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BEEF

Chapter 3

Management for Lifetime Success in Young Beef Cows

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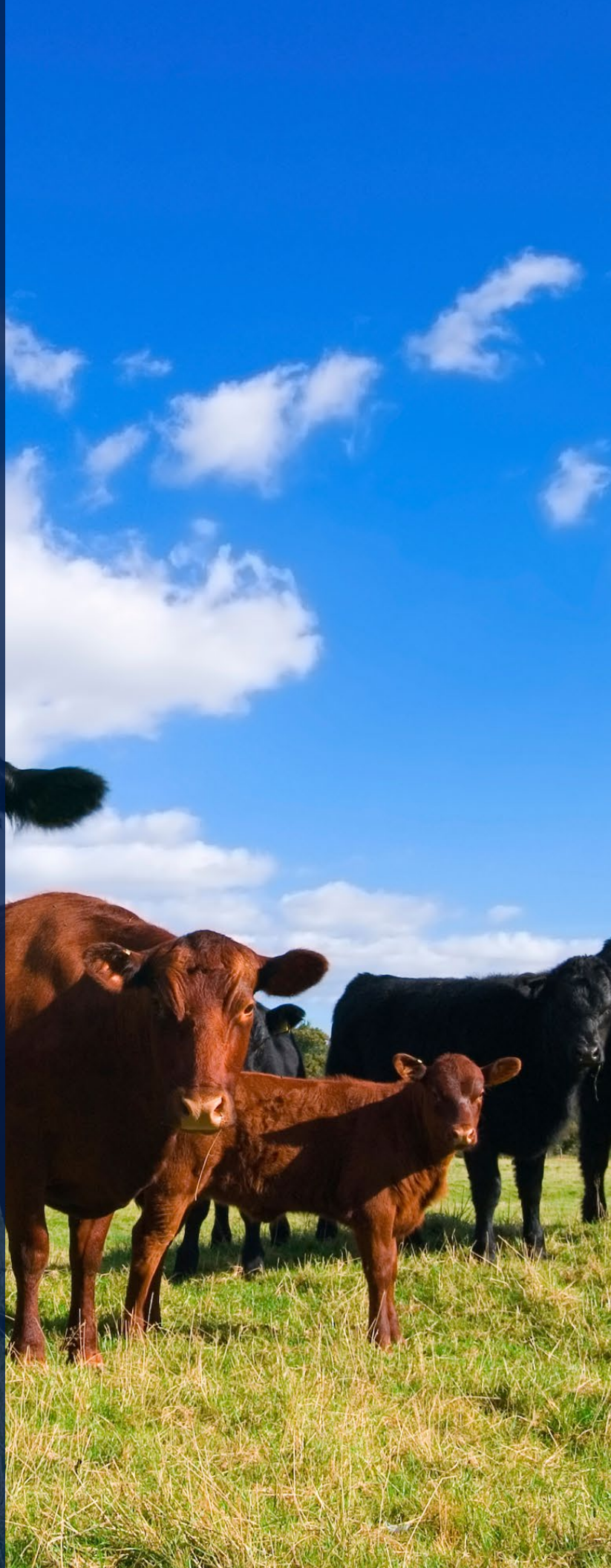

Chapter 3

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Introduction

"How can you tell if a beef producer is making money? Take a look at how many older cows they have."

– Dr. Jerry Lipsey, 2014 Cattlemen's College, Nashville, TN

After the costs of feed and pasture, the next largest non-labor expense is the cost of replacing beef cows that are culled. That expense has dramatically increased in recent years due to higher values for purchased females and greater opportunity costs associated with retaining raised heifers. Producing more calves over the lifetime of each cow that enters the herd reduces the replacement expense when expressed on a cost per calf basis.

One of the realities of ranching for herds with a single calving season is that in order to optimize returns, non-pregnant cows and those that lose their calves are culled (Clarke et al., 1984). To maintain a steady herd size these females need to be replaced by retaining heifer calves to breed or by purchasing females. Both options affect profitability, either by reducing sales or by increasing the cash expenditures for breeding cattle.

Successfully reducing the replacement rate can have a significant impact on the production and profitability of a cow-calf operation. The effect of changing the replacement rate from 20% to 15% is shown in Table 1. Reducing replacement rate results in more heifer calves to sell, but just as importantly, more calves produced by older, more productive cows, resulting in a more pounds weaned per cow exposed (Roberts, 2007). The net result in this 100-cow breeding herd example is approximately 4700 pounds of additional calf weight to sell.

Reducing replacement rate also creates opportunities to generate additional income. Surplus heifer calves not needed for herd replacements can be marketed as feeder cattle or replacements heifers for other producers. Ranchers could also use the additional

Key Points

- Reproductive soundness is a major reason for cows leaving the breeding herd and focus on the components of reproduction in the young cowherd will improve longevity and productivity.
- Heritability of most reproductive traits is low; therefore, crossbreeding is an important tool for managing reproductive success.
- Managing and selecting heifers to breed early in the breeding season improves lifetime productivity.
- Segregating young cows from the mature cowherd can improve feeding and calving management for increased lifetime success.
- Incidence of calving difficulty is greater in heifers than cows and this has long-term impacts on reproduction. Providing early assistance when heifers experience dystocia can help mitigate this negative effect.
- Managing heifers and young cows to have greater body condition than the older cowherd is good insurance for reproductive success.

Table 1: Effect of changing replacement rate from 20 to 15% on pounds of calf produced for a 100 head breeding herd[1]. *Adapted from Roberts, 2007*

Age	% of Cow Herd Replacement Rates		Pounds Calf Weaned[2] Replacement Rates		% Change
	20%	15%	20%	15%	
1	20	15	---	---	---
2	16	13	7176	5852	-19.5
3	12	12	5861	5388	-5
4	10	10	4914	4918	0
5 & older	42	50	21000	25000	19
Number & pounds calf weaned	81	85	38770	41157	6.2
Number & pounds replacement	20	15	9585	7241	-25
Pounds of calf to sell	---	---	29185	33916	16

[1] Does not account for the reduction in numbers or pounds of cull cows sold.
[2] Assumes that cows 5 years old and older wean 500 pound calves and estimates that there is a 20 pound reduction in weaning weight for every year of age less than 5. Data are not adjusted for differences in weaning weight due to sex of the calf.

heifers as a method to expand their herd. Reducing the number of mandatory culls provides ranchers the luxury of placing additional selection pressure on performance or other desired attributes. Surplus bred females could be marketed at a significantly higher value compared to cows sent to slaughter.

What are the causes for cattle to leave the breeding herd?

According to a survey of U.S. cow-calf producers (NAHMS, 2010), the three most common reasons for cows to leave the herd are pregnancy status or reproductive problems, age, and economic or environmental conditions such as drought (37, 32, and 16%, respectively; Table 2). The remaining 15% of culls leave for health and productivity concerns. Two of these factors can be viewed as either inevitable (age) or difficult to predict in advance (drought or economic downturns). If those causes were removed, reproductive problems would be the primary cause of premature culling for 71.1% of the cows removed for performance and productivity causes.

Some of the causes for culling, such as disposition and skeletal soundness, are best dealt with when replacement heifers are selected. The economic impact of removing those heifers from the replacement pool will be much less at that time rather than after devoting significant resources in heifer development. Likewise consulting with a herd veterinarian regarding vaccination protocols, biosecurity, and other health management concerns could reduce the culling rate because of health related concerns.

Table 2: Reasons for cows leaving the breeding herd. *Adapted from NAHMS, 2010*

Reason	Percent of Cows	Percent of Cows, Age and Economic Factors Excluded
Pregnancy or other reproductive reasons	36.9	71.2
Age or teeth	32.1	---
Soundness or other health reasons	5.0	9.7
Udder problems	2.7	5.2
Disposition	3.6	6.95
Producing poor calves	3.6	6.95
Economics, drought, other	16.1	---
Total	100.0	100.0

However, reproductive performance plays such a large role in whether or not cows stay in the herd, the greatest opportunities for improving cow longevity lie in improving reproductive performance, particularly in young cows. The balance of this chapter will focus on management strategies to improve reproductive performance and productivity.

Genetic Influences

There has been a great deal of change in growth and carcass traits due to improvements in the ability to identify sires and dams of greater genetic merit for growth and carcass traits. Could genetic selection and the use of selection tools such as EPDs and selection indexes allow managers to select for greater reproductive efficiency and longevity in beef cows? Unfortunately, the heritability estimates for most reproductive and longevity traits are much lower (<0.2) than growth and carcass traits (Cammack et al., 2009; Berry and Evans, 2014). Increased usage of whole-herd reporting systems by breed associations, the development of EPDs for stayability and reproduction, and selection indexes that incorporate that information will allow for improvement in those traits, albeit slowly (Rogers et al., 2004; MacNeil and Vukasinovic, 2011).

Crossbreeding, on the other hand, is a genetic tool that is very effective for extending the productive life of beef cattle. Based on research from the U.S. Meat Animal Research Center and other laboratories, crossbred cows produce approximately one more calf over their lifetime compared to the average of their purebred parents. Differences in cow longevity is a major contributor to the approximately 25% greater lifetime cumulative weaning weight for the crossbred cow (Weaber and Spangler, 2013). Incorporating a well-designed crossbreeding system to capitalize on maternal heterosis is a key management step to improve cow longevity and lifetime productivity.

Heifer Development Effects on Lifetime Production

Management of the beef female as a herd replacement begins at the time of selection or weaning. A more thorough discussion of heifer selection and heifer development is beyond the scope of this chapter but can be found in Chapters 2 and 30. A typical goal for producers has been to develop heifers so as many as possible calve at approximately 22 to 24 months of age (Patterson et al., 1992).

The percentage of females that conceive for their second calf may be more important than heifer pregnancy rate when considering lifetime productivity and profit. An economic analysis of the development costs and reproductive outcomes of the first two breeding seasons in cattle suggest that the success or failure of the second breeding season has a greater impact than does the pregnancy rate achieved in the yearling heifers (Meek et al., 1999; Clark et al., 2005).

However, the timing of when a yearling heifer conceives in the first breeding season can have profound impacts on that heifer's lifetime productivity. It has been well recognized for some time that heifers that calve in the first 21 days of their first calving season tend to continue to calve early in subsequent pregnancies (Lesmeister et al., 1973). This has been substantiated in more recent work in Nebraska (Funston et al., 2012). As the period in which a cow calves moves from the first 21 day period to periods later in the calving season, the probability of becoming pregnant the next breeding season decreases (Burris and Priode, 1958).

An analysis of lifetime production records from South Dakota herds and from the U.S. Meat Animal Research Center (USMARC) showed that heifers that calved in the first 21 days as a two-year-olds stayed in the herd longer than those heifers that calved in later periods (Cushman et al., 2013). In the South Dakota dataset, the difference in longevity between calving in the first 21 day period and later periods was 1.2 years. The average longevity for USMARC heifers that calved in the first, second, or third 21 day period was 8.2, 7.6, and 7.2 years, respectively. A higher percentage of the USMARC heifers that initially calved in the first 21 day period became pregnant in their next five breeding seasons compared to heifers that calved in the second or later periods. Those same earlier calving heifers also weaned heavier calves in each of their first six calving seasons.

Collectively, these results strongly suggest that a primary focus should be on managing heifers so that as many as possible conceive in the first 21 days of the breeding season and that when heifers become pregnant plays a greater role in lifetime productivity than does the pregnancy percentage as yearlings. If producers can afford to breed extra heifers, they should consider doing so, and select the earliest calving females as replacements using ultrasound technology for pregnancy detection and fetal aging.

Following this management practice will produce a pool of replacement females that should have the greatest probability of remaining in the herd longer.

If producers do not have the resources to retain and breed excess heifers, an alternative strategy would be to select the oldest heifers as replacements. Based on the work of Funston et al. (2012) these heifers should be the most likely to be cycling at the start of the breeding season and consequently be more likely to conceive in the first 21 day period. These heifers may also be the most cost effective, as they will require less feed to reach 55% of mature body weight by breeding due to their heavier weaning weight. Producers do need to be cautious about simply selecting the largest and heaviest heifers without regard to date of birth. By selecting on absolute size and weight regardless of age, producers will be indirectly selecting for heifers with increased growth rate and mature size. That practice will result in increased mature weight over time if left unchecked, which could have adverse effects on the adaptability of those cows to their environment.

Two-year-old cows often have a longer anestrous period after calving compared to older cows. For that reason heifers are often bred to calve earlier than the mature cowherd. This strategy allows more time between calving and the start of the subsequent breeding season. An additional benefit of this strategy is that it is easier to focus more attention on managing and observing the bred heifers to ensure sufficient precalving nutrition. In addition, the incidence of calving difficulty is usually the greatest in heifers and managing them to calve before the cows allows the producer to devote more attention and assistance, which should help reduce the number of calves (or heifers) that die due to dystocia.

The adoption of reproductive technologies to increase the number of heifers (or cows) that conceive early whether by AI or natural service is another option that could enhance longterm productivity of beef cows. A number of proven estrous synchronization protocols are available for use, all of which would increase the number of females bred early. Those protocols that involve a progestin have the added benefit, in some cases, of inducing either puberty in heifers or the resumption of estrous cycles in anestrous cows. Chapters 30 and 31 provide more in-depth discussion of the various protocols and under what situations they might be best suited.

Management of Young Cows Before and After Calving

Segregation of Groups

One of the challenges of managing bred heifers and young cows is that these cattle are still growing. These cattle will require additional feed resources, particularly energy and protein, compared to more mature cows. More specific information regarding nutrient requirements and diets can be found in Chapter 14.

The smaller size of a bred heifer or a three-year-old cow compared to mature cows means that she is less able to compete with older cows for feed resources, whether fed daily or self-fed. For that reason, plus the increased nutrient requirements discussed earlier, it is recommended that bred heifers and young cows be managed separately from mature cows (four years of age and older). While that is a common practice for first-calf heifers, managing cows bred for their second calf separately is much less common. Increased adoption of that practice could increase the percentage of that age group that remains in the herd for three or more calf crops. The fact that the value of improving pregnancy rate by 1% in two-year-old cows is almost twice as high as a 1% increase in virgin heifer pregnancy rate (Meek et al., 1999) would justify the additional labor and expense.

Calving Difficulty

Dystocia is one of the primary causes of death for calves born to first-calf heifers. In most herds, failure to produce a live calf is grounds for culling. In addition, heifers that experience calving difficulty are less likely to re-breed on time. In a study at the U.S. Meat Animal Research Center, the pregnancy rate for cows with dystocia was 16% lower than cows that calved unassisted (Laster et al., 1973). An analysis of more recent data has shown that cows that experience calving difficulty as heifers are at a 25% greater risk of being culled compared to heifers that calve unassisted (Rogers et al., 2004). Research

from Miles City, MT has shown that providing early assistance can mitigate many of the negative effects on reproduction caused by dystocia (Doornbos et al., 1984; Bellows et al., 1988) as heifers in those studies that were helped early were more likely to be pregnant in the fall. The use of EPDs for maternal and direct calving ease to select sires less likely to cause dystocia problems and sire easier calving daughters, as well as using AI sires that are highly proven for calving ease will help reduce the risk of calving difficulty.

Body Condition Scores

The influence of body condition on reproductive function in beef cows has been extensively reviewed, including Chapter 4 in this book; however, a short discussion of this topic as it relates to managing young cows is warranted. The standard recommendation has been to develop heifers so that they are in a BCS of 6 (1 = emaciated, 9 = obese) at calving, compared to a recommendation of a BCS 5 for mature cows. The extra energy reserves provide a level of "insurance" to help ensure that the heifers will resume estrous activity and ovulation early enough to re-breed on time. Increased energy reserves and increased body condition scores have been correlated with a shorter postpartum interval and a quicker return to estrus (Houghton et al., 1990). This is especially important in the case of heifers that happen to calve later. Pruitt and Momont (1988) demonstrated that a higher body condition score was required if later calving cows that were thin were going to be able to maintain a yearly calving interval.

Summary

Increasing the productive lifespan of beef cows will be extremely important in the future, especially as the amount of capital required to replace a beef cow increases. Management practices designed to increase the proportion of heifers that calve early offer the best opportunities for beef herd to improve longevity and lifetime productivity. These include proven principles such as appropriately designed crossbreeding systems, estrous synchronization technologies, and time-tested management practices such as calving heifers earlier than cows and monitoring body condition.

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