PROPER GRAZING MANAGEMENT DURING DROUGHT: THE DIFFERENCE BETWEEN MAKING A PROFIT AND LOSING YOUR HERD

J. Alfonso Ortega-S. and Steven D. Lukefahr

ABSTRACT: The objective of this paper is to report on results of proper grazing and beef cattle management practices on productivity and profitability of a commercial operation in south Texas in an extremely dry year in 2009. The enterprise consists of approximately 40 cows on 146 ha of native grasses with Kleberg bluestem (*Bothriochloa ischaemum*) and bermudagrass (*Cynodon dactylon*). Crossbred cows are comprised of Red Angus, Senepol, and Tuli breeds (via rotational crossbreeding). Some of the land is leased free to the cattle owner so that land owners benefit from tax deductions for agricultural use. A drastic reduction in stocking rate was done in 2001 (from 1 AU/1.4 ha to at least 1AU/2.3 ha), which was maintained in most years from 2003 to 2009. Forage is stockpiled in pastures following rains. No fertilization or aeration on pastures is used. Cattle are rotated through subdivided pastures to the extent that approximately half of the forage remains. Cattle have not been fed hay or cereal grains in over 5 years. Calves are weaned following fall or spring rains so that cows can recoup body condition before summer or winter to minimize need of feed supplements. Between October 2008 and June 2009, only about 75 mm of rainfall was received. In this area, close to 50% of forage production occurs during the spring (April to June), therefore, forage production was severely affected by the drought. In severe droughts, such as in 2009, energy-protein supplements (whole cottonseeds and cottonseed range cubes) were provided from March through August to maintain body condition scores of cows. Based on the amount of stockpiled forage in October 2009, the decision was made to lease approximately 50 ha of additional pastures to decrease grazing pressure and maintain body condition scores in cattle. Pregnancy, calving, and weaning rates, as well as weaning weights, did not show major differences between 2008 and 2009. Feed-related expenses increased from $41 in 2008 to $185 in 2009, equivalent to a 351% increase. Total expenses increased from $291 in 2008 compared to $411 in 2009, and profit per cow decreased from $252 to $199. Profit per ha decreased from $109 to $64 in 2008 and 2009, respectively. A proper grazing management program, including moderate stocking rate, stockpiling of forage for winter and droughts, and the flexibility to adjust the grazing program made the difference between making a profit and losing the herd. Moreover, it was possible to maintain pasture conditions, body condition scores, pregnancy and weaning rates and calf weaning weights, without destocking, but even more importantly to safeguard the integrity of plant communities.

Keywords: Grazing, Drought, Beef Production, Stockpiling, Brush Control, South Texas add Adaptation?

Introduction

South Texas is a region where in terms of precipitation, an abnormal year is probably the most normal condition; drought and flooding are also common events in this area. An analysis of 42 years of rainfall data from Kingsville, TX, indicated that between 1950 and 1997, 38% of years were categorized by drought (Ortega and Bryant nd). Between October 2008 and June 2009, only about 75 mm of rainfall was received, and by August 24, 2009, total rainfall was only 20% of normal with a cumulative total of only 93 mm for the year. As stated by Bryant (2009), the most recent serious drought between the October and June period occurred in 1952 and 1953 when precipitation was 165 mm, which was about 30% more than what was received in 2009.

Under this extreme situation, forage production was obviously severely affected. Many

Department of Animal , Rangeland and Wildlife Sciences, Texas A&M University-Kingsville, MSC 228, Kingsville, TX, 78363, s-lukefahr@tamuk.edu

Department of Animal, Rangeland, Wildlife Sciences and Caesar Kleberg Wildlife Research Institute, Texas A&M University-Kingsville, MSC 218, Kingsville, TX 78363, poncho.ortega@tamuk.edu

ranchers in south Texas feed hay during the winter and summer. However, stockpiling forage in pastures is an alternative practice to feeding hay that may be used do reduce feeding expenses and to increase profit (Lukefahr et al. 2009). However, in a year where either fall or spring moisture is extremely limited (such as in 2009), the amount of forage that may be stockpiled can be dramatically reduced. By the end of 2009, many area ranchers had sold off their herds when the forage supply was depleted and/or hay became either unavailable or too expensive.

Considering the challenging environmental conditions in south Texas, a successful beef production enterprise requires an efficient monitoring system to identify pasture responses to grazing management and forage availability in combination with appropriate beef cattle genetics to withstand the adverse environment. The monitoring system must consider both plant community and animal responses in terms of forage quantity and quality. For example, by using body condition scores in cattle, management decisions can be made in response to changes in these parameters.

In the Gulf Coast region, most breeds of cattle raised by ranchers are Brahman-influenced to overcome the problems with heat, insects and insect-borne diseases as reported by Lukefahr et al. (2009). However, a growing criticism about the Brahman breed is the large mature size, delayed age at first breeding, and disposition, as well as issues relating to beef marbling and tenderness (Thrift and Thrift, 2003).

Many areas of south Texas are dominated by exotics, such as buffelgrass (*Bothriochloa ischaemum*), coastal bermudagrass (*Cynodon dactylon*), guineagrass (*Urochloa minima*), and Kleberg bluestem (*Cenchrus ciliaris*), which have largely displaced native stands. These monocultures require fertilization and herbicide application in order to be maintained, which of course is expensive.

This paper reports on an alternative, sustainable production system based on 40 cows on 146 ha of mostly leased land that compares the effects of an extremely dry year with previous normal years. The objective of our paper is to report on the effect of proper grazing and forage management practices and appropriate cattle breeding as used in a small commercial operation in south Texas during the severe drought of 2009.

Background

Grazing Management and Forage production

A detailed description of management practices and related profits of this operation between 2001 and 2008 was reported by Lukefahr et al. (2009). Prior to 2001, this operation was managed similarly as many traditional operations in south Texas involving continuous grazing, overstocking, and feeding hay during winter and droughts. As a result, in 2001 (also a mild drought year), the net profit per cow and per acre was a loss of $191and $53, respectively. In 2002 and 2003, grazing and forage management practices were drastically modified, whereby stocking rate was reduced by about 40%, and a rotational grazing system was implemented involving the stockpiling of forage in pastures for winters and drought periods. Also, the feeding of hay was discontinued. Even when profits changed from a negative to a positive figure in 2003, it was not until 2006 when the combination of grazing, forage, and cattle breeding management practices were fully combined to demonstrate the benefits of the total system. By 2008, conditions of pastures improved considerably in terms of cover of grasses. Weaning weights increased from 198 to 255 kg from 2001 to 2008, respectively. Average feed cost per cow decreased from $291 to $41 from 2001 to 2008. Also, net profit per cow and per ha increased to $252 and $97 in 2008, respectively.

The operation presently manages about 146 ha that have been subdivided into 25 smaller pastures or paddocks using cross-fencing and portable water tanks. Concerning land management and ownership, land is mostly leased (over 90%), to minimize risk.

Since 2003, pasture conditions have been frequently monitored by foot or horseback to determine when to move cattle and/or stockpile

forage, whereby the stocking rate varied, depending on forage availability. Moreover, flexibility has been the key in the grazing management program in order to make timely adjustments to pasture and cattle responses. Minerals are offered free choice. During winter and droughts, whole cottonseeds and/or cottonseed cubes were fed. Feeding level depended on body condition and stage of production of cows.

Cattle breeding system

Since 2000, the Red Angus, Senepol, and Tuli breeds have been used in a rotational crossbreeding program, but the process started with the production of F_1 crosses. It was not until 2007 that most cows in the herd were a composite of all three breeds. The genetic melting pot has produced a crossbred animal with a combination of desirable traits that include: the polled condition, yellow or red coat colors, slick hair coats, early age at puberty, light birth weights yet thrifty calves, small-sized teats, optimal milk production, low parasite infestation, and acceptable marbling and tenderness.

Results

Rainfall

Between October 2008 and June 2009, only about 75 mm of rainfall was received, and by August 24, 2009, total rainfall was only 20% of normal with a cumulative total of only 93 mm for the year (Fig. 1). In this area, close to 50% of forage production occurs during the spring (March to June) (http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx, accessed March 10, 2010), hence, forage production was severely affected by the drought.

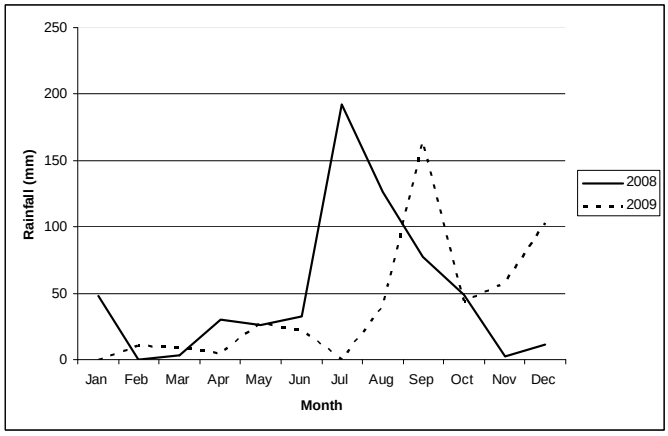

Figure 1. Monthly rainfall for 2008 and 2009 in Kingsville, TX.

Many ranchers in south Texas feed hay during the winter and summer; however, stockpiling forage in pastures is an alternative practice that may be used to reduce feed-related expenses and increase profits (Lukefahr et al. 2009). The dry conditions of the winter of 2008 and spring and summer of 2009 dramatically affected forage availability. On many ranches, forage reserves and hay were depleted and ranches were forced to sell part or even the entire herd.

Grazing management and forage productivity

Considering the challenging environmental conditions in south Texas, a successful beef production enterprise requires an efficient monitoring system to identify forage availability and pasture responses to grazing management. We monitored forage quantity and quality in pastures as well as body condition scores in cattle with adjustments being made to the grazing management program and to the level of supplementation based on these parameters.

In October 2008, after a “normal” fall, stockpiled forage in pastures was approximately 5,000 kg/ha, but in October 2009 was only 3,000 kg/ha, due to the lack of moisture. Additionally, armyworms removed a large percent of the leaves in the pastures, which not only reduced the quantity of forage but also the quality.

Monitoring forage availability and pasture responses is an essential task in order to make timely grazing management decisions. Stockpiled forage decreased from approximately 5,000kg/ha in October 2008 to 1,600 kg/ha in August 2009 (Figure 2). Energy-protein supplements were used to maintain body condition scores of cows. Based on the amount of stockpiled forage (approximately 3,000 kg/ha), by October 2009 (after the end of the drought), the decision was made to lease approximately 50 ha of additional pastures to decrease grazing pressure and maintain body condition scores in cattle. This decision proved to be very appropriate. By February 2010, stockpiled forage was only 750 kg/ha. It is imperative to point

out that after the end of the serious 2009 drought, but when only limited moisture was available, when pastures again looked green and lush, we were already planning ahead. It was important to continue to monitor pasture response in terms of productivity in order to make grazing management decisions that affected pasture and animal responses for several more months.

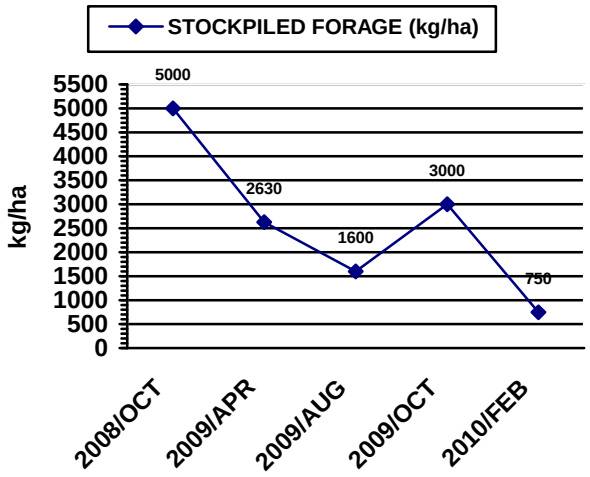

Figure 2. Stockpiled forage supply between October 2008 and March 2010.

Supplementation and feed costs

Stockpiled forage nutritive value decreased considerably during the drought of 2009. In April, crude protein of forage was only 4.54%. Energy and protein supplementation to cattle began in March 2009 as we monitored the decrease in nutritive value of stockpiled forage. From March through August, whole cottonseeds (20% crude protein) and range cubes (37% crude protein) were fed regularly to provide a minimum of approximately 0.5 kg of protein and 0.5 kg of fat for energy per cow per day. The timely decision to initiate the supplementation program was effective. By August at the end of the drought, body condition scores were maintained at over 5 with an average of 5.5 +- 0.15 (range of 4.5 to 7). By the end of February 2010, mean body condition scores increased to 6.8+- 0.13 (range of 6 to 7.5). Even after the further reduction of forage quantity and quality caused by armyworms, cows were able to gain BCS at the end of the drought in the fall and winter without any feed supplements (except minerals). Besides consuming stockpiled mature forage, cows were grazing on a plethora of palatable and presumable nutritious weed species that preceded the spring growing season of grass.

Feed-related expenses increased from $41 in 2008 to $185 in 2009, equivalent to a 351% increase. However, there was no need for feeding hay or destocking of cows; the moderate stocking rate and the practice of stockpiling forage proved to be effective to minimize the negative effects of the drought.

Herd productivity and profitability

In many cases the major concern during the drought should not be the productivity or profitability of the ranch, but rather the ability of the manager to maintain the integrity of the plant communities and the herd in order to re-establish the production cycle following the drought. One of the main decisions the rancher needs to make is when and by how much to destock. Also, what are the criteria that should trigger the destocking process? If the decision of when to destock is taken too late, the integrity of plant communities is affected and its capacity to recover after the end of the drought could be greatly diminished.

In addition, the cow-calf enterprise offers limited flexibility of destocking. For example, when a critical number of breeding cows are sold it may be difficult to recover as the economical losses may be great. As stated by Dunn (2010, personal communication), ”in an analysis of alternatives for ranchers coping with the extreme drought affecting South Texas in 2009, the King Ranch Institute for Ranch Management found that a rancher could spend over $1200/cow in feed and still be better off than if they would sell cows and restock. This was primarily due to two things. First, the loss of future income during the time the ranch is being re-stocked. Secondly, the future cost of re-investing in breeding stock. This analysis did not take into consideration negative impacts on rangeland. Hopefully the cattle retained for feeding during drought would be in a lot, corral or relatively small sacrifice area”.

In our situation, the moderate stocking rate and the flexibility of the grazing program prevented pasture deterioration. By the end of the drought, average residual forage was 1,630 kg/ha.

Additionally, the supplementation program allowed for the maintenance of BCS of at least 5. Cows were exposed to a three-breed composite bull for 60 days between August and September, and by December all cows were determined to be pregnant by rectal palpation. In addition, calving, and weaning rates were high, and weaning weights were not dramatically affected by the 2009 drought as compared to 2008 (Table 1).

Total expenses increased from $291 in 2008 to $411 in 2009 and profit per cow decreased from $252 to $199. Profit per ha decreased from $109 to $64 in 2008 and 2009, respectively. Overall, the drought reduced profit per cow and per ha by 21 and 41%, respectively. Our data indicate that even in droughts it is possible to minimize the losses and still show a profit through the combination of grazing and forage management practices, as well as the proper breed-type of cattle. In the long term, proper grazing management in combination with an effective monitoring program (including pasture/range as well as cattle responses) is critical to make timely decisions and adjustments. Ultimately, such a program can lead to healthier plant communities that are more resilient to drought and that may recover more rapidly, and hence be more productive, in response to favorable moisture and temperature and other climatic conditions.

Conclusions

A proper grazing management program, including a moderate stocking rate, stockpiling forage for winter and droughts, and the flexibility to adjust the grazing plan, can make the difference between making a profit and losing your herd. Timely decision making based on an effective monitoring program is the key to survive even serious droughts. Even when profit per cow and per acre were reduced during the drought of 2009, it was possible to maintain pasture conditions, body condition scores, and cattle productivity, and even more important the integrity of the plant community.

Acknowledgements

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Table 1. Productivity, Returns, Expenses, and Profits of a Cow-Calf Grazing Operation in South Texas in a "Normal" (2008) and an Extremely Dry Year (2009).

Item	2001	2008	2009
Stocking rate (ha/AU)	1.4	2.1	2.4
Pregnancy Rate (%)	92	100	100
Weaning Rate (%)	100	100	100
Actual kg of Weaned wt/Cow	198	255	276
Actual kg of Weaned Calves/ha	109	87	71
Calf Market Value ($)	339	543	610
Cost of Brush Management Practices/ha ($)	0	20	40
Feed Cost/Cow ($)	291	41	185
Lease Cost/Cow ($)**	65	103	93
Veterinary Cost/Cow ($)	31	31	10
Maintenance Cost/Cow ($)	144	116	122
Total Costs ($)	530	291	411
Market-based Net Profit/ha ($)	-131	109	64
Market-based Net Profit/COW ($)	-191	252	199
Rainfall	Dry spring	Dry spring and fall	Severe drought

*Based on weight of calves and local auction prices at time of weaning, which were used to determine market value.

**Based on standard lease rate of $18/AC/YR.