cattle have been marketed with an alliance or have been sold using one of the packer grids, all of the meaningful data including hot yield, premiums paid for quality and yield grading, and discounts for “outs or non-conforming” carcasses needs to be a part of the close out data.

All physical performance data from the cattle during the feeding program as well as collected carcass data, by the use of a spread sheet, can compare the performance and carcass data with other cattle of similar weight when going on feed. The confidentiality of producers furnishing the data used is closely protected.

The value of this information, when making management decisions concerning the genetic makeup of the cattle and when making changes in production practices, runs a close second to the profitability of the feeding program itself. Retained ownership is well justified if your cattle posses superior genetics and produce above-average performance both in feeding and carcass value. If not, the information should be used as the basis for making needed changes.

For those of you who normally retain ownership through a grazing and/or a feeding program, all of the above is quite elementary. Our discussion, however, is targeted to those producers who have not retained ownership or have done so on a limited basis, and/or who may have had an unpleasant experience when retaining ownership the first time. We believe that by making full use of all of the tools available and by close supervision as the cattle progress thru the program, a reasonable amount of success can be obtained the majority of the time.

Notes:

Ranchers Who Have Retained Ownership After Weaning

Herman Laramore
Bar L Ranch
Marianna, Florida

Retained ownership is not for everybody and is certainly no "get rich" scheme. There are numerous decisions that should be made and actions taken before retaining ownership, i.e.

I. Size of Ranching Operation - Size is not important so long as producer can load a semi-truck with approximately 50,000 pounds of reasonably uniform calves. They can be mixed sex if necessary to make the load, but feeding cost increases with mixed group.

II. Reason for Retaining Ownership
   A. Economical aspects:
      1. Shift income to another year;
      2. Alter cash flow; and
      3. Potential to increase profits.
   B. Data collection:
      1. Carcass data collection to evaluate cattle produced and determine breeding needs for improvement; and
      2. Use data to build herd reputation for future sales of cattle.

III. Selecting Feed Yard
   A. There are many feedyards, both large and small, available for retained ownership. I would suggest that a producer visit several feedyards, talk to feedyard customers, and talk to your neighbors and friends that retain ownership for references. Select a feedyard that is willing to work with you to provide you the data desired and with which you feel comfortable. If feeding more than one load of cattle, one might want to feed at more than one yard, which will spread risk and exposure to more than one type and location of feeding operation.
   B. Partnering might be an option. Most feedyards are willing to partner with a producer by buying an interest in the cattle at time of delivery to feedyard. First-time retaining ownership might feel more comfortable if they partner in the beginning. Risk is reduced and cash flow can still be affected to some degree.

IV. Preparing Cattle for Retained Ownership
   A. Preconditioning is not an absolute must, but is highly recommended.
   B. The selected feedyard will suggest a vaccination and preconditioning protocol, and the more suggestions that can be performed; the more likely you will have a successful experience at retaining ownership. Pharmaceutical companies offer suggested protocol for preparing cattle before shipment to feedyard.

V. Profit Potential - A general rule of thumb is that more money is made feeding cattle when feeder prices are cheap than when prices are high. In very simple terms:

Example with cheap prices:

600 lb	feeder steer
x.70	lb cost
$420	value at ranch
1,200 lb	finished weight
.70	lb selling price
$840.00	gross proceeds
- 420.00	less cost/value at ranch
$420.00	
- 300.00	less cost to feed (600 lb gain at .50/lb)
$120.00	
- 30.00	less .05 lb. freight
$ 90.00	
- 10.50	interest on cattle & feed or loss of use of money at 5% for 6 months

$79.50 Potential Profit

Example with high prices:

600 lb feeder steer
x .90 lb cost
$540.00 value at ranch

1,200 lb finished weight
.70 selling price
$840.00 gross proceeds
- 540.00 cost/value at ranch
$300.00
- 300.00 cost to feed (600 lb x .50/lb)
-0-
- 30.00 freight to feedyard (.05 per lb)
- 13.50 interest on cattle & feed or loss of use of money @ 5% for 6 months

$43.50 Potential Loss

VI. Price Protection - Price protection is a variable from year to year and should be discussed with feedyard who usually has personnel or contacts with expertise to competently advise you of your options based upon current market futures and options.

VII. Other Considerations
A. Shrink - Shrink is a major loss in sale of calves though sale barn, however, this can be recaptured or at least reduced by proper handling of cattle in a retained ownership.
B. Alliances or Special Marketing Groups - Depending on your breed and quality of cattle, there are a number of alliances or special marketing groups that can be utilized to increase profit potential.

VIII. Downside - Along with the potential to make a profit by retaining ownership comes the "risk" of losing money.
A. The adage, "What can go wrong, will go wrong" comes into play.
B. The longer you own cattle, the better chance of death loss due to sickness, injury or weather.
C. The increased labor costs, costs of vaccination and feed for preconditioning increases your costs in calves.
D. Market fluctuation in price of finished cattle and feed can result in loss.

IX. Conclusion - The bottom line is, it is a "learn as you go" endeavor, and I would strongly suggest that if you are considering retained ownership for whatever reason, that you take the time to sit down with someone who has participated in a retained ownership program and fully discuss it with them.

Then, start slowly.

Notes:

Notes:

Do I Have the Cow that is the Most Efficient Producer for My Environment/Management Level?

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Introduction

Efficiency of beef production is one of those terms that probably means something different to each person discussing the topic. Certainly, efficiency means something different to the packer than to the feeder or cow/calf producer. Beef production practices, and especially breeding, have been largely influenced by feed conversion (one measure of efficiency) in the feedlot and in dressing percentage (another measure of efficiency) at the slaughter facility. Under these influences, larger framed, growthier cattle that consume the most feed per day appear to be the most efficient feed converters. How do these influences affect the other segments of the beef industry?

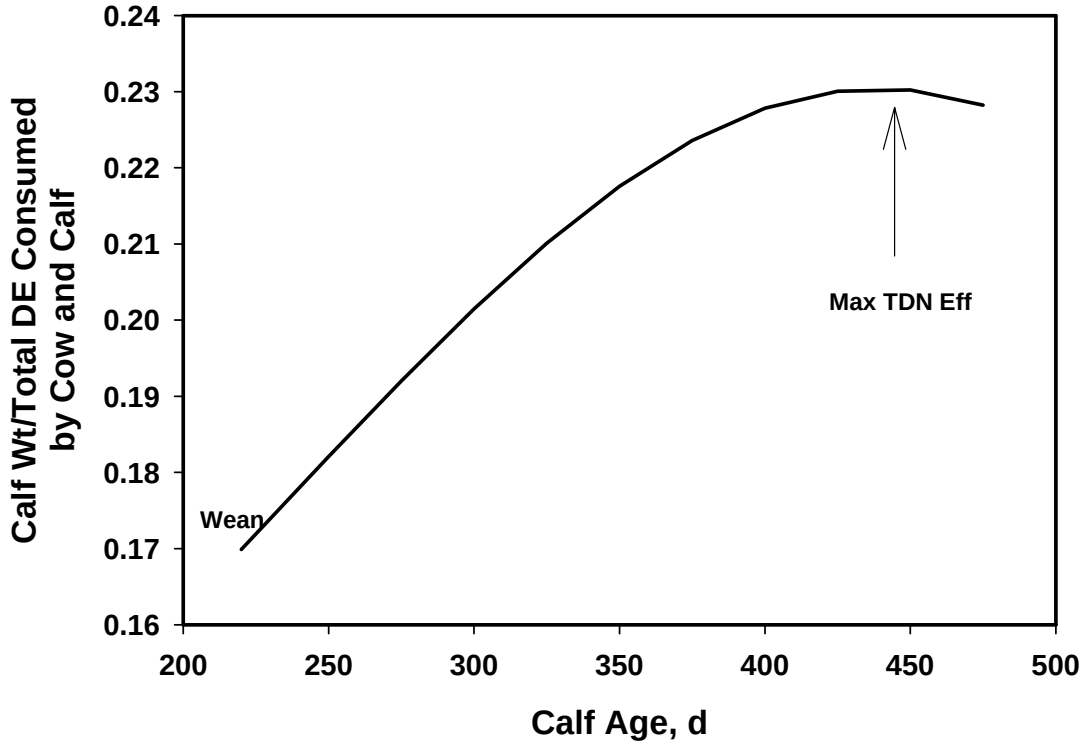
The Gulf Coast and Southeast contain almost 40% of the U.S. cow/calf population. The climate and soils of the region are well suited for production of warm season perennial forage grasses. These grasses produce large amounts of dry matter during the growing season, are low to moderate in quality, usually die with the first frost, and do not grow during the winter. Therefore, a cow suited to the region must be able to consume and process large amounts of this available forage, and perhaps to withstand the feast-famine production regime characteristic of the wet-dry tropics. Under this scenario, cows must be able to store energy and protein during the growing season for use during the dry season when forage is either limiting or of such low quality so that it will not support maintenance. The real difficulty occurs when the cow is asked to calve during, or just before the dry or winter season, when nutrient supply is at its lowest and requirements are at the highest. Some breed-types have adapted to such a regimen and have modified reproductive behavior in order to survive under the described circumstances. However, they are likely not as productive as those selected for high production when available feed supply is unlimited or matched to the production system. It is much easier (I think) to change or adapt an animal to fit the system, than it is to change the feed supply. However, most of the costs for producing a calf in the subtropical U.S. are for feed to winter a cow.

What Defines Efficiency in the Cow/Calf Sector?

Total requirements of TDN for producing a slaughter animal was developed by Neel (1973) when they fed cows during the period from calving to weaning. All feed for the cow and calf were recorded in dry lot. Milk production, calf and cow weight, backfat thickness, linear measurements, and condition scores were recorded. The efficiency of production (lbs calf/lb total DE consumed by cow and calf) was lowest at calving, and increased as the calf grew (Figure 1) from 0.17 at weaning to about 0.24, when the calf was about 14 months old, described by the author as the optimal time to slaughter. Furthermore, with this set of Angus cows, decreased efficiency was associated with increased cow weight.

How is efficiency affected by the type of cow I keep?

Figure 1. Total digestible energy required for production of a pound of calf at different times during the life of the calf.



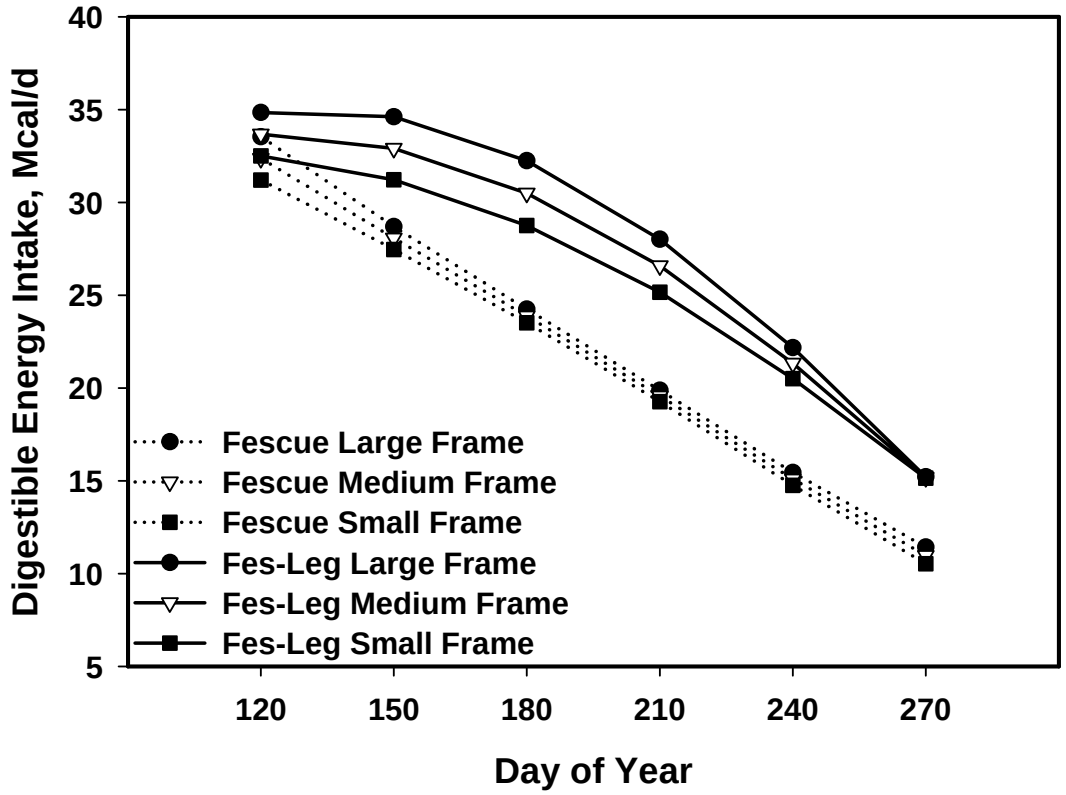
Interactions of Genetics and Location

A classic piece of research was conducted in the late '60s and early '70s at the Brooksville station in collaboration with the USDA station in Miles City, Montana (Burns et al., 1979; Butts et al., 1971). Two lines of cattle were compared. One was Line 1 Herefords developed in Miles City, the other was Line 6 Herefords developed in Florida. Each herd was split and part of the cows shipped to the alternate location (Table 1) and performance was monitored for many years. There were many aspects of the project, but I will concentrate on weaning weight and condition of the calves produced. Cows developed in Montana produced heavier calves at weaning than cows developed in Florida among those maintained in Montana. However, the reverse was true in Florida, demonstrating a classic interaction between genetics (Herd or line) and environment (represented by all the conditions of each location). The environment may have imposed stresses through heat load, pests, nutrition, or other mechanisms. The researchers did not determine the mechanisms for the interaction, but demonstrated clearly that it exists. Following this research producers were careful to buy breeding stock from 'adapted' herds or lines of cattle, usually buying breeding stock from the southeastern US and especially from those producers that paid attention to adaptation. We are 28 years removed from that research, and with the tremendous pressure for cow/calf producers to supply a 'calf that will fit the box', many have reached out to more northern climates for breeding stock. Have we traded away some of the traits that were necessary for a cow to compete in the environment that we have to deal with?

Interactions of Genetics and Nutrition Level

Industry has identified a large framed feeder that will finish at high select or low choice, YG 2 at carcass weight < 950 pounds. What kind of cow is necessary to produce the

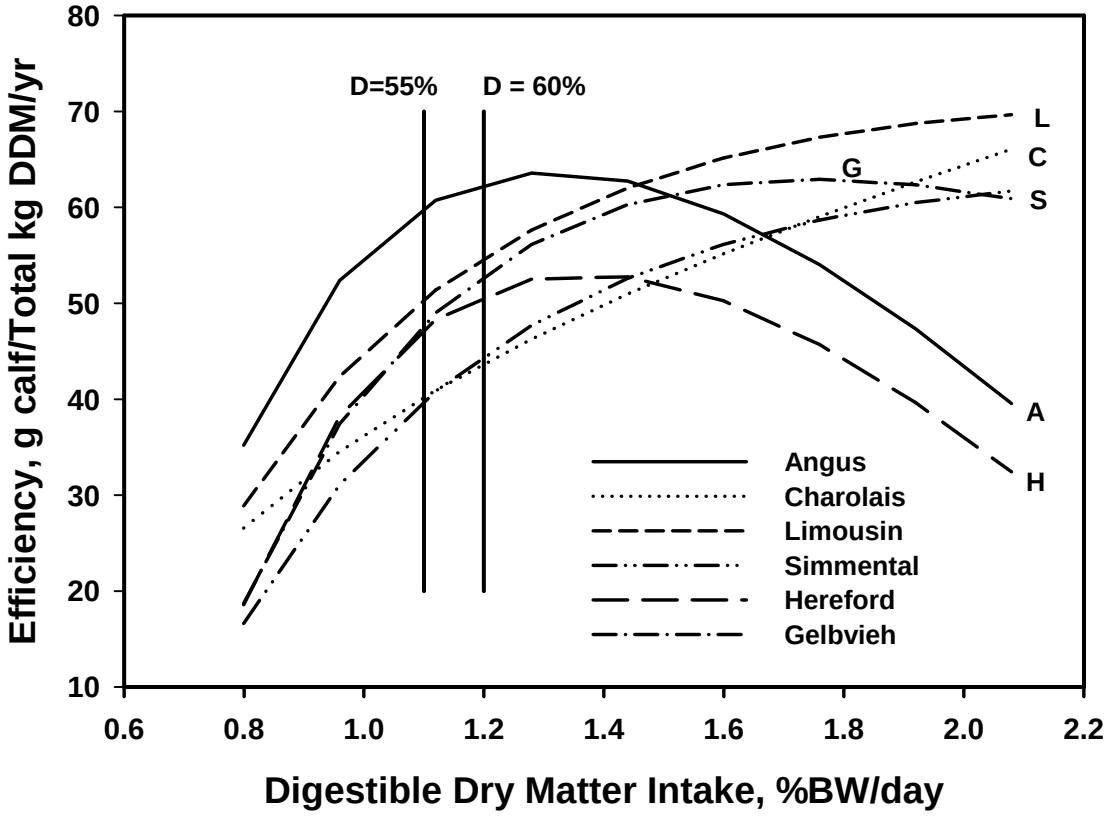
Figure 2. Relationship of cow-frame score and digestible energy intake of cows grazing fescue or fescue-legume at different times during the grazing season.



feeder to achieve that? Can alternative production practices produce the same carcass from different genetic types? Research that addresses one of the questions or causes involved in the interaction (nutrition) was conducted at the University of Tennessee (Holloway and Butts, 1984). Angus cows of different frame score were assigned to either fescue or fescue-legume pastures representing medium- or high-quality forage. Each year, intake was measured on the cows from May 1 to October 1. Cow weights, backfat thickness, calf weights, forage digestibility (digestible energy), and intake of both cow and calf were recorded (Table 2). Large framed cows were about 200 pounds heavier at weaning than small framed cows. They produced more milk and about 30 pounds more calf, if adequate nutrition was available such as that provided by fescue-legume pastures. However, there were essentially no differences in milk or calf weaning weight among different size cows grazing fescue alone. This can be interpreted that large framed cows have the potential to produce, provided nutrition is available. However, these production parameters assume that each cow will produce a calf each year.

The amount of feed consumed by large and small framed cows on fescue alone indicates that only small-framed cows could consume 2% of their body weight per day, whereas all size cows could exceed this level on fescue-legume (Figure 2). When diet digestibility is considered, there were large differences in digestible energy intake (DEI) between the two pasture types, and among cow size on fescue-legume. However, little differences in total DEI were noted for different size cows on fescue. Efficiency of calf production is obtained by dividing calf weaning weight by total DEI (only for the 120-day test period). Cows grazing fescue

Figure 3. Efficiency of digestible dry matter intake conversion to calf weaning weight per cow exposed. Vertical bars represent 2% BW intake at 55 or 60% digestibility, estimated average for bahiagrass.



were much more efficient than those on fescue-legume, suggesting the fescue-legume pastures provided more energy than needed by the cows. This was borne out by the fact that cows on fescue-legume had 0.1 in more backfat at weaning than those on fescue alone. Little difference was noted among cows of different frame score, although there might be a tendency for small-framed cows to be more efficient.

The studies mentioned above largely involve comparisons within a breed. The work at USDA, ARS, Meat Animal Research Center (MARC) for years has compared sire breeds in different cycles, maintaining certain breeds in all cycles for comparison. Jenkins and Ferrell (1994) took the MARC comparisons one step farther and determined the feed efficiency of different breed types (F1 crosses representing different levels of production potential) at four levels of nutrition. The data in Table 3 represent two levels (1.21 and 2.18 % BW of diet with about 66% digestibility) of nutrition for a selection of the breeds compared. Body weight and condition score were linearly related to level of nutrition, but each breed type responded differently. For instance Charolais cows were heaviest at both levels of nutrition, but Hereford and Angus showed the most response in weight as a response to higher nutrition. The continental breeds had higher demands either for growth (larger frame) or milk production. However, calf weaning weight was the same within breed across all feeding levels, indicating that cow nutrition level did not appear to influence weaning weight. This experiment was conducted in dry lot and calves had access to an oat based creep to mimic what they would eat from pasture. However, calf weaning weights were about 79% of their contemporaries raised under more conventional pasture conditions.

When calving rate, survival rate, and calf weaning weight are multiplied, the result is calf produced per cow exposed. Angus and Limousin were the most productive at low levels of nutrition. Angus, Limousin, and Gelbvieh produced more calf at the higher level of nutrition. The 2.18% of body weight did not represent the highest level of nutrition, but in speaking with Dr. Jenkins he said that at the higher levels, most breed types became overly obese to the detriment of production.

Another measure of biological efficiency is the weight of calf weaned per unit of feed (or digestible energy) consumed by the cow and calf as discussed above for the Neel (1973) data. When plotted across all intake levels, breed types responded differently (Figure 3). At low to moderate levels of nutrition, Angus were the most efficient, whereas at higher levels the continental breeds were more efficient at converting feed to calf. Production at higher levels of nutrition were 3- to 4-times that at lower levels for all breeds suggesting the higher nutrition may be economically viable. However, keep in mind that the cattle were fed in confinement, and all components of production were less than their pasture reared counterparts. This was especially true for survival rate, which was much lower than one would expect in a production environment. All of the loss in production resulted from reduced calving and survival rates, because nutrition had no effect on weaning weight. Thus ranking among breeds for efficiency depended on DMI, yet the rank of the breeds across DMI was the same for calf growth alone (Table 3). Breeds with greater genetic potential for growth produced heavier calves. For an enterprise, evaluation of overall efficiency requires an appreciation of the interrelationships and requirements of the individual components contributing to the production system.

While data is scarce concerning the quality and availability of forage in Florida pastures, we assume a cow would limit her intake to about 2% of body weight (probably realistic for bahiagrass). We then bracketed digestibility at 55 and 60% on the figure. Florida pastures probably limit cows to the lower range of nutrition that Jenkens and Ferrell (1994) used. They fed a prepared feed that was approximately 66% digestible and available year round. When bahiagrass is high in quality (spring), it is often limiting in availability, thus limiting intake in a different manner.

The cow/calf sector is unique because the predominance of feed and other resources are consumed by the cow, and yet the outcome or product is in the form of the calf. Therefore, one can reduce the cow costs in terms of maintenance and production costs, while increasing the potential for increased calf production with improved genetics of the sire (Gregory and Cundiff, 1980). This predicates on the ability to either keep a separate herd for replacement production, or buy replacements from an outside source. Only large producers can achieve the former, and it is likely not cost effective. The male counterparts must also be marketed through the normal production processes and may not fit high return markets. In all of the above discussion (except Jenkens and Ferrell, 1994), biological efficiency was defined as some measure of output per cow. It assumes 100% calf crop. What if that assumption is not true? And IT IS NOT!

Reproductive Efficiency

Reproductive efficiency is the most important economic trait in beef production. Net calf crop, often used as an indicator of reproductive efficiency, was 71% in a 14-year summary that contained 12, 827 observations (Bellows et al., 1979). Net calf crop is simply the number of calves weaned as a percentage of the number of cows exposed. The factor that accounted for most of the 29% loss in net calf crop was failure for 17.4% of the females to become pregnant during the breeding season (Table 4). Three additional factors

were also reported, however, even when those losses were combined they did not approach losses associated with the primary factor. The secondary factor was a 6.4% loss in net calf crop due to perinatal calf deaths.

An important part in reproductive efficiency is matching the cow type to the environment in which she is asked to perform. This is particularly important in stressful environments such as the subtropics and tropics. Environment, however, is not simply related to geography or climate (temperature, humidity); it also includes nutrition (forages, minerals, supplements), disease, and pest prevalence. A classic example was provided by Koger et al. (1979) and Burns et al. (1979). They reported results from a study where Hereford cattle from Florida (Line 6) were swapped with Hereford cattle from Montana (Line 1). These herds were maintained in Brooksville, Florida and Miles City, Montana. Over the 11 years of the project that were reported on, it is obvious that pregnancy and weaning rates fluctuated from year to year (Table 5). Mean pregnancy rates in Montana for Hereford of Montana origin were 81% and of Florida origin were 83%. However, pregnancy rates in Florida for Hereford of Montana origin were 64% and of Florida origin were 86%. This line x environment interaction was evident for most of the traits that were studied and is commonly referred to as genotype by environment interaction. Mean weaning rate in Montana for Hereford of Montana origin was 73% and of Florida origin was 76% and in Florida Hereford of Montana origin was 59% and of Florida origin was 80%. In Table 6, these data are presented a little differently. Clearly the pregnancy and weaning rates are lowest in Florida for Herefords of Montana origin (72 and 65%, respectively). Line differences were observed for both pregnancy rate and weaning rate with both being greater for Hereford of Florida origin than of Montana origin. Location also affected pregnancy and weaning rates that were greater in Montana than Florida. What is most striking about these data, however, is that there was a 6.7% advantage in pregnancy rate and a 6.1% advantage in weaning rate for local over introduced cattle.

Another indicator of cow productivity that includes reproductive efficiency and maternal traits is annual production per cow calculated in the next example as the product of weaning rate x 205-day weight (Table 7). These data are from the same project that was just discussed. Clearly the 205-day weight (366.2 pounds) and annual production per cow (238.1 pounds) were the lowest in Florida for Herefords of Montana origin. Interestingly birth weights were smaller in Florida for both Herefords that originated in Montana and Florida. Thus birth weights were affected by location as well as line and origin. Calf 205-day weight was not influenced by line but was heavier in Montana than in Florida. In fact there was a 35.1-pound advantage for local cattle over introduced cattle in 205-day weaning weight. This combined with weaning rate led to a 48.9-pound advantage in annual production per cow for the local over the introduced cow herd. The researchers indicated that “the advantages of local over introduced lines were large enough to be of great economic significance in commercial beef production.” It was concluded that the results should be considered in “commercial cattle production, performance testing, interregional exchange of seedstock, and sources of semen for AI in different environments.”

Another important consideration in matching the cow to the environment involves the mature size of the cow in relation to the nutritional environment that is primarily forage based. At Brooksville, Florida, a relatively long term breeding study was conducted that involved breeding small, medium, and large frame size Brahman cows to like frame size Brahman bulls (Vargas et al., 1999). In that study, weaning rate was considerably lower for large frame size first-parity (46.2%) and second-parity (38.3%) dams compared to medium frame size first

(74.3%)- or second-parity (59.8%) dams and small frame size first (75.0%)- or second-parity dams (Table 8). Weaning rates did not differ among frame sizes in third or greater-parity dams. The question then becomes what was responsible for the decreased weaning rates in the large frame size first- and second-parity dams? For the first-parity dams, calf survival rate was significantly lower for large frame size (47.9%) than either small (80.7%) or medium (83.4%) frame size dams. This difference in calf survivability explains the decreased weaning rate observed for large frame size first-parity dams. Calf survivability did not differ among frame sizes for second- or third- or greater-parity dams. In second-parity dams, calving rate was significantly lower for large frame size (41.0%) dams compared to either small (65.8%) or medium (69.0%) frame size dams. This stage of production, that is raising their first calf and becoming pregnant with their second calf is a critical and stressful time in the subtropics. Thus the lower weaning rate observed in large frame size second-parity dams was due to low calving rates. There were no differences in calving rate among frame sizes in first-parity dams. However, interestingly calving rates were higher for small frame size (93.5%) than either medium (78.5%) or large (79.8%) frame size third-or greater-parity dams. This would suggest that from a pregnancy perspective the small frame cow was superior to the other frame sizes. Production per cow, however, really addresses the sum of the components that we have discussed as well as calf weaning weight. For both first- and second-parity, large frame size dams had significantly lower production per cow than either small or medium frame size cows that did not differ from each other. For third- or greater-parity dams there was no statistical difference among frame sizes in production per cow.

Development of replacement heifers is also critical to the economic efficiency of a beef cattle operation. In the context of matching cow size to the environment it is important to consider sire selection for use on the cowherd because in most instances heifer calves will be selected as herd replacements. In addition to the differences in productivity observed among the frame size groups of Brahman cows there were also ramifications observed in saving heifer calves as replacements. Large frame size heifers were 39 days older than small frame size heifers and 46 days older than medium frame size heifers at puberty. When managed in a defined breeding season these differences can be important even if breeding to calve first as three-year-olds.

Most commercial cattle production in the subtropics is based on crossbred Brahman cows. At Brooksville, Florida we developed a F1 crossbred cowherd about 10 years ago. Over two years using AI, we bred the Angus cowherd to Brahman, Senepol, and Tuli sires. Age at first conception (or puberty) did not differ among the F1 crossbred heifers and was 15.5 months for Brahman x Angus, 15.6 months for Senepol x Angus, and 15.3 months for Tuli x Angus heifers (Table 9). There were, however, large differences in body weight at first conception among the breed types. Angus bulls were used to breed the heifers for their first calf and Charolais bulls were used for second and subsequent calves. For first-parity, there were no statistical differences among breedtypes in age at first-calving, percentage of normal births, or calf survival (Table 10). For second and later parities, calf crop born was higher for Brahman x Angus (89.0%) and Tuli x Angus (94.7%) cows than Senepol x Angus (76.9%) cows. This indicated that under the conditions of this experiment the reproductive efficiency of the Brahman x Angus and Tuli x Angus cows was superior to that of the Senepol x Angus cows. The percentage of normal births was higher for Brahman x Angus (98.7%) cows than Tuli x Angus (91.6%) cows when bred to Charolais bulls. Calf survival was higher for Brahman x Angus (96.2%) than Tuli x Angus (91.1%) cows. Calf crop weaned (or net calf crop) was higher for Brahman x Angus (86.1%) and Tuli x Angus (86.5%)

cows than Senepol x Angus (70.2%) cows. Thus the relatively high calf crop born observed for the Tuli x Angus cows was tempered by relatively lower normal births and calf survivability. Charolais-sired calf weaning weights were heaviest from Brahman x Angus (592.8 pounds) cows, lightest for Tuli x Angus cows (514.6 pounds) and intermediate for Senepol x Angus (540.1 pounds) cows. However, when weaning weight was expressed as weaning weight per cow exposed (for three- to eight-year-old cows), the heaviest was from the Brahman x Angus (516.3 pounds), the lightest from the Senepol x Angus (381.5 pounds), and intermediate from the Tuli x Angus (461.0 pounds) cows. The advantage of Brahman x Angus cows over Tuli x Angus cows in weaning weight per cow exposed was therefore due to the heavier calf weaning weights because calf crop weaned was similar between Brahman x Angus and Tuli x Angus cows. However, maintenance costs of the cow are also important to consider in overall efficiency. As seven-year-olds, the Brahman x Angus cows were the heaviest (1,239 pounds), the Tuli x Angus cows were the lightest (1,130 pounds), and the Senepol x Angus cows were intermediate (1,186 pounds). Therefore when cow size is also considered the overall efficiency of the Tuli x Angus cows becomes closer to that of the Brahman x Angus cows. This is significant because there are few examples of F1 crosses that can compete with Brahman x Angus or Brahman x Hereford F1 crosses in the subtropics of the U.S. An additional factor that needs to be addressed is longevity of Tuli versus Brahman crosses because historically Brahman crosses have excellent longevity and hence lifetime productivity.

Conclusion

The initial question “Do I have the cow that is the most efficient producer?” It depends! Interactions of cow genetics with environmental constraints such as nutrition, location, or climate are evident from several research trials. Cow type and size that is suitable depends on the resources, primarily nutritional, that are available. Therefore the dilemma! How do we maintain an efficient, yet productive cow that weans a high quality, growthy calf that does well in the other segments of the industry?

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Table 1. Weight and growth characteristics of calves born to Montana Line 1 and Florida Line 6 Hereford cows each located in Montana or Florida (1964-1974).

Item	Originated in Montana		Originated in Florida	
	Florida	Montana	Florida	Montana
Birth weight, lb*	64	81	66	77
205 day weight, lb*	365	434	403	402
Daily gain, lb	1.46	1.72	1.64	1.59
Body length, in*	39.2	40.9	40.1	40.0
Condition score*	8.3	8.6	9.5	8.9

*From Burns et al., 1979.

Table 2. Interaction of forage type (nutrition level) with frame score in Angus cattle.

Item (at weaning 240 days)	Frame score					
	Fescue			Fescue - Legume		
	Small	Medium	Large	Small	Medium	Large
Cow weight, lb	941	1,036	1,124	963	1,064	1,154
Milk, lb/day	9.53	9.79	9.47	10.57	10.86	12.16
Calf weight, lb	508	514	495	518	529	548
DMI by cow, % BW	2.00	1.87	1.68	2.29	2.16	2.10
Digest. energy intake (cow only, Mcal)	2,759	2,856	2,813	3,330	3,480	3,660
Efficiency of calf prod. lb calf/Mcal DE	.184	.179	.176	.155	.152	.150

(Adapted from Holloway and Butts, 1984).

Table 3. Weight and condition score of cows from different breed of sire and fed at different levels of production.

	Cow weight, lb		Condition score		Calf weight, lb	Calf weight/cow exposed	
DMI, %BW	1.21	2.18	1.21	2.18		1.21	2.18
Sire breed							
• Angus	1,000	1,230	4.1	6.3	445	127.6	409.9
• Charolais	1,300	1,490	4.3	5.6	489	96.4	332.3
• Gelbvieh	1,110	1,280	4.3	5.3	478	67.9	393.8
• Hereford	1,096	1,307	4.7	6.6	394	67.4	344.7
• Limousin	1,067	1,270	3.5	5.4	446	104.8	405.2
• Simmental	1,100	1,319	3.5	4.9	485	60.3	343.2

(Adapted from Jenkins and Ferrell, 1994).

Table 4. Factors affecting net calf crop.[a]

Factor	Number of females	Reduction in net calf crop, %
Female not pregnant at end of breeding season	2,232	17.4
Perinatal calf deaths	821	6.4
Calf deaths birth to weaning	372	2.9
Fetal deaths during gestation	295	2.3
Total potential calves lost	3,720	29.0
Net calf crop weaned	9,107	71.0
Totals	12,827	100.0

[a]From Bellows et al., 1979.

Table 5. Annual pregnancy and weaning rates of two lines of Hereford in two locations.[a]

Location and line	Year											Mean
	64	65	66	67	68	69	70	71	72	73	74	
	Pregnancy rate, %											
Montana												
M line 1	89	84	63	81	65	85	90	83	79	85	82	81
F line 6	82	78	87	73	89	94	96	88	73	73	77	83
Florida												
M line 1	83	36	83	78	72	85	59	39	73	44	55	64
F line 6	90	90	84	80	93	81	82	77	98	94	83	86
	Weaning rate, %											
Montana												
M line 1	83	70	57	77	60	73	86	76	68	83	69	73
F line 6	79	69	81	68	82	87	92	78	69	65	67	76
Florida												
M line 1	83	36	71	78	71	75	59	31	58	33	55	59
F line 6	79	86	75	74	86	78	75	75	90	91	66	80

[a]From Koger et al., 1979.

Table 6. Reproductive performance of two lines of Hereford at two locations.[a]

Item	No. of matings	Pregnancy rate, %	Calf survival, %	Weaning rate, %
Subgroups				
• M line 1 in MT	948	81.6	90.3	73.7
• F line 6 in MT	526	82.8	91.9	76.1
• M line 1 in FL	1,007	72.0	90.3	65.0
• F line 6 in FL	464	86.5	92.1	79.7
Line				
• M line 1	1,995	76.8	90.3	69.4
• F line 6	990	84.7	92.0	77.9
• P <		0.01	ns	0.01
Location				
• MT	1,474	82.2	91.1	74.9
• FL	1,471	79.3	91.2	72.3
• P <		0.01	ns	0.01
Origin				
• Local	1,412	84.1	91.2	76.7
• Introduced	1,533	77.4	91.1	70.6
• Difference		6.7	0.1	6.1
• P <		0.01	ns	0.01

[a]From Koger et al., 1979.

Table 7. Reproductive performance of two lines of Hereford at two locations.[a]

Item	No. of calves born	Birth weight, lb	205-day weight, lb	Production/ cow, lb
Subgroups				
• M line 1 in MT	727	81.1	435.4	321.0
• F line 6 in MT	405	77.2	403.2	306.9
• M line 1 in FL	677	63.9	366.2	238.1
• F line 6 in FL	363	65.7	403.9	321.9
Line				
• M line 1	1,995	72.5	400.8	279.5
• F line 6	990	71.4	403.7	314.4
• P <		0.05	ns	----
Location				
• MT	1,474	79.1	419.3	313.9
• FL	1,471	64.8	385.1	280.0
• P <		0.01	0.01	----
Origin				
• Local	1,412	73.4	419.8	321.4
• Introduced	1,533	70.5	384.7	272.5
• Difference		2.9	35.1	48.9
• P <		0.01	0.01	----

[a]From Burns et al., 1979.

Table 8. Reproductive performance of small, medium, and large frame size Brahman.[a]

Item	First-parity dams	Second-parity dams	Third or greater-parity dams
Weaning rate, %			
• Small	75.0[b]	64.9[b]	71.8
• Medium	74.3[b]	59.8[b]	68.5
• Large	46.2[c]	38.3[c]	75.8
Survival rate, %			
• Small	80.7[b]	97.5	77.6
• Medium	83.4[b]	88.1	86.9
• Large	47.9[c]	93.9	95.7
Calving Rate			
• Small	93.5	65.8[b]	93.5[b]
• Medium	88.5	69.0[b]	78.5[c]
• Large	97.3	41.0[c]	79.8[c]
Weaning weight, lb			
• Small	424.8[b]	422.0	439.2[b]
• Medium	476.8[c]	422.8	448.2[b]
• Large	498.2[c]	427.5	509.7[c]
Production/cow, lb			
• Small	315.9[b]	268.5[b]	310.0
• Medium	356.9[b]	254.4[b]	331.4
• Large	226.8[c]	177.5[c]	389.8

[a]From Vargas et al., 1999.
[b,c]Means with a different superscript letter within a column and item differ ($P < 0.05$).

Table 9. Puberty in Brahman x, Senepol x, and Tuli x Angus heifers.

Item	Brahman x Angus	Senepol x Angus	Tuli x Angus
Number of heifers	42	34	50
Age at puberty, months	15.5	15.6	15.3
Weight at puberty, lb*	765	719	679

*$P < 0.001$.

Table 10. Reproductive performance of Brahman x, Senepol x, and Tuli x Angus cows.

Item	Brahman x Angus	Senepol x Angus	Tuli x Angus
First-parity, Angus-sired calves			
• Age at first calving, days	752.5	751.3	743.2
• Normal births, %	90.3	88.4	93.7
• Calf survival, %	88.4	90.9	90.5
• Weaning weight, lb	470.7[a]	429.7[b]	422.2[b]
Second- and later-parities, Charolais-sired calves			
• Calf crop born, %	89.0[a]	76.9[b]	94.7[a]
• Normal births, %	98.7[a]	93.3[ab]	91.6[b]
• Calf survival, %	96.2[x]	91.2[xy]	91.1[y]
• Calf crop weaned, %	86.1[a]	70.2[b]	86.5[a]
• Weaning weight, lb	592.8[a]	540.1[b]	514.6[c]
Weaning weight/cow exposed, lb			
• 3- through 8-year-olds	516.3[a]	381.5[c]	461.0[b]

[a,b,c]Means with a different superscript letter in a row differ ($P < 0.05$).
[x,y]Means with a different superscript letter in a row differ ($P < 0.10$).

Notes:

Cactus Feeders' Experience with Feeding Florida Cattle

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Until 1998, Cactus Feeders had been out of the Florida calf market for at least 10 years. Both the quality and disposition of the cattle had been the main reason for the lack of participation. After one of the major feed companies organized a weeklong tour of Florida ranches, we could see many positive changes that had occurred.

A very important fact about the Florida beef industry is the large size of the cowherds. As can be seen from the January 1, 2003, Beef Cow Inventory table (Table 1), Florida ranks 11th in total beef cows; however, it ranks first in concentration of 500+ head operations. Forty-five percent of the total Florida cow numbers are in operations of 500 cows or more. The average size of the 500+ category is 1,532 cows, as compared with a national average of only 874 cows.

The large size of the Florida ranches is a big plus for many reasons, such as several same-sex loads can be bought direct from the ranch. As these larger size operations make changes to both their cow base and their bulls, large numbers of calves will be the beneficiary of those changes. As a company like ours provides feedback of both the feedyard and packing plant performance to these ranches, the ranch can then use the data to either support the changes or to indicate where more are needed.

From the following data (Tables 2 and 3) from two south Florida ranches that were fed in one of our feedyards, one can see the type of information that can be generated. The cattle from both of these ranches were shipped directly off the cow. They were weaned on the truck! You can see from the pictures of the cattle from these two ranches that the cattle are quite different. Ranch 1 (Figure 1 and 2) is a more typical Florida Beefmaster/Braford type of cow operation, but with an increasing number of Red Angus bulls. Ranch 2 (Figure 3) calves are Brangus/Charolais crosses.

As a company, Cactus Feeders wants to increase our participation of both retained ownership feeding and buying of Florida calves. The following listing would be some of the positives and negatives of our experience with Florida calves:

Positives:

- Health – in spite of most only doing single vaccination
- Improved terminal sires
- Substantial reduction in Brahma influence
- Low dry matter conversion

Negatives:

- Disposition - temperament sometimes bad enough that cattle cannot be weighed going to packer
- Generally low feed intake, which results in low average daily gain
- Need more double vaccination programs

Cactus FEEDERS

Figure 1. Florida Ranch 1 – 476-pound steers – 259 days on feed.

Figure 2. Florida Ranch 1 – 440-pound heifers – 261 days on feed.

Figure 3. Florida Ranch 2 – 478-pound heifers – 255 days on feed.

Table 1. Beef cow inventory – January 1, 2003.

State	Beef cow pounds (in 1,000's)	No. of operations	No. of 500+ head operations	% of total 500+ operations	Avg. head/ operation	Avg. head/ 500+ operation
FL	953	16,500	280	45.0%	58	1,532
ND	973	11,800	80	6.0%	82	730
TN	1,106	44,000	20	1.4%	25	774
KY	1,120	39,000	30	1.9%	29	709
MT	1,402	11,400	470	27.0%	123	805
KS	1,525	28,000	180	8.5%	54	720
SD	1,686	16,800	430	17.0%	100	667
NE	1,934	22,000	530	24.0%	88	876
OK	2,042	50,000	200	8.0%	41	817
MO	2,116	58,000	100	4.0%	36	846
TX	5,489	133,000	900	14.0%	41	854
US	32,947	805,080	5,390	14.3%	41	874

Table 2. Feedyard performance.

	In wt	Out wt	ADG	DOF	COG $	DMC	DMI	Avg wt	DMI % BW	Death loss %	Med/hd $	Proc/hd $	Morbidity %	Repull %	Railer %
Ranch 1- Steers	551	1,121	2.42	226	47.55	6.11	14.76	836	1.76	4.00	9.60	10.23	49.29	37.00	5.71
Ranch 1- Heifers	509	1,030	2.26	231	47.84	6.10	13.76	770	1.78	2.44	6.12	10.30	41.00	17.50	5.50
Ranch 2- Heifers	480	1,044	2.20	250	47.67	6.07	13.34	761	1.73	2.92	7.02	9.60	46.67	26.67	4.67

Table 3. Packing plant performance.

	% Hot yield	% Choice	% No roll	% Yield 1&2	% Yield 4	% <550#	Average carcass weight
Ranch 1- Steers	64.13	35.22	9.26	60.00	2.57	2.55	726.57
Ranch 1- Heifers	64.10	60.00	4.67	39.00	7.00	8.00	661.67
Ranch 2- Heifers	65.27	52.67	4.33	82.33	0.00	4.33	689.00

Notes:

Notes:

Preparing Florida Calves for the Feedlot: Repairing Our Reputation

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In an industry whose profit margins are often low, the challenge has become one of maximizing production while keeping production costs as low as possible. This is especially true as it relates to respiratory disease. Bovine respiratory disease (BRD) remains the most costly and prevalent disease complex facing stocker and feedyard operations.

According to the NAHMS 1999 feedyard study, BRD affected almost five times as many placements as the next most commonly reported disease (acute interstitial pneumonia). Overall, producers reported 14.4% of all placements developed BRD while at feedlots.

A survey of 59 feedyards representing 38.6 million cattle between January 1990 and May 1993 acknowledged BRD to account for 44.1% of all dead cattle. Mortality losses, although more visible, are exceeded by losses in production. Production losses are realized through poor performance, labor costs, and medicine costs; not just death loss. BRD costs the industry as much as $1 billion per year.

It is generally accepted that BRD results from an interaction of stressors, animal susceptibility, and pathogens (viruses, bacteria/mycoplasma). Individually, these pathogens do not appear to be capable of causing respiratory disease in healthy cattle. Compromise of the respiratory defense mechanisms (as a result of environmental and management stressors) appears to be critical to the development of BRD. Animal susceptibility to disease would depend on how functional (competent) the animal's immune system is and the degree of exposure.

Major advances have been made in respiratory vaccines, pharmaceuticals, and management systems; however, reluctance to adopt new technology and advances prevents the industry as a whole from moving forward. It is therefore prudent that management practices be implemented and honed to reduce production losses.

Bovine Respiratory Disease is not unique to Florida sourced calves in the feedyard; so why is their reputation so undesirable? Two basic questions need to be addressed:

1. What exactly is the opinion of feedlot operators and consultants and is the reputation justified?

2. Are Florida calves inferior to those of other cow/calf producing states?

In response to the first question, Florida calves are part of a larger group called "southeasterns." Opinions range from "little dying pukes," "challenging at best," to "okay if handled correctly and received at the appropriate time of the year." Not all Florida calves are created equal nor managed the same. However, given the right set of circumstances (i.e. bawling lightweight calves shipped during the fall of the year) the poor reputation can indeed be justified. Secondly, I am unaware of any data that specifically show Florida calves, as a whole, genetically or immunologically inferior to their peers in other cow/calf producing states. While there

is evidence demonstrating a genetic predisposition to disease occurring in other species and it has been speculated to occur in cattle, there has not been any geographic links established.

Why then is it perceived that Florida calves behave differently in the feedlot than their contemporaries with respect to morbidity and mortality? Are there particular stresses that are inherent to Florida calves? Longer distances traveled, greater differences in climate and altitude, and nutritional status are a few of the obvious issues.

No matter their origin, calves need to be prepared to experience extensive distress for varying periods of time. For Florida calves, 32 hours in transit to a feedlot would not be uncommon. Thus, sound husbandry and good management are the keys to producing an animal with a functional immune system capable of combating disease.

General considerations for preparing calves are:

- Gathering/weaning/castration
- Sorting
- Commingling
- Transportation
- Change in feed/water
- Altitude
- Weather – humidity, temperature, precipitation
- Infectious pressure
- Time of year

Distress is an important factor in determining an animal's ability to fight infection and respond to vaccines. The immune system must be highly functional to deal with all of these variables. Feedlot vaccination programs do very little to reduce the initial wave of illness due to respiratory disease at the feedlot because onset of disease occurs before the immune system can respond to vaccines. Vaccination only ensures that the animal has been exposed to the particular antigen (bacteria or virus particle) in the vaccine not that a protective immune response has occurred. Two key components are required for successful immunization:

1. Efficacious vaccine

2. Immunocompetant animal (an animal with a functional immune system).

Additionally, increased cortisol levels in the calves are caused by many environmental and management factors (i.e. weaning, castration, transport, and commingling). Increased cortisol levels depress the immune function of the animal by reducing antibody production in response to vaccine.

Vaccination programs are highly variable and regional and product selection/type can be very controversial. An example of a program for calves received directly from the cow herd to the feedlot is summarized as follows:

1. Modified live BRSV-IBR-PI3 BVD at branding (2-4 months of age).

2. Clostridial 7-Way (UltraChoice or Vision 7) at 2-4 months of age.

3. Modified live BRSV-IBR-PI3 BVD 2-4 weeks prior to weaning if not concerned about immune status of the cow herd.

4. Intranasal IBR-PI3, 2-4 weeks prior to weaning if concerned about the immune status of the cow herd.

Proper handling of vaccines and their administration is necessary for maximizing efficacy and reducing injection site blemishes. Vaccine failures result from inattention to details in critical areas. Guidelines for proper use are as follows:

1. All vaccines should be administered in front of the shoulder according to new Beef Quality Assurance guidelines. New packaging of case-ready meat retail cuts is making injection site blemishes more visible and less desirable to the consumer.

2. If given the option for subcutaneous (SC) use, products should be administered by this route rather than intramuscularly (IM).

3. Even injections administered IM as young as 1-2 months or 6-8 months of age can cause damage that is present at harvest as proven by researchers at Colorado State University.

4. Modified-live viral (MLV) vaccines are extremely sensitive to light once reconstituted.

5. MLV vaccines should not be reconstituted more than 1-2 hours prior to administration.

6. Avoid contaminating vaccine by pulling from the original container, never transfer to a secondary container. Never enter a vial with anything but a transfer needle, vent spike or new needle.

7. Never use chemical disinfectants on syringes, needles, etc.

8. Avoid exposure to sunlight, other UV sources, and heat.

9. Clostridial vaccines can be contaminated and create abscesses or joint infections. Always pull from the original container.

Vaccination programs are critical, but nutritional programs are equally important if not more important. Trace mineral nutrition/supplementation can have a tremendous impact on the immune system of the animal and remains one of the most frequently missed opportunities in cattle prior to shipment to feedlots. Supplementation should be provided throughout the life of the calf. Levels and elements should be determined for the geographical area. It is not uncommon to have deficiencies in copper, zinc, and selenium. Deficiencies or potential deficiencies can be determined by:

1. Analyzing liver levels on any cattle that die acutely (suddenly)

2. Liver biopsies

3. Analyzing feedstuffs (grass, hay, and concentrates) for copper, selenium, and/or zinc deficiencies and levels of molybdenum and sulfates which bind and interact with copper

4. Analyzing water for Molybdenum and sulfates

On arrival at the feedlot we are using products that contain:

- Copper – 2000-3000 ppm
- Selenium – 20-50 ppm
- Zinc – 3000-4000 ppm
- Little or no iron
- Ca:P ratio of 2:1
- Salt

Preconditioning programs have gained increased acceptance and are growing in popularity. If a vaccine is used in any fashion other than prior to exposure, vaccine efficacy will be less than optimal. Pre-exposure vaccination, while not a guarantee, has proven to be beneficial. In a controlled study, where the effect of preconditioning on feedlot health was investigated, morbidity was reduced from 26.5% to 20.4% and mortality 1.44% to .74%. Other researchers have reported an approximate 20-30% reduction in morbidity and 1.7% decline in mortality.

Optimal control of pneumonia in feedlot-destined cattle begins with effective management of passive transfer. Passive transfer of maternal antibodies present in colostrum is an important event in preventing respiratory and other disease. The impact on

health and future performance has been shown to continue past weaning.

Prevention of disease through management practices prior to arrival at the feedlot increases survivability and performance and maximizes monetary returns. Enhancing the immune system by minimizing stress, providing proper/timely vaccinations, therapeutics, and dietary supplementation, and using proper animal husbandry practices all aid in increasing an animal's ability to cope with disease and increased disease resistance.

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Grazing Management: Strategies to Improve Animal Performance and Nutrient Cycling on Pensacola Bahiagrass Pastures

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Introduction

Bahiagrass (*Paspalum notatum* Flügge) is an important resource to the beef cattle industry in Florida. It is the most widely planted grass in the state, covering approximately 2.5 million acres. Of this area, 90% is grazed by beef cattle. Nitrogen is generally the most limiting nutrient for bahiagrass growth, and research has shown a potentially large increase in yield and forage crude protein with increasing nitrogen fertilizer rate. Thus, there is potential to achieve greater livestock production on bahiagrass by increasing nitrogen fertilization rate.

Stocking method plays an important role in grazing systems. Because of its grazing tolerance and to minimize cost of production, most bahiagrass pastures in Florida are continuously grazed during the summer grazing season. Rotational grazing generally allows for a higher stocking rate and higher gains per unit land area, so potential exists to increase livestock production per acre on bahiagrass pastures by using rotational grazing.

Stocking rate is the number of animals per acre over an extended period of time. Stocking rate is generally considered to be the most important grazing management decision because it has a major impact on both forage production and performance of grazing animals. Increasing stocking rate often decreases individual animal production but increases animal production per acre up to a point, after which both production per animal and per acre decrease. Thus, stocking rate is a powerful tool influencing production of a pasture.

A large proportion of the nutrients consumed by grazing animals are returned to the pasture in excreta, however, distribution of excreta on the pasture is not uniform. Nutrient return tends to be concentrated in small areas that contain more nutrients than needed by plants, thus, losses to the environment may occur. Understanding the effect of pasture management on animal behavior and excreta distribution has potential to increase uniformity of nutrients in pasture soils, reduce nutrient losses, and increase fertilizer efficiency. This may lead not only to higher profitability of beef cattle production systems but also less environmental contamination.

The objective of this research was to evaluate animal performance, animal grazing behavior, pasture characteristics, and nutrient dynamics and cycling on grazed Pensacola bahiagrass managed at different intensities (defined by stocking rate, nitrogen fertilizer rate, and stocking method).

Methods

Two grazing experiments were performed at the Beef Research Unit, northeast of Gainesville, FL, on Pensacola bahiagrass pastures. The first experiment evaluated animal performance, forage response, and changes in soil nutrient concentrations of continuously stocked

bahiagrass pastures. The treatments were combinations of stocking rate and nitrogen fertilizer rate and represented a wide range of management intensity. The treatments were LOW management (36 lb of nitrogen/acre/year with a stocking rate of 0.5 animal units/acre [AU, one AU = 1,100 lb live weight]), MODERATE (108 lb of nitrogen/acre/year and 1.0 AU/acre stocking rate), and HIGH (324 lb nitrogen/acre/year and 1.5 AU/acre stocking rate). Each treatment was replicated twice. Average daily gain of yearling crossbred beef heifers and weight gain per unit land area were measured, as were forage nutritive value, forage on offer, forage production, and changes in soil nutrient concentrations.

The second experiment evaluated forage responses to four rotational grazing and one continuous grazing treatment (HIGH treatment from Experiment 1) on bahiagrass pasture. The rotational grazing treatments all had a 21-day rest period between grazings, but they differed in number of pasture subunits (paddocks) and length of the grazing period on a given pasture subunit. Treatments had grazing periods of 21, 7, 3, and 1 day(s) per paddock on systems that included 2, 4, 8, and 22 paddocks, respectively. Each treatment was replicated twice. The nitrogen fertilizer rate and stocking rate of the HIGH management intensity treatment from Experiment 1 was imposed on all paddocks in Experiment 2. Cattle performance was not measured in this experiment and the focus was on forage responses and nutrient management and recycling. Forage responses measured included nutritive value, herbage mass, herbage accumulation, and changes in soil nutrient concentrations.

For both experiments, water, artificial shade (shade cloth), and mineral salt were provided. To mimic producer practice, these locations were not altered throughout the course of the experiment. In each pasture (Experiment 1) or pasture subunit (Experiment 2), three zones were defined based on their distance from shade and water. Zones were 0-25 feet, 25-50 feet, and greater than 50 feet from shade and water. Changes in soil nutrient concentration were measured by sampling soil in each of these zones before and immediately after each grazing season.

Preliminary Results

In Experiment 1, heifer average daily gain was greater for the LOW and MODERATE treatments than for HIGH (Table 1). This occurred mainly because the HIGH pastures had less forage per acre on average than LOW (Table 2) and less forage per animal than either MODERATE or LOW (Table 3). Management intensity also had an effect on the forage “in vitro” organic matter digestibility (IVOMD) and crude protein (CP). Both IVOMD and CP increased (Tables 4 and 5) as management intensity increased from LOW to HIGH. Animal gain per acre also increased with increasing management intensity, and was highest for HIGH and lowest for LOW (Table 6). The difference in stocking rate was the major factor causing animal gain per acre to be different among treatments. Cost of added nitrogen fertilizer per lb of additional animal gain over the LOW treatment was $0.25 for MODERATE and $0.55 for HIGH. These data suggest that intensification of grazed bahiagrass pasture management beyond the MODERATE level used in this experiment is unlikely to be economical.

In Experiment 2, the rotationally grazed treatments produced more forage per day than the continuously grazed High treatment (Table 7). In 2002, for example, growth rates for all of the rotational treatments were similar, but all of them had greater growth rates than the continuously stocked treatment. These findings support the idea that stocking method also affects the forage response. The rest period provided by the rotational treatments (21 days) probably had a major effect, allowing the bahiagrass to achieve a higher leaf area and to produce more

growth than the pastures that were continuously defoliated.

The treatments imposed also had an effect on the soil nutrient concentrations, although the major effects are probably going to be noted by the end of a third year of research in October 2003. In Table 8, the results are shown for soil magnesium concentration. For pastures grazed rotationally with 1- or 3-day grazing periods per paddock (rapid rotations), nutrient concentrations in all three zones were nearly the same. For the 7-day and 21-day treatments as well as continuous stocking (HIGH), nutrients accumulated in areas of the pasture nearest to shade and water (Zones 1 and 2). The 21-day treatment also had the highest soil nitrate concentration (4.75 parts per million) in Zone 1.

Summary

The main findings of this project are:

1. Increasing management intensity of bahiagrass pastures can increase weight gain per acre, but the increase is not likely to be economical for HIGH levels of management intensity (high nitrogen rates and stocking rates).

2. Bahiagrass pastures produce more forage under rotational than continuous grazing suggesting that rotationally grazed pastures could carry more animals than continuously grazed pastures at the same fertilization rate.

3. Soil nutrient concentrations appear to be more uniform in rotationally than continuously grazed pastures and in rotationally grazed pastures if cattle graze each pasture subdivision for a short (1-3 days) rather than a longer (7-21 days) time. This suggests that grazing method may be a useful tool for avoiding some loss of nutrients to the environment.

Table 1. Average daily gain of beef heifers grazing Pensacola bahiagrass pastures managed at three intensities.

Treatment	Grazing season		Average
	2001	2002	
	lb/day		
LOW	1.08	0.93	0.99 a
MODERATE	1.10	0.84	0.97 a
HIGH	0.84	0.75	0.79 b

Table 2. Average forage on offer for Pensacola bahiagrass pastures managed at three intensities.

Treatment	Grazing season		Average
	2001	2002	
	lb/acre		
LOW	2,960	2,620	2,800 a
MODERATE	2,580	2,150	2,370 b
HIGH	2,530	2,290	2,410 b

Table 3. Forage per animal for Pensacola bahiagrass pastures managed at three intensities.

Treatment	Grazing season		Average
	2001	2002	
	lb forage/lb of animal liveweight		
LOW	4.46	4.02	4.24 a
MODERATE	1.99	1.68	1.84 b
HIGH	1.03	1.21	1.12 b

Table 4. In vitro organic matter digestibility (IVOMD) of Pensacola bahiagrass managed at three intensities.

Treatment	Grazing season		Mean
	2001	2002	
	%		
LOW	42.6	47.8	45.2 a
MODERATE	44.5	49.9	47.1 b
HIGH	45.3	53.6	49.3 c

Table 5. Crude protein concentration of Pensacola bahiagrass managed at three intensities.

Treatment	Grazing season	
	2001	2002
	%	
LOW	8.8 c	10.6 b
MODERATE	10.8 b	11.2 b
HIGH	12.5 a	14.1 a

Table 6. Beef cattle live weight gain per acre on Pensacola bahiagrass pastures managed at three intensities.

Treatment	Grazing season		Mean
	2001	2002	
	lb/acre		
LOW	98	125	112 a
MODERATE	205	223	214 b
HIGH	232	304	268 b

Table 7. Forage growth rate on Pensacola bahiagrass pastures under different grazing management treatments.

Treatment	Grazing season	
	2001	2002
	---------- lb/acre/day----------	
Rotational - 1 day	49 ab	56 a
Rotational - 3 days	40 bc	71 a
Rotational - 7 days	63 a	61 a
Rotational - 21 days	60 a	64 a
Continuous - HIGH	30 c	39 b

Table 8. Soil magnesium concentration on Pensacola bahiagrass pastures under different grazing management treatments.

Treatment	Zones		
	1	2	3
	---------- parts/million----------		
Rotational - 1 day	79 a	84 a	75 a
Rotational - 3 days	88 a	76 a	83 a
Rotational - 7 days	80 a	64 a	44 b
Rotational - 21 days	130 a	97 b	88 b
Continuous - HIGH	97 a	91 a	81 a

Notes:

How Do We Control Johne's Disease in Florida Herds?

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Introduction

Mycobacterium avium subsp. paratuberculosis (MAP) is a bacteria that infects ruminants worldwide. It causes chronic, thickening of the gut (granulomatous enteritis), known as Johne's Disease. The disease is characterized by chronic diarrhea and weight loss, despite a good appetite, even on a high plane of nutrition. There is no known cure for the disease and it is eventually fatal. The disease has a significant economic impact.[1,2,3] The organism can be isolated from the cow's colostrum and milk and is transmitted primarily by the fecal-oral route to their calves in the first few months of life. There is a long incubation period and the animal rarely shows clinical signs until two years of age or more. Herds become infected by new additions that may be shedding the bacteria and showing no clinical signs. Control of the disease is difficult. Currently there are no reliable tests for detecting early infection.[4,5]

Many studies have been done worldwide to estimate the prevalence of infection in ruminants. The prevalence appears to be on the rise. In an early study in the USA, 7,450 culled, clinically normal cattle in slaughterhouses in 37 states from 1983 to 1984 indicated an apparent prevalence of 2.9% in dairy cattle and 0.8% in beef cattle, with an overall prevalence of 1.6%.[6] In Florida, a 1986-1987 survey indicated a prevalence of 8.6% in beef cattle and 17.1% in dairy cattle.[7] The high prevalence in that study warranted the re-evaluation of the prevalence of Johne's disease in the state today.

Do We Have a Problem in Florida?

Data from the Florida State Veterinary Diagnostic Laboratory and USDA APHIS statewide submissions of specimens submitted for Johne's testing from 1999-2001 were examined. The data represented 32,011 cattle, of which 25,561 were dairy cattle and 6,450 were beef cattle. These cattle originated from 75 herds in 30 Florida counties. Beef breeds represented in this study were predominantly Brahman crosses. Purebred beef herds included Angus, Brangus, Hereford, Charolais, Red Angus, Limousin, Santa Gertrudis, and Senepol breeds. Dairy herds were almost exclusively of the Holstein breed. Females accounted for 26,604 of the cattle tested and 40 of the 73 herds were female only.

The distribution of the 49 beef and 26 dairy study herds across the state is illustrated in Figure 1. Counties of herd origination, state region, number of tested cattle and herds, and herd size category are summarized in Table 1. The estimated apparent prevalence of MAP antibodies in the sampled Florida cattle was 6.5% (2,089 of 32,011 cattle). Of the 75 herds, 62 herds (82.7%) had at least one seropositive animal in the herd. The apparent sample prevalence and herd prevalence estimates for each of the categories of herd size, herd type, and geographical location of that herd are shown in Table 2 and 3.

Prevention and Control of Johne's Disease in Beef Cattle

Note: *This information is derived from the United States Animal Health Association,*

National Johne's Working Group (NJWG), Subcommittee on Education, 2003 (http://www.usaha.org/njwg/jdbeefm.html).

Many animals in the early stages of Johne's disease may not be seen. Therefore, it becomes a herd problem, besides an individual animal problem. Johne's disease can be prevented, controlled and even eliminated from infected herds, based on a thorough understanding of the disease. Half-hearted attempts to prevent or control Johne's disease will generally fail. Once a herd becomes infected, control of Johne's disease takes time. Usually, the infection has been spreading through the herd for a few years before clinical cases are noticed. A typical herd control program may take 5 years or longer. Faster programs are possible, but may be more expensive. Prevention is cheaper than control.

Prevention

Prevention should be the goal of every ranch and farm that is currently free of the disease. It is encouraging to note that management practices directed at preventing Johne's disease will also reduce the risk for other important cattle diseases as well.

Several viral, bacterial, and parasitic intestinal diseases that affect beef herds are also transmitted from infected animals excreting or shedding the pathogen in their feces. A potential list of these pathogens includes calf scour microbes like BVD, Corona and Rota viruses, E. coli, and Salmonella bacteria. There are also intestinal parasites like Coccidia and Crypto plus nematodes or worms transmitted through manure.

The basics of prevention are straight forward. Prevent infections by closing the herd from animal additions or securing additions or replacements from Johne's-free or Johne's test-negative herds. In herds where infection is already present, additional steps are required for control. These include manure management, colostrum or milk management, identification of infected animals and their removal or separation from the herd, and by culling offspring of known infected mothers.

I. Prevention Practices
- Prevent infections by closing the herd or securing additions from Johne's-free or Johne's test negative herds.
- Purchase replacements from a herd that has individual cow/calf records, good management practices and is currently herd-test-negative.
- Purchase replacements from a herd that has had no evidence of Johne's disease for 5 years as a second choice.

II. Control Practices for an Infected Herd

A. Reduce infections by manure management (all manure is suspect).
- Maintain high standards of cleanliness in animal handling during calving periods.
- Avoid build-up of manure and contaminated mud in pastures and corrals where animals are kept.
- Calves should be born in a clean environment with minimal fecal contamination.
- Avoid crowded calving areas.
- Place new cow/calf pairs into clean uncrowded pastures as soon as bonding has occurred.
- Keep cow/calf pairs and replacement heifers in clean uncrowded pastures.
- Protect post-weaned replacement heifers from adult fecal contamination at least until they are a year old.
- Avoid manure contamination of feed by using feed bunks, hay racks, and by not using the same equipment to handle feed and move manure.
- Avoid manure contamination of water sources where animals drink.

- For maximum risk reduction, infected pastures could be tilled or grazed by non-replacement, feeder-cattle until environmental conditions destroy the microbe.

B. Reduce infections in calves by colostrum management.

- Use the colostrum from Johne's-negative dams if needed to supplement some newborn calves.
- Thoroughly clean the udder and teats before collection of the colostrum to avoid manure contamination.
- Clean dam's udder and teats following any assisted births.

C. Reduce infection spread by identifying and removing infected animals and their calves.

- Consult with your veterinarian for decisions on how best to use and interpret tests used for diagnosis of Johne's disease.
- Use a test-certified diagnostic laboratory for running your tests.
- Identify all females and their daughters remaining in the herd.
- Remove, or keep separate, all test-positive animals.
- Prevent infection spread by culling, or separating, offspring of infected mothers.

Control Plan Options

❑ Make management changes only.

It should be noted that these management practices are essential for the success of other program options. Reduce risk to calves by separating new cow/calf pairs from the rest of the herd when possible after birth. Avoid the spread of disease through fecal contamination by using elevated feeding troughs, hay racks and water troughs. Other management changes should include at least four steps:

1. Immediate isolation of any scouring or unthrifty animals;

2. taking samples to diagnose condition;

3. culling of any animal with diarrhea that is unresponsive to therapy and of an unknown cause;

4. culling offspring of infected cattle.

Further management recommendations are to restrict access of susceptible stock to high-risk areas (including swamps and ponds) where infected animals are known or highly suspected to have recently been.

To buy time to clear heavily contaminated pastures, graze non breeding stock on these high-risk areas. Sell these high-risk stock (i.e. cattle less than 12 months old exposed to infection) only through slaughter channels. Finally, keep a closed herd or purchase only from test negative herds.

A management-only choice is generally more affordable than other more stringent choices. Most often it will likely reduce the load of infection in the herd and incidence of clinical cases to a steady state. In some herds, of low-risk and low-prevalence, good management only may eliminate Johne's disease.

A disadvantage to the management-only option may be that costs will not always be evident. These methods are unlikely to work in heavily infected herds or unsuitable environments. For best results, this management only option must become a permanent part the operation. One final note: if the prevalence of infection in the herd is not known, an initial screening test is advised to establish a baseline for the herd. The test-positive animal(s) found by herd screening should be considered for culling.

❑ Test and cull

This option requires adoption of the improved management practices as described. Whole-herd tests are recommended at least

once per year. Confirmed positive cattle and their offspring must be immediately isolated and/or sold through feeder/slaughter channels. In herds with a low prevalence of infection, ELISA-positive test results should be confirmed with a culture test or with appropriate samples collected at slaughter.

This approach permits assessment of the herd status, identification of high-risk groups, and monitoring of progress. Another advantage is the ability to have an objective assessment of herd status for the purpose of selling breeding stock. Managed well, there will likely be a quick reduction in infection and clinical disease, allowing rapid progress toward a test negative status.

A disadvantage may be the cost associated with testing and culling reactors. Further, since some infected cattle will not be detected by the diagnostic tests early in their disease course, this option requires a long term commitment.

Expected outcomes include a rapid reduction in the prevalence of the disease and a decrease of environmental loads of Johne's microbes. Further, this option can assist eradicating infection from most herds. The test and cull approach may be an option for seed-stock beef herds, commercial beef herds selling breeding stock, and some self-replacing herds.

❑ Partial depopulation

This option requires sending high-risk groups of livestock and any other home-bred culls to slaughter only. Cull normally and sell all home-bred cattle through feeder or slaughter channels only. The operator must buy replacement cattle from test-negative herds. Another option is to obtain a written statement from both the herd owner and the veterinarian of record that, to the best of their knowledge, Johne's disease has not been in the herd for the past 5 years. Long-term considerations suggest that management should progressively create low-risk pastures, i.e. grazing with low risk terminal stock. Manage the herd as described above, emphasizing animal identification, record-keeping, whole-farm planning, and risk assessment of operation.

This option generally incurs lower costs as compared with other options and, with good management skills and effective planning, will improve the prospects for overall success.

One disadvantage is that low-risk replacement stock may not be identifiable or available for purchase until herd certification programs are more widely used. However, using this option to eliminate infection may still be possible in most herds. This may be an option for a beef herd where high-risk groups are well defined.

❑ Two-herd program

This option requires producers to rear calves from sero-negative dams in isolation, then gradually depopulate infected animals by selling to slaughter. Restocking occurs after an appropriate time lapse. Maintaining hygiene precautions is essential between the two locations.

This option may be tried with other options as well. It may also provide an excellent means of saving family lines of high genetic merit. As a caution, it should be noted that some infected cows will test negative and a small percentage of calves from these cows may have become infected before birth. These infected calves might not be detected until they are adults. Currently, there are no tests commercially available that detect light infection in animals less than a year old.

❑ Embryo transfer

There is minimal risk of embryos being contaminated. As a precaution, it is recommended to use embryos from Johne's-

negative dams; however, embryos from infected dams may also be harvested with limited risk. Regardless, all embryos must be implanted in uninfected recipients. This option provides a means of saving family lines of high genetic merit. Success will depend on risk and disease freedom of recipients.

- ❑ Vaccinate

Vaccinated cattle may become infected and shed the organism, but vaccination usually results in a reduction of clinical disease in herds. It also reduces the number of cows shedding the microbe. By that the environmental load of Johne's bacteria is also reduced, thus lowering the risk of infection spread to the herd. However, without other management practices, herd infection continues and is maintained at an unknown level.

Vaccination may be an option for any heavily infected herd with a high rate of clinical disease to reduce some impact of clinical disease, but it is not a way to eliminate infection from the herd.

As with all other options, producers will need to adopt improved management as described. Use of the vaccine requires approval from the State Veterinarian and is only available in certain states. Every year, all calves must be vaccinated within 35 days of birth. Some states require permanent identification of all vaccinated cattle.

The expense of vaccination may be a disadvantage for some. The per-dose cost of vaccine may be high as it must be administered by a veterinarian. Further, vaccinated herds may remain infected. Vaccinated cattle may be sensitized to the standard tuberculin (TB) test and require a comparative test to be done. Vaccinates may be false-positive reactors to serological Johne's tests thus limiting the testing options that may be used in a control program. Injection-site lesions are common and severe tissue reactions occur from accidental injections into humans.

Developing a Specific Plan for Prevention or Control

Herd owners and managers must have a long-term commitment to preventing or controlling Johne's disease in their herd. If they are to be successful, some thorough, well-designed plan needs to be fully integrated into management practices. In herds currently free of Johne's disease, the sooner a prevention plan is put to use, the better the chance is for maintaining a free status. For most low-risk, low-prevalence herds, the best time to start a control plan is now! The longer the delay the more difficult and expensive control becomes.

For successful establishment and use of prevention or control plans, one must consider all variables and have full support of all involved. Plans that do not take into consideration long term goals, management, desires, and capabilities of herd owners and others working on or for the operation, are prone to failure due to a noncompliance.

Preventing or controlling Johne's disease can enhance herd protection from other diseases. Remember, management actions designed to prevent or control the disease are simply good management practices that will be effective against other intestinal diseases as well.

Steps to Develop a Farm- or Ranch-Specific Program

Your veterinarian can help you develop a specific program tailored to your operation (Table 4). The following steps provide a practical Johne's disease prevention or control plan:

1. Assess current and long-term goals of the operation's business.

2. Assemble a herd history for probable Johne's disease risk or prevalence.

3. Estimate a most-likely prevalence for Johne's disease in the herd.

4. Identify workplace-specific risks for preventing or spreading the disease.

5. Examine various options to manage identified risks, including costs and benefits.

6. Consider diagnostic and herd testing strategies.

7. Define objectives and time to accomplish.

8. Tailor the program around long term goals, management capabilities, and commitment of personnel.

9. Monitor progress and success of the plan at regular intervals.

Additional considerations in developing a whole ranch or farm plan include the following points:

1. Become familiar with current information about Johne's disease. Thorough understanding of the disease and how it spreads allows a producer to be more aware of the risks associated with different management practices.

2. Learn about your own state law requirements regarding Johne's disease. Some states require reporting of all Johne's disease test-positive results. In addition, some states require official action to be initiated by their Office of the State Veterinarian or Department of Agriculture as a follow up to a positive test report. The presence and confidentiality of these requirements and reports may have an impact on the business of the particular beef enterprise reporting the result. For example, a seed stock producer may wish to be pro active about Johne's disease prevention or control yet is inhibited by the fear that prospective buyers will find out they are testing for Johne's disease and stop buying animals. Safeguards need to be in place in each state to prevent such unfavorable actions from taking place while encouraging producers to address the concerns that Johne's disease poses to their herd. Producers and veterinarians are encouraged to become aware and involved in their own State Johne's disease Advisory Group.

3. Determine what can be expected from prevention or control programs. Herd owners should be aware that different control options have different outcomes and that the plan's success depends largely on the exactness with which control options are applied. Johne's disease prevention, control, or elimination is a long term commitment. In some herds, infection may be prevented or eliminated with management alone. In other herds, strategies to eliminate infection may be prolonged and expensive. It may take years of commitment for a few infected herds to achieve and maintain test negative status. The longer time the infection has had to spread throughout the herd, the more difficult and time consuming it will be to control or eliminate the disease.

4. Decide which strategies may work for your operation. Prevention or control strategies include: changing management, vaccinating, implementing test and cull control programs, and, in extreme cases, depopulating the herd. Treatment is not considered an option for livestock, due to its extremely high cost and uncertain success.

The most appropriate strategy depends on the type of enterprise (commercial cow/calf, purebred, seed stock) and the commitment of the herd owners. These factors determine the outcomes, chance of success and cost benefit of different control strategies. For example, commercial cow/calf producers who have herds with low prevalence of Johne's infection, and sell cattle for slaughter only, may gain maximum economic benefit from management practices that reduce spread

of infection rather than test and cull programs. The downside is that their herd may have a lower value if they choose to sell replacement stock or bulls.

5. Consider owner liability. Owners of infected herds have some liability and responsibility in the sale of animals from their herd. Culture test positive animals from these herds should be sold for slaughter only. Test negative animals may, in some circumstances, be sold for production purposes depending on the herd history, Johne's disease prevalence, previous test results, and individual farm or ranch risk assessment.

6. Keep a written copy of the plan. A written plan should identify the short term (e.g., 12 months) and long term goals of the control program. It should also cover details of the control strategy that the herd owner has elected, its duration, approximate cost and likelihood of success. The plan needs to be reviewed or updated regularly. A regular review may lead to changes in management and/or testing procedures.

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Figure 1. Distribution of cattle herds included in the study according to geographical location. Shaded area designates North Florida; Unshaded area designates South Florida. Beef herds are represented by a circle; Dairy herds are represented by a square.

Table 1. Distribution of Florida cattle included in the study according to county, geographical region, and herd size.

County	Region	Cattle	Herds	Herd size		
				<100	100-500	>500
Alachua	North	577	4	2	2	0
Bradford	North	8	1	1	0	0
Charlotte	South	72	1	1	0	0
Clay	North	1,493	2	0	1	1
Collier	South	5	1	1	0	0
Columbia	North	109	2	1	1	0
Desoto	South	1,217	3	2	0	1
Duval	North	1,571	3	0	2	1
Gilchrist	North	72	2	2	0	0
Glades	South	134	3	3	0	0
Hamilton	North	303	1	0	1	0
Hardee	South	436	2	0	2	0
Hendry	South	67	1	1	0	0
Hernando	North	623	1	0	0	1
Hillsborough	South	282	1	0	1	0
Holmes	North	159	1	0	1	0
Jackson	North	296	3	1	2	0
Lafayette	North	358	2	1	1	0
Levy	North	786	5	3	2	0
Manatee	South	2,145	4	1	1	2
Marion	North	611	7	4	3	0
Martin	South	50	1	1	0	0
Okeechobee	South	17,416	7	1	1	5
Osceola	South	299	1	0	1	0
Pasco	North	277	3	2	1	0
Polk	South	1,175	6	3	2	1
Saint Lucie	South	216	1	0	1	0
Sarasota	South	428	2	0	2	0
Suwannee	North	806	3	1	1	1
Washington	North	20	1	1	0	0
Total		32,011	75	33	29	13

Table 2. Raw data, apparent sample prevalence estimates and herd prevalence estimates of Johne's in Florida cattle according to herd size, type, and geographical location.

	Total	Herd size			Herd type		Region	
		<100	100-500	≥500	Beef	Dairy	North	South
Cattle tested	32,011	1,109	6,918	23,984	6,450	25,561	8,069	23,942
Positive test results	2,089	67	527	1,495	477	1,612	539	1,550
Sample prevalence (%)	6.5	6.0	7.6	6.2	7.4	6.3	6.7	6.5
Prevalence range within herds (%)	0-28.6	0-28.6	0.9-19.2	3.5-15.8	0-28.6	0-15.8	0-28.6	0-20
Herds tested	75	33	29	13	49	26	41	34
Positive herds	62	20	29	13	37	25	31	31
Herd size range	5-8,921	5-75	102-469	544-8,921	5-1,153	40-8,921	7-1,171	5-8,921
Mean herd size	427	34	239	1,845	132	1,014	197	704
Herd prevalence (%)	82.7	60.6	100	100	75.5	96.2	75.6	91.2

Table 3. Least squares means sample prevalence estimates and herd prevalence estimates of Johne's disease in Florida cattle by herd size, type and geographical location.

Prevalence category (%)	Beef	Dairy	All cattle
Individual	7.2	7.6	–
Herd	75.5	96.2*	–
Herd region			
North	64.0[b]	93.8	75.6[a]
South	87.5	100	91.2
Herd size			
<100 head	58.6[c]	75[a]	60.6[c]
100-500 head	100	100	100
>500 head	100	100	100

*Values for beef and dairy herd prevalence differ significantly (P=0.02).

[a,b,c]Values for least squares means within columns differ significantly ([a]P<0.10, [b]P<0.05, and [c]P<0.01).

Table 4. Example Beef Herd Management Plans for different levels of aggressiveness for control after infection.

	Aggressiveness of control plan desired		
	Low	Moderate	High
Test selection	• can use least-expensive test	• recommend combination of tests	• recommend combination of tests
Test strategy	• initial mature herd screen • partial herd (high-risk animals) • monitor clinical suspects	• 1-2 times/yr >20-24 mos of age • serology, fecal culture; serial or alternating • clinical suspects	• 2-4 times/yr >18-24 mos of age • multiple tests; maximize sensitivity, specificity
Test result use: Cull test + animals	• clinical suspects • high-risk test positives	• clinical suspects immediately • subclinical test positives priority by test result, other problems, production, economics • consider culling offspring of clinical dams	• clinical suspects immediately, segregate prior to decision • aggressive early culling of subclinical positives before infection advanced or clinical disease • consider for offspring of test-positive dams • consider not raising replacements until prevalence is reduced
Test result use: Manage test + animals	• monitor positives for clinical signs • use for culling criteria	• identify for long term segregate or group • do not breed higher-risk positives	• same as for moderate, more aggressively • base on frequently updated test results • separate calving area
Mgt. concerns and areas to address	• calving area density and cleanliness • remove newborn calf pairs • minimize weaned stock contact with adults and their manure • minimize feed and water contamination	• calving area density/ hygiene • remove new cow/calf pairs • immediately separate weaned stock and adults with barrier or in separate facility • prevent feed and water contamination	• superior calving management and cleanliness • remove all new cow/calf pairs • immediately separate weaned stock from adults • completely eliminate feed and water contamination
Other mgt. choices to aid income	• improve general management in priority areas: near term cows, calving, developing heifers, nutrition	• focus management to improve performance in related areas: dry cow nutrition, calving, calves, developing heifers, reproduction	• improve health and performance in other areas to offset effects of JD; i.e., calf performance, nutrition costs, replacement heifers • optimize management; i.e.,feeding and nutrition, dry cows and pre-calving heifers, calf mgt. minimize stressors

Notes:

Should I Purchase Replacement Females?

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The cows that make up the cow herd are the factories that produce the primary product of the ranch. These cows, like factories, have a limited life and have to be replaced over time. When investing in replacement bred cows or bred heifers, a producer is faced with two options; raise the replacements on the ranch or purchase the replacements. In this paper, we will outline the process by which the investment alternatives can be analyzed and the best decision made.

In analyzing the costs of raising versus purchasing a bred replacement heifer, we will use a Net Present Value (NPV) approach. This approach allows us to examine the bred heifer for her investment potential by discounting the stream of cash flows to a value that can be translated to a simple dollar figure in the present. This NPV figure will help determine if the heifer costs too much or not. We are then able to benchmark the market value for a bred heifer and the cost of raising the same against the NPV.

The analysis we will conduct in this paper will use Alabama and Southeast data over the 1990-2000 time period. The advantage to using historical data is that the numbers are clearly defined, and we can see what would have happened had we employed the different investment strategies. The results then can be extrapolated into the future using the budget and valuation framework established over the predefined time period.

Evaluating the Cost of a Bred Replacement

Understanding and budgeting the costs of developing a bred heifer is key to effectively analyzing the decision to raise or purchase your bred replacement heifers. In outlining this process, we will develop a budget situation based on the averages for the 1990 to 2001 time period. Keep in mind that these prices will vary with the cattle cycle — see Figure 1 for an illustration.

The data we will use in examining the cost of the bred replacement will be based on the previously mentioned Alabama and Southeast data. We will assume 550-pound September heifer prices, medium and large frame, number one muscle score (Alabama Auctions) and high-end bred beef replacement heifers prices (Cattle-Fax). In examining this data, we find that the average September weaned heifer from 1989 to 1998 sold for an average $385/head. Likewise, the same heifers sold a year later as bred beef replacements during 1990-1999 would have sold for an average $653/head. Thus, the market has placed an average value of $268/head for developing a September bred replacement heifer.

The first assumption we will make in developing the cost budget for developing our own bred heifer is that the initial cost of the weaned heifer is the foregone revenue from not selling her as a weaned calf. Until that point, all costs of her production were borne by her mother. This is an accounting transfer essentially from one asset to another. In this case, we will assume the average market price of the 550-pound weaned heifers, $385/head. In our calculations, we will then adjust this value per head at the end of the year to reflect the costs of culled and dead heifers where the adjusted cost per replacement heifer is $476 in year one.

Table 1 shows the costs for developing a bred heifer from a 550-pound weaned heifer. This table shows a $383/head development cost. When summed up with the outlay cost of the heifers, we have a total cost of a bred heifer being $859/head. This is $206 ($859-$653) above the average cost of purchasing a bred heifer in the Southeast over the time period being examined.

In our budgeting analysis, we include values for labor (which includes operator labor), land, and fixed or sunk costs. These costs are an important part of the equation from an economist's point of view, but let us examine what happens when these values are omitted (Table 2). We can see that the cost of developing the heifer falls to $265 which is $3 below the average value the market puts on the development of a bred heifer from weaned heifer. Still, our total cost of the raised bred heifer is $741 which is $88 ($741-$653) higher than the average the market put on a bred heifer in the Southeast.

Using Net Present Value

Net Present Value is a process where all cash flows — both inflows and outflows — are summed using their present values (Table 3). The present value approach is a means to adjust future dollar earnings and costs to reflect their value in today's dollars. This technique uses a discount rate to adjust those future earnings or costs to attain their value in today's dollars. The discount rate may be viewed as our desired rate of return. For example, I have $1 today. If I select an investment that provides a 5% rate of return, my $1 investment in one year will be worth $1.05. Alternatively, another way to think of this is that $1.05 in one year would be the same to me as $1 today. Thus, by bringing all future earnings back to today's value, we can determine if this investment meets our desired rate of return. The NPV coefficient is simply the sum of the stream of present values. A NPV of greater than or equal to zero is necessary to indicate that this investment attains our desired rate of return. A NPV of greater than zero means that we have attained a higher rate of return than we desired.

In a related concept, we can determine the Internal Rate of Return (IRR) in a reverse fashion. The IRR is simply the rate of return – discount rate – that makes NPV equal to zero. This allows direct comparison of the returns provided by alternative investments.

In determining the NPV of a bred replacement, we considered the bred replacement heifer at two years of age with calf. We considered all monies in the heifer to that point as the investment layout (this figure will be discussed in comparing the purchase and raise options). Cash flows for the future were discounted on two categories. First, we used a discount rate for determining a rate of return. Additionally, we accounted for the probability that any given heifer might not calve and thereby be culled in any given year during the expected 12-year production period developing a stream of expected cash flows. This process provides us with an expected NPV (E[NPV]).

The E[NPV] accounts for the risk factor inherent in cow production, the risk a cow will not calve. The calculation of the E[NPV] will be dependent on the initial outlay for the heifer.

Net Present Value Analysis

In our budgeting example, we found that we might be better off by purchasing bred replacements. Even though the cash flows will be the same for the investment choices once the first calf is born, an NPV analysis is helpful in illustrating the investment decision. We will be able to see the differences in the NPV and in the internal rate of return (IRR) between the two options.

As discussed earlier, a key component of the NPV calculation is the discount rate. We will assume a 2% discount rate. This rate

is used based on a sense of the next best alternative investment. In this case, we used current Treasury Bill rates rounded to the nearest whole percent. Additionally, it is generally accepted that returns to agricultural enterprises is in the vicinity of 2% as well.

In Table 4, we present the present value (PV) cash flows for a raised replacement cow through an eleven calf lifespan. We can see that the net present value — assuming a 2% discount rate and 550-pound calves — of this heifer at time period zero is $329. Table 5 shows the PV cash flows for a purchased replacement cow weaning the same 550-pound calves. This animal has a NPV of $540. This assumes that the heifer will indeed produce eleven calves. Tables 6 and 7 show the changes when we sell calves at 650 pounds – NPV's increase to $792 and $1,003 respectively.

If we examine the IRR's of the same investment choices, we see that the rankings will remain the same. The raised replacement cow weaning 550-pound calves provides an IRR of 5.74% while the purchased replacement cow with the same calves provides an IRR of 9.75%. Similarly, the raised replacement weaning 650-pound calves provides an IRR of 10.70% and her purchased counterpart provides an IRR of 16.50%.

We can clearly see a difference between the decision to purchase or raise as well as the decision to wean at 550 pounds or 650 pounds. However, a further analysis will show that there is really only a 7% chance of realizing these afore mentioned outcomes. So, we will examine the case further.

Using data reported by Kunkle et al. 2002, we can compute the likelihood that a cow will have been culled in a given year (Tables 8 and 9). From this information, we can then calculate the probabilities of realizing any given outcome. This determines the expected return. In Tables 10 and 11, we show the present value of the expected returns in each year. The result for a raised cow weaning 550-pound calves was an E[NPV] of -$283. Shifting to a 650-pound calf changes this E[NPV] to -$112. In contrast, the purchased cow weaning 550-pound calves provided an E[NPV] of -$72.20 while the same cow weaning a 650-pound calf would have an E[NPV] of $99.28.

A similar analysis of the individual expected internal rates of return (E[IRR]'s) shows the same ranking for the four alternatives with -4.88% return for the raised cow weaning 550-pound calves, -0.40% return for the purchased cow weaning 550-pound calves, -0.66% return for the raised cow weaning 650-pound calves, and 5.32% return for the purchased cow weaning 650-pound calves. In both the case of the E[NPV] and the E[IRR], a purchased replacement weaning a 550-pound calf provided better returns than a raised replacement weaning 650-pound calves.

When accounting for the risk factor of open cows, we see that a slightly different ranking comes about. Without risk, both 650-pound strategies outperformed their 550-pound counterparts. However, when accounting for the probability of culling any given cow in any given year, we find that purchasing outperforms raising independent of calf size examined in our example. This underscores the costs of open cows on the system, and reinforces the importance of herd management techniques in keeping conception rates up and costs down.

Summary

Here are a couple of things to keep in mind when examining the cow replacement opportunities. If replacement cows are too cheap to sell, it implies that you might be facing cattle cycle price lows, high production costs, and/or the replacement market is saturated (over supplied). If replacement cows are too expensive to buy, it implies that you might be facing cattle cycle price highs, lack

cow/calf profitability, and/or limited availability (reduced supply) of replacements.

The example we have provided is an outline of how to evaluate the decision making process using the NPV approach with known values. There are clearly some other factors to consider. Table 12 outlines some of the advantages and disadvantages of both purchasing and raising replacement heifers and raising your own. These factors will be taken into consideration when you make your management decision. The option you choose should be tied both to the financial impact on the operation and the way it fits into your operational goals.

The decision to buy or raise replacement heifers occurs at a time when there is still uncertainty about costs and prices. While our example used the averages over a historical time period, we can see from Figure 2 that there are times when one option would have been better than the other in a purely financial sense. However, in reality, we make this decision looking into the future when we can only speculate at the future costs of raising or buying replacements. The question ultimately comes down to future financial costs, future cattle market prices, future cattle performance, and individual producer herd goals. Since we can not accurately forecast these variables, cattle producers will continue to make the replacement decision with insufficient information. Therefore, when cattle producers breed a heifer, they are clearly assuming that future costs, cattle market prices, and cattle performance will be sufficient to achieve their desired rate of return.

Our analysis suggests that over the 1990-2000 time horizon it would have been better financially to have purchased replacement heifers. This outcome was expected since our budgeted cost to develop a bred replacement heifer was greater that the value the market placed on developing a bred replacement heifer. However, this analysis is flawed by the fact that it was done on a historical time. Obviously, when attempting to look forward into the future to make this decision, a producer will not have perfect knowledge of the time period ahead. The decision must be made with all of the previously mentioned factors taken into account. Therefore, the replacement heifer decision can be made with assumptions (heifer development costs, costs of production, calf and reproductive performance, market prices, etc.) about the future. Using the framework outlined in this paper will allow one to answer the question; should I purchase replacement females?

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USDA Agricultural Marketing Service. "Alabama Livestock Market News." Fed-State Livestock Market News. Various issues 1989-1999. Montgomery, AL.

Figure 1. High-end September bred heifer prices and September weaned heifer prices, 500-pound, Medium and Large, Number 1, Alabama, 1989-1999.

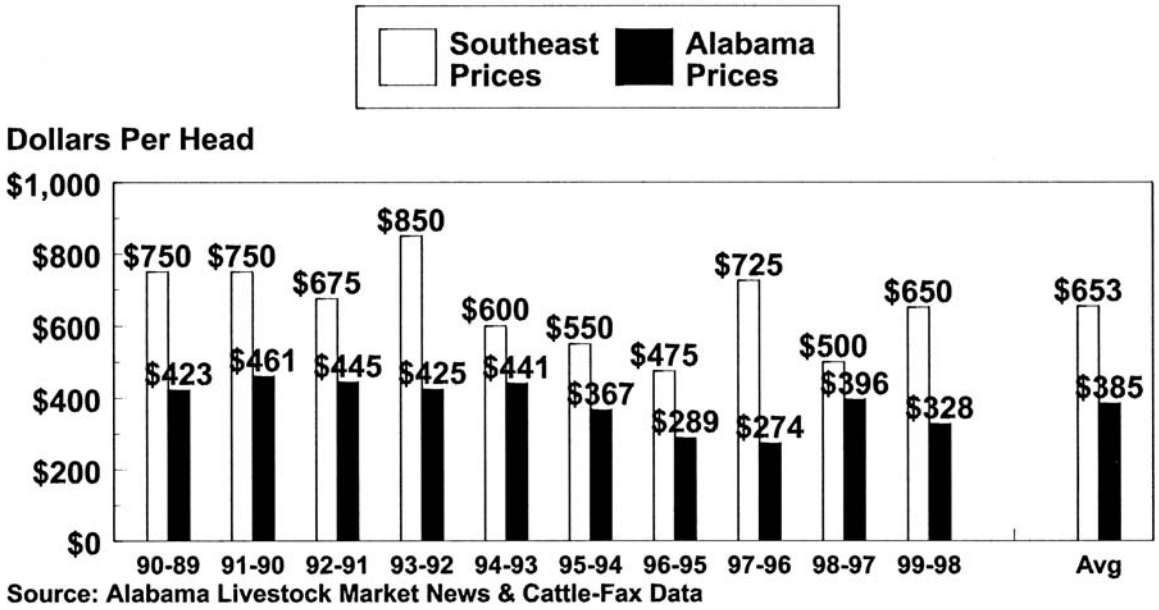

Figure 2. Value the market places on developing a September bred beef replacement heifer, 1989-1999.

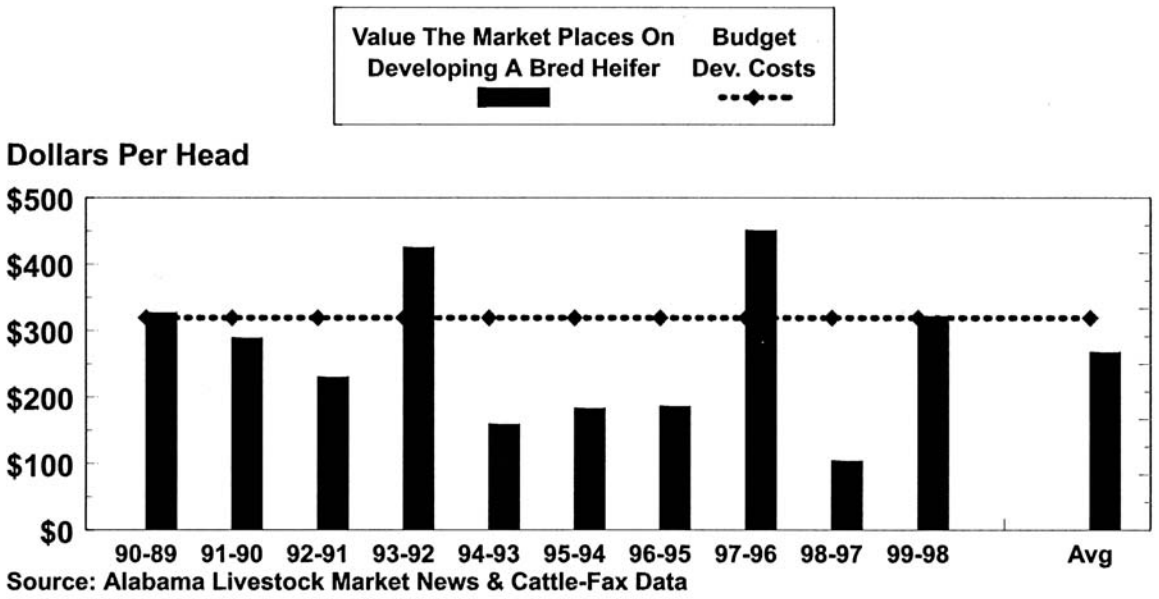

Table 1. Estimated total cost per beef cow replacement, 1990-1992.

Item	Year 1 ($/head)	Year 2 ($/head)
Replacement heifer/cow	476 *	939 *
Grazing	84	127
Supplement	83	95
Labor	45	47
Land	23	35
Breeding, AI/bull	26	23
Miscellaneous & supplies	25	32
Interest	60	106
Fixed cost	37	38
Total	859	1,443

*Replacement heifer/cow value at the end of the year after adjusting for culled and dead animals.

Table 2. Estimated total cost per beef cow replacement without land, labor, and fixed costs, 1990-1992.

Item	Year 1 ($/head)	Year 2 ($/head)
Replacement heifer/cow	476 *	939 *
Grazing	84	127
Supplement	83	95
Breeding, AI/bull	26	23
Miscellaneous & supplies	25	32
Interest	60	106
Total	741	1,291

*Replacement heifer/cow value at the end of the year after adjusting for culled and dead animals.

Table 3. Example net present value valuation of cash flows.

Price	Weight	Revenue	Cost	Net cash-flow	Present value factor	Cash flow - present value
86.60			476	-476	1.0000	-476
84.23			383	-383	0.9804	-375
80.24	550	441	503	-62	0.9612	-60
82.95	550	456	300	156	0.9423	147
69.57	550	383	300	83	0.9238	76
56.07	550	308	300	8	0.9057	8
53.27	550	293	300	-7	0.8880	-6
75.95	550	418	300	118	0.8706	102
62.88	550	346	300	46	0.8535	39
76.45	550	420	300	120	0.8368	101
85.66	550	471	300	171	0.8203	140
87.15	550	479	300	179	0.8043	144
87.15	550	479	300	179	0.7885	141
40.00	1,100	440	0	440	0.7885	347
Net present value of beef cow investment.*						329

*Present value factor was assumed to be 2%.

Table 4. Net present value of raised beef replacement cows, 550-pound calves, 1990-2002.

Year		Cash flow - present value
0	1990	-476
1	1991	-375
2	1992	-60
3	1993	147
4	1994	76
5	1995	8
6	1996	-6
7	1997	102
8	1998	39
9	1999	101
10	2000	140
11	2001	144
12	2002	141
12	Sal. value	347
Net present value*		329

*Present value factor assumed to be 2%.

**This investment produces a rate of return of 5.74%.

Table 5. Net present value of purchased beef replacement cows, 550-pound calves, 1990-2002.

Year		Cash flow - present value
0	1990	0
1	1991	-640
2	1992	-60
3	1993	147
4	1994	76
5	1995	8
6	1996	-6
7	1997	102
8	1998	39
9	1999	101
10	2000	140
11	2001	144
12	2002	141
12	Sal. value	347
Net present value*		540

*Present value factor assumed to be 2%.
**This investment produces a rate of return of 9.75%.

Table 6. Net present value of raised beef replacement cows, 650-pound calves, 1990-2002.

Year		Cash flow - present value
0	1990	-476
1	1991	-375
2	1992	-15
3	1993	203
4	1994	120
5	1995	48
6	1996	40
7	1997	148
8	1998	74
9	1999	141
10	2000	178
11	2001	181
12	2002	178
12	Sal. value	347
Net present value*		792

*Present value factor assumed to be 2%.
**This investment produces a rate of return of 10.80%.

Table 7. Net present value of purchased beef replacement cows, 650-pound calves, 1990-2002.

Year		Cash flow - present value
0	1990	0
1	1991	-640
2	1992	-15
3	1993	203
4	1994	120
5	1995	48
6	1996	40
7	1997	148
8	1998	74
9	1999	141
10	2000	178
11	2001	181
12	2002	178
12	Sal. value	347
Net present value*		1,003

*Present value factor assumed to be 2%.
**This investment produces a rate of return of 16.50%.

Table 8. Expected NPV of raised beef cow replacement, 550-pound calves, 1990-2002.

Year		Cash flow - present value	No. of calves	NPV @ each year	Conception rate	Probability will have been culled	Expected cash flow - present value
0	1990	-476					-476
1	1991	-375					-375
2	1992	-60	1	-488.02	0.84	0.16	18
3	1993	147	2	-349.10	0.71	0.40	189
4	1994	76	3	-280.89	0.85	0.49	75
5	1995	8	4	-281.29	0.87	0.56	30
6	1996	-6	5	-295.34	0.87	0.62	20
7	1997	102	6	-200.51	0.87	0.67	53
8	1998	39	7	-168.92	0.74	0.75	42
9	1999	101	8	-75.47	0.74	0.82	42
10	2000	140	9	57.69	0.74	0.86	36
11	2001	144	10	194.82	0.74	0.90	27
12	2002	141	11	329.25	0.74	0.93	36
12	Sal. value	347					
Net present value*		329			Expected net present value		-283

*Present value factor assumed to be 2%.
**This investment produces an expected rate of return of -4.88%.

Table 9. Expected NPV of purchased beef cow replacement, 550-pound calves, 1990-2002.

Year		Cash flow - present value	No. of calves	NPV @ each year	Conception rate	Probability will have been culled	Expected cash flow - present value
0	1990	0					0
1	1991	-640					-640
2	1992	-60	1	-276.80	0.84	0.16	18
3	1993	147	2	-137.88	0.71	0.40	189
4	1994	76	3	-69.66	0.85	0.49	75
5	1995	8	4	-70.07	0.87	0.56	30
6	1996	-6	5	-84.11	0.87	0.62	20
7	1997	102	6	10.72	0.87	0.67	53
8	1998	39	7	42.31	0.74	0.75	42
9	1999	101	8	135.75	0.74	0.82	42
10	2000	140	9	268.92	0.74	0.86	36
11	2001	144	10	406.04	0.74	0.90	27
12	2002	141	11	540.48	0.74	0.93	36
12	Sal. value	347					
Net present value*		540			Expected net present value		-72.20

*Present value factor assumed to be 2%.

**This investment produces an expected rate of return of -0.40%.

Table 10. Expected NPV of raised beef cow replacement, 650-pound calves, 1990-2002.

Year		Cash flow - present value	No. of calves	NPV @ each year	Conception rate	Probability will have been culled	Expected return
0	1990	-476					-476
1	1991	-375					-375
2	1992	-15	1	-443.28	0.84	0.16	55
3	1993	216	2	-248.39	0.71	0.40	222
4	1994	130	3	-136.02	0.85	0.49	97
5	1995	48	4	-95.65	0.87	0.56	48
6	1996	40	5	-63.69	0.87	0.62	38
7	1997	148	6	76.37	0.87	0.67	68
8	1998	74	7	142.37	0.74	0.75	51
9	1999	141	8	276.21	0.74	0.82	49
10	2000	178	9	447.28	0.74	0.86	41
11	2001	181	10	621.38	0.74	0.90	31
12	2002	178	11	792.06	0.74	0.93	39
12	Sal. value	347					
Net present value*		792			Expected net present value		-112

*Present value factor assumed to be 2%.

**This investment produces an expected rate of return of -0.66%.

Table 11. Expected NPV of purchased beef cow replacement, 650 pound calves, 1990-2002.

Year		Cash flow present value	No. of calves	NPV @ each year	Conception rate	Probability will have been culled	Expected cash flow present value
0	1990	0					0
1	1991	-640					-640
2	1992	-15	1	-232.05	0.84	0.16	55
3	1993	203	2	-37.17	0.71	0.40	222
4	1994	120	3	75.20	0.85	0.49	97
5	1995	48	4	115.57	0.87	0.56	48
6	1996	40	5	147.53	0.87	0.62	38
7	1997	148	6	287.60	0.87	0.67	68
8	1998	74	7	353.60	0.74	0.75	51
9	1999	141	8	487.44	0.74	0.82	49
10	2000	178	9	658.51	0.74	0.86	41
11	2001	181	10	832.60	0.74	0.90	31
12	2002	178	11	1,003.28	0.74	0.93	39
12	Sal. value	347					
Net present value*		1,003			Expected net present value		99.28

*Present value factor assumed to be 2%.

**This investment produces an expected rate of return of 5.32%.

Table 12. Advantages and disadvantages of raising and purchasing replacement heifers.

	Purchasing replacements	Raising replacements
Advantages	• Use resources in other ways to improve NFI. (labor, land [stocking rate], etc.) • Added flexibility to change herd size and/or breeding program • Opportunity to buy genetically superior replacements • May be cheaper than raising	• Ability to know and select for factors such as temperament, calving dates, etc. • Ability to maintain disease control and herd health program • Opportunity to raise genetically superior replacements • May be cheaper than purchasing • Always available
Disadvantages	• Availability likely limited • Uncertainty of herd health impacts and disease introduction • Added transportation stress • May cost more than raising	• Resources tied up in developing replacements instead of producing calves • Limits herd expansion flexibility and breeding program changes • May cost more than purchasing

Notes:

Notes:

Economic Options to Increase the Value of Your Ranchlands

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I have the unenviable task of discussing a subject that readers understand far better than I do: the economics of their land. Nonetheless, my goal is to suggest some options for land management that I understand and that might supplement your current revenue or even be substituted for some of your current practices. You are already familiar with some of these options, such as the silvopasture operations described by George Owens at this meeting several years ago.

Trees represent a long term commitment to cropping, but can be added to the landscape in diverse configurations to meet a variety of objectives. Some of those objectives may focus on a high level of revenue flow from timber crops. At the other end, your objectives may be only to use trees to provide other benefits such as shade for cattle or habitat for game animals. I will attempt to describe some of the benefits, operational considerations, and constraints for a range of practices in which you add or promote trees on your ranchlands.

Silvopastures

The most common option is actually an array of practices that merge timber management and livestock production. Historically, trees have been associated with cattle when livestock graze on grass or shrub forage in pine plantations or other woodlands. This involved little more than being opportunistic with an available, and underutilized, forage resource. Silvopasture practices involve a more intentional combination and management of cattle, timber, and improved forage crops.

Trees provide important benefits for cattle ranchers. Shade during summer heat influences weight gains; even if trees are only planted or retained in rows along pasture boundaries or as single trees scattered across the range. At higher densities, opportunities for revenue increase although shading can also reduce forage production. Silvopastures are created through two general processes – conversion of existing plantations to widely spaced trees with improved forage crops, or addition of trees to existing pastures. In either case, different tree configurations are possible. Widely spaced rows, or multiple rows, result in fairly uniform forage conditions across the property and offer the highest potential for adding timber-based revenue to cattle operations. Alternatively, trees can be grouped in clumps of ¼ to one acre in size. Forage production in the open pasture should remain unchanged, while the tree clumps still provide timber, shade for cattle, and possible wildlife cover. Timber production may be slightly reduced because of soil effects from the cattle concentrations in the tree "islands".

Costs associated with the two processes for creating silvopastures are substantially different. Generally, planting trees into open pasture or rangeland is the lowest cost option since it does not require operations to establish grasses, control shrubs, or remove logging debris. The following list of practices and approximate costs reflect the common practice of planting trees in double rows (8 feet between rows x 4 feet between trees within rows) with 40-foot spacing

between sets of rows. The 40-foot spacing maintains forage production in full sunlight for most of your pasture, and optimizes timber and forage production as demonstrated by the 13-year-old results of a silvopasture spacing study at Withlacoochie State Forest (Table 1, Lewis et al., 1985). Establishment practices may include some or all of the following:

1. Herbicide (Accord + Arsenal, Arsenal, Oust, Oust + Velpar, Oust + Arsenal) in 3 ft bands along planting rows, applied during site preparation and/or post planting ($30-55/acre);

2. Subsoil (ripper) + scalp (moldboard plow) to shatter compact soil horizons, roll sod away from planting rows, and provide a trench for root growth and water collection ($25-45/acre);

3. Prescribed burning (site preparation and/or post-planting after trees are at least 10 feet high) to reduce competition and increase forage palatability ($3-20/acre);

4. Mechanically plant 450 trees/acre ($50-60/acre);

5. Mowing during the first two to three years after planting to reduce competition and harvest hay ($15-25/acre)

6. Avoid grazing for one to two years, until trees are 4 feet high.

Other important management and planning guidelines are outlined in several extension publications (Tyree and Kunkle, 1995; Nowak et al., 2002; Demers and Clausen 2002).

If, instead, you want to convert existing plantations to silvopasture, the main treatments focus on establishing forage crops rather than tree seedlings. The plantation should first be thinned, with residual densities dependent on tree arrangements. If trees are left at widely spaced intervals across the site, no more than 100-150 trees per acre (tpa) should be left. However, if left in widely spaced double rows, 200-400 tpa are acceptable depending on plantation age at thinning. Revenue from thinning will not be large ($20-300/acre), but should partially compensate for the forage establishment costs. Once harvesting is completed, substantial site preparation is necessary for forage crops, the most expensive step being removal of stumps if not left to decompose in place. A number of other steps (such as 3 and 4 below) may also be optional depending on your particular conditions.

1. Stump removal ($200/acre and up);

2. Rake, pile and burn debris ($150-200/acre);

3. Disk, cultivate, and level soil being careful not to cultivate right beside residual pines ($20-40/acre);

4. Lime and fertilize to improve forage conditions (most pine soils are pH 4-5) and sow forage crops ($175-250/acre);

5. Repeat fertilization with N-P-K ($25/acre);

6. Avoid grazing for 6-18 months for forage establishment.

Table 1. Total wood volume and forage production in 13-year-old slash pine silvopastures at Withlacoochie State Forest (adapted from Lewis et al., 1985).

Spacing	8 x 12 ft	4 x 24 ft	4 x 8 x 40 ft	2 x 8 x 88 ft
Wood volume (cu ft/acre)	903	866	1086	580
Forage production (lbs/acre)	1138	542	1264	2573

The primary justification for planting pines is to reap a future income. Unlike most other crops, or livestock, timber tends to increase in value the longer it grows and it doesn't need to be harvested at a particular time. Actual values will depend on age of harvest, prevailing market prices, and distances to markets. Most southern pines will reach first harvest ages between 10 and 15 years age when 4-8 inch diameter stems can be sold as pulpwood to paper mills across north Florida. Unfortunately, the closest mill for pulpwood from south Florida is in Palatka, which may be too far for many timber sales. As trees grow into the 9-13 inch diameter classes they are usually sold to sawmills at prices for landowners that have tended to be two to four times higher per ton than pulpwood. A variety of sawmills across Florida are potential markets for these logs. As long as trees have ample room to grow (especially as rows or single trees in pastures) they generally reach sawtimber sizes by ages 15-25 years. Harvesting options include complete cutting of all trees, or thinning which removes ⅓-⅔ of the trees, leaving the rest for shade and to grow into larger, more valuable, sizes.

Timber prices for sawlogs have generally been on an upward trend for more than 10 years (Figure 1), with various spikes and downturns due to the economy, weather, and fires. Pulpwood, on the other hand, has remained relatively flat with little potential for short term change. However, if you own land within 30-40 miles of a pulp mill, you may still receive fairly reasonable prices due to short hauling distances. Timber yields will vary depending on site conditions and stocking levels. A recent study in central Florida indicated that a typical widely spaced double row configuration of slash pine in a bahiagrass pasture produced 1.8 cords/acre at age 11 (Ezenwa et al., 2003). The authors projected yields at ages 15 and 20 of 10 and 18 cords/acre, respectively, which translated to timber values of $60/acre and $400/acre. At age 15, timber yields will obviously not cover the costs for establishing trees in the silvopasture but by age 20 timber harvests could represent a sizable profit.

Figure 1. Average quarterly timber stumpage prices in northwest Florida, 1990-2002, from Timber Mart-South.

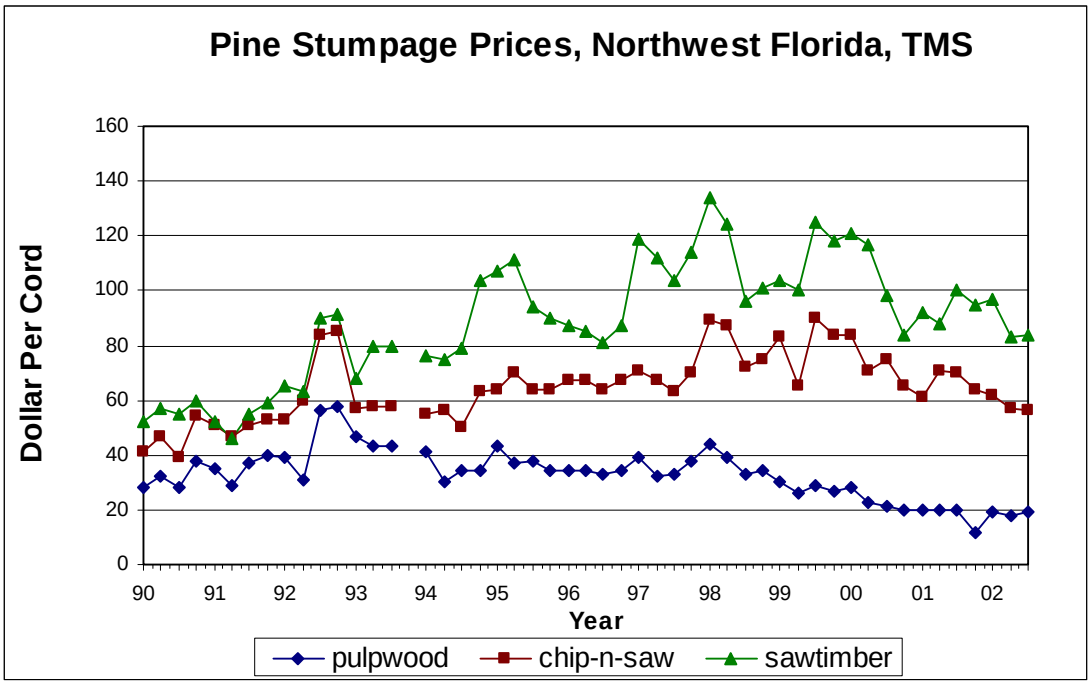

Table 2. Selected economic parameters for open pasture, silvopasture, and pine plantations as described in several recent studies and publications.

Study	Economic parameter	Value		
		Open pasture	Silvopasture	Pine plantation
Husak & Grado, 2002	EAI ($/acre) @ 5%	55	67	69
	EAI ($/acre) @ 9%	54	38	27
Grado et al., 2001	LEV ($/acre)	1,358-2,246	591-1,569	239-963
Clason, 1995	NPV–31 years ($/acre)	613	1491	644
Clason, 1995	Cash flow ($/acre/yr, ages 20-31)	56	135	58

Using the types of price information and silvicultural practices just described, economic analyses have been conducted for both real and simulated scenarios across the South. Brief descriptions of several of those studies follow with key economic parameters summarized in Table 2.

Silvopastures compared very favorably with open pasture cattle grazing and pine plantations in a recent economic model of Southern land management systems (Husak and Grado, 2002). Silvopastures were established at 4 x 8 x 20 foot spacings with loblolly pine and maintained for a 30-year rotation with two thinnings. Open pastures were established with a mix of summer grasses and calves were sold in their second year. Pine plantations were carried for a 35-year rotation with two thinnings. All economic parameters were taken from relevant regional agricultural reports. Results were presented as land expectation values (LEV), equivalent annual incomes (EAI), and rates of return at three different interest rates. The results demonstrated that at low interest rates silvopasture and plantations had slightly higher LEVs and EAIs than open pasture (Table 2). At higher interest rates (e.g. 9%) open grazing was preferred, probably because of the periodic, rather than annual, nature of timber revenues. EAIs increased by $2-10/acre when hunting leases were added to the silvopasture option, making up for some, or all, of the difference between silvopastures and open pastures.

Another comparison of pine silvopastures, open pastures and pine plantations in southern Mississippi indicated that land expectation values for cattle grazing of improved forage in commercially productive loblolly pine stands were lower than for grazing steers in open pasture only, but considerably higher than LEVs for pine plantations (Grado et al., 2001). When fee hunting was added to the silvopasture treatments (at a modest $6/acre lease rate), LEVs improved by almost 9%.

Clason (1995) compared the economics of converting a 20-year-old loblolly-pine plantation to open pastures or a silvopasture (thinned to 245 tpa) with continued timber production in the plantation. He demonstrated that 10 years later the silvopasture had a higher net present value (NPV) and annual cash flow (Table 2) than if the land had been retained in just timber management or converted to open pasture for forage production.

Dangerfield and Harwell (1990) compared a regular 25-year timber management scenario starting with 640 tpa loblolly pine with a silvopasture design of widely spaced double rows. Net present value of the silvopasture was 71% higher than in the regular forestry enterprise, largely because of the annual revenues from cattle production. Their study did not include an open pasture comparison.

Hunting and Recreational Leases

Hunting leases represent a second important source of revenue from silvopastures. Game animals that might utilize the trees for cover and pastures for forage include deer, turkey, quail, and dove. The likely presence of wildlife increases if surrounding properties include hardwoods, older plantations, and/or shrubs where additional cover and food are available. At a landscape scale, ideal habitat includes a mosaic of different vegetation types and ages. Combining several adjacent properties into one lease may optimize this diversity of cover and bring higher lease rates.

Fee hunting (leases or day permits) can begin as early as the second year after seedlings are planted. Typical hunting leases range from $3-10/acre depending on factors such as the size of the lease, diversity of vegetation communities in the lease, and past hunting experiences. Rates may go even higher later in the rotation when habitats mature. Leases provide one other important benefit. Hunt clubs and lease holders will usually provide a security presence, especially during hunting season, to guard against trespass, arson, and dumping. Lease contracts should clearly state lessee and landowner responsibilities, insurance requirements, and payment schedules. Several companies currently provide hunting lease insurance that protects both landowners and hunt clubs from general liability, fire damage liability, and medical expenses.

Other management practices are not necessary for most hunting leases, although establishment of food plots at various locations may increase the value of the lease. Food plots may be strips along roads, property boundaries or power lines, or 1-2-acre blocks in or near timber stands. Plots can be disked or mowed, and seeded or left to revegetate from natural seed. Either the ranch owner or hunt club can assume responsibility for creating and maintaining such plots.

Another much less common lease is one that allows various recreational uses on your land, such as trail riding (horseback, mountain bikes, or ATVs), wildlife viewing, hiking, or even paintball games. As with hunting leases, your best opportunities for developing such leases may be with local organizations who will be interested in protecting your property, or even in helping you develop the trails or other infrastructure. There is little information available to help guide you in developing such leases. Local public agencies who are involved in recreational activities are a possible source of information and assistance, especially if your property is adjacent to theirs.

Pasture Conversions to Other Management Uses

The options described so far are designed to maintain your cattle operation with little, if any, decrease in productivity. Other options represent partial or complete conversion of some of your land, generally with the goal of diversifying income opportunities. The most common option has been planting old pastures with loblolly, slash or longleaf pine, using the silvicultural practices described previously. Planting densities are usually 500-700 tpa with spacing between rows sufficient to allow tractors that might be used for mowing, pine straw baling, or thinning.

Plantations on old pastures provide a variety of benefits and revenue opportunities. Until stands are five to eight years old they can still be used for cattle grazing or hay production. Once tree crowns begin to touch, forage grass production decreases as shade increases (Byrd et al., 1984). Several years later, pine straw raking can begin in slash pine and longleaf pine plantations (Duryea, 2000). Old pastures are preferred for pine straw because there is usually little understory cleanup necessary before raking begins. Raking and baling is usually conducted for a

3- to 5-year period with per acre revenues of $50-125/acre. By age 15, most plantations are ready to thin. This first timber sale should focus on removing small, deformed, and diseased trees and leave the best trees well spaced to grow into higher value logs. Prices for sawtimber logs today are much higher than pulpwood logs, and that difference is not likely to change in the foreseeable future. Although the first thinning may not produce significant revenue it is very important for increasing growing space for final crop trees which might be harvested between ages 20 and 30, either as a final clearcut or with one or two additional thinnings before final harvest.

In central and south Florida, another plantation option is for short rotation woody crops that can be used as mulch or biomass for energy production (Rockwood, 1996; 1998). Both pines and Eucalyptus have been tested so far and there may be other suitable species in the future. Planting densities are generally much higher than regular plantations but harvesting rotations may be as short as 5-7 years. An important factor in a decision to establish energy plantations will be the locations of biomass-to-energy mill sites.

Alley cropping is another agroforestry practice that could be established anywhere in Florida on pasture or other crop land. Although it represents a significant departure from traditional livestock ranching, it may provide income diversification while only requiring a small portion of your total land base. Alley cropping combines trees, planted in single or grouped rows, with agricultural, high-value crops that are cultivated in wide alleys between the tree rows (Workman et al., 2003). Some of the most likely combinations in Florida include nut, hardwood, or timber trees such as pecan, oaks, pines, or cottonwood, and cash crops such as corn, hay, peanuts, cotton, soybeans, blueberries, and Christmas trees. Appropriate combinations will depend on the soils and climate in your area.

In alley cropping, trees are generally planted in widely spaced (20-30 feet) rows to allow sufficient room for mechanized cropping and sunlight for the alley crops. Tree spacing within rows will depend on the species you plant, with wider spacings necessary for nut crops and closer spacings for timber production. Tree species might even be mixed within the tree rows (i.e. redcedar for Christmas trees and slash pine for timber), and alley crops can be mixed both spatially and temporally. For example, corn, soybeans, melons, or other cash crops might be grown for the first 2-4 years while trees are growing above grazing height. At that point, the alley crop could be switched to forage grasses for cattle grazing, creating a silvopasture system.

The decision about which trees and crops to combine in an alley cropping system will depend on your particular objectives and soil characteristics, local markets, and perhaps most importantly, what you will feel comfortable doing. Considering your ‘comfort level’, one option for managing these other cropping systems may be to team up with other landowners in your area who have the equipment and knowledge. Leases, or other agreements, would probably be necessary to spell out responsibilities and payments.

Conclusion

Economic options for ranchlands include a variety of practices that incorporate trees either as a supplement to, or replacement for, grazing pastures. Income may be from various timber products, pine straw, other agricultural crops, or recreational leases. Economic values of each option may or may not exceed the value of cattle ranching under normal conditions. However, these options may provide an important supplement to cattle income; more importantly, they can provide a significant buffer when cattle prices are down. As in most investment literature, diversification is a key to long term economic survival.

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Notes:

Country of Origin Labeling (COOL): Implications of Policy on Cow/Calf Producers

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Introduction

The Country of Origin Labeling (COOL) provision, in the 2002 Farm Bill, requires retail sellers of several food commodities to inform consumers of the country of origin. There has been considerable debate and several competing claims regarding costs and benefits of this program despite the fact that USDA has not yet designed the regulations to implement labeling. The basic provision of COOL is that retailers must provide country of origin information for beef, pork, lamb, fish, peanuts, fruits, and vegetables.[1] These commodities are termed "covered commodities" in the law. Food service establishments, such as restaurants and cafeterias, are exempted.[2] The method by which consumers are to be notified is through a "label, stamp, mark, placard," or other type of signage that is "clear and visible" at the point of sale.[3] The law does not distinguish between countries in the consumer information requirement. Covered commodities must be exclusively produced and processed within the United States to be deemed of U.S. origin.

The program will not be mandatory until September 30, 2004.[4] Retailers will have to comply at that time. Until then, labeling will be voluntary. The United States Department of Agriculture (USDA) was required to propound guidelines (not regulations) for voluntary labeling by September 30, 2002, and did so on October 11, 2002. By September 30, 2004, the USDA is to have regulations in place to implement this law.

The labeling legislation contains several provisions governing how one verifies the country of origin of a covered commodity. The Secretary of Agriculture is allowed, but not forced, to require those handling, processing, or distributing covered commodities maintain a verifiable record keeping audit trail.[5] The definition of what constitutes a "verifiable record keeping audit trail" has been left to the discretion of the USDA. However, the Secretary of Agriculture is prohibited from using a mandatory identification system to verify country of origin.[6]

The law is enforceable against retailers if they "willfully" violate the law up to $10,000 per violation[7]. There are no enforcement penalties for packers, processors, or others that handle food.

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[1]Farm Security and Rural Investment Act of 2002, Subtitle D-Country of Origin Labeling (hereafter Farm Bill Labeling Subtitle), Sec. 282(a)(1).
[2]Id. at §282(b).
[3]Id. at §282(c).
[4]Id. at §285.
[5]Id. at §282(d).
[6]Id. at §282(f)(1).
[7]Id. at §283(c).

USDA Guidelines and Implementing Regulations

There are no binding regulations currently in effect for COOL. The USDA issued "guidelines" for voluntary labeling on October 11, 2002.[8] These guidelines are designed to assist retailers and their suppliers to facilitate voluntary labeling. However, no person or entity is required to enter into a voluntary labeling program until September 2004.

Cost Analysis

The methods of estimating costs of labeling are very different from the methods of estimating benefits. For example, in the early 1990's, federal legislation was passed requiring added nutritional labeling on foods covering over ⅔ of the U.S. food system, a far greater swath of the food economy than is covered by the labeling law. That legislation, in contrast with the present labeling law, required third party verification of nutritional claims by outside laboratories.

A major study was performed by two teams of economists. One team studied the estimated costs of nutritional labeling while the other team worked independently to estimate the benefits of the program. The two teams were required because the methods of studying benefits generally differ from those methods for estimating costs. Further, it was determined beneficial if the teams were unable to coordinate results in any way. The resulting study has been praised as a model for future studies of the same type.

USDA Estimate of Record Keeping Burden

The USDA published an estimate of record keeping costs (hereinafter "Cost Estimate") in the Federal Register in November 2002.[9] This notice was published pursuant to the Paperwork Reduction Act that requires federal agencies to estimate the record keeping burdens of new regulations.[10] The total cost calculated was $1,967,759,000 for all groups affected by the legislation.

- **Cost to producers.**

The Cost Estimate stated that the producer record keeping burden would be $1 billion.[11] It assumed that there were two million farms, ranches and fishermen (production entities) and that all would implement a system for voluntary labeling.[12] It further assumed that the time required to develop a record keeping system to comply with the voluntary guidelines is one day.[13] USDA also estimated that the time required to generate and maintain the records is one hour per month. Lastly, the USDA applied a labor cost of $25/hour. This resulted in a cost estimate of $400 million to establish a record keeping system, $600 million/year to maintain records, for a total first year cost of $1 billion.

- **Cost to handlers.**

USDA estimates that there are 100,000 food handlers (including packers, processors, importers, wholesalers, and distributors) in the country. Though it concedes that many do not handle covered commodities, USDA goes on to assume all will choose to comply with the Voluntary Guidelines. Further, USDA

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[8]Federal Register, "Establishment of Guidelines for the Interim Voluntary Country of Origin Labeling of Beef, Lamb, Pork, Fish, Perishable Agricultural Commodities, and Peanuts Under the Authority of the Agricultural Marketing Act of 1946," Vol. 67, No. 198, pp. 63367-63375, October 11, 2002 (hereinafter Voluntary Guidelines).
[9]Cost Estimate, supra at note 1.
[10]See generally, 44 U.S.C. 3501.
[11]Cost Estimate, supra at pg. 70205.
[12]Id.
[13]Id.

presumes that food handlers require two days of labor to create a record keeping system and an additional one hour per week to maintain the system. Lastly, USDA establishes a value of $50/hour for labor to generate a $340 million record keeping burden.[14]

- **Cost to retailers.**

USDA estimates that there are 31,000 retailers that could potentially adopt the voluntary guidelines. USDA further claims that each retailer will require five days for one person to establish a record keeping system and one hour per day to maintain the records. Lastly, USDA presumes that the wage rate for such duties is $50/hour. Thus, their total cost estimate is $625.75 million for retail record keeping.

Alternative Cost Estimates

There have been other groups who have estimated the cost of implementing and maintaining COOL legislation. Sparks Companies, Inc. estimates the cost of the COOL legislation to be somewhere between $3.6 billion and $5.6 billion, with the cattle and beef industry supply chain absorbing between $1.55 billion and $1.725 billion. They estimate these costs to be $198 million to cow/calf producers and backgrounders, between $109 million and $167 million for feedlot operators, between $435 million and $522 million for packers/processors and $805 million for the retail distribution and retail store sector.[15]

Other groups have estimated the actual cost of implementing COOL could be as little as $36.8 million if the USDA chooses the least cost alternative for implementing the legislation. There are three basic types of verification systems that may be implemented: (1) third party verification of all product; (2) self verification of all product; and (3) a regulatory presumption that all product is of U.S. origin with an accompanying duty to self verify product of foreign or mixed origin. It is important to note again that mandatory identification systems are prohibited by the labeling legislation itself.[16] In sum, the least cost alternative among the basic types of possible "verifiable audit trail" systems is probably the "presumption of U.S." self verification system. The primary advantage is one of cost in that fewer entities will be affected, and the record keeping affirmatively required is largely in place.

Cost Estimate Summary and Bearer of Burden

A review of the estimate provided by USDA indicates that the cost to producers may be overstated. The USDA estimate assumes no record keeping system is in place and that all required procedures will be new to producers and handlers. Secondly, it assumes that the time required to implement the requirements will cost producers $25/hour and handlers $50/hour, both well above the $7.76/hour for the published estimate for value of farm labor and $13.60/hour estimate for value of closest category for laborer in food handling establishments (meat inspectors). A second issue is whether the USDA overstates the number of producers to be impacted by the provisions that could result from the COOL legislation. USDA estimates that 2 million producers will be affected by this legislation, however, estimates from other Agencies within USDA indicate that there are 1.03 million cattle producers, 75,350 hog producers, 64,170 sheep and goat producers, 106,069 fruit and nut farms, and 53,717 vegetable farms. The total number of

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[14]Cost Estimate, supra at 70206.
[15]Sparks Companies, Inc. "COOL Cost Estimate." April 2003, @4.
[16]Farm Bill Labeling Subtitle, §282(d).

producers affected by the legislation should therefore be no more than 1,169,520. Obviously, the actual cost to implement will be dependent on the provisions required by USDA for verification.

The debate over labeling has not only given rise to competing claims about cost, but also about who will bear the ultimate cost. From an economic perspective, in a perfectly competitive market, all additional costs incurred by suppliers are passed on to consumers. "Costs" in this sense refers to the net burden, including the benefits. If absolute costs outweigh the absolute benefits, the difference is net cost. If benefits outweigh costs, then the net benefits will be passed to the consumer.

Those that claim the costs will be borne by the producers are unintentionally arguing the market is not competitive and that handlers and retailers have market power that allows them to pass the cost to producers. This assumption may be true in many food categories, but even monopolists tend to pass half the burden on to consumers, while suppliers bear the other half. Thus half, if not all of the cost should be passed on to consumers.

Benefits to COOL

Consumers are becoming increasingly concerned with the quality and safety of their food. Consumers' concern with safety and origin of beef is especially true in light of the recent European and Japanese BSE outbreaks and occurrences of E-coli 0157:H7 in U.S. beef. Visual inspection of beef and produce do not generally reveal origin and processes used to produce these products. Without labeling, consumers are not able to differentiate origin or processes used to produce products in the retail store.

Opponents to COOL argue that COOL holds no real benefit to the industry and that mandatory COOL could impose a trade barrier and fuel trade wars. Proponents express concern about the safety of imported food and argue that "consumers have a right to know" where their food comes from. Supporters also contend that COOL could provide a competitive advantage in the supermarket for U.S. producers whose production practices are better known and generally more regulated. Labeling provides a distinguishable characteristic that will give consumers choice. It also provides a characteristic to distinguish products when quality or food safety issues arise around a certain supplier of a product.

Several studies have been completed to assess the consumers' view on labeling. Quagrainie et al. (1998) found that consumers in western Canada preferred beef products originating from Alberta to products originating from other locations in Canada or the U.S. Roosen et al. (2003) found that consumers in France and Germany indicate that origin of beef was more important than other product attributes like brand, price, marbling, or fat content. They found that UK consumers ranked origin more important than brand, but less important than steak color, price or fat content.

Loureiro and Umberger (2003) assessed the view of Colorado consumers toward labeling and found that they were willing to pay $184/year for a mandatory COOL program. The same consumers indicated that they would be willing to pay 38% and 58% more for "U.S. Certified Steak" and "U.S. Certified Hamburger," respectively. A more recent study by Umberger et al. (2003) found that consumers in Denver and Chicago preferred to purchase beef with COOL. They found that consumers were willing to pay 11% and 24% premiums for COOL on steak and hamburger, respectively. The most commonly cited reasons for preferring COOL in that study were: food safety concerns; a preference for labeling source and origin information, a strong desire to support U.S. producers; and beliefs that U.S. beef was higher quality.

Summary and Conclusions

Implementation of COOL legislation will not come without cost. USDA estimates that cost to be $1,967,750 in the first year. Opponents to the legislation have estimated those costs to be as high as $5.6 billion while supporters argue that choosing the least cost system for verification could bring the cost down to $36.8 million.

Opponents argue that there is no real benefit to COOL, while proponents argue that consumers have a right to know where their food comes from and are willing to pay for that right. Studies estimate that consumers prefer food with COOL and are willing to pay as much as 58% more for "U.S. Certified Hamburger."

The U.S. produce industry has been working for several years to implement a mandatory COOL. The State of Florida has required COOL for produce for many years. The 2002 Farm Bill puts in place the process that will lead to COOL for beef, pork, lamb, fish, peanuts, fruits, and vegetables. Mandatory COOL will bear out the accuracy in the estimates of costs and benefits if it is implemented on schedule in 2004. Studies suggest that the cost of COOL to U.S. cow/calf producers who handle U.S. born and raised calves should be minor, but that they could reap significant potential benefits in additional returns.

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