They Don’t Produce Income If They Don’t Reproduce

W. Craig Burrell

Nola A. Taylor

Follow this and additional works at: http://digitalcommons.usu.edu/extension_histall

Part of the Agriculture Commons, and the Animal Sciences Commons

Warning: The information in this series may be obsolete. It is presented here for historical purposes only. For the most up to date information please visit The Utah State University Cooperative Extension Office

Recommended Citation

http://digitalcommons.usu.edu/extension_histall/3

This Presentation is brought to you for free and open access by the Archived USU Extension Publications at DigitalCommons@USU. It has been accepted for inclusion in All Archived Publications by an authorized administrator of DigitalCommons@USU. For more information, please contact dylan.burns@usu.edu.
"THEY DON’T PRODUCE INCOME IF THEY DON’T REPRODUCE"

21st Annual
Utah Beef Cattle Field Day

Sponsored by
Brigham Young University
Utah State University
Utah Cattlemen's Association

Tuesday, February 13, 2001

Ellsworth Building
Brigham Young University
Provo, Utah
“They Don’t Produce Income If They Don’t Reproduce”

8:30 am Refreshments and Registration ........................ $25/person $30/couple

9:15 Welcome and Introductions
Master of Ceremonies ................................. Roy Silcox, BYU

9:30 Lead Speaker “Impact of Reproductive Performance on Profitability in Cow-Calf Production” ............................... Ken Odde, AgSpan

10:15 Move to Rotation Sessions
10:20-12:20 Rotation Sessions
1. Selecting and Managing Replacement Heifers: Make the Color of First Choice Green ................................. W. Craig Burrell, USU
2. Autumn Seasonal Beef Herd Management Decisions ................................. Bill Kvasnicka, University of Nevada
3. Dealing with Dystocia ............. Robert Mortimer, Colorado State University
4. Managing the Estrous Cycle ............................... Roy Wallace, Select Sires
5. ............................................................ Trade Show

12:20 pm Lunch Break

1:10 Move to Rotation Sessions
1:15-3:15 Rotation Sessions
1. Developing a Heifer Enterprise ................................. Kevin Heaton, USU
2. Raising vs. Purchasing Replacement Heifers–Which is the Best Option for Your Operation? ................................. Jim Keyes, USU
3. Nutritional Management of the Beef Cow . . Pat Momont, University of Idaho
4. Care of the Newborn Calf ............................... Robert Mortimer, CSU
5. ............................................................ Trade Show

3:20-3:40 Protecting Your Herd from Reproductive Diseases ............ Ken Odde, AgSpan
PROCEEDINGS INDEX

<table>
<thead>
<tr>
<th>Topic and Speaker</th>
<th>Page nos.</th>
</tr>
</thead>
<tbody>
<tr>
<td>“Impact of Reproductive Performance on Profitability in Cow-Calf Production”</td>
<td>1-5</td>
</tr>
<tr>
<td>Dr. K.G. Odde, AgSpan</td>
<td></td>
</tr>
<tr>
<td>“Selecting and Managing Replacement Heifers: Make the Color of First Choice Green”</td>
<td>6-10</td>
</tr>
<tr>
<td>Dr. W. Craig Burrell, Utah State University</td>
<td></td>
</tr>
<tr>
<td>“Autumn Seasonal Beef Herd Management Decisions”</td>
<td>11-24</td>
</tr>
<tr>
<td>Dr. William G. Kvasnicka, University of Nevada</td>
<td></td>
</tr>
<tr>
<td>“Marketing Alternatives of Cull Cows: A Case Study” <em>(Supplementary Paper)</em></td>
<td>25-29</td>
</tr>
<tr>
<td>Ron Torell, University of Nevada; Willie Riggs, University of Nevada; Cevin Jones,</td>
<td></td>
</tr>
<tr>
<td>Eden, Idaho; Ken Conley, University of Nevada</td>
<td></td>
</tr>
<tr>
<td>“Feeding and Marketing Cull Cows” <em>(Supplementary Paper)</em></td>
<td>30-34</td>
</tr>
<tr>
<td>Dillon M. Feu, University of Nebraska</td>
<td></td>
</tr>
<tr>
<td>“Dealing With Dystocia”</td>
<td>35-38</td>
</tr>
<tr>
<td>Dr. Robert G. Mortimer, Colorado State University</td>
<td></td>
</tr>
<tr>
<td>“Managing the Estrous Cycle”</td>
<td>39-41</td>
</tr>
<tr>
<td>Dr. Roy Wallace, Select Sires, Inc., Plain City, Ohio</td>
<td></td>
</tr>
<tr>
<td>“Developing a Heifer Enterprise”</td>
<td>42-44</td>
</tr>
<tr>
<td>Kevin Heaton, Utah State University</td>
<td></td>
</tr>
<tr>
<td>“Raising vs. Purchasing Replacement Heifers–Which is the Best Option for Your Operation?”</td>
<td>45-47</td>
</tr>
<tr>
<td>James D. Keyes, Utah State University</td>
<td></td>
</tr>
<tr>
<td>“Nutritional Management of the Beef Cow”</td>
<td>48-53</td>
</tr>
<tr>
<td>Dr. Patrick A. Momont, University of Idaho</td>
<td></td>
</tr>
<tr>
<td>“Care of the Newborn Calf”</td>
<td>54-56</td>
</tr>
<tr>
<td>Dr. Robert G. Mortimer, Colorado State University</td>
<td></td>
</tr>
<tr>
<td>“Protecting Your Herd from Reproductive Diseases”</td>
<td>57-58</td>
</tr>
<tr>
<td>Dr. K.G. Odde, AgSpan</td>
<td></td>
</tr>
</tbody>
</table>

We would like to express our sincere appreciation to those who have helped make this program possible.

Proceedings edited by Dr. W. Craig Burrell, U.S.U. Animal Scientist

Manuscript preparation by Nola A. Taylor, U.S.U. Administrative Secretary
I. Economics of Beef Herd Reproductive Efficiency

In cow-calf production, veterinarians and animal scientists have long promoted the need for high levels of reproductive efficiency. The assumption has been that high levels of reproductive efficiency are a requirement for profitability. Is this assumption correct?

Let’s begin by discussing efficiency in general. There are several kinds of efficiency in any production unit. For example, in a beef cow unit, we may use production efficiency, reproductive efficiency and economic efficiency to evaluate the operation. Many of our research colleagues, particularly those doing modeling work, describe the differences between biological efficiency and economic efficiency.

Reproductive efficiency in cow-calf production is generally measured with pregnancy rate, calving rate and percent calf crop or weaning rate. Percent calf crop is defined as the number of calves weaned as a percentage of females exposed to breeding the previous year. This is probably the best single measure of reproductive efficiency in cow-calf production. Percent calf crop weaned can be reduced by failure of cows to become pregnant, abortion, perinatal death and calf death from birth to weaning. Most of the reduction in percent calf crop weaned is a result of cows failing to become pregnant or losses occurring at or shortly after calving. Percent calf crop weaned, however, provides no information concerning the grouping of calves within a calving season. Herds may have similar percent calf crop weaned, but one herd may have a higher percentage of calves born early within a fixed calving season, because they get both cows and heifers bred early in the breeding season. Therefore, adequately evaluating reproductive efficiency in a cow-calf operation requires more information than that provided with percent calf crop weaned. It is also important to recognize that many producers do not define percent calf crop on the basis of females exposed the previous year. It is easy to achieve a high “percent calf crop” by simply changing the denominator in the equation.

Economic efficiency in cow-calf production is a function of four factors: 1) percent calf crop weaned; 2) weaning weight; 3) annual cow cost; and 4) price received for calves. Weaning weight is related to milk production of the cow, genetic potential of the calf to grow, parasitism, forage availability and perhaps most importantly, calf age. This may seem obvious, but I emphasize it here to point out that the effectiveness of our reproductive management program will greatly influence average calf age at a fixed weaning time. Again, those producers that do a good job of grouping calving will have older and heavier calves at a fixed weaning time than those that don’t.

Weaning weight is a trait for which the “maximum” is clearly not “optimum.” What does this mean? Increases in weaning weight are frequently associated with
increases in milk production. Increases in milk production mean that cows have higher nutrient requirements, not only for lactation, but also for maintenance. Increasing milk production may have the effect of decreasing pregnancy rate, particularly if the management program is not changed to provide the required nutrients. When weaning weight is increased by increasing herd milk production, cows may become “mismatched” to their environment. Hence, unfettered pursuit of weaning weight may increase annual cow costs and reduce reproductive performance.

In recent years, the theme of many cow-calf seminars has been “lowering costs of production.” This thesis is in part driven by defining poultry and pork as the competition, and the obvious need to produce at a lower cost to compete. Several studies have shown dramatic differences in annual cow costs across beef-cow operations. One of the weakest links in many cow-calf operations is the failure to identify and monitor costs of production. Price received for calves is the fourth item affecting economic efficiency. Historically, marketing has been a weak link in many cow-calf operations. Many cow-calf producers are now becoming aware of the need to capture more value from the product that they produce.

So how does reproductive efficiency affect economic efficiency? Assuredly, it is a very important component. Dr. Bryan Melton, in a paper presented a little over a year ago at the Beef Improvement Federation meeting, compared two beef production systems: 1) a fully integrated firm that owns seedstock and markets retail beef to the final consumer; and 2) a typical cow-calf producer who sells weaned calves at an average market price. Dr. Melton reported economic weights for the reproduction, production and consumption phases for each system. He showed that the production and consumption phases are much more important for the integrated firm. Another way of saying this is that although reproductive efficiency is important for both systems, it is relatively more important for the producer that sells his calves at weaning. Both research and experience tell us that high levels of reproductive efficiency are important for economic efficiency.

II. Risk Factors for Dystocia

Neonatal calf deaths are a significant economic loss to cow-calf producers. Incidence and causes of calf death loss were investigated as part of the National Animal Health Monitoring System in Colorado in 86 randomly selected beef cow herds in 1986-1987. Calf death losses were 4.5% of the calves born. Of the calves born, 34% of the death losses were due to dystocia—stillbirth, 12% were due to scours, 12% were due to cold stress, and 8% were due to pneumonia.

The single most important cause of calf death is dystocia. Bellows summarized calf losses at the Fort Keogh Livestock and Range Research Station, Miles City, Montana. This study included records on 893 calves that were lost over a 14-year period. The highest age of dam group for calf losses was first-calf, two-year-old heifers. Of all losses, 68% occurred within three days after calving and 61% of these were due to dystocia.

The primary cause of dystocia is a disproportion between the size of the dam and the size of the calf. This disproportion has been termed “feto-pelvic incompatibility.” Birth weight and pelvic area have been shown to account for approximately 50% of the variation in calving difficulty in two-year-old beef heifers. Some calving difficulty is attributable to fetal malpresentation. Holland et al. (1993) analyzed records on 3873 calvings over a 21-year period from
the Colorado State University Resident Instruction beef cattle herd. Approximately 82% of the calvings were assisted and 18% were unassisted. Of all births, 96% were normal presentations and 4% were malpresentations. The most common malpresentations were those in the posterior dorsal position (73%). Factors that influenced the incidence of posterior dorsal presentations were year, sex of calf, sire of calf within breed, and age of dam. Bull calves represented 70% of the total posterior dorsal presentations, while heifer calves represented 30%. Within the Hereford breed, heritability estimate for posterior presentation was 0.17, suggesting a significant genetic contribution. In this study, cows that had more than one malpresentation in their lifetime were examined individually. One cow had four posterior dorsal presentations and one breech out of 10 calves in her lifetime.

Since most dystocia occurs in two-year-old first-calf heifers, the most consequential methods of reducing dystocia are selecting bulls that will sire lower birth weight of calves and proper replacement heifer selection and management. Cow-calf producers have traditionally selected bulls based primarily on visual appraisal. They usually selected a bull of a breed known for calving ease to breed to their yearling heifers. However, with all the selection pressure on growth traits and the related increase in birth weight, utilizing a “calving ease” breed has not necessarily resulted in calving ease. Some producers have opted for extremely low birth weight breeds, but at the same time have made a significant sacrifice in growth and therefore suffered from reduced weaning weights. The opportunity to identify sires that will sire low birth weight calves with moderate growth is available, because of the development of EPDs (Expected Progeny Differences).

EPDs are reported in units applicable to a given trait. If a bull is used on a group of heifers, the resulting calves are expected to have birth weight differences given by the bull’s EPD value relative to EPD values for any other bull of the same breed used on the same group of heifers. For example, suppose Bull A has a birth weight EPD of +5.0 and Bull B has a birth weight EPD of −2.0. If these two bulls were mated to a comparable group of heifers, the average birth weight on calves from Bull A would be seven lbs heavier than the calves from Bull B. The seven lbs is the difference between the two EPDs. Every EPD published on a bull has an accompanying ACC (accuracy). The ACC indicates reliability of the EPD. ACC values range from 0 to 1, least reliable to most reliable. The ACC value is a function of the amount of information available when the bull was last evaluated.

How should cow-calf producers use EPD information with respect to calving difficulty in first-calf heifers? It seems logical that a producer would want to minimize calving difficulty and achieve moderate weaning weights. Low birth weight EPD bulls with high accuracies and at least moderate weaning weight EPDs are usually only available through artificial insemination. Birth weight EPDs are advantageous to have on bulls to be used naturally as well. It is important to remember that birth weight EPDs on yearling bulls will have low accuracies and will therefore be less reliable.

A subject of considerable debate in both animal science and veterinary medicine the last few years is the value of pelvic measurements in heifers and bulls. There have been many studies that have investigated the relationships, both phenotypic and genotypic, between pelvic measurements and calving ease. Most studies show significant relationships, although these relationships are not strong. I
believe that the differences of opinion on this topic are due to several factors. When studies are done, there is variation in the statistical methods used, data sets used, and interpretation of results by scientists. This is an issue where one can find studies to support almost any position one chooses to take. Given that, let me provide you with my “position” on this issue. I do believe that there is value in measuring pelvic area in yearling heifers as a means of identifying heifers that are likely to have high degrees of calving difficulty. The nutrition program for the replacement heifer is also important for minimizing calving difficulty in first-calf heifers.

III. Timing of Breeding and Calving

What is the most appropriate time of year to breed and calve beef cows? What is the optimum length of the breeding and calving season? Let’s address the second question first. Numerous Extension bulletins contain the recommendation that cow-calf producers should strive for a 60-day breeding season. Cows that conceive during this 60-day period will calve in a fixed calving season (somewhat longer than 60 days because of gestation length variation). The supposition is that cows that are grouped by stage of production can be managed more appropriately nutritionally, since nutrient requirements are highly influenced by stage of production. For example, cows that are lactating have notably higher nutrient requirements than cows that are non-lactating and in mid-gestation. If cows calve on a year-around basis and if they are group fed, some cows will be deficient and some will receive nutritional excesses. So to optimize use of both grazed and supplemental feeds, grouping of cows by stage of production makes sense. I would argue that a short calving season can be attained without a short breeding season. If a skilled veterinarian examines cows for pregnancy, cows can be dated and late bred cows can be culled. In fact, many times a late bred cow will have more value than an open cow. Cows that calve in a short, fixed calving season will also have heavier calves at a fixed weaning date as well.

The timing of calving is influenced by numerous factors, and also varies a great deal by location in the country. In the northern U.S., spring calving predominates. February, March and April are the peak calving months. The date that individual producers turn out their bulls and therefore choose to start their calving seasons is usually a function of expected weather at calving (producers usually choose to start calving when the worst part of winter is over), labor availability (many producers want to be done calving prior to starting farm work in the spring), desire for heavy weaning weights in the fall (most calves are sold in the fall and producers are subject to peer pressure at the livestock auction market), and forage availability (both quantity and quality) during peak demands of the cow. If the goal is to produce the most pounds of calf from the range resource at lowest cost, matching nutrient demand of the cow herd with forage availability is crucial. If supplemental feed is expensive, then matching cow herd demand to the forage resource becomes more critical.

Dr. Don Adams, a range nutritionist at the University of Nebraska, North Platte has been evaluating time of calving in western Nebraska. He is comparing two herds, one that starts calving March 20 and one that starts calving June 20. Preliminary results from his research suggests that the June calving herd has lower birth weights, reduced labor costs at calving, reduced calf scour, and lower feed costs. Dr. Adams also believes that calves born in the June calving herd provide greater marketing
flexibility because these calves can be “roughed” through the winter and go back to grass the next summer.

In the southern part of the U.S., I suspect that one wants to avoid both breeding and calving during the hottest part of the summer. The effects of heat stress on fertility are well documented. My last point to consider in choosing calving season is the market the calves enter. Since about 75% of the calves in this country are spring born, we now have a seasonal surplus of finished cattle in the late spring-early summer. Cattle-Fax data shows that on average there is a seasonal low in the finished cattle market in the late summer-early spring (1996-1997 may not fit because of the effect of drought in the southwest and high corn prices delaying cattle arrivals in the feedyard). Calves that target that finished cattle market are generally facing a seasonal price discrimination. We are now seeing some traditional spring-calving operations move to summer or fall calving in large part to hit a better market with their calves. As cow-calf producers improve their management skills, I suspect we will see more producers with business plans that provide greater marketing flexibility.

The “best” time to calve is a complex question. Numerous variables including forage availability, labor availability, weather possibilities at both breeding and calving, calf health, and marketing options should be considered.

Literature Cited


SELECTING AND MANAGING REPLACEMENT HEIFERS: MAKE THE COLOR OF FIRST CHOICE GREEN

Dr. W. Craig Burrell
USU Extension Animal Scientist

Several years ago, I ran a fall artificial breeding program for a large corporate ranch. Two hundred replacement heifers comprised one third of my project. After I had been checking heat and breeding the heifers for 20 days, the foreman stopped by to tell me that one third of the heifers needed to be sorted off the following day. The heifers were going to be sold for tax reasons. It was a “profit year.” He explained that they would sort off the colors they didn’t want. The heifers were crossbreeds and were an assortment of blacks, reds, greys and duns with various white markings. The boss wanted to have a herd uniform in color, and the foreman wanted to keep the reds and blacks that had very few white markings.

After he left, I pondered the situation. With the foreman’s plan, many of the good heifers I had inseminated during the first breeding period would be sold, and a lot of the poorly developed heifers that had not cycled yet would be kept. It was easy to pick out the heifers that had been inseminated because I had marked them clearly with green paint over their withers. As I rode through the heifers that night an idea came into my head. The next morning, as we rode out to the heifers in the early light, I made a proposition to the foreman: “The boss insists that we sort these heifers by color. Would it be okay if we make the color of first choice green?”

Today, we have numerous criteria to use when we select replacement heifers—Breed, frame size, weight, age, color, EPDs for growth, carcass and milk, disposition and many other factors. Years ago, I discussed this topic with Jim Wiltbank, and he told me something that has stuck with me. “The first factor to use when selecting replacement heifers is the production of a live calf as a two-year-old and the second factor to consider is the production of a live calf as a three-year-old.” Jim’s philosophy for selecting heifers included as much management as selection and as much common sense as scientific principle.

In this short paper, I will outline a process of selection and management that will enable a heifer to produce a live calf as a two-year-old and repeat her performance the following year.

At weaning time, we take our first critical look at replacements. If a producer is a bit tight on cash flow, it may be a temptation to sell the heavy ones and keep the younger ones. Most producers have found that the light heifers are not mature enough to breed the following year. Scientific data shows that both age and weight affect when a heifer will reach puberty. The breed of the heifer, and particularly the mature size also need to be taken into consideration. Hereford x Angus heifers with a mature weight of 1000-1050 lbs will be used as an example. Table 1 shows the percentage of the heifers showing heat at various ages and weights.
Table 1. Percentage of Hereford x Angus Heifers Cycling as Affected by Age and Weight

<table>
<thead>
<tr>
<th>WEIGHT</th>
<th>12</th>
<th>13</th>
<th>14</th>
<th>15</th>
</tr>
</thead>
<tbody>
<tr>
<td>500</td>
<td>30</td>
<td>40</td>
<td>60</td>
<td>90</td>
</tr>
<tr>
<td>550</td>
<td>30</td>
<td>50</td>
<td>60</td>
<td>90</td>
</tr>
<tr>
<td>600</td>
<td>40</td>
<td>70</td>
<td>80</td>
<td>100</td>
</tr>
<tr>
<td>650</td>
<td>50</td>
<td>70</td>
<td>90</td>
<td>100</td>
</tr>
<tr>
<td>700</td>
<td>50</td>
<td>80</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>

(Adapted from Fillmore 1984)

A chart like this can be used to determine a target weight at which 90 to 95% of the heifers will reach puberty. It is evident from the chart that less than 80 percent of the younger heifers that are 12 to 13 months old at breeding will reach puberty, even when they are pushed on feed. Furthermore, we need to select heifers from our example herd that will weigh over 650 lbs and be 14 months of age or over at the beginning of the breeding season. There may be some other criteria that a producer may wish to use in a selection program. However, the first priority should be to retain heifers that have the potential of attaining adequate weight and age to breed early as a yearling. If you apply this you have made “the color of first choice green.”

After studying the data in Table 1, we determine that heifers should weigh 675 lbs at breeding, and this becomes the target weight for the heifers. At this point some management decisions need to be made. First, we need to determine how much weight the heifers need to gain and second, we must determine an economical feeding program. The feeding program will be limited by what feeds are available and the economic feasibility of the program which will be affected by the cost of feeds and the value of a pregnant heifer. Most heifers will require a gain of 1 to 2 lbs per day to reach their target weight. Without supplementing with concentrates, poor to medium quality forage provided by grass hays and range will not sustain an adequate weight gain. Some producers choose to have heifers gain .5 lbs per day or less on poorer feed for two or three months and then place them on a ration which will allow them to gain 1.5 lbs per day or more for the remaining period of time prior to the breeding season. Some heifers are heavy at weaning and do not require an aggressive feeding program over the winter. These heifers can be sorted off and be fed on a ration that is tailored to their needs in order to reduce feed costs. It is essential to keep both the target weight and the economics of attaining it in mind when planning a feeding program.

Producers should consider the heifer development program on their ranch as a separate enterprise. Failing to invest adequately in the development of heifers will invite reproductive failure early in their tenure in the cow herd. However, if excessive spending occurs during the development stage it will not be recaptured later on in the cows productive lifetime. A budget should be calculated to determine the economic feasibility of a heifer development program. An example of a heifer budget is
included at the end of the paper in Tables 2 and 3. During some years and on some ranches it does not pay to raise heifers.

The management that has been applied to this point will assure that a high percentage of the heifers will cycle early in the breeding season. Nevertheless, to assure a high conception rate heifers must be gaining weight during the breeding season and they must be bred by a fertile bull or inseminated in a well managed artificial insemination program.

It is essential that heifers continue to grow and develop properly during gestation. A rule of thumb tells us that heifers should achieve 85% of their mature weight by the time they calve as a two-year-old. Pelvic size is correlated highly with frame size. Therefore, if heifers do not develop adequate frame more calving difficulties may be expected. Every ten years or so a group of people will get real excited about taking pelvic measurements. It is a tool that can be used to eliminate heifers with pelvic openings that are extremely small. However, if bulls with records for easy calving are used and heifers are fed to develop adequate frame by calving time most of the problems will be eliminated. Nevertheless, in some circumstances pelvic measurements can be used to identify heifers that have pelvic openings that are disproportionately small in comparison to their frame size.

Monitoring pregnant heifers during their second winter for body condition score is a useful tool to assure that they calve in moderate condition. Realize that these heifers are fighting an uphill battle. They are developing a calf, they are still growing, and we want them to have adequate body condition so they will produce milk and breed back again on schedule for the next year. As an extra handicap, they are usually doing this during the stress of winter and sometimes competing with older, larger cows for feed. It is essential to develop a nutrition program for them that is tailored to their needs. When Jim Wiltbank talked about breeding two-year-old heifers, he emphasized two factors—time and nutrition. The reproductive system of a cow requires time to recover after calving. Nutrition can affect how long the time period is from calving to first heat. The probability of estrus at 60 days postpartum is .91 for cows in good condition, .61 for those in moderate condition and .46 for those in thin condition (Whitman 1975).

Jim Wiltbank’s second criteria for heifer selection was production of a live calf as a three-year-old. You might wonder what selection has to do with breeding heifers as two-year-olds. I will explain.

1. We select heifers at weaning that have the potential of reaching their target weight by breeding season.
2. We provide adequate nutritional management to ensure that heifers reach their target weight.
3. We provide adequate reproductive management: breeding heifers twenty days earlier than the cow herd to calving ease bulls and applying practices that will ensure high conception rates.
4. If we breed more heifers than we need, it is possible to select heifers from this program that conceived early in the breeding season, culling ones that conceived late or are open.
5. We manage pregnant heifers so they will calve in moderate condition with minimal dystocia. By this process of selection and management we have ensured that the heifers calve the first year and that a high proportion of them calve early in the season in moderate body condition. These early calving heifers will have adequate body condition and adequate time
post calving to start cycling early in the breeding season.

6. By applying adequate reproductive and nutritional management throughout the breeding season and gestation period these animals will calve as three-year-olds.

Make the color of first choice green.

As you select weanling heifers in the fall make sure that your first priority is to choose heifers that have the potential to conceive early in the season as yearlings. (Cull the ones that won’t have adequate age.) The following fall, your first choice of the heifers bred as yearlings should be ones that have a high potential of re-breeding as 2-year-olds. (Cull the ones that will be late calvers.) If this selection is combined with proper nutritional and reproductive management you will be successful in having high calving rates in 2- and 3-year-old heifers.

Table 2.

<table>
<thead>
<tr>
<th>Beef Heifer Replacement Budget</th>
<th>Estimated Costs and Returns, Utah, 1997</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Units</td>
</tr>
<tr>
<td>Receipts: Replacement heifer</td>
<td>head</td>
</tr>
<tr>
<td>Operating Costs:</td>
<td></td>
</tr>
<tr>
<td>Heifer calf</td>
<td>cwt</td>
</tr>
<tr>
<td>Feed</td>
<td></td>
</tr>
<tr>
<td>Hay</td>
<td>tons</td>
</tr>
<tr>
<td>Pasture &amp; aftermath</td>
<td>AUMs</td>
</tr>
<tr>
<td>Other direct costs</td>
<td></td>
</tr>
<tr>
<td>Vet &amp; medicine</td>
<td>head</td>
</tr>
<tr>
<td>Breeding</td>
<td>head</td>
</tr>
<tr>
<td>Death loss</td>
<td>percent</td>
</tr>
<tr>
<td>Miscellaneous</td>
<td>head</td>
</tr>
<tr>
<td>Interest @ 9.00% for 16 months</td>
<td></td>
</tr>
<tr>
<td>Total Cost</td>
<td></td>
</tr>
<tr>
<td>Net above total cost</td>
<td></td>
</tr>
</tbody>
</table>
Table 3.

<table>
<thead>
<tr>
<th>Price of hay per ton</th>
<th>Price of heifer calves per cwt if sold at weaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>50</td>
<td>60 70 80 90 100</td>
</tr>
<tr>
<td>60</td>
<td>576 632 688 744 800</td>
</tr>
<tr>
<td>70</td>
<td>607 663 719 775 831</td>
</tr>
<tr>
<td>80</td>
<td>638 694 750 806 862</td>
</tr>
<tr>
<td>90</td>
<td>668 724 780 836 892</td>
</tr>
<tr>
<td>100</td>
<td>699 755 811 867 923</td>
</tr>
</tbody>
</table>

Assumptions:
- Death loss: 2.00%
- Heifer weaned in October, calved in March at age 2 years
- Interest charge is based on value of weaned heifer

Heifer fed hay from November through April of each year

<table>
<thead>
<tr>
<th>Calf</th>
<th>Summer</th>
<th>Bred heifer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pounds of hay fed per day</td>
<td>14 0 20</td>
<td></td>
</tr>
<tr>
<td>Pounds of gain per day</td>
<td>0.8 1.4 0.8</td>
<td></td>
</tr>
</tbody>
</table>

Budget prepared by E. Bruce Godfrey and W. Craig Burrell, 1998 Utah Agricultural Statistics


AUTUMN SEASONAL BEEF HERD MANAGEMENT DECISIONS

William G. Kvasnicka, DVM
Extension Veterinarian, University of Nevada, Reno

TOPICS
Section I Introduction
Section II Beef management calendar
Section III Early weaning considerations and management
Section IV Preconditioning considerations and management
Section V Pregnancy examination
Section VI Cull cow decisions
Section VII Fall management of bulls
Section VIII Summary

Section I: INTRODUCTION
Managing beef cattle involves planning and implementing practices that take into account the available resources and goals of the rancher. Management practices, nutrition, and diseases of the herd necessary to improve production and increase profitability need to be considered. However, the cost of the total management program must be less than the resulting economic gain and should be structured to fit the rancher’s needs. When planning and implementing practices consideration is given to all aspects of the ranching operation and to the production system employed.

The ideal program is drafted as a beef management calendar. The calendar contains a monthly listing of the common management practices needed for commercial beef herd production in the Great Basin region. The monthly strategies vary from herd to herd and seasonally from year to year. The program is changed by the influence of the stage of development, capital, marketing, environment, and geographic location.

The plans should be reviewed seasonally throughout the year. Programs must be flexible so that alternatives are implemented at any time, based on results of periodic evaluation. Seasonal reviews are necessary to review and examine progress for the season just completed and to adjust the monthly strategy if necessary. In addition to review of the season just completed it is timely and important to review and plan for the forthcoming seasonal program practices and needs. The autumn plans should be reviewed at the end of the spring season and again at the end of the summer season. A practice may be increased, reduced, or eliminated, with or without introducing a new practice. Review in advance allows time to update equipment and animal health inventory, repair facilities, and arrange for additional labor if needed.
Section II: BEEF MANAGEMENT CALENDAR

Following is a suggested fall season beef management calendar for commercial cattle production in the Great Basin region. The calendar is based on a mid February through April calving season. These dates are not necessarily the best dates for all producers but were chosen because they are reasonably close to the times best suited to utilize the available feed resources in the Great Basin. The cowherd’s energy and protein requirements increase at calving and remain high through the breeding season. It is best to plan the breeding season for the time of the year when forage quality is at its best. Spring pasture in the Great Basin offers the best feed for breeding cows and heifers. Plan your monthly calendar based on your feed resources and availability of labor. Remember the time to review and plan for the fall season is at the end of the spring season and again at the end of the summer season.

This fall season calendar begins in July and is continued through December. The summer months are included because events occurring during late summer often influence the autumn management practices. Drought may necessitate early weaning in order to maintain the body condition of the gestating cow. Culling of the cowherd and cull cow management should be planned based on summer conditions and events in order to maximize the income derived from excess inventory. A current market price often dictates when calves are weaned, whether they are sold as weaned, preconditioned before marketing or if the ownership of the weaned calves will be retained as stockers or feeders.

This calendar includes recommended practices for cows grazing private land, meadows, or irrigated pastures and also for cows usually moved in October from public land allotments. Producers should recognize that the calendar is only a general guide. Each production system requires a schedule tailored to fit the management requirements of the individual ranching operation.
## Great Basin Beef Cow Herd Management Calendar

<table>
<thead>
<tr>
<th>Month</th>
<th>Management Issues</th>
<th>Animal Health Issues</th>
</tr>
</thead>
<tbody>
<tr>
<td>July</td>
<td>• Continue fly control. As tags get old you may need to begin spraying or using dust bags.</td>
<td>• Check for pinkeye and footrot on a regular basis. Early treatment is essential.</td>
</tr>
<tr>
<td></td>
<td>• Take stock of hay and forage inventory so additional purchases can be made if needed.</td>
<td>• Develop and maintain a veterinary production medicine program. Veterinarian acts as consultant for program review.</td>
</tr>
<tr>
<td></td>
<td>• Send in forage samples on hay now so you will have results to use in planning winter-feeding.</td>
<td>• Establish fall animal health medications, vaccines, dewormers, and pesticide needs. Product discounts are usually available with volume purchase.</td>
</tr>
<tr>
<td></td>
<td>• Clip overgrowth in meadow pastures that were grazed during the spring and summer.</td>
<td>• A veterinary/client/patient relationship is necessary for purchase of prescription medications and extra label use of medications.</td>
</tr>
<tr>
<td></td>
<td>• Check water and minerals often. Trace minerals are necessary to assure immune system function.</td>
<td>• Train and certify (or re-certify) manager and employees regarding NCBA Beef Quality Assurance Guidelines.</td>
</tr>
<tr>
<td></td>
<td><strong>Continue Yearly</strong></td>
<td></td>
</tr>
<tr>
<td>Month</td>
<td>Management Issues</td>
<td>Animal Health Issues</td>
</tr>
<tr>
<td>--------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
</tbody>
</table>
| August | • Continue fly control. As tags get old you may need to begin spraying or using dust bags.  
• Consider creep feeding if grazing private pastures depending on pasture conditions and marketing plans.  
• If possible pregnancy check cows and heifers 45 to 60 days after the end of the breeding season. Not feasible if grazing public allotments.  
• Check cows for bad eyes, udders, legs, and production record for culling decisions.  
• Establish permanent IDs for bred heifers.  
• Consider selling open cows and heifers to preserve resources. Decision to sell will be based on market conditions and body condition of the cull animals.  
• Pull bulls at end of breeding season and place in secure pasture. Young bulls and thin bulls may need supplemental feed.  
• Check water and minerals often. Trace minerals necessary to assure immune system function. | • Treat cows and calves for grubs between now and the first of October.  
• Consider options for selling early weaned calves, backgrounding or maintaining ownership.  
• Vaccinate at least three weeks before weaning with IBR, PI-3, BVD, BRSV, and Clostridial vaccines.  
• If not preconditioned vaccinate at weaning as above.  
• Deworm early-weaned calves at weaning and feed a coccidiostat.  
• Implant calves retained as stocker cattle. Do not implant replacement heifers.  
• Have veterinarian outline treatment regimes for sick calves.  
• Observe early-weaned calves for bovine respiratory disease and signs of disease twice daily. Pull sick to hospital pen and treat.  
• Call veterinarian to necropsy calves following death to determine cause of death and to revise treatment regime if necessary. |
|        |                                                                                                                                                                                                                      |                                                                                                                                                                                                                        |
| September | • Continue fly control. As tags get old you may need to begin spraying or using dust bags.  
• Pull fly tags now to reduce development of resistance.  
• Check water and minerals often. Trace minerals necessary to assure immune system function. | • Follow veterinarian’s treatment regimes for sick calves. Necropsy calves following death to determine cause of death and to revise treatment regime if necessary.  
• Continue to observe weaned calves for bovine respiratory disease and signs of disease twice daily. Pull sick to hospital pen and treat.  
• Plan weaning facilities and hospital pens.  
• Review animal health equipment and supply inventory.                                                                 |
<table>
<thead>
<tr>
<th>Month</th>
<th>Management Issues</th>
<th>Animal Health Issues</th>
</tr>
</thead>
<tbody>
<tr>
<td>October</td>
<td>• Pregnancy test cows moved from grazing allotments.</td>
<td>• Pull bulls and test for trichomoniasis two weeks after sorted from cows.</td>
</tr>
<tr>
<td></td>
<td>• Wean calves.</td>
<td>• Deworm bulls and treat for grubs and lice.</td>
</tr>
<tr>
<td></td>
<td>• Precondition calves. Plan nutritional requirements of calves for the 45-day preconditioning period.</td>
<td>• Sort thin bulls for supplemental feeding.</td>
</tr>
<tr>
<td></td>
<td>• Body condition cows and sort thin cows for supplemental feeding.</td>
<td>• Dehorn and castrate; however, the most opportune time to dehorn and castrate is at birth or at branding.</td>
</tr>
<tr>
<td></td>
<td>• Consider feeding first calf heifers separate to assure second conception.</td>
<td>• Vaccinate at least three weeks before weaning with IBR, PI-3, BVD, BRSV, and Clostridial vaccines.</td>
</tr>
<tr>
<td></td>
<td>• Cull open cows and heifers</td>
<td>• If not preconditioned vaccinate at weaning as above.</td>
</tr>
<tr>
<td></td>
<td>• Consider selling late calving cows based on pregnancy determination.</td>
<td>• Deworm calves and feed a coccidiostat at weaning.</td>
</tr>
<tr>
<td></td>
<td>• Cull cows with bad eyes, legs, udders and those weaning poor doing calves.</td>
<td>• Implant calves retained as stocker cattle. Do not implant replacement heifers.</td>
</tr>
<tr>
<td></td>
<td>• Select replacement heifers. Use weaning weights to project needed gain between now and breeding (March or April).</td>
<td>• Calf hood vaccinate heifers for brucellosis at 4-8 months of age.</td>
</tr>
<tr>
<td></td>
<td>• Check water and minerals necessary to assure immune system function.</td>
<td>• Observe weaned calves for bovine respiratory disease and signs of disease twice daily. Pull sick to hospital pen and treat.</td>
</tr>
<tr>
<td></td>
<td>• Pull bulls and test for trichomoniasis two weeks after sorted from cows.</td>
<td>• Have veterinarian surgically treat cows with early signs of cancer eye.</td>
</tr>
<tr>
<td></td>
<td>• Deworm bulls and treat for grubs and lice.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Sort thin bulls for supplemental feeding.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Dehorn and castrate; however, the most opportune time to dehorn and castrate is at birth or at branding.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Vaccinate at least three weeks before weaning with IBR, PI-3, BVD, BRSV, and Clostridial vaccines.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• If not preconditioned vaccinate at weaning as above.</td>
<td>• Deworm calves and feed a coccidiostat at weaning.</td>
</tr>
<tr>
<td></td>
<td>• Deworm calves and feed a coccidiostat at weaning.</td>
<td>• Implant calves retained as stocker cattle. Do not implant replacement heifers.</td>
</tr>
<tr>
<td></td>
<td>• Calf hood vaccinate heifers for brucellosis at 4-8 months of age.</td>
<td>• Calf hood vaccinate heifers for brucellosis at 4-8 months of age.</td>
</tr>
<tr>
<td></td>
<td>• Observe weaned calves for bovine respiratory disease and signs of disease twice daily. Pull sick to hospital pen and treat.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Have veterinarian surgically treat cows with early signs of cancer eye.</td>
<td>• Have veterinarian surgically treat cows with early signs of cancer eye.</td>
</tr>
<tr>
<td>November</td>
<td>• Deworm cows and heifers after November 1.</td>
<td>• Vaccinate replacement heifers for breeding diseases (IBR, PI-3, BVD, BRSV, H. somnus, Trichomoniasis, Vibriosis, and Leptospirosis). They must also be scheduled for booster vaccinations one month before breeding season.</td>
</tr>
<tr>
<td></td>
<td>• Treat for lice now and again in three weeks. Option to wait until late December or when signs of the winter active parasite show if you decide to treat only one time.</td>
<td>• Do not vaccinate cows now for breeding diseases. Time cowherd boosters just before the breeding season.</td>
</tr>
<tr>
<td></td>
<td>• Check water and minerals often. Trace minerals necessary to assure immune system function.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Watch body condition of bred heifers and adjust ration to reach target weight.</td>
<td></td>
</tr>
</tbody>
</table>
### Section III: EARLY WEANING CONSIDERATIONS AND MANAGEMENT

Traditionally, weaning time has been set relative to the movement of cows from pasture to winter-feeding grounds. Early weaning would be at any time less than 7 months of age. In selecting the appropriate time to wean, a producer needs to evaluate how the cowherd is responding to the available feed resource. In some locations, fall regrowth may occur particularly with cool season grass, otherwise pastures normally deteriorate in the fall. If milk production levels are high enough, cows may lose condition before milk production drops. Therefore, the strategy for weaning should be to make optimal use of milk production and remove calves as soon as feed resources begin to decline. Therefore, early weaning does not mean at 30 days of age, but any time before 7 months.

Calf gains can be improved with better feed, perhaps in other pastures, or supplemental feed. In a normal year, most western ranges will support gains of 2 pounds per day. In late July or August, typical calf gains on pastures will be about 1 to 1 1/2 pounds per day. Most ranches will have areas of unused grass in the early fall that can provide nutrition for calves to gain 1 1/2 pounds without nursing. It is more economical for calves to be put on these resources after weaning than to feed them through the cow to support calf gains.

Under low feed conditions, earlier weaning has some advantages. The cows will maintain body weight when not nursing calves and go into winter in better condition. Dry, non-lactating cows need less water than those nursing calves, so dry cows range farther away from water. Dry cows can go to water every other day and still thrive, but cows nursing calves need water every day to support milk production. In areas where feed and stock water shortages create a problem, cows could be left on the range, and calves could be weaned and fed in dry lot or placed on irrigated pasture if available.

At 120 days of age, the rumen is functioning sufficiently that calves can make satisfactory gains without the benefit of milk. By this age, nursing calves on pasture probably are obtaining more than one-half of their nutrition from natural forage.

<table>
<thead>
<tr>
<th>Month</th>
<th>Management Issues</th>
<th>Animal Health Issues</th>
</tr>
</thead>
</table>
| December | • Vitamin A supplementation may be needed.  
• Assure balanced mineral supplementation including trace minerals.  
• Keep replacement heifers gaining to reach target weight at breeding.  
• Keep first calf heifers gaining to assure second conception.  
• Body condition score cows and feed to maintain a body condition of at least a score of 5. | • Plan pre-calving and pre-breeding vaccination of cowherd to prevent calf scours and reproductive diseases. Time vaccinations about four to six weeks before calving and again before breeding.  
• Inventory animal health supplies and equipment. Plan for and purchase pre-calving and pre-breeding vaccinations needs. Purchase calving supplies.  
• Sanitize calving barns and equipment.  
• Review calving management procedures with veterinarian and ranch employees.  
• Review NCBA Beef Quality Assurance Guidelines. |
A weaned calf normally consumes about 2.5 to 3 percent of its body weight of high quality dry feed each day. By the time the calf weighs 300 pounds it will eat 8 to 9 pounds per day of a ration that is 50 percent high quality roughage and 50 percent concentrate. The amount of roughage can be varied from 35 to 65 percent depending on availability.

A ration that has given excellent results with weaned calves is 2 pounds of barley, 1 pound of protein supplement, and free-choice grass hay. Use caution when feeding barley in combination with alfalfa because of the potential for bloat.

Typically calves weaned at 3 1/2 to 4 months of age do not require a milk replacer. They do need a palatable and nutritious ration. Unless there is a feed emergency, calves should not be weaned at less than 5 months of age. Successful programs incorporate considerations for health, nutrition, and strategic timing of weaning. All of these factors, properly managed, will reduce stress and increase the successful economics of ranch operations.

Section IV: PRECONDITIONING CONSIDERATIONS AND MANAGEMENT

Bovine respiratory disease (BRD), commonly called shipping fever, is the most common disease of weaned calves. The disease usually occurs 7-10 days after weaning. BRD is associated with the stress of weaning and processing, plus the additional stress of shipping. Because of the common occurrence of BRD and the losses associated with the disease complex, attention needs to be directed toward preventing the problem.

1) **Preweaning management options:** Successful control of BRD begins with good management while the calves are still on the range and continues through preweaning handling, weaning, and shipping.
   a) Castration and dehorning.
      i) Preferable this be completed shortly after birth or at least during branding.
      ii) The castration operation should be done with a knife instrument.
   b) Feeding and management.
      i) Trace mineral supplementation from birth to weaning.
         (1) Copper, selenium, and zinc are needed to maintain the function of the immune system.
         (2) Creep feed for 60 days preweaning.
         (3) Bunk break the calves preweaning.
         (4) Assure that the calves are familiar with water troughs or feedlot type water bowls.
         (5) Preweaning feed and water management allows for the cows to be removed from the calves at weaning time minimizing the stress of weaning.
   c) Transportation.
      i) Provide adequate bedding.
      ii) Calves should not be without feed and water more than 8-12 hours.
   d) Parasite control: Internal and external parasite burdens create stress and lower the resistance of beef calves.
      i) Stomach worms.
         (1) Prevent stomach worm infestations by following a strategic deworming program.
         (2) Treat all of the calves at weaning with a class II dewormer. Administer the dose
recommended on the label to control inhibited forms of stomach worms.
(a) Remember that if the calves are treated before weaning and turned out on
grass they will become re-infected.
(b) Fecal exams may be necessary to determine the need for retreatment on entry
into the feedlot.

ii) Flukes.
(1) Use products to control liver flukes only if infestation occurs under the ranch’s
management environment.
(2) Time treatment to kill the adult and developing forms of the liver flukes.
(3) Follow a strategic fluke control program to prevent fluke infestation.

iii) Lice.
(1) Treat the calves at weaning.
(2) One treatment will only kill the adults. The eggs will hatch and reinfest the herd.
(3) For complete control treat again no longer than three weeks after the first
treatment and do not mix the calves with untreated cattle.

iv) Grubs.
(1) All beef calves should be treated with an appropriate grubicide at weaning.
(2) Calves will not be reinfected if the treatment is applied after the fly free date.

v) Coccidiosis.
(1) Coccidiosis should be prevented. Do not wait for symptoms to appear. All beef
cattle are infected and acute disease will often occur associated with the stress of
weaning.
(2) Feed an approved, effective coccidiostat in the preweaning ration and continue for
at least three weeks after weaning.

e) Pre-vaccination: All calves should be immunized at least 2 weeks prior to weaning.

i) Clostridial vaccines.
(1) Utilize the 7-way vaccine. Use the single redwater vaccine if necessary rather than
the 8-way vaccine.
(2) Most Clostridial vaccines require two shots 3 weeks apart. A new one-shot
Clostridial vaccine is now marketed and is effective.
(3) Administer all Clostridial vaccine under the skin in the neck.
(4) Blackleg protection may be needed at branding time.

ii) Have all heifer calves calfhood vaccinated against Brucellosis. These calves must be
marked with a Bangs vaccination tag and with a legible tattoo.

iii) Pasteurella vaccination.
(1) Over 72% of the stocker cattle with BRD are infected with Pasteurella hemolytica.
(2) Effective vaccines are now available and should be included in the pre weaning
vaccination program. Follow label directions.

iv) *Hemophilus somnus* is a bacterium that causes BRD and a central nervous disease in
newly weaned calves.
(1) Killed vaccines should be used to stimulate resistance to *H. somnus*.
(2) Most vaccines available require two shots.

v) Red nose, PI-3, BRSV and BVD are the common viral agents associated with BRD.
(1) Killed and modified live vaccines are available.
(2) Follow label directions.
(3) Killed vaccines require two shots.
(4) Do not mix calves that have been vaccinated with an MLV vaccine with pregnant cows.
(5) Residual colostral antibodies can interfere with the development of resistance stimulated by MLV vaccines when administered before 6 months of age.
(6) Most immunologists now recommend using only killed BVD vaccines.

vi) The consulting veterinarian should design a vaccination schedule. The schedule should be entered on a management calendar to assure timely administration of the correct vaccines.

vii) Train the employees about correct injection sites and proper handling of vaccines.

2) **Strategies for marketing beef calves or for retained ownership.**

   a) Least cost option.
      i) Sell horned bull and heifer calves at weaning.
      ii) Involves only one handling and no treatments.

   b) Minimal cost option.
      i) Producer castrates and dehorns calves at two months of age.
      ii) Goal is to get higher sale prices at weaning time.

   c) Preimmunization option.
      i) Calves are dehorned, castrated, treated for warbles, and vaccinated with the IBR, PI-3, and clostridial vaccines at least 3 weeks before they are sold.
      ii) No requirement they are held for any length of time between weaning and sale.
      iii) Some producers also vaccine with a Pasteurella and a *Hemophilus somnus* bacterin three weeks before sale.

   d) Preconditioning option.
      i) If the following procedures are done 3 to 6 weeks before weaning, the only stress imposed at weaning time is separation from their dams.
         1) Castration and dehorning at least 3 weeks or more before weaning.
         2) Insecticide treatment for warbles and lice plus deworming calves before weaning.
         3) Administer all vaccines at least 2 weeks before weaning.
         4) Hold calves for a period of 3 to 4 weeks after weaning so they become accustomed to dry feed and drinking out of water tanks.
         5) Ranchers may elect to creep-feed calves or offer a preconditioning ration for 1 month before weaning.
         6) The producer owns the calves for at least 45 days prior to sale or shipment.
      ii) The preconditioning option is successful if both the producer and the feedlot operator benefit.
         1) Morbidity and mortality caused by BRD should be reduced.
         2) When calves are sick fewer treatments are required, relapses and deaths should be reduced.
         3) Producers will benefit directly if they retain ownership of the calves at a commercial feedlot or if they over winter the calves and graze the herd as stockers.
3) **Buyer/seller assurance of conditioning practices.**
   a) Certified preconditioning programs.
      i) The veterinarian can conduct the program. The calves are identified with an official
         preconditioning ear tag. A health certificate is completed at the time of sale attesting to
         the management options and vaccinations that have been accomplished.
      ii) The rancher under the supervision of the consulting veterinarian can conduct the
          program.
   b) NCA-IRM certification program.
      i) The producer records all practices on the attached NCA-IRM calf health record form.
      ii) The form is not certified by anyone except the producer who signs that the treatments
          have been completed.
      iii) The buyer and seller develop a strong alliance.
      iv) After the parties involved have established a good working and trading relationship the
          form will gain credibility.

**Summary:** Programs to condition the immune system for weaning of beef calves will raise the
resistance and lower the challenge imposed by weaning and shipping of beef calves. The result
should be a reduction of the morbidity and mortality caused by Bovine Respiratory Disease plus
a decrease of price docking at marketing.

**Section V: PREGNANCY EXAMINATION**

Pregnancy diagnosis allows a cattle producer to make better management decisions about the beef cowherd. A veterinarian using a relatively simple procedure performs pregnancy diagnosis. The arm is inserted into the cows’ rectum and the reproductive tract, which lies just below the rectum, is examined. Depending on the stage of the pregnancy different structures can be felt that are supportive or positive signs of pregnancy. For example, an enlarged uterus would suggest but not be a sure sign of pregnancy. (Recent pregnancy, pus, or a decomposing fetus, as well as a normal pregnancy, will enlarge the uterus). Feeling a live fetus or the placental membranes are examples of positive signs of pregnancy.

In some cases the veterinarian may be able to estimate calving dates based on pregnancy checking. Checking cows at earlier stages of pregnancy allows a veterinarian to more accurately predict the calving date.

Having cows pregnancy checked requires an adequate facility. Cows must be put into a head catch so that they are well restrained for the procedure. There must be a way for the veterinarian to safely get behind the cow to perform the examination.

Ultrasound technology is now available for cattle pregnancy diagnosis by some veterinarians. Use of the ultrasound is made when early diagnosis (down to 26 days versus 35-40 days for manual examination). Ultrasound will also allow sexing the fetus if examined between 50 and 70 days after breeding. These advantages will not justify this more expensive procedure in all cases.

Pregnancy detection is a technology that is vastly under utilized in the beef industry. Pregnancy detection is worth it! It costs an average of $300 per year to keep a cow. Most herds, even small herds, have at least one open cow every year. In the U.S., an average of 10 to 25% of the cows in a herd are open depending on location and herd size. Veterinarians charge $1.50 to
$3.00 per head for the professional service. Often vets will charge by the hour. If you have good facilities you can work cattle quickly and reduce the cost per head. One open cow in a herd of 20-100 cows, you easily pay for the service.

A veterinarian can also age fetuses and give an expected calving date. Therefore, cows can be sorted according to calving dates and the producer has the option of selling the late calving cows. In order to do this, the bull needs to be out at least 45 days and no cow should be farther along than 120 to 130 days.

Often producers will learn pregnancy detection. Consider that it requires the examination of at least 1,500 cows to become proficient at performing the examination and especially to age the fetuses. In addition, it is necessary to palpate more than once a year to retain the skills necessary to accurately determine pregnancy of cattle.

Value can be added to the time and labor required to gather and handle cows for pregnancy examination. Each cow can be evaluated and the results used for making culling and management decisions.

1. Body condition score the cows and heifers. The herd can then be sorted according to body condition score and the nutritional requirements can be adjusted to maintain the recommended score of five. This will assure cows produce an adequate milk supply for the newborn calf and improve conception rates during the subsequent breeding season.
2. Check for cancer eye and lump jaw.
3. Examine the feet and legs for defects that limit the ability to graze, walk and care for the calf.
4. Examine the udder and eliminate cows with signs of mastitis, blank quarters, and well-placed teats.
5. Check the teeth to cull those cows with missing or worn teeth.
6. Evaluate the behavior of the cow and consider eliminating cows with undesirable behavior characteristics.
7. Review the weaning weight records and cull cows that produce poor doing calves.
8. Producers are tempted to vaccinate cows at this time to eliminate handling the herd again. A successful vaccination program requires using the right vaccine at the right time!

**Section VI: CULL COW DECISIONS**

Several criteria must be applied when culling the cowherd. Cull open cows or cows not raising a calf to weaning unless economic conditions warrant retaining a pregnant cow that has not weaned a calf. Any unsoundness that impairs bearing or raising a calf to weaning or that might result in unsatisfactory performance the next year is a basis for culling. Another criterion for culling is the weight and quality of her weaned calf compared with the rest of the cowherd. Decisions are only as good as the information upon which they are based. Good records make sound management decisions possible.

Beef cow owners should evaluate the performance of their animals at least once a year and perhaps more often. The most convenient time for evaluating is when the cowherd is examined for pregnancy or when the calves are weaned. For spring-calving cows, this is in the fall before supplemental feed is offered.
Before any decisions can be made about culling animals from the herd, the cow owner or manager must make two decisions. Which production traits are most desirable, and what priority should be given to each trait. It is management’s responsibility to determine the minimum levels of performance that a cow must meet to stay in the herd. These levels may be different from herd to herd due to the expansion or reduction of herd size. There are two minimums that the cow should meet. She should wean a calf, and rebreed early in the breeding season.

The information to use in determining which cows to cull includes information supplied by the animals own performance and information that compares the animal to the herd or group. Each female entering the herd must meet these critical performance levels 1) breed early in the breeding season (first 40 days), 2) deliver a live calf, 3) rebreed on schedule (within 80 to 90 days after calving), and 4) wean a calf.

After a cow meets these necessary performance levels, other culling criteria should be of a comparative nature. The most important of these is the size or weight of her calf. This can be established fairly only by comparing the calf’s weight or standing within an age group for a particular year or similar environment.

Economically important traits that need to be selected for and retained in the herd are reproduction, structural soundness, and production.

Reproduction

Heifers should calve at two years of age and raise a calf to weaning. Cows should rebreed and calve every 365 days under the environment in which they are maintained with a minimum of supplemental feed. A replacement heifer development program, should allow for the breeding of more heifers than are needed with final selection based on how early the heifer breeds. Selection pressure should be toward heifers and cows that breed and rebreed early in the breeding season.

Open cows are the greatest contributors to low weaning percentages. On the average, a cow that does not breed one time will lose 15 to 20 percent of her lifetime production potential. It will take the net return from two to three productive cows to pay for the maintenance of the open cow. An unusually high number of open cows warrants a serious investigation. Diseases in the cowherd or bull reproductive problems could be the cause. It would make more economic sense to sell the open cows and buy bred cows or bred heifers that have a known genetic and health background rather than to wait two years for these open cows to wean their next calf, providing they conceive when next exposed. Research has shown that open cows conceive only about two-thirds of the time.

Death loss, infertility, low productivity and advanced age may result in the culling of 15 to 25 percent of the cowherd annually. Low culling rates permit more intense selection of the replacement heifers raised. A high percent calf crop weaned has a positive effect on the culling/selection. In commercial herds, the expense of raising replacements must be compared with the amount of genetic improvement desired to determine culling rate.

Structural soundness

With the high cost of replacement heifer development, longevity becomes extremely important. Evaluate the soundness of mouth, feet, legs and udders. Cull cows with problems. Examine the eyes. Salvage cows exhibiting any signs of cancer eye before they are discounted at the market.
place. Remove cows that have previously prolapsed or exhibited abnormal calving difficulty, or that exhibit any other physical impairment that would increase management needs and costs in producing a calf.

**Production**

The cow should provide enough milk to wean a calf that will reach the weight goal set by the manager. Genetic ability for growth is important. The most reliable means of making genetic progress for economically important traits is to use superior sires. If the replacement heifers are produced within a herd, 87.5 percent of the genetics contained in the calf crop will come from the last three sires or groups of sires used in the herd. Therefore, selecting herd bulls that are superior for economically important traits (birth weight or calving ease; maternal, weaning and growth breeding values; or expected progeny differences) will aid in establishing a trend of genetic improvement.

Included in this proceedings are two papers describing in detail management of cows that are culled. These papers are included with the approval of the authors. The first paper is *Feeding and Marketing Cull Cows*. The second paper is *Marketing Alternatives of Cull Cows: A Case Study*. This information will aid producers in making autumn management decisions regarding marketing of culled cows.

**Section VII: FALL MANAGEMENT OF BULLS**

A high degree of reproductive performance is the key to profits for a cow/calf operation. Bulls must be healthy and properly managed continuously to meet the high levels of fertility desired in beef herds. To impregnate a high number of cows during the breeding season a bull must be sound of sight and limb, be capable of manufacturing a high percentage of normal sperm cells and be able to deliver the semen to the cow’s reproductive tract. Practical research shows that there will be an increase in fertility by careful screening and maintenance of bulls. Too often much of the attention is given to the health of the cowherd and the bulls are not properly cared for. Bulls should be pulled at the end of the breeding season and the yearly management program initiated.

Well-managed ranches give bulls a physical examination at the end of the breeding season to detect injuries, body condition, and plan the post-breeding season nutrition program. Bulls should start the breeding season with a body condition score of 6 on the 1 to 9 scale. Thus, thin bulls should be sorted after the breeding season to restore body condition. The nutritional program should be adjusted for the entire bull battery to maintain a desirable body condition.

Bulls should be dewormed and treated for lice and grubs at the end of the breeding season. Remember that effective louse control requires the application of approved pesticides twice. The first treatment will kill the adult and developing lice but will not kill the eggs. The eggs hatch within 21 days. The second treatment applied three weeks after the first treatment will kill the lice that hatch after the first treatment before they mature and produce additional eggs.

Herds that are under a trichomoniasis control program collect samples for culture after the breeding season. Three tests are needed in order to assure that a bull is not infected.

A vaccination schedule should be outlined for the bull battery. It is advisable to administer the vaccines just before the breeding season and can be accomplished at the same time that a breeding soundness
examination is performed.

Section VIII: SUMMARY

Most Great Basin cattle producers presently have some management plan or vaccination schedule they try to follow. Current programs are based on tradition and experience or on free advice received from animal health sales representative or local Extension faculty. Programs may be formulated following a disaster and are often discharged after the disaster has been forgotten.

There is a need to change because the industry is facing increased operating costs and a reduction in profitability. Vaccines and medications are often misused or not applied at the correct time. There is a lack of understanding of the influence management and nutrition has on animal health and production efficiency. A producer cannot afford to have a planned production system and animal health program. There is a tendency to place too much trust in vaccines. However, neglecting to strategically use known and proven management practices causes the largest losses of productivity. The autumn beef management practices outlined in this paper are based on sound research and offer a solution to solving the crises facing the industry. Producers should also outline and institute a yearly program to further enhance the health and productivity of their ranching operations.

References


Field, R.W. 1997. Immunization for Cow/Calf Operations. Department of Large Animal Medicine & Surgery, College of Veterinary Medicine, College Station, TX.


Hutchinson, L.J. Cattle Vaccines. Special Circular 306. The Pennsylvania State University, College of Agriculture, Cooperative Extension Service, University Station, PA.


McGinty, A., Machen, R. Reducing Livestock Losses to Toxic Plants. B-1499 Texas Agricultural Extension Service. College Station, TX.


Wikse, S.E. 1992. The Relationship of Trace Element Deficiencies to Infectious Diseases for Beef Calves. TAMU Beef Cattle Short Course. Department of Large Animal Medicine & Surgery, College of Veterinary Medicine, College Station, TX. 1997

MARKETING ALTERNATIVES OF CULL COWS: A CASE STUDY

Ron Torell, University of Nevada Cooperative Extension, Livestock Specialist
Willie Riggs, University of Nevada Cooperative Extension, Extension Educator
Cevin Jones, Intermountain Beef Producers Feedlot, Eden ID
Ken Conley, University of Nevada, Gund Ranch Manager

INTRODUCTION

The typical Nevada range cow-calf operation grazes cattle on federal rangelands through the spring, summer and fall periods. Because cattle are “not handy” during this time frame, chute processing is often delayed until late fall or early winter. Culling decisions such as pregnancy and age status is determined at time of processing, thus marketing cull cows is delayed until late November or early December. As pointed out in the accompanying paper, Feeding and Marketing Cull Cows, November and December is generally the annual low of the cull cow market. Additionally, cows culled in this time frame are usually in the body condition 4 or 5 category causing them to fall into the cutter or utility grades of cull cows. On a hoof basis, cutter and utility grades are priced twenty-four percent below the higher body condition score commercial grades. This is mainly due to reduced dressing percentage on the rail.

Depending upon the relationship between cull cow and calf prices, and the herd-culling rate, cull cow receipts generally account for fifteen to thirty percent of income from a cow-calf enterprise. Most operations do not have enough cull cows to make up a truckload. Because of this, little thought or effort is devoted to marketing this class of livestock. Most cattlemen haul cull cows to the sale in December and “take what they can get.” Oftentimes old cows in poor condition (canners and cutters) may bring as little as $200 per head.

This study looked at the economics of placing cull cows of all ages and body condition (cutter, utility and commercial) on feed in late December (annual cull cow market low) and marketing them as commercial grade cows in March (annual cull cow high).

DEMONSTRATION OVERVIEW

Forty-one English and continental-cross cull cows ranging from 4 to 13 years old and body condition score three (canner) to six (commercial) from three participating Nevada ranches were placed on feed at Intermountain Beef Producers in Eden, Idaho on December 21, 1999. Four Limousin and two Angus bulls, five and six years old, in body condition score five were placed on feed with the cows. The average in value of cows and bulls was established by attending the Twin Falls Livestock Sale Commission sale for the week of placement and using the average price of cows and bulls in similar body condition and of similar age. At the onset of feeding, animals were individually identified, weighed, aged by mouthing, body condition scored and frame size estimated. Days on feed (D.O.F.) for bulls was 54 and for cows 86. The ration identified for the study consisted of a high
concentrate potato waste. Cows were processed at Armor Inc., Boise, Idaho and the bulls were processed at Ferry Brothers Inc., Ferndale, Washington. Cost above the at-ranch marketing opportunity was determined in order to perform economic analysis.

RESULTS FEEDLOT PERFORMANCE
The average body condition score (BCS) of 41 cows placed on feed December 21, 1999 was 4.6 (on a 1 to 9 scale). As shown in Table 1 the average finished BCS on March 17, 2000 was 6.9. This resulted in a net BCS change of 2.3 during the 86-day feeding period. The average in-weight of all cows was 973 pounds with a finish weight of 1,139 pounds. This resulted in a 166-pound net gain and a 1.93 average daily gain (A.D.G.), after accounting for the death loss of one cow.

The average BCS of six bulls at time of placement was 5.0 with a finished BCS of 6.8 for a net change of 1.8 during the 55-day feeding period. The average in-weight of the bulls was 1,595 with a finish weight of 1,747 pounds for an average daily gain of 2.76 for the 55-day feeding period. (See Table 1.)

Table 1. Feedlot performance of cull cows and bulls fed a high concentrate potato waste ration.

<table>
<thead>
<tr>
<th></th>
<th>#</th>
<th>Death loss</th>
<th>Avg DOF</th>
<th>BCS In</th>
<th>BCS Out</th>
<th>BCS Change</th>
<th>In Wt</th>
<th>Out Wt</th>
<th>Total Gain</th>
<th>ADG</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cows</td>
<td>41</td>
<td>1</td>
<td>86</td>
<td>4.6</td>
<td>6.9</td>
<td>2.3</td>
<td>973</td>
<td>*1139</td>
<td>*166</td>
<td>1.93</td>
</tr>
<tr>
<td>Bulls</td>
<td>6</td>
<td>0</td>
<td>55</td>
<td>5.0</td>
<td>6.8</td>
<td>1.8</td>
<td>1595</td>
<td>1747</td>
<td>152</td>
<td>2.76</td>
</tr>
</tbody>
</table>

*Includes death loss in weight of (-938).

ECONOMIC ANALYSIS
A partial budgeting process was used to determine the possible profit/loss potential of this management alternative. Partial budgeting is the process that evaluates the cost/benefit opportunities of a single decision. In this study the economic question was to compare the profitability of selling cull cows and bulls in a traditional fashion versus feeding these animals in a feedlot setting and marketing in a different time period.

BEGINNING VALUE
At the beginning of the trial the owners of the cattle had the opportunity to sell the animals. Using typical sale values the cows could have been sold for $262.71 and the bulls for $669.90.

EXPENSES INCURRED
Table 2 shows the expenses that were incurred during the feeding period. All expenses incurred by the cow that died were prorated and charged to the remaining cows for analysis. Interest was charged on the in value of all cows as opportunity cost and on all incurred expenses.
### Table 2. Expenses incurred per animal during feeding period.

<table>
<thead>
<tr>
<th></th>
<th>Cows</th>
<th>Bulls</th>
</tr>
</thead>
<tbody>
<tr>
<td>Days on Fed</td>
<td>88</td>
<td>55</td>
</tr>
<tr>
<td>Transportation in and out</td>
<td>$20.58</td>
<td>$31.80</td>
</tr>
<tr>
<td>Brand inspection out</td>
<td>$2.01</td>
<td>$2.01</td>
</tr>
<tr>
<td>Dollar check off</td>
<td>$1.00</td>
<td>$1.00</td>
</tr>
<tr>
<td>Processing and health</td>
<td>$6.14</td>
<td>$6.14</td>
</tr>
<tr>
<td>Feed cost</td>
<td>$133.62</td>
<td>$131.94</td>
</tr>
<tr>
<td>Death loss expenses</td>
<td>$10.41</td>
<td>$0.00</td>
</tr>
<tr>
<td>Interest</td>
<td>$10.17</td>
<td>$12.69</td>
</tr>
<tr>
<td><strong>Total Expense per Animal</strong></td>
<td>$183.93</td>
<td>$185.58</td>
</tr>
</tbody>
</table>

### OUT VALUE

After the feeding period the cattle were marketed on the rail. The average carcass weight of 40 cows was 651 pounds resulting in a 57.2 dressing percent (Table 3).

Cows were sold on the rail for an average price of $74.58/cwt. This value was based on dressing percentage and cow grade. This value converts to a $40.72/cwt hoof price or an average gross value of $485.51 per head.

The average carcass weight on the six bulls was 1,030 pounds resulting in a 58.9 dressing percentage (Table 3). The bulls sold on the rail for $88/cwt or $51.88/cwt hoof price. The average gross value on the bulls was $906.40 per head.

### Table 3. Rail performance and pay out of cull cows and bulls.

<table>
<thead>
<tr>
<th></th>
<th>#</th>
<th>Carcass Wt</th>
<th>Dressing %</th>
<th>Carcass $/cwt</th>
<th>Hoof $/cwt</th>
<th>Carcass Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cows</td>
<td>40</td>
<td>651</td>
<td>57.2</td>
<td>74.58</td>
<td>40.72</td>
<td>$485.51</td>
</tr>
<tr>
<td>Bulls</td>
<td>6</td>
<td>1030</td>
<td>58.9</td>
<td>88.00</td>
<td>51.88</td>
<td>$906.40</td>
</tr>
</tbody>
</table>

### PROFIT LOSS

Table 4 shows a $38.87 per head profit potential for feeding the 40 head of cull cows. It also shows a $50.92 per head profit potential for feeding the six bulls. Most of this profit can be attributed to the positive $13.72/cwt buy/sell margin for the cows and $9.88/cwt for the bulls (Table 5). The positive buy/sell margin can be attributed to an increase in cow quality grades from time of placement to time of processing. Not only did cows move one to two quality grades higher (cutter and utility to commercial) the value of those quality grades also increased. The price increase of each quality grade was due to the historical annual low prices at time of placement (December) to annual highs at time of processing (March). Couple this with the fact that well over 150 pounds of weight was added to the product of cows and bulls.

### Table 4. Profit/Loss

<table>
<thead>
<tr>
<th></th>
<th>In Value</th>
<th>Expenses</th>
<th>Out Value</th>
<th>Net Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cows</td>
<td>$262.71</td>
<td>$183.93</td>
<td>$485.51</td>
<td>$38.87</td>
</tr>
<tr>
<td>Bulls</td>
<td>$669.90</td>
<td>$185.58</td>
<td>$906.40</td>
<td>$50.92</td>
</tr>
</tbody>
</table>
Table 5. Buy/sell price spread due to market timing and grade change from utility to commercial

<table>
<thead>
<tr>
<th></th>
<th>#</th>
<th>Hoof in value $/cwt</th>
<th>Hoof out value $/cwt</th>
<th>$/cwt Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cows</td>
<td>40</td>
<td>$27.00</td>
<td>$40.72</td>
<td>$13.72</td>
</tr>
<tr>
<td>Bulls</td>
<td>6</td>
<td>$42.00</td>
<td>$51.88</td>
<td>$9.88</td>
</tr>
</tbody>
</table>

SMOOTH-MOUTHED OLD COWS VERSUS SOLID-MOUTHED MIDDLE-AGED COWS

Ten of the 41 cows were over ten years old and termed smooth mouthed. Most professionals recommend not feeding these old cows due to the unpredictable performance. Table 6 shows the range of performance and profit/loss of smooth-mouthed versus solid-mouthed cows. The solid-mouthed cows returned a $64.73 per head profit while the old smooth-mouthed cows returned a negative $2.93, accounting for the old cow that died on feed and the reduced performance of these old cows.

DISCUSSION

This study mirrored other studies reported on feeding cull cows and bulls as a marketing alternative to selling directly off the ranch. This study showed that young and middle-aged cows are the most predictable to feed. Large-framed cows that are in thin body condition at the time of placement can be expected to perform at a higher rate than those placed in flesher condition and of smaller frame size. We can expect cows to increase 1.5 to 2 full body condition scores and increase in cow quality grades by one to two full grades in a 60 to 90 day feeding period. Performance and profit/loss when feeding old smooth-mouthed cows is unpredictable. This class of animals should be marketed directly off the ranch or sold prior to becoming this old.

Four factors important to the decision to sell cows when culled versus feeding them and selling at a later time are: 1) seasonality of cull cow prices; 2) price differences between cull cow slaughter grades and percentages of cull cows in each grade; 3) cost of feeding cull cows and; 4) age, frame, and body condition of cows to be fed.

In this study the partial budgeting question of feeding cull cows for an 86-day period resulted in a $38.87 per head profit over selling the cows off the ranch. Feeding bulls resulted in a net per head profit of $50.92.

Table 6. Variability in feedlot performance, profit and loss between middle-aged cows and old smooth-mouthed cows.

<table>
<thead>
<tr>
<th></th>
<th>Solid Mouthed</th>
<th>Smooth Mouthed</th>
</tr>
</thead>
<tbody>
<tr>
<td>A.D.G.</td>
<td>1.70 to 4.70</td>
<td>-0.56 to 3.71</td>
</tr>
<tr>
<td>Dress %</td>
<td>42.6 to 65.3</td>
<td>49.1 to 65.1</td>
</tr>
<tr>
<td>P/L Range</td>
<td>-$37.15 to $142.17</td>
<td>-$26.00 to $119.14</td>
</tr>
<tr>
<td>Average P/L</td>
<td>$64.73</td>
<td>*$39.00</td>
</tr>
<tr>
<td>BCS Change</td>
<td>1 to 4</td>
<td>0 to 3</td>
</tr>
<tr>
<td># Head</td>
<td>31</td>
<td>10</td>
</tr>
</tbody>
</table>

*Without dead charged against group (-2.93) with dead charged against group.
REFERENCES


Feuz, Dillon M. Feeding and Marketing Cull Cows. Managing for Today’s Cattle Market and Beyond.

The authors wish to express thanks to Mitch and Rhonda Heguy, Elko, Nevada for taking the risk in feeding the middle-aged cows and bulls used in this study and for allowing Nevada Cooperative Extension access to the data. The authors wish to thank the University of Nevada Gund Ranch and Manager Ken Conley of Eureka for taking the risk and financial hit in feeding the old smooth-mouthed cows used in this study.
FEEDING AND MARKETING CULL COWS

Dillon M. Feu
Associate Professor of Agriculture Economics
University of Nebraska-Lincoln

Reprinted with permission and pre-requisite reading to Marketing Alternatives of Cull Cows: A Case Study

INTRODUCTION
Cull cows often are overlooked as an important source of income to the cow-calf enterprise. Depending upon the relationships between cull cow and calf prices, and the herd culling rate, cull cow receipts generally account for 15-30 percent of income from the cow-calf enterprise. However, some producers give little attention to this source of income and ways of enhancing it. For many producers, cull cows are sold at the time they are culled from the herd. Much of this culling is done in the late fall soon after calves are weaned. Is it most profitable to sell cows when they are culled, or should they be fed for a period of time? Several factors need to be considered to properly answer that question.

Three factors, important to the decision to sell cows when culled versus feeding them and selling at a later time, are: (1) seasonality of cull cow prices, (2) price differences between cull cow slaughter grades and percentages of cull cows in each grade, and (3) cost of feeding cull cows. Each of these factors will be discussed in some detail.

PRICE SEASONALITY
Cull cow prices generally follow a consistent seasonal pattern. Prices normally are the lowest in November, December and January and are at their highest level in March, April and May. Prices during the summer months are typically near the average for the year. If overall cattle prices are rising sharply or declining sharply in a year, then this price pattern may not be as apparent. However, by analyzing prices over a number of years the seasonal price patterns can be determined. Figure 1 contains a graph of the seasonal price pattern at Torrington, Wyoming for 1995-1999 for cutter grade cows. Prices at many other locations, such as Twin Falls, Idaho, and Fallon, Nevada, have similar seasonal patterns.

Figure 1. Monthly Seasonal Price Pattern at Torrington, Wyoming, 1995-1999.

![Graph showing seasonal price pattern](image)

It may be profitable, by simply considering this seasonal pattern, to feed cows that are culled in fall or early winter into the spring months to take advantage of the seasonal prices. On the other hand, it may be most profitable to sell cows that are culled during the late calving season or early summer. However, the other two factors (cull cow grades and feed costs) still must be considered.

COW SLAUGHTER GRADES
Prices for cull cows are based on their USDA carcass grade or their expected carcass grade. The most common grades, in order of the least amount of marbling to the greatest amount of marbling are: Canner (BSC 2 & 3), Cutter (BSC 4), Utility (BCS 5), and Commercial (BCS 6>). Price differences between these grades impact the
price of cull cows directly if a producer sells on a carcass weight and grade basis, and indirectly if the cow is sold on a live weight basis. These price differentials vary from year to year and also from month to month within a year. The differential is wider in higher priced years and in the fourth quarter of the year. Average price differentials between grades at Sioux Falls from 1985-1994 are displayed in Table 1. These differences are also consistent with those at the Twin Falls and Fallon markets.

### Table 1. Percentage price increases between cull cow grades at Sioux Falls, 1985-94.

<table>
<thead>
<tr>
<th></th>
<th>Cutter</th>
<th>Utility</th>
<th>Commercial</th>
</tr>
</thead>
<tbody>
<tr>
<td>Canner</td>
<td>10%</td>
<td>18%</td>
<td>24%</td>
</tr>
<tr>
<td>Cutter</td>
<td></td>
<td>8%</td>
<td>14%</td>
</tr>
<tr>
<td>Utility</td>
<td></td>
<td></td>
<td>6%</td>
</tr>
</tbody>
</table>

Source: Computed from Feuz.

In a 1993 study at South Dakota State University (Pritchard and Burg) cull cows were purchased in November and December from area sale barns. The cows were sent to slaughter after 0, 50, 77, and 105 days on feed. The cows were fed a high concentrate ration of 75 percent corn grain and 15 percent corn silage on a dry matter basis. The cows gained 2.8, 3.0, and 3.1 pounds per day for each of the respective feeding periods. Table 2 contains the percentage of cull cows that were in each grade at slaughter.

### Table 2. Percentage of cows in each grade following a feeding program of corn and corn silage.

<table>
<thead>
<tr>
<th>Days Fed</th>
<th>USDA Slaughter Grade</th>
<th>Canner</th>
<th>Cutter</th>
<th>Utility</th>
<th>Commercial</th>
<th>Standard</th>
<th>Choice</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td></td>
<td>64</td>
<td>29</td>
<td>7</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>50</td>
<td></td>
<td>18</td>
<td>57</td>
<td>24</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>77</td>
<td></td>
<td>8</td>
<td>21</td>
<td>65</td>
<td>4</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>105</td>
<td></td>
<td>0</td>
<td>19</td>
<td>74</td>
<td>6</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

Source: Adapted from Pritchard and Burg.

In the trial at South Dakota State, initial condition of the cows did not affect the rate of gain, but it did have an effect on the degree of marbling. From this trial it would appear that most cull cows could be expected to improve one grade following a 60-100 day high concentrate feeding program, and that many could improve two
grades.

Cull cows that are fed on primarily a roughage diet would not obtain the same rates of gain, nor grade changes. A ration of alfalfa-grass hay should produce about 1.5 pounds per day gain over a 60-90 day feeding period, assuming the cows were fairly thin at the start of the feeding period (Wagner). It is unlikely that the cows would improve more than one slaughter grade on this feeding program.

COST OF FEEDING

Revenue can often be increased by feeding cull cows due to seasonal prices, weight gains, and slaughter grade changes. However, that doesn't automatically imply a profit from feeding. The cost of the feeding program must be considered. The primary cost in feeding is the feed cost. A charge for labor and facilities (yardage), interest on the cull cow and ½ of the other variable costs, and any death loss should all be considered.

Feed costs will vary depending upon the price of feed and the feedstuffs used in the ration. Proper procedures should be used to balance a ration for the cows and determine the cost of feed. A cost of around $0.20-$0.25 per day is often used to cover the yardage charge. Interest on the value of the cull cow at the time she is placed on feed should be charged until she is sold. For example, if you could sell the cull cow for $350 and if you are paying 10% interest and you plan on feeding the cow for 90 days, the interest charge would be $8.63 per head [\( \$350 \times 0.10 \times \frac{90}{365} = \$8.63 \)].

PARTIAL BUDGET ANALYSIS

The proper manner to consider all of these factors is to construct a partial budget and evaluate if it would be more profitable to feed the cull cow (Table 2) rather than selling when culling takes place. The partial budget will have three main sections: (1) the expected revenue at the end of the feeding period, (2) the additional costs from feeding the cull cow, and (3) the revenue lost by not selling the cull cow at the time of culling (opportunity cost).

When calculating expected revenue, weight gain, price changes due to seasonal variations, and price change because of grade changes all should be considered. Feed costs, yardage, death loss, and interest should be computed to estimate feeding costs.

The break-even selling price often is calculated to determine the risk involved in the feeding program. If the break-even selling price is considerably below your expected selling price, the program would be less risky than if the break-even selling price was at or above your expected selling price. The break-even selling price is calculated by adding the total feeding costs to the value of the cull cow at the start of the feeding period and then dividing this sum by the expected ending weight (allowing for shrink) of the cull cow.

SENSITIVITY ANALYSIS

How sensitive to feed costs and cull cow prices are the returns to cull cow feeding? Cull cow prices were varied from $30/cwt. to $45/cwt. for the price of a Canner grade cull cow in September and October (Tables 3 & 4). The price in November would be somewhat lower due to the seasonal pattern.

The price of corn grain was varied from $2.00/bu to $3.00/bu, and corn silage and concentrate prices were adjusted relative to corn prices. The expected returns from feeding cull cows on a high concentrate ration are displayed in Table 3. The most profitable number of days on feed, in 14 day increments also is displayed in the table.

The price of alfalfa/grass hay was varied from $40/ton to $80/ton and the expected profit from feeding a thin, Canner or Cutter grade cow for 98 days on a roughage ration is displayed in Table 4.
Table 3. Expected returns ($/Head) and optimal days on feed from feeding cull cows on a high concentrate ration with varying feed costs and cull cow prices.

<table>
<thead>
<tr>
<th>September-October Canner Grade Cull Cow Prices</th>
<th>Com Price</th>
<th>$30/cwt</th>
<th>$35/cwt</th>
<th>$40/cwt</th>
<th>$45/cwt</th>
</tr>
</thead>
<tbody>
<tr>
<td>$3.00/bu</td>
<td>-$15</td>
<td>84 days</td>
<td>$10</td>
<td>98 days</td>
<td>$38</td>
</tr>
<tr>
<td>$2.75/bu</td>
<td>-$7</td>
<td>84 days</td>
<td>$20</td>
<td>98 days</td>
<td>$50</td>
</tr>
<tr>
<td>$2.50/bu</td>
<td>$8</td>
<td>98 days</td>
<td>$36</td>
<td>112 days</td>
<td>$67</td>
</tr>
<tr>
<td>$2.25/bu</td>
<td>$18</td>
<td>98 days</td>
<td>$49</td>
<td>112 days</td>
<td>$79</td>
</tr>
<tr>
<td>$2.00/bu</td>
<td>$35</td>
<td>112 days</td>
<td>$66</td>
<td>112 days</td>
<td>$96</td>
</tr>
</tbody>
</table>

Table 4. Expected returns ($/Head) from feeding thin cull cows on a roughage ration for 98 days with varying feed costs and cull cow prices.

<table>
<thead>
<tr>
<th>September-October Canner Grade Cull Cow Prices</th>
<th>Hay Price</th>
<th>$30/cwt</th>
<th>$35/cwt</th>
<th>$40/cwt</th>
<th>$45/cwt</th>
</tr>
</thead>
<tbody>
<tr>
<td>$80/ton</td>
<td>-$13</td>
<td></td>
<td>-13</td>
<td></td>
<td>0</td>
</tr>
<tr>
<td>$70/ton</td>
<td>-$15</td>
<td>-15</td>
<td>0</td>
<td>13</td>
<td></td>
</tr>
<tr>
<td>$60/ton</td>
<td>-$15</td>
<td></td>
<td>-1</td>
<td>13</td>
<td>27</td>
</tr>
<tr>
<td>$50/ton</td>
<td>-$2</td>
<td>12</td>
<td>26</td>
<td>40</td>
<td></td>
</tr>
<tr>
<td>$40/ton</td>
<td>$11</td>
<td>$25</td>
<td>$39</td>
<td>$53</td>
<td></td>
</tr>
</tbody>
</table>

There are several observations that can be made from analyzing the results of this sensitivity analysis. Obviously, the higher the cost of the feed stuffs for a particular ration, the lower the expected return to the cull cow feeding program. Not so intuitive, is the finding that returns to feeding cull cows increase with higher cull cow prices. The reason this happens is that the seasonal price pattern and the price differentials between grades remains relatively similar in periods of low and high cull cow prices. Therefore, if cull cow prices increase by 10 percent, there will be a greater price and revenue increase based on a $40/cwt cull cow prices compared to a $30/cwt cull cow price.

The final observation is that, in most cases, returns from the high concentrate feeding program will exceed returns from the roughage feeding program. The exception to that is in periods of relatively low cull cow prices, when corn is relatively high priced compared to hay. In that case, the roughage ration provides higher expected returns.
SUMMARY

Cull cow receipts are a valuable source of income to most cow-calf enterprises. In periods of relatively low cattle prices, properly managing and marketing cull cows may mean the difference between a profit and a loss for the year. In this paper, the seasonality of cull cow prices was discussed and the price differentials between cull cow grades were reported. By timing cull cow sales to take advantage of seasonally higher prices, and by feeding thin cull cows to improve their slaughter grade, revenue from cull cows can be increased significantly.

Feed costs vary from year-to-year, mostly depending upon the price of feeds. They also vary within each year, depending upon the feeding program.

The profit potential of various cull cow feeding and marketing alternatives can be properly evaluated through the use of a partial budget. Costs and revenue will likely be different each year. However, the partial budget analysis will help to evaluate the most profitable marketing/management decision for cull cows. Remember, when arriving at expected prices, you should consider both seasonal price changes and potential for grade changes. All costs, and not just feeding costs, should be considered on the cost side of the budget.

The feeding programs discussed in this paper are not the only available alternatives. Evaluate feed resources and analyze programs that may work for you. Your financial future in the cow-calf industry will be somewhat dependent upon the income generated from cull cows.

REFERENCES


Wagner, J.J. 1995. Extension Ruminant Nutritionist and Feedlot Specialist, Department of Animal and Range Science, South Dakota State University. Personal Communication
Calving difficulty (dystocia) still ranks as one of the major causes of decreased calf crop (Table 1). On most livestock operations this is an area where personnel training is beneficial. This discussion will first focus on the decision-making process in providing assistance with calving and second, on a recommended technique for delivery.

Table 1. Causes of calf death loss from 24,396 calvings in the Colorado NAHMS project

<table>
<thead>
<tr>
<th>Cause</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Premature/Abort/Stillbirth</td>
<td>3.5%</td>
</tr>
<tr>
<td>Dystocia/Stillbirth</td>
<td>30.0%</td>
</tr>
<tr>
<td>Hypothermia/Exposure</td>
<td>12.2%</td>
</tr>
<tr>
<td>Infectious Disease</td>
<td>25.7%</td>
</tr>
<tr>
<td>Starvation</td>
<td>0.5%</td>
</tr>
<tr>
<td>Accident</td>
<td>7.0%</td>
</tr>
<tr>
<td>Miscellaneous</td>
<td>0.7%</td>
</tr>
<tr>
<td>Unknown</td>
<td>19.9%</td>
</tr>
</tbody>
</table>

Wittum, 1994

RECOMMENDED GUIDELINE FOR OBSERVATION FREQUENCY

Determining the frequency for observing calving cows and heifers is a decision of primary importance. The general recommendation is to observe the animals every three hours. This schedule will increase the likelihood of delivering a live calf to each individual cow. This is based on the time frame of the stages of labor. Usually, prolonged labor increases the number of still births and weak calves. However, management considerations should be given based on herd size and labor restraints. When a very large number of heifers is calving, observing them every three hours is not profitable nor recommended.

ESTABLISHING RECOMMENDATIONS FOR PROVIDING ASSISTANCE

Before a person can understand when it is necessary to provide assistance they must first understand the normal calving process. Understanding the mechanical and sequential aspects of calving is more important than understanding the biological aspects. Delivery is divided into different stages of labor. Stage 1 is the pre-delivery, cervical dilation phase, and Stage 2 is actual delivery of the calf.

The duration of Stage 1 is from 2 to 6 hours and is evidenced by the animal being restless, seeking isolation, and showing colic behavior, particularly in heifers. During this stage, there is increasing frequency and strength of uterine contractions leading to an increased separation of uterine-placental attachments. The first recommendation for intervention is to provide assistance if you think the heifer has been in stage 1 more than 8 hours.

Stage 2 begins when fetal parts enter the birth canal and stimulate the abdominal press. The water breaks early, the second unbroken water sac is often forced out past the vulva, and fetal parts usually become
visible. A second recommendation for intervention is to assist if the water sac has been visible for more than 2 hours and delivery is not complete. This is valid only if the animal is not trying to complete delivery.

Both of the above recommendations are suggested to decrease the number of stillborn and weak calves. In both of these instances, placental separation is occurring. Procrastinating assistance can seriously affect calf viability. If the heifer is trying, you should be able to determine if assistance is necessary within 30-40 minutes following the presentation of the unbroken water sac.

The third recommendation for intervention is to assist if the heifer is trying and no progress is being made or if she is showing fatigue. If the calf is stressed excessively, assist immediately. If there is anything abnormal about the calf’s delivery assistance should be provided.

**MAKING THE CORRECT DECISION ABOUT DELIVERY**

A relatively oversized calf in normal position and abnormal calf presentations account for over 90% of assisted births. The producer must decide if the calf can or should be pulled. Every producer’s objective is to deliver a live calf that will generate income. The oversized calf may be pulled if both shoulders of the calf fit through the pelvis of the cow. In order to pull the calf, the heifer must be positioned correctly. The direction of pull, type of force and amount of force must also be correct. The heifer should be positioned lying down on her right side. This maximizes the physical efforts of the heifer by maximizing the space in the pelvic opening. Furthermore, it minimizes the amount of force applied to the calf. The functional size of the pelvic opening increases as the heifer applies the abdominal press. This advantage is not possible if the heifer is assisted in a standing position.

Traction is applied first to the leg nearest to the ground. The leg is pulled straight out from the heifer (Figure 1A) using the force of one man while the heifer is straining. The first shoulder usually passes easily through the pelvic canal, so the true test for delivery is whether the second shoulder of the calf can pass with the same amount of force. Usually you can feel the shoulder of the calf pass the pelvis of the cow during the pulling process. If the fetlock joint of the calf is one hand’s width beyond the vulva of the heifer the shoulder is past the pelvis. This is an effective test in most assisted births to determine if the second shoulder has passed the pelvis. When both shoulders do not pass through the pelvic canal the calf can not be pulled and should be delivered by other means.

**Figure 1.** Delivery of anterior presented calf illustrating direction of pull, rotation, and revised direction of pull for most advantageous delivery.
The following guidelines suggest when you should call for professional assistance:

1. When you don’t know how to handle the problem.

2. When you know what the problem is and understand that it is beyond your ability.

3. When you know what the problem is and continue to try to help with no success. If no progress is made in 30 minutes call for professional assistance.

Number three is of greater importance than the other two because of the frustration factor. A frustrated person will usually apply excessive force. The use of excessive force results in traumatized calves that have a high risk of not surviving and heifers that have decreased reproductive performance.

COMPLETING DELIVERY

Once both shoulders of the calf are through the pelvis, you can provide traction to both front legs of the calf at the same time using the force of two men. The direction of pull should continue straight out until the rib cage of the calf is through the pelvis of the cow and the hips of the calf are engaged in the pelvis of the cow. This is usually manifested by a large amount of fluid material from the abdomen being forced out of the calf from pressure on the abdomen. At this point, the umbilical cord is compressed and the calf will need to establish its normal breathing pattern so it will be as strong as possible for the remainder of delivery. This is usually when the cow takes a break in the process. At this point the mucus should be cleaned out the mouth of the calf and a determination is made whether or not to provide oxygen. Before more traction is applied the calf is rotated taking advantage of the largest diameter of the cow’s pelvis to deliver the hips of the calf (Figure 1C).

Rotating the calf about 45 degrees is usually all that is necessary to finish delivery. Live calves tend to rotate easily. Once rotation is accomplished, the cow is usually ready to continue the delivery. Continue the type and amount of force necessary while the cow is straining until delivery is complete. Direction of the pull should continue either straight out or slightly towards the back of the cow to allow delivery of the hips of the calf (Figure 1C).

CORRECTION OF ABNORMAL DELIVERIES

Abnormal presentations comprise less than 5% of assisted births. The most significant of these is the posterior presented calf which can usually be delivered. Nevertheless, the risk of loss is greater. In a posterior presentation the test for whether delivery by forced extraction is possible is if both hips of the calf can fit through the pelvis of the cow. The force of one person per leg is recommended and the cow can be lying down on either side for application of the test.

All other deviations from the normal presentation should be corrected with the animal standing before applying the test for delivery. It is helpful to determine the viability of the calf before the decision is made to use forced extraction, c-section or fetotomy.
SUMMARY

By the time delivery is occurring the options of preventing dystocia by genetic and nutritional management are exhausted. A successful delivery is more a function of good decision making. The four decisions with major impact are:

How frequently should the cows be observed?
When should assistance be provided?
How should assistance be provided?
When should professional assistance be called for?

Good luck with your calving!!!
MANAGING THE ESTROUS CYCLE

Roy Wallace
Select Sires, Inc.
Plain City, Ohio

Synchronization doesn’t cost—IT PAYS!!!

Estrus synchronization of cows and heifers facilitates the use of superior proven genetics while reducing labor and herd bull expenses. Some protocols stimulate cyclicity in anestrus animals and allow you to get more animals pregnant during the first week of the breeding season. This results in:

- More days for cows to recover after calving before the next breeding season begins
- Older, heavier, more uniform calves at weaning
- Older, more mature replacement heifers

Select Synch

With Select Synch, animals are injected with Gonadotrophin Releasing Hormone (GnRH) and prostaglandin (PGF) 7 days apart. Heat detection begins 24-48 hours before the PGF injection and continues for 5-7 days afterwards. The PGF injection is excluded for animals detected in estrus on days 6 or 7. Animals are inseminated 8-12 hours after being observed in standing estrus. The GnRH injection synchronizes follicular development and will initiate cyclicity in some anestrus animals while the PGF injection synchronizes luteal regression. The result is more cows in heat in a shorter period of time compared to using PGF alone. Overall, estrus response rates in well-managed beef herds average ~70-75% with no adverse effect on conception rates (60-70%) resulting in synchronized pregnancy rates around 45-50%. Because the success of Select Synch depends on good heat detection and breeding of cows in standing heats, conception rates will tend to be less variable than with fixed-time AI protocols. This will be particularly important when using expensive semen or if the cycling status of the herd is in question.

Cosynch

Cosynch is a fixed-time AI synchronization protocol that can be used when heat detection is not an option. The protocol builds on the GnRH/PGF format with a second GnRH injection 48-64 hours after the PGF injection. The second GnRH injection induces ovulation of follicles recruited in synchrony after the first GnRH injection. Animals are mass mated without estrus detection at the same time as the second GnRH injection and thus requires only 3 trips through the chute. As with any fixed-time AI protocol, results to Cosynch can be variable. Although Cosynch can achieve pregnancy rates >50% in beef cattle, overall averages are more often in the 40-
45% range. As with Select Synch, 8-10% of the animals will display estrus prior to the PGF injection. Thus, pregnancy rates to Cosynch are maximized if early heats (24 hours of PGF) are visually detected and bred using the AM/PM rule.

**A Hybrid Approach**

An alternative GnRH-based method of synchronization is a “Hybrid” of the Select Synch and Cosynch protocols. Animals are treated with GnRH and PGF 7 days apart. Heat detection and breeding begins 24-48 hours before and continues until 72 hours after the PGF injection. At 72 hours, animals that have not been bred on standing heats are mass mated and injected with GnRH at the same time. This system maximizes pregnancy rates by using heat detection to catch the early animals, breeding the majority of the herd (60-70%) on standing heats, and mass mating the non-responders to give every animal an opportunity to conceive. Using this method, Cosynch drug costs are reduced as only 30-40% of the herd receives the second GnRH injection. If less than 40-50% of the herd is detected in estrus by 72 hours, the mass mating can be aborted, saving drugs, money and semen that might otherwise be wasted on anestrous animals.

**The MGA-PGF System**

The MGA-PGF system is a time tested, proven method for synchronizing estrus in beef and dairy heifers. Melengestrol Acetate (MGA) is a synthetic form of the naturally occurring hormone, progesterone. Mix MGA into a grain supplement or top dress rations at a rate of 0.5 mg/head/day for 14 days. Within 3-5 days after MGA feeding, many animals will display standing heat. DO NOT BREED at this heat as conception rates are reduced. Wait 17-19 days after the last day of MGA feeding and inject all animals with a single dose of PGF. For the next 5-7 days, inseminate animals 8-12 hours after detected in standing estrus. Success of the MGA system depends on adequate bunk space and proper feeding rates. In addition to stimulating cyclicity in many prepubertal and anestrus animals, the MGA-PGF system appears to result in higher conception rates when compared to synchronization using PGF alone. With good heat detection of well-managed heifers, synchronized pregnancy rates of 50-70% are par for the course.

Results to fixed time insemination using this system are extremely variable, but, acceptable pregnancy rates (~50%) have been achieved by a single insemination at 72 hours or by double inseminating at 60 and 96 hours following the PGF injection. On the average, timed AI with this system will result in a 5-10% reduction in pregnancy rates relative to what is possible with heat detection and breeding on standing heats. The MGA-PGF system is also extremely effective in beef cows, although the long treatment protocol and late calving animals
MGA Priming to GnRH-Based Protocols

To give any GnRH-based synchronization protocol an added boost, initiate the treatment 12 days after a 14-day MGA feeding period. This simply superimposes the MGA-PGF heifer program on the GnRH-based protocol. The MGA feeding period will “jump start” many of the anestrus animals, tightens synchrony of estrus and eliminates most of the early heats. Although late calving cows are difficult to fit into the extended treatment protocol, preliminary research suggests the results are well worth the added hassle.

Pay Attention to Details

- First-calf heifers, late calving cows, difficult births, and retained placentas are all associated with reduced fertility. Group these “high risk” animals separately so maximum nutrition, veterinary care and TLC can be efficiently provided.
- Vaccinate at least 3 weeks prior to the beginning of the breeding season.
- Use some type of estrous detection aid (tail chalk, paint, Kamar, Bovine Beacon) to improve the efficiency of your heat detection program.
- Make sure adequate labor will be available for heat detection and breeding and that each person is adequately trained for their assigned task.
- Recheck the semen tank and breeding kit to ensure adequate quantities of semen and all breeding supplies are in your possession before you synchronize animals.
- Make sure all handling facilities are in proper working order and safe for both man and beast.

Notes:
- MGA is not approved for use in lactating dairy cattle
- Results using GnRH-based synchronization protocols in virgin heifers tend to be variable and in general, are not recommended.
INTRODUCTION: Maximizing returns is critical for sustainable cow-calf operations. Traditionally, heifer calves have brought $5.00-10.00/cwt less than steers of the same quality. Therefore, livestock producers have an opportunity to increase the value of their heifers through better marketing and management. Many producers are taking advantage of this economic opportunity through management, better genetics and marketing. Heifers intended for breeding purposes can have value added to them through various means. These would include: raising purebred heifers, raising crossbred heifers, using a heifer certification program, backgrounding, and artificial breeding heifers. In addition, new technology such as sexed semen, cloning, timed breeding, etc, may increase the opportunity for producers to specialize by developing a heifer enterprise. The producer must determine which enterprise yields the greatest revenue per dollar invested.

Crossbred Heifer Enterprise: Several cross-breeding programs have been developed for heifer enterprises. All of them relate to demand for the type, quality and breed of heifers. Systems that work very well in southern Utah are those that produce a black baldy heifer which is a Hereford/Angus cross. These mother cows perform well on limited feed, are moderate-framed, moderate milkers and easy fleshing. All of these traits are a necessity for producers who summer their livestock on rough, high mountain meadows and winter their livestock on sparsely vegetated deserts. Ranchers who raise their own replacement heifers tend to maintain maternal traits in their cow herd. While maternal traits are very important to the cow-calf operator, terminal traits provide the highest growth and carcass quality. Although there has been an effort to combine terminal and maternal traits into individual animals and breeds of livestock, the greatest production efficiency comes when you specialize in either maternal or terminal breeding systems. Ranchers in the market for replacement heifers want quality genetics with superior maternal traits. They do not raise replacement heifers for themselves, but will sell all their calves. They maximize production by using a crossbred cow superior in maternal traits to a terminal sire that is superior in growth and carcass traits.

Single Herd of Purebred Cows with Two Breeds of Bulls: This is a system designed for the producer who wants to raise crossbred heifers while maintaining a purebred mother cow herd. Two different breeds of bulls are used. One to produce crossbred heifers and one to produce purebred replacements.

Advantages:
• Able to raise own heifers if desired.
• Does not require two separate cow herds or extra management.
• Maintain control of herd replacement genetics.

Disadvantages:
• Your best calves might not be the breed or sex that you want to market or keep for replacements.
• Straight bred steers will not have maximum hybrid vigor.
• One breed of bull may dominate breeding season, thus providing a disproportionate number of calves.
• May still have to buy replacement heifers from a purebred source.

Two Herds of Purebred Cows with Two Breeds of Bulls:
Another system is designed for an operator who has the capability to maintain two separate cow herds. Cows from each purebred mother cow herd (Angus and Hereford) are bred by bulls of the opposite breed. Similar F1 type offspring are produced from each herd.

Advantages:
• All calves are very consistent in color, frame and type.
• Maximum flexibility in selecting heifers to market
• All calves should exhibit hybrid vigor.

Disadvantages:
• Cannot raise own heifers. Must buy heifers or replacement cows which brings up the following issues:
  - Must find a consistent, reliable source for replacement cows.
  - Lose control of the quality of genetics going into the mother cows.
  - May be purchasing someone else’s problem.

At weaning time, crossbred replacement heifers from these types of operations can yield a $5.00-10.00/cwt premium. This equates to approximately $25 to $65.00 per head. Therefore, producers are getting “steer” price for heifers with little or no extra costs. In the above situation marketing is very important. The heifers are marketed locally to neighbors who know and trust the genetics. The breeds, Hereford and Angus were used in this example because they work for producers in the southern Utah area. By no means are they the only possibilities.

Purebred Heifer Enterprise:
In the above systems, the operators find it is difficult to raise their own replacement heifers. Therefore, they rely on outside sources for their replacements. Culls from purebred operations may end up in commercial type operations. Purebred operators typically run fewer cattle numbers and may produce more quality heifers than they are able to maintain. Purebred producers may obtain greater profit from heifers and cull cows by marketing them to heifer enterprises than hauling them to the local auction.

Heifer Certification Program:
A heifer certification program is a state-wide or region based program for heifers which must fit certain criteria. Examples include Kentucky Certified Replacement Heifers and Missouri Show-Me-Select. These programs were developed for producers to obtain greater returns from their heifers. Both programs have very stringent requirements. The Show-Me-Select heifer program includes the following management criteria. It is an example of a quality heifer enterprise.
In the Fall:
- All heifers must be calfhood vaccinated for brucellosis.
- Heifer are vaccinated for IBR, BVD, BRSV and 7-way Clostridia. Label directions must be followed for initial vaccination and boosters.
- The use of implants is discouraged. If implants are used, only products approved by the FDA are allowed.
- Long-term use of MGA is prohibited. It may be used for up to 14 days to synchronize estrus.
- Internal and external parasites are controlled as required.
- Heifers must be polled or dehorned and completely healed by sale day.
- A final screening committee examines the animals on sale day to eliminate blemishes, such as scarred eyes, frozen ears or short tails.
- Heifers must have a minimum body condition score of 5 (on a 1-9 scale) on sale day.

The Show-Me-Select program has been well received. In 1999, 8,750 heifers were enrolled and over 6,000 were kept on the farms where they were raised. In addition, 2,058 were sold at an average of $824/head. Heifers sold through this program have returned producers approximately $100.00 per head after all expenses. In Utah, there are opportunities for certification programs. Producers do not have to have a formal program run by a university to raise certified heifers. Ranchers could certify heifers by what they do at their ranch. Examples of this would include: a guarantee that heifers will calve in a 45-day period; certification that heifers are artificially inseminated to prescribed bulls; guarantee of pregnancy; and certification of vaccination.

Conclusion:
Some producers have started heifer enterprises that have been very successful. The systems, breeds, certification and genetics may be different, but the end result is quality, trust and repeat buyers. New technology will change the way ranchers do business in the future and may create niches for specialization into enterprises such as raising heifers for profit. As ranchers move forward in the next millennium developing a heifer enterprise may increase the revenue per cow, create new marketing niches and/or opportunities.
The question of whether it is more efficient to raise your own replacement heifers or purchase them from someone else has befuddled the cattle industry for decades. By the use of charts, graphs and figures, agricultural economists can put up a good fight for either side of the argument. Nevertheless, one thing that a number cruncher can’t do is put a dollar value on the knowledge that a heifer has accumulated when she is raised on the same range where she will spend her entire productive life. She comes into her career already knowing every trail, water hole, salt ground, and good grazing area on the land where she will live and produce offspring.

If a cattle producer looks at this age-old question realistically, it becomes obvious that there are two main factors to this equation. Number one, the economic evaluation that is so important to every rancher who operates on a tight budget. Number two, the non-calculated value of a heifer raised on the home range. An attempt will be made to look at both components of this question.

Raising vs. Purchasing—An Economic Point of View

To begin with, what is the real value of a replacement heifer? It seems fairly simple to put a dollar value on a weaned heifer, add to that what it will require to feed her for the next year or so, toss in the cost of breeding, and total it all up. But, this is only the beginning of the process of finding the true value.

There are other factors that need to be considered. For one thing, the number of replacements that a producer holds back will affect the number of calves that are available to be marketed. To insure continued reproductivity, the level of management required for a heifer is much greater than that of a mature cow. However, the production of a heifer is typically less than that of a mature cow. Add in the necessity of heifer-type bulls, increased calving difficulties and the extra effort it takes to get those first calf heifers bred back, and suddenly the cost of the raised replacement heifer goes up.

There is no perfect answer for all cattle producers. Each ranch has its own individual circumstances. Direct and variable costs, management practices, and market prices expected can vary greatly from operation to operation. Ranchers need to be vitally aware of all aspects of their business to avoid making haphazard decisions.

Information from researchers at the University of Nebraska shows a comparison of four different ranching operations and their costs of raising replacement heifers (Table 1).

Variable costs include such items as veterinary, supplies, breeding, machinery costs, etc. Interest was charged on the value of the animal and half the value of the variable expenses and feed costs. Fixed costs include insurance and depreciation on livestock buildings and equipment.
Table 1. The total direct and indirect costs of raising replacement heifers under four different management practices.

<table>
<thead>
<tr>
<th>OPERATION</th>
<th>Year 1</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Opportunity cost of the heifer</td>
<td>$395</td>
<td>$395</td>
<td>$395</td>
<td>$395</td>
<td></td>
</tr>
<tr>
<td>Winter</td>
<td>80</td>
<td>87</td>
<td>96</td>
<td>107</td>
<td></td>
</tr>
<tr>
<td>Summer</td>
<td>58</td>
<td>60</td>
<td>63</td>
<td>65</td>
<td></td>
</tr>
<tr>
<td>Aftermath</td>
<td>7</td>
<td>7</td>
<td>7</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>Other variable expenses</td>
<td>55</td>
<td>55</td>
<td>55</td>
<td>55</td>
<td></td>
</tr>
<tr>
<td>Interest @ 10%</td>
<td>50</td>
<td>50</td>
<td>51</td>
<td>51</td>
<td></td>
</tr>
<tr>
<td>Fixed expenses</td>
<td>15</td>
<td>15</td>
<td>15</td>
<td>15</td>
<td></td>
</tr>
<tr>
<td>Total: First year’s costs</td>
<td>$660</td>
<td>$669</td>
<td>$682</td>
<td>$695</td>
<td></td>
</tr>
<tr>
<td>Less value of cull heifers</td>
<td>107</td>
<td>68</td>
<td>60</td>
<td>84</td>
<td></td>
</tr>
<tr>
<td>Net: First year’s costs</td>
<td>$553</td>
<td>$601</td>
<td>$622</td>
<td>$611</td>
<td></td>
</tr>
<tr>
<td>Net: Cost for one bred yearly</td>
<td>$690</td>
<td>$691</td>
<td>$701</td>
<td>$717</td>
<td></td>
</tr>
</tbody>
</table>

The net cost for one bred yearling heifer adjusted for death loss and culls, represents the price a cattle producer could afford to pay to obtain one bred heifer and just break even with the cost of raising a heifer. Also, selling surplus bred heifers for more than this amount would be net profit.

As can be seen in Table 1, there are many factors involved in calculating the value of a replacement, much more than just adding the value of a weaned heifer and what she will eat in the next year. The bottom line is to calculate the adjusted cost of raising bred heifers and compare that to the cost of purchasing bred heifers.

There are other options that may be considered such as, if replacements are purchased instead of raised then the ranch will have more resources available. In other words, there would be more animal units available for calving out a larger number of mature cows. If more cows can be calved, the rancher can afford to spend $50 to $100 more to purchase a replacement than it would cost to raise one.

**Raising vs. Purchasing—A Practical Point of View**

Comparing one cost figure to another makes it fairly easy to decide which one is best. What do you do about those factors that don’t have an economic value attached to them? How do you put a dollar value on the fact that a heifer knows her way around the home range? In a lot of western cattle operations this becomes a very important factor.
When grazing resources are limited and scattered, and water holes are far apart and inconspicuous, knowledge of the range is critical. Some rough country cattle producers claim that it takes at least two years for a new cow to become comfortable and knowledgeable about her surroundings. In that two-year adjustment period her production suffers.

Under many circumstances, some cattle may never be able to adjust to a harsh environment, and raising replacement heifers is the only option. The knowledge that comes from being raised on a certain range becomes invaluable.

A long established genetic program also needs to be considered. Some ranchers have worked for generations to develop a genetic line that meets the needs of their operation. At the same time, if a producer wants to change the genetic makeup of a herd, it can be done much more quickly through buying replacements.

**What Does it all Mean?**

A cattle producer needs to have a goal in mind, and know the intricate aspects of their operation. How else can informed decisions be made? Maximization of ranch resources is the key to profitability. This is why a careful thought out and evaluated decision on whether to purchase or raise replacement heifers is extremely important. Which avenue will provide the best outcome for your business? Take the time to find out.
In order to attain high levels of cow performance, the nutritional requirements of the cow must be met and feed resources must be used efficiently. Precise feeding of beef cows is complicated under diverse range and pasture environments. Monitoring body condition during the production cycle is an effective means of evaluating the cow herd’s nutritional program. Utilizing computer ration balancing programs, inventorying of available feed resources and analyzing the nutritional value of those feeds are complimentary steps to cost effective nutritional management of the beef cow.

**Condition Scores**

Cow body condition scoring is a method of categorizing breeding animals by their degree of body reserves. Numerical values, derived through subjective visual appraisal and (or) manual palpation, are assigned to each cow according to apparent external fat covert, muscle appearance, and apparent skeletal features. While several numbering systems for assessing condition scores are in use, they all are based on the same range of cow body condition, and all serve the same function. A system using the relative rankings of 1 through 9, which is commonly used throughout the United States, is described in Table 1.

<table>
<thead>
<tr>
<th>Score</th>
<th>Condition</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Severely emaciated</td>
<td>Individual spinous processes, shoulder, rib, and hip bones are obvious. No apparent fat cover. Shoulder, loin, and rearquarter muscle has marked atrophied appearance. Physically weak.</td>
</tr>
<tr>
<td>2</td>
<td>Extremely thin</td>
<td>Same as 1 but not weakened.</td>
</tr>
<tr>
<td>3</td>
<td>Very thin</td>
<td>Individual spinous processes, shoulder, rib, and hip bones are obvious. No apparent fat cover. Only slight muscle atrophy.</td>
</tr>
<tr>
<td>4</td>
<td>Slightly thin</td>
<td>Individual spinous processes no longer apparent. Rear ribs, hip, and pin bones evident. Slight fat cover over shoulder and foreribs only. No visible muscle atrophy.</td>
</tr>
<tr>
<td>5</td>
<td>Moderate</td>
<td>Last two ribs noticeable. Small amount of fat over shoulder, foreribs, and loin. Slight or no fat on brisket or over hip and pin bones.</td>
</tr>
<tr>
<td>Score</td>
<td>Condition</td>
<td>Description</td>
</tr>
<tr>
<td>-------</td>
<td>-----------</td>
<td>-------------</td>
</tr>
<tr>
<td>6</td>
<td>Slightly fleshy</td>
<td>Individual ribs are not evident. Moderate fat covering over shoulder, loin, and foreribs. Some fat in brisket and over last ribs and hip bones.</td>
</tr>
<tr>
<td>7</td>
<td>Fleshy</td>
<td>Very smooth profile due to fat deposits. Considerable fat covering over shoulder, rib, loin, and hip. Fat fills out brisket, flanks and tailhead.</td>
</tr>
<tr>
<td>8</td>
<td>Obese</td>
<td>When viewed from behind, back and hips have square appearance, and tail head is full due to excessive fat deposits. Flanks appear deep, and brisket is full and distended with fat.</td>
</tr>
</tbody>
</table>

Researchers have reported strong positive correlations between condition scores and the percent body fat of cows. In fact, condition scores are more indicative of an animal’s relative body fatness than other objective linear measurements such as weight to height ratios and backfat probes. Research shows visual appraisal alone can accurately evaluate body condition, which is beneficial considering that palpating all cows may not be practical under certain circumstances. A simplified reference guide containing key points and backfat estimates for each condition score is shown in Table 2.

<table>
<thead>
<tr>
<th>Reference point</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physically weak</td>
<td>yes</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>no</td>
</tr>
<tr>
<td>Muscle atrophy¹</td>
<td>yes</td>
<td>yes</td>
<td>slight</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>no</td>
</tr>
<tr>
<td>Outline of spine visible</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>slight</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>no</td>
</tr>
<tr>
<td>Outline of ribs visible</td>
<td>all</td>
<td>all</td>
<td>all</td>
<td>3-5</td>
<td>1-2</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Fat in brisket &amp; flanks</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>some</td>
<td>full</td>
<td>full</td>
<td>extreme</td>
</tr>
<tr>
<td>Outline of hip &amp; pin bones visible</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>slight</td>
<td>no</td>
<td>no</td>
</tr>
<tr>
<td>Fat udder &amp; patchy fat around tailhead</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>slight</td>
<td>yes</td>
</tr>
<tr>
<td>Backfat estimate, inches</td>
<td>0</td>
<td>0</td>
<td>.05</td>
<td>.11</td>
<td>.19</td>
<td>.29</td>
<td>.41</td>
<td>.54</td>
<td>.68</td>
</tr>
</tbody>
</table>

¹Muscles of loin, rump, and hindquarter are concave, indicating loss of muscle tissue.
Condition Scores and Cow Reproductive Performance

Condition scores can be used to manage the cow herd toward a desired level of reproductive performance. Cows of higher body condition at calving and during early lactation are more likely to cycle and become pregnant early in the breeding season.

Results from a 3-year study in western South Dakota indicate that the likelihood of estrus by the beginning of the breeding season increases with higher cow body condition scores (Table 3). The probability of cows conceiving early and becoming pregnant during a 60-day breeding season is also greater as condition score increases (Table 4).

Late-calving cows that are thin (condition score 3 or less) have the poorest chances of cycling and becoming pregnant. Cows that calve early could be one condition score less at the beginning of the breeding season than late calvers and still have the same probability of conceiving. Higher levels of nutrition for late-calving cows and early calving of heifers will ensure that a majority of the cow herd cycles early in the breeding season.

Several studies indicate that average body condition or cows with condition scores of 5 at calving and at the beginning of the breeding season will have relatively high levels of reproductive performance. Many management factors in addition to nutrition and body condition will affect reproductive performance of the beef cow herd. What is considered ideal body condition may vary with location, breed, month of the breeding season, and management system. The optimum body condition at various times of the year will also depend on what level of reproductive performance is expected.

To obtain relatively high reproductive performance and still avoid excessive feed costs, nutritional programs should match cow body condition with an expected level of performance. For the scoring system described, a change in one condition score is equivalent to a 60- to 80-pound change in weight if condition score 5 is the goal. A condition score 3 cow would need to gain 140 pounds. These weight changes do not include weight gain of the fetus and fluids associated with pregnancy.

<table>
<thead>
<tr>
<th>Condition score</th>
<th>Probability based on pre-calving condition score</th>
<th>Probability based on pre-breeding condition score</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>____</td>
<td>.05</td>
</tr>
<tr>
<td>3</td>
<td>.09</td>
<td>.12</td>
</tr>
<tr>
<td>4</td>
<td>.19</td>
<td>.28</td>
</tr>
<tr>
<td>5</td>
<td>.35</td>
<td>.52</td>
</tr>
<tr>
<td>6</td>
<td>.55</td>
<td>.74</td>
</tr>
<tr>
<td>7</td>
<td>.74</td>
<td>.89</td>
</tr>
<tr>
<td>8</td>
<td>.86</td>
<td>____</td>
</tr>
</tbody>
</table>
Table 4. Cow body condition and reproductive performance (SDSU).

<table>
<thead>
<tr>
<th>Condition score</th>
<th>Early calvers</th>
<th>Late calvers</th>
<th>Early calvers</th>
<th>Late calvers</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>.88</td>
<td>—</td>
<td>.51</td>
<td>—</td>
</tr>
<tr>
<td>4</td>
<td>.93</td>
<td>.88</td>
<td>.58</td>
<td>.41</td>
</tr>
<tr>
<td>5</td>
<td>.96</td>
<td>.93</td>
<td>.65</td>
<td>.56</td>
</tr>
<tr>
<td>6</td>
<td>.98</td>
<td>.96</td>
<td>.72</td>
<td>.70</td>
</tr>
<tr>
<td>7</td>
<td>.99</td>
<td>.97</td>
<td>.77</td>
<td>.81</td>
</tr>
<tr>
<td>8</td>
<td>.99</td>
<td>.99</td>
<td>.82</td>
<td>.89</td>
</tr>
</tbody>
</table>

Based on condition score at calving:

Based on condition score at the beginning of breeding season:

Condition Scores and Calf Performance

Increased condition scores of cows at calving have been associated with increased calf birth weights, decreased calving difficulty, decreased calf death loss and sickness, and increased milk production and better calf immunity.

Calf birth weight is reduced by restricting energy intake of the cow the last 60 days of gestation. While these calves may be smaller, the body condition loss of the cow reduces her ability to endure the physical strains of parturition and ultimately calving difficulty (dystocia) is increased. Colorado State University has demonstrated that heifers calving in condition scores 5 and 6 had higher colostral antibody production and passed on this immunity to their suckling calves than heifers calving in condition scores 3 and 4. In addition, calves from fleshier heifers in this study were quicker to stand and nurse which is critical for calfhood survival and future resistance to disease challenges.
Table 5. Effects of cow condition score change from March until May calf performance (SDSU).

<table>
<thead>
<tr>
<th>Condition score change, March to May</th>
<th>Maintained</th>
<th>Lost one</th>
<th>Lost two or more</th>
</tr>
</thead>
<tbody>
<tr>
<td>205-day adjusted weight, lb</td>
<td>607</td>
<td>606</td>
<td>586</td>
</tr>
</tbody>
</table>

In general, fleshier cows have higher daily milk production than thin cows under the same environmental, physiological and feeding conditions. Lactating cows use their body fat as an energy source for milk production, a fact long known in the dairy industry. Also, heavier milking cows tend to lose more body condition during lactation than average milkers when both groups are provided a similar level of nutrition. As a result, the heaviest calves may often be suckling the thinnest cows at weaning time. Therefore, culling thin cows during drought years is not recommended. Early weaning can reduce late-season cow condition loss.

Several university studies have shown that weaning weights of calves are not related to cow body condition scores. Changes in management and feeding programs from spring to summer and fall may have allowed for compensatory growth of calves that were previously undernourished in these studies. Only under severe nutritional restriction of the cow (loss of two or more condition scores during early lactation) has it been determined that weaning weights of calves are depressed.

**Feeding the Thin Cow**

Included in the proceedings is a laminated, color handout of a cull pregnant cross-bred cow that was fed under feedlot conditions. Pictures were taken weekly to document condition score changes from one to six. Feed intake and weight changes were recorded and feed costs were determined. Cow #98 was a healthy, mature cow, 120 days pregnant during the winter of 1992-1993. The following information coincides with the change from condition score 1 to condition score 6.
## Increase in Body Condition Score and Weight Gain

<table>
<thead>
<tr>
<th>Date</th>
<th>Condition Score</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/11/93</td>
<td>1</td>
<td>723 lb</td>
</tr>
<tr>
<td>2/1/93</td>
<td>2</td>
<td>801 lb</td>
</tr>
<tr>
<td>2/20/93</td>
<td>3</td>
<td>860 lb</td>
</tr>
<tr>
<td>3/15/93</td>
<td>4</td>
<td>915 lb</td>
</tr>
<tr>
<td>4/1/93</td>
<td>5</td>
<td>993 lb</td>
</tr>
<tr>
<td>4/26/93</td>
<td>6</td>
<td>1086 lb</td>
</tr>
</tbody>
</table>

**Totals (for 105 days)**

- **5 CS gain**: 363 lb gain

## Performance

- **Average daily gain**: 3.46 lbs/day
- **Pounds of gain/condition score**: 72.6 lbs/CS
- **Feed efficiency, lb feed DM/lb gain**: 6.65 F/G

## Diet

- 5.1 lb barley/day AF
- 54.2 lb corn silage/day AF
- 2.02 oz TMS/dical/day AF

23 lbs DM/day

**Total DM: 2415 lbs (for 105 days)**

## Costs

<table>
<thead>
<tr>
<th>Item Description</th>
<th>Rate (ton)</th>
<th>Cost (for 105 days)</th>
</tr>
</thead>
<tbody>
<tr>
<td>536 lb barley per day</td>
<td>$130/ton</td>
<td>$34.84</td>
</tr>
<tr>
<td>5695 lb corn silage per day</td>
<td>$25/ton</td>
<td>$71.19</td>
</tr>
<tr>
<td>13.1 lb TMS/dical per day</td>
<td>$350/ton</td>
<td>$2.30</td>
</tr>
</tbody>
</table>

**Total feed costs**: $108.33
PHYSIOLOGICAL CHANGES AT BIRTH

The calf has many obstacles to overcome in order to successfully adapt to extrauterine life. There are several physiological changes that are essential steps in making this adaptation. These steps include: changes in circulation, initiation of external respiration, correction of acid-base balance, obtaining the ability to thermoregulate, energy assimilation, and development of immunity against pathogens. Circulatory changes include umbilical cord separation and closure of the ductus venosus, foramen ovale, and ductus arteriosis. These closures dramatically affect the flow of blood through the liver, heart, and lungs. The circulatory system going to the lungs changes from a low to a high pressure system that must immediately be able to allow for oxygen exchange and the elimination of carbon dioxide during the breathing process.

During the birthing process, the thorax of the calf is compressed as it comes through the birth canal expelling some fluids from its lungs. When the chest is allowed to expand an elastic recoil of the lungs pulls in external air. This is aided by contraction of the diaphragm. Absorption of additional lung fluids occurs. When the source of oxygenated blood from the umbilical cord is removed an oxygen debt is created. This is necessary to stimulate the respiratory center to activate breathing. If successful, these events will lead to the correction of minor metabolic and respiratory acidosis of the calf that may have occurred during birthing.

After the adaptation is complete normal physiological parameters are stabilized. The body temperature will range from 100 to 103 degrees F, the heart rate will be from 100 to 140 beats per minute and the respiration rate will be from 30 to 60 breaths per minute. Much of this process is beyond our control. However, it is imperative to understand that the success of this adaptation process is affected by the timeliness of the delivery process and to some extent by the way we handle the calf post delivery. Consider, for example, the procedure of hanging a calf upside down after calving. How does this affect its ability to optimize respiration? What effect does this have on its ability to maximize the volume of oxygen inhaled? Does this affect its ability to correct the metabolic status?

At birth the calf has three main needs: to maintain body temperature, to receive antibodies from colostrum, and to minimize disease exposure.

THERMOREGULATION

Following a normal birthing, thermoregulation is generally not a problem unless the adverse affects of mother nature are overwhelming, there is a lack of good mothering ability, or a combination of both of these factors. An adverse environment following calving has a more pronounced affect on calves that have been stressed heavily during delivery. Therefore, we have to be able to recognize when a problem exists and take appropriate action to correct it.

The negative effects of mother nature are usually a function of moisture, wind, and temperature. The calf arrives into its extrauterine environment soaking wet. What the calf really needs is dryness. This is usually achieved by the mother doing a vigorous job of licking and stimulating the calf into activity. Sometimes in adverse weather, protection from the elements is all that is necessary to allow the mother to do her job without fighting the elements. With assisted births it is usually better to be somewhat pro-active in the approach to
thermoregulation than to have to play catch up later. This approach should be simple and not interfere with bonding of the calf to its mother. It is recommended that the calf be placed in a position and location that will minimize loss of body heat. If the area for assisted delivery has a concrete floor, I suggest placing a mat for insulation between the floor and the calf. The calf should be placed on the mat in sternal recumbency with its front legs either extended forward or folded under. This serves a couple of purposes. It allows the calf to maximally improve the volume of oxygen taken in with each breath. Moreover, when the calf is lying on its sternum the position better facilitates tubing of the calf with colostrum. If a calf is allowed to simply lie on its side, it will not get full expansion of its chest. This will delay its ability to correct metabolic problems. Laying a calf on its side also enhances body heat loss from the flank and lower abdomen area.

How do we recognize when the calf is too cold? This may seem to be an elementary question. However, too often a calf is brought in only when it has severe hypothermia. I advocate that most producers would save time and effort and be more successful in management of the hypothermic calf if they intervene earlier. I know this is not always possible. One of the best tools for assessing hypothermia is a thermometer. For less than $5.00 a small battery operated thermometer can be purchased that anyone can carry with them. We consider a calf hypothermic if its temperature is below 99 degrees. In some cases when the temperature is 99 degrees, it is evident that if action is not taken the calf will simply get colder. This is a matter of clinical judgement. Certainly, a calf with a temperature of 98 degrees is much easier and faster to warm up than a calf that has a temperature of 92 to 94 degrees. When the body temperature drops to 98 degrees a calf loses its shiver response and in most cases its suckle reflex. As the body of the calf responds to combat cold, peripheral circulation is decreased in order to maintain the core temperature of the body.

Energy is essential to maintain body temperature and the energy stores of the newborn are limited. The liver and other glycogen sources of energy are exhausted within 1 to 4 hours after birth while the brown fat may serve as a source of energy for 1 to 5 days. Beyond this the energy has to come directly from outside nutrition, i.e. colostrum.

**COLOSTRAL MANAGEMENT**

With a normal delivery in beef cattle the calf will usually nurse and consume adequate colostrum without assistance. However, with an assisted delivery we recommend that colostrum is provided immediately. Colostrum is essential as an energy source and a source of protective antibodies (maternal antibodies). Don’t assume that the calf will receive adequate antibodies from nursing the cow on its own. Take advantage of the moment when you have both the cow and the calf together for handling. Generally, tubing is the most efficient method of delivery from a time management standpoint.

Calves that are stressed heavily during the birthing process absorb antibodies from colostrum less efficiently than calves that experience a normal delivery. This could be caused by a number of mechanisms. Decreased absorption of protective antibodies has been associated with hypoxia, impaired circulation, hypothermia, and competing proteins. In addition to this, when calves are left too long without receiving colostrum “gut closure” occurs. Only during the first 24 to 36 hours of life are calves able to absorb from their intestines most of the protective immunoglobulins found in colostrum.

I prefer to give a calf colostrum from its own mother. If adequate colostrum is not available from this source use colostrum from another cow within the same herd. General principles suggest that colostrum from a mature cow is superior to that taken from a heifer even though both may have a similar concentration of immunoglobulins. The mature cow in all likelihood has been exposed to many more antigens and has a wider variety of antibodies than does the heifer calving for the first time. Colostrum from dairy herds or colostral substitutes can also be considered. Please note that you may be bringing in disease from outside dairy sources of colostrum. Be careful of what you
introduce! Colostral substitutes should be considered as a last ditch effort. Be aware that the calf needs to absorb about 100 grams of antibody to be protected. Most substitutes provide from 10 to 36 grams at best. Do not forget that the amount of antibody absorbed by the intestines of a calf is a function of the amount of colostrum consumed and the concentration of antibody in the colostrum. Earlier colostral intervention is always better than late intervention.

In heifers, one of my concerns is to not overwhelm the calf with colostrum. If its appetite is satiated it will not make the effort to get up and nurse. The bonding of the heifer with its calf takes more than just licking. The calf plays a very active role in the bonding. Usually I administer 1 to 1 1/2 quarts of colostrum to a beef calf and place the pair in a clean dry environment for mothering up and bonding. The calf should be observed periodically to determine if the calf is nursing and to make sure it is not showing signs of cold stress. We generally record first nursing time of the calf on the record to assure that the calf consumes colostrum after it is tubed.

**MANAGING TO DECREASE EXPOSURE OR OVEREXPOSURE TO DISEASE PRODUCING ORGANISMS**

Throughout the whole process of calving management, care must be taken to establish and apply practices that will decrease the exposure of calves to pathogens. The control of pathogens starts in the delivery area, continues in the jugs where pairs are penned, and continues as the pairs are turned out to mingle with other animals.

These practices are strongly recommended:

- Avoid calving cows in winter feeding areas.
- Clean delivery areas between assisted births.
- Clean the teats of mothers off before milking out colostrum.
- Treat the navel of calf with tincture of iodine to minimize pathogen entry.
- Isolate cows that have recently calved from cows that calved earlier in the season.
PROTECTING YOUR HERD FROM REPRODUCTIVE DISEASES

K. G. Odde, D.V.M., Ph.D.
Vice President, Veterinary Operations
AgSpan

It is perhaps useful to begin this discussion by defining the scope of this presentation. In the general sense, disease is defined as the absence of health. Diseases are typically categorized as infectious, metabolic, toxicologic and parasitic. Reproductive disease could be any disease condition contributing to reproductive loss. These reproductive losses could occur because of anestrus, failure to conceive, early embryonic death, abortion or perinatal losses. I would argue that the single largest factor contributing to reproductive loss in beef cattle operations is nutrition. We could perhaps argue that nutritional deficiencies are metabolic diseases. For the purposes of this presentation, reproductive disease will be defined as infectious disease that contributes to reproductive loss in cattle.

BOVINE VIRUS DIARRHEA (BVD) 

BVD was first recognized as a clinical entity in the U.S. in 1946. BVD virus can cause gastroenteritis, diarrhea, ulcerations of the muzzle, nasal and oral cavities, fever, leukopenia, early embryonic death, cerebellar hypoplasia in fetuses and abortion. The primary concern in beef cow herds is fetal infection that results in abortion, congenital defects, or the development of persistently infected fetuses (calves) that survive and become a constant source of infective virus.1,2

The BVD virus can cross the placenta in susceptible pregnant cattle and result in fetal infection. If fetal infection occurs early in pregnancy, fetal death or persistent infection may occur. Fetal infection late in pregnancy usually results in the birth of a seropositive, healthy calf.2 Calves that are born persistently infected with BVD have a mortality rate approaching 50% by weaning. Persistently infected calves can survive to adulthood. Persistently infected cows that survive and become pregnant give birth to persistently infected calves.

There has been a great deal of interest recently in BVD outbreaks where the acute/peracute manifestation of disease occurred. USDA-APHIS has reported outbreaks in Wisconsin, Michigan, Ohio, Kentucky, Pennsylvania, New York and California. These were caused by Type 2 BVD virus. These herds experienced acute or peracute disease with moderate to high mortality rates. The disease was characterized by acute diarrhea, high body temperatures (≥107° F), pneumonia, and bleeding disorders in both adult cattle and calves. Cattle that develop disease from BVD virus type 2 are not persistently infected. Cases of type 2 BVD infection are thought to result when susceptible animals come in contact with acutely ill or a persistently infected animal.3

Prevention and control of BVD should include effective vaccination and biosecurity. The program should focus on the prevention and/or elimination of persistently infected animals. Persistently infected animals may enter a herd when
pregnant cows carrying persistently infected calves are brought in, persistently infected calves for grafting onto cows that lose calves are acquired, or when persistently infected bulls are purchased.

**INFECTIOUS BOVINE RHINOTRACHEITIS (IBR)**

IBR is a highly contagious infectious disease that is caused by bovine herpesvirus 1. It can cause respiratory disease, conjunctivitis, vulvovaginitis, abortions and encephalitis. Bovine herpes virus 1 can be divided into three groups or subtypes: Subtype 1 causes primarily respiratory infections; subtype 2 causes respiratory and genital infections; and subtype 3 causes primarily neurologic infections.4

The primary concern with IBR virus in beef cow herds is the risk of abortion. Abortions resulting from IBR virus infections usually occur in mid- to late pregnancy. Because IBR virus is a herpes virus, reactivation of latent virus may occur. This may result in abortions that occur months after initial infection.

Since herpes viruses are transferred from cell to cell, humoral mediated immunity appears to be less important in disease prevention than cell-mediated immunity. Modified live IBR vaccines administered to cows have been shown to provide fetal protection while killed IBR vaccines have not.2

**CAMPYLOBACTERIOSIS (VIBRIOSIS)**

Campylobacteriosis is a venereal disease of cattle characterized by temporary infertility and occasionally abortion. Beef herds experiencing Campylobacteriosis will usually have an increased incidence of nonpregnant cows and more cows bred late in the breeding season. Since Campylobacteriosis is a venereal disease, it can be controlled by eliminating the possibility that bulls will infect cows and that cows will infect bulls.

Vaccines, used appropriately have proven effective in minimizing the effects of this disease in many areas. Immunization of bulls has been shown to be of value in preventing carrier bulls.

**LEPTOSPIROSIS**

Leptospira interrogans serovars hardjo and pomona have been reported to be the most common leptospirosa in cattle abortion. Leptospira abortions are usually seen in mid- to late pregnancy. In endemic areas, frequent immunization with multivalent antigens may be required. In beef herds that are not in endemic areas, less frequent immunization is usually practiced.

**SUMMARY**

Many other microorganisms in addition to those discussed may also contribute to reproductive loss. These include trichomonas fetus, hemophilus somnus, bluetongue virus, neospora and others. These reproductive losses can best be prevented with a clear understanding of the causative agents, the disease epidemiology and pathogenesis and available preventive measures.

**LITERATURE CITED**


