Stocker Options Under Adverse Conditions

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Stocker cattle enterprises rely upon weight gain to increase dollar value (per head) of calves to generate marginal profits. Stating the obvious, the cost of the gain must be lower than the added value in order to realize a profit. The purchase and conditioning of calves for a grazing program results in upfront costs (morbidity, mortality, animal health products, feed) that must be recovered. In the classical sense these are not "fixed costs" but in a stocker enterprise these costs that are fixed or "sunk" within about a month of purchasing the calves. From that point on, the contribution of these sunk costs to cost of gain is diluted by accumulated weight. In addition to these sunk costs, there are continuing costs (interest, labor/equipment, grazing) that must be covered through the ownership period. Rate of gain and total weight gain by stocker calves are drivers influencing the recovery these costs.

More total gain dilutes the cost of production inputs over more pounds of weight. Total gain is a function of time as well as rate of gain. More time (days) allows calves to continue to add weight. More rapid gains (lb/day) dilute the upfront production costs on a daily basis and allow the cost to be recouped in a shorter period of time. More rapid gains help ensure that continuing daily cost of ownership are covered by increased weight and value.

In order to gain weight and dilute dollar costs, daily nutrient consumption must exceed the metabolic costs associated with maintenance. As nutrient consumption increases, the cost of maintenance is diluted and more rapid gains are achieved.

Adverse conditions that limit nutrient consumption and/or utilization by calves reduce potential gains and profits. These conditions may be "preexisting" - harsher production environments, forage resources with relatively low nutritional value and/or productivity - or, these conditions may develop during the time calves are being managed - changes in forage quality or availability as a result of prevailing climate. Management options can possibly aid in offsetting these limiting factors.

Value of weight gain and cost of weight gain

Value of weight gain ($/lb gain) is calculated as the [(Final $ value/head - initial $ value/head)/weight gained]. The value of weight gain does not necessarily equate to the sale price ($/lb). Value of gain can be calculated for the entire ownership period. A calf was purchased for $700 and after gaining 300 lbs was sold for $1000. Value of gain was $300/300 lbs or $1.00/lb.

Value of gain can also be used to evaluate the efficacy of management practices. For instance assume that a supplemental feeding program will increase sale weight by 30 lbs. The value of the 30 lbs is estimated as [($ value/head of the supplemented calf - $ value/head of an unsupplemented calf)/weight increase attributed to supplement].

Cost of gain for the entire ownership period is simply [total cost $/head / total weight gain]. To evaluate an optional practice to improve gain, cost of gain for the practice is [total cost $/head for the practice / weight increase attributed to the practice. These two concepts must be kept in mind when evaluating alternative practices.

Extend grazing

Total weight gain can be increased by lengthening time of ownership. Extending the grazing season also changes the marketing window; moving the marketing date can influence (up or down) the value of weight gain. Longer grazing programs may be a means of increasing gain and returns in production environments where potential weight gains are inherently low.

Grazing can be extended by using different forage resources in sequence or perhaps adding forage species with different growth curves into a pasture (i.e. interseeding). The former requires some planning and development of different forage types that have different growing seasons and provide some continuity of forage supply. The grazing of cool season annual pastures in the late winter and spring then moving calves onto warm season perennials in late spring and removal before summer slump sets in is an example. In this case, the risk associated with establishing winter annuals, perhaps having limited grazing and gain on the winter annuals can be somewhat offset by following onto the summer perennial. Likewise, the warm season perennial can be grazed at a more optimum time and the cattle removed before the gains drop off in the summer.

Diversifying a pasture by interceding may also extend grazing. Such an approach might utilize a mixture of cool and warm-season perennial grasses; a mixture or warm-season perennials with different late spring and summer growth patterns might also be a consideration. However, management of pastures containing a mix of species with different growth curves/characteristics is more difficult and sustainable production by the different components may be a risk.

Another alternative for extending grazing or the ownership period is the addition of supplementation to enhance nutrient intake and carry cattle through less desirable forage conditions. The type and level of supplementation will depend on forage quality, forage availability, feed costs, and the amount of gain added by supplementation as opposed to no supplement.

Alter the grazing season

Changing the period when forages are utilized may offer the opportunity to capitalize on periods of better forage conditions and avoid periods that are less desirable. For instance, in the tallgrass prairie regions of Kansas and Oklahoma, stocker cattle gains decline during the latter half of the summer season as a result of forage quality and heat. One approach to increasing production but avoiding the summer slump in that region is to increase stocking density (hd/ac) and end the grazing season in mid-July rather than September. Daily gains are not affected, total gain per hd is lower, but gain per acre increases with this system. Developing a forage system that avoids grazing cattle during times of low forage value or climatic stressors on the calves may be a useful strategy.

Enhance quality of available forage

In general, warm-season perennial grasses are the class of forages that have the lower nutritional value. Diversifying the forage species in a grazing system can enhance quality of forage available for calves. Introduction of legumes (clovers, peas, peanuts) into a warm-season pasture system should enhance overall forage quality and potentially support better gains than a forage system based on warm-season grass alone. The legumes will also provide some N fixation. As mentioned previously, maintaining mixtures of species is more challenging than managing monocultures.

Match cattle to forages

Heavier (more mature) cattle tend to gain more rapidly than lighter cattle on similar forages. If forage quality and resulting weight gains are of concern, the weight of calves purchased/selected may be a consideration.

Ackerman et al (1999) reported that, averaged across two years, lighter weight calves gained less (ave. 0.30 lb/day lower) than calves that were 150 to 170 lbs heavier at turnout onto old world bluestem. Despite the lower gains by the lighter calves, gain per acre was greater because more head of the lighter calves could be grazed compared to the heavier calves.

The difference in daily gain can be partly explained by the relationship of potential forage intake and maintenance requirements of calves. As calf size increases, maintenance energy requirements relative to body weight (mcal NEm/100 lb BW) decline. Forage intake capacity is related to body weight. So as calves consume forage to their intake capacity, more of the daily consumption is used for maintenance in the lighter calf while less is used for maintenance and more is available for gain in the larger calf.

For instance, the maintenance energy requirement for a 400 lb calf is about 3.81 mcal NEm/day or 0.95mcal/100 lb BW while the requirements for a 500 calf are 4.50 mcal NEM/day or 0.90 mcal/100 lb BW. If a forage contains 58% TDN, the lighter calf must consume 1.94% BW to meet maintenance while the heavier calf has to consume 1.83% BW. In this example, the difference of 0.1% BW forage intake is equivalent to about 0.14 lb gain/day.

Manage forage availability

Forage production is the combined result of growing conditions (rainfall and temperature), soil fertility, and forage type/species and varies from month to month and year to year. Forage availability (lb forage/hd/time) is the combined result of forage production and stocking rate (hd/ac/time). Forage availability can be further evaluated as the amount of forage in the total forage mass that is more or less desirable by the grazing calves. Cattle graze selectively and discriminate among species of plants, plants within a species, parts of plants, and age of plant parts. As stocking rate increases, the availability of the desirable components in a grazing unit becomes more limited, nutrient intake is more difficult to sustain and calf performance declines.

Most would associate adverse conditions with rainfall and growing conditions that limit forage production. However, in some instances excess rainfall and abundant forage production can also adversely affect calf performance. In the face of adverse growing conditions it becomes necessary to either adjust forage availability, supplement calves to sustain nutrient intake, or accept lower performance by the calves.

Adjusting stocking rates is a primary means of managing forage availability and sustaining better calf performance. However, adjusting stocking can be one of the more challenging adjustments to commit to and carry through. Decisions on the type and number of calves to purchase/retain are usually made and "sunk" costs are accrued before the grazing season. The prospects of losses or limited income cloud the decisions to reduce numbers or take on additional costs of supplementation.

In some cases, what one might consider excellent growing conditions may actually adversely affect calf performance as a result of more rapid forage growth and accumulation and a decline in forage nutritional value. In this situation, the availability of more desirable forage is reduced even though total forage mass is elevated. Adjusting stocking rates upward to attempt to regulate and use the forage might be beneficial but requires foresight and access to (and investment in) additional calves. Or, supplementation may be required to support higher gains by the calves.

Figure 1 illustrates relationships derived from research with stockers grazing bermudagrass (Guerrero et al, 1984). The researchers classified forage as low, medium or high quality. As expected, projected gains were greater as forage quality increased (except at very low forage availabilities). Regardless of forage quality, projected gain increased with increasing forage availability. But, note that the forage availability that promoted the highest projected weight gains varied with forage quality. As forage quality declined, higher forage availability was required to support higher weight gains. As a generality, weight gain is relatively less sensitive to forage availability when forage quality is high and vice versa.

Adjusting forage availability by adjusting stocking rates is the immediate means of managing adverse growing conditions. Conditions that limit forage production require lower stocking rates to ensure forage intake. When conditions lead to excessive accumulation of lower quality forage, reducing the stocking rate may support higher gains by allowing calves to graze more selectively.

Supplemental feeding

Supplemental feeding is a means of managing production risk when forage nutritive value is low or forage production is limited. Approaches vary depending on the issue at hand and range from supplying small amounts of a supplemental feed to correct a key nutrient deficiency to feeding relatively large amounts to push performance beyond what the forage supply may allow. The former could involve minerals, protein and energy while the latter is focused on increasing energy consumption by calves. In either, evaluating cost and benefit (cost of added gain versus value of added gain) is a important part of the decision process.

Low rates (lb/hd/day) of supplement are used to supply specific nutrients such as protein or minerals that are deficient and may be retarding growth or forage intake and utilization.

With warm season grasses the protein concentration in the forage or the balance of protein and energy in the forage can be too low to support optimal microbial activity in the rumen. When this occurs, forage digestibility and forage intake will be lower than potential. This results in less energy being derived from the forage, less total energy being consumed daily, and less total energy and protein available for the calf. Feeding protein supplements can enhance digestibility and intake and increase performance.

With cool-season forages (small grains as an example) the opposite may be the case. Forage protein levels can be high relative to the energy density in the forage. In this case, supplying small amounts of energy-based supplement can enhance nutrient utilization from the forage.

In both of these cases, the increase in performance achieved with a low supplement intake (less than 0.4% body weight) is usually very efficient with supplement conversion rates (lbs of supplement/lb additional gain) ranging from 1:1 to 3:1. During periods when forage quality is seasonally low or on forages that have inherently low protein concentrations, this approach is usually a very economical means of enhancing weight gain.

Moderate rates of supplement are used to supply protein and energy to calves with the goal of maintaining forage intake and enhancing performance of the calf. In some cases, simply correcting a ruminal protein deficiency may not provide the performance boost that is desired. The approach is then to increase the intake of supplement while allowing the calves to continue fully utilizing the forage resources. Supplying adequate protein with increased energy intake is a key consideration to maintaining ruminal activity and forage intake. Focus is usually on supplements with moderate protein concentrations (20-30%). This approach to supplementation will usually result in supplement conversion rates in the 4:1 to 6:1 range. Because of the efficiency, attention to cost versus value of gain becomes more important than with the low-level programs.

High rates of supplementation are used in an attempt to push calf gains or maintain weight gains with limited forage supplies. The program focuses on supplying energy. Protein must be supplied but the levels in the supplements will be lower (9-18%). The daily feeding rates are relatively high (in excess of 0.75% of body weight). The conversion of the supplement to added gain per calf will be lower than in the aforementioned situations and can range from about 8:1 to infinity (no added gain per lb of supplement offered).

These programs reduce daily forage consumption or, put another way, reduce the need for a full daily allowance of forage. Oftentimes this is the reason these approaches are implemented. Forage accumulation and forage availability (lb/hd/day) are limited. In lieu of reducing stocking rates, supplements are fed to replace the forage that cannot be consumed by the calves. Or, the supplements are fed to intentionally reduce forage consumption and spread the limited forage supply into the future over more calves and more days.

Because of the relatively poor supplement conversion rates, attention to cost and return is even more imperative. On a per head basis, the conversion rates are often unattractive. However, in essence these approaches are used to support higher stocking rates than allowed by the forage supply. So rather than view efficiency on a per head basis it may be more appropriate to evaluate efficiency as a function of added gain per acre.

Summary

Adverse conditions can result in reduced forage nutritional value and/or reduced forage availability. Both of these limit weight gain by calves and hence affect profit potential. Developing forage systems and nutritional management programs to maintain higher nutrient intake and gains can help offset the adverse production environment.