Low-input Heifer Development

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Introduction

Historically, developing replacement heifers has been one of the most expensive segments of a cow-calf operation. Though exact figures vary from ranch to ranch, managers have long recognized that it may require several productive years of weaning a live calf to pay for the development costs incurred during the first two-years of life. A significant portion of the cost associated with developing heifers is attributed to the nutritional program primarily since numerous studies have long tied reproductive success in the beef female to nutritional status.

Traditional nutrition programs for heifers were developed on the basis of a positive association between critical body weights and pregnancy rates. The birth of these concepts originated as the industry was transitioning from breeding virgin heifers to calve as three-year olds to a more intensive system of calving heifers as two-year olds. Conceivably managers have focused on achieving or exceeding recommended critical body weights to maximize reproductive success in younger females. Nutrient density of the diet required to grow heifers to the traditional critical body weights is dependent upon harvested energy and protein feedstuffs, which have become more costly. Thus the economics of growing heifers as replacement females with these recommendations is not a sustainable practice for cow-calf operations in the Southwest.

Since the foundation nutritional guidelines were developed for replacement heifers both the reproductive efficiency of the U.S. cowherd and supporting feed and applied reproductive technologies have evolved. As a result, numerous researchers have challenged the traditional guidelines in an effort to define more cost-effective approaches to develop heifers. The results of these studies are timely as the cost of fuel and feed has skyrocketed over the last year attributing to an increased cost of production across the ranch.

Growing ranch-raised heifers versus buying bred heifers has always been a highly debatable question. On either side of the equation most managers have identified the cost-centers of developing heifers and have come to realize most expenses, to a degree, are necessities. In today’s economy, the best case scenario one can hope for is to accurately identify cost-centers to do one of three things: 1) trim expenses where possible, 2) obtain more response from each dollar spent, and/or 3) make system changes. This paper will focus on evaluating the most current recommendations to more cost-effectively develop heifers in the production environments of the arid Southwest.

While every producer is in high gear to become a low-cost producer both logic and practicality should not be thrown out the window. It is important to keep in perspective that there are still multiple
consequences of mismanaging replacement heifers during defined critical periods in the development phase that can affect lifetime production efficiency (i.e. calf health, lactation, pregnancy rates, etc.).

**Trimming Feed Costs**

*Post-weaning Growth.* The most productive mature females in a cowherd are typically those who bred early in the breeding season as yearlings. As previously mentioned, early research clearly identified the relationship among heifer body weight, puberty, and yearling pregnancy rates. Thus significant pressure has always been placed on the post-weaning gain of heifer calves developed as replacement females.

In an effort to curb feed costs, numerous researchers have evaluated altering both rate and timing of post-weaning gain. Convincingly and consistent across studies, it is clear that delaying a significant portion of heifer gain until 45 days prior to start of the breeding season results in a compensatory growth, reduced feed costs, and no negative affects on yearling pregnancy rates.

The aforementioned relationship was the basis for the commonly accepted recommendation to grow heifers to achieve 60 to 65% of the mature body weight by the start of the breeding season. When these guidelines were developed numerous data sets supported significant improvements in puberty rates prior to the breeding season when heifers were grown to this critical weight. These specific guidelines have been challenged by numerous researchers since the turn of the 21st century because newer research does not support as strong of a relationship between body weight and puberty in today’s replacement heifer. In short, for the last 30 years, as the industry has shifted to calving two-year olds there has been increased selection pressure for age when puberty occurs compared to when the traditional guidelines were developed. Today, the most comprehensive data suggests age rather than weight at the beginning of the breeding season is requisite for a successful pregnancy in yearling heifers. In support of this concept, multiple studies have been carried out to grow crossbred heifers below 60% (and as low as 50%) of their mature body weight and measure reproductive performance. In these studies, there have been no negative impacts reported on yearling pregnancy rates or subsequent rebreeding performance as two- and three-year-olds.

Altering rate and time of post-weaning gain as well as growing heifers to lighter than traditional critical body weights are two cost-effective means of trimming feed costs during the post-weaning period for heifers. Combined these recommendations fit growing heifers on native rangelands in the Southwest.

The key to reproductive success in nutrition programs that delay post-weaning gain is to keep heifers on an increased plane of nutrition through the breeding season as higher incidences of embryonic mortality attributed to nutrient restriction are observed in the first trimester. The only drawback of growing heifers to lighter body weights as yearlings is that younger and lighter heifers may require additional service days to conceive. Furthermore, it is important to re-emphasize that the studies pertaining to growing heifers to lighter critical body weights were conducted with crossbred heifers. These recommendations have not been reported for purebred heifers in the literature, but it can be assumed from older literature that critical body weight (% of mature body weight) to achieve similar results may vary within and among breeds.

*Pregnancy.* While not as commonly discussed or evaluated are the impacts of altered rate gains during pregnancy. In the Southwest, it is very common for cattle to experience varying degrees of energy restriction during and after the breeding season due to abnormal patterns in precipitation which coincide with the critical growth cycle of predominant grass species on native rangelands. Depending on the timing of energy restriction during pregnancy, it is commonly accepted that pregnancy rates may be negatively affected. Recognizing the negative implications of energy restriction on pregnancy rates many
producers opt to substitute energy during these periods to avoid losses in body condition and embryonic mortality. However, energy and protein substitution in the diet to sustain body condition during these periods can be costly.

After the first-trimester of pregnancy, data suggests bred heifers can undergo periods of severe energy restriction through the third trimester without experiencing pre-mature loss of the developing fetus. However, to avoid complications at calving and reduce subsequent calf, lactation, and rebreeding performance a timely period to recoup body condition loss prior to calving is necessary.

Minimizing unnecessary energy substitution to bred heifers grazing native rangelands in the Southwest is an additional option to reduce costs associated with developing heifers. Further research is required, however, to understand the implications of energy restriction on post-weaning performance of calves born from energy restricted females.

Justified Management Practices

An essential component of low-cost heifer development program is to spend wisely. More often than not, and increasingly over the last year, producers have at least considered cutting out critical elements in their whole herd management scheme. The relative cost-to-benefit of vaccination programs, parasite control, and trace mineral supplementation has been questioned by many producers. However, it is strongly recommended that before these types of practices are removed from your program that consultation with your veterinarian and area livestock specialist be scheduled to objectively review the role and potential benefits of these practices in a heifer development program.

Vaccination Programs. Today, more than ever, it is critical to incorporate an aggressive herd health protocol. Judicious use of vaccines to protect against economically significant respiratory and reproductive diseases is warranted. An effective vaccination protocol for replacement heifers includes strategically timed vaccinations pre-weaning, post-weaning, and four to six weeks prior to the start of the breeding season. Furthermore, the use of quality modified-live vaccines is strongly recommended.

Parasite Control. A review of multiple studies suggests timely use of parasite control product to control internal and external parasites has consistently been worth the initial investment relative to the added performance and the role in improving immune status. Selecting appropriate and quality products is paramount to observe a desirable response.

Trace Mineral Supplementation. In recent years many producers have been faced with a significant increase in the price of most commercial trace mineral supplementation packages. As a result, trace mineral supplementation programs were altered or eliminated on many operations. While clinical symptoms of trace mineral deficiencies only present themselves in severe situations, deficiencies that elicit subclinical symptoms are more common in beef cattle operations but often go unnoticed. In the short-term quantifying the impacts of not having a trace mineral program may prove difficult. It is important to recognize, however, that deficiencies of trace minerals are common in the diets of grazing beef cattle across many production environments in the Southwest and the significance of adequate copper, zinc, and selenium status has been demonstrated to affect growth performance, immune status, and key reproductive events in the developing heifer.
System Changes

Current data suggests the most cost-effective environment to grow replacement heifers is on pasture. The nutritive value of common grass species found on much of the native rangelands in the Southwest results in the need to provide protein supplementation (assuming adequate grass supplies exist) throughout a majority of the calendar year to meet the defined nutrient requirements of developing heifers. This constraint contributes to a high cost of purchasing and delivering supplemental feed to grazing cattle, which is commonly the single largest operating expense incurred on beef cattle operations in the Southwest. Therefore, a thorough evaluation of low-cost heifer development strategies cannot be completed without discussing options to reduce supplementation costs by changing the time of the breeding season and subsequent calving season.

Unlike other grass species found in other parts of the U.S., there is a window of opportunity with many common warm-season grasses in the Southwest in which the nutritive value during the summer growing season can adequately meet or exceed nutrient requirements for growth in developing heifers, which in turn may positively impact reproductive performance. Data suggests supplementation needs can be greatly reduced by commencing periods of high nutrient demand by a female during the active growing season of these grasses.

While supplementation costs may be reduced by more closely matching heifer nutrient requirements with nutritional quality of available native forage, it is important to thoroughly evaluate the overall changes to the operations relative to the calving season and the effects of marketing calves.

Conclusion

In review of the most current research it is clear that traditional nutritional guidelines to develop replacement heifers no longer apply to the type of crossbred heifer that is found across varying production environments in the U.S. A current recommendation to grow heifers to lighter weights prior to the breeding season is one of many practical solutions to decrease costs of growing replacements. Understanding the critical periods in heifer development and the benefits of management practices such as vaccination programs, parasite control, and trace mineral supplementation that equate to performance that increases longevity as a mature cow should be thoroughly evaluated prior to determining where savings can be realized in a heifer development program.

Literature Sources


AG DAYS DEGREE
by Marcy Ward
Extension Livestock Specialist

Our first year of the Ag Day’s Degree Program which was held September 6th and 7th was a huge success! We had a total of 43 folks attend. People who attended offered nothing but positive feedback and said they plan to come back next year. The only problem is we offered too many classes that they wanted to attend. That was the plan. We want you to have too many choices so you will keep coming back for more!

MORE MORE MORE was the theme of comments. More hands on, more days, more classes! We will do our best to accommodate the demand next year. Look for more hands on and less classroom time. We also plan to expand the program to two full days. There may also be an opportunity to have a field tour.

Thanks to all who helped and who attended. See you next year!

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