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STRATEGIC RESOURCE MANAGEMENT FOR FORAGE-LIVESTOCK SYSTEMS IN DROUGHT

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Utilizing available forage resources in cattle operations is essential for overall feeding objectives when drought periods have affected hay crops and forage availability in pastures. In the Southeastern US, winters are normally mild, but hay is still the main forage source to feed cattle from November to March. In Tennessee, most livestock operations will feed hay for 80 days or more in the winter but also from 20 to 70 days during the fall. Thus, there is a need to have enough hay to supply from 100 to 150 days (averaging 130 days) (Griffith et al., 2019). Knowing how much it costs to feed cattle with hay and supplements, a longer grazing season will reduce variable feeding costs and improve whole-operation profitability. Consequently, during and after a drought period, the decision-making process requires yet more attention to management practices in a forage-based system.

Cattle Management

Cull to Reduce Forage Needs

The first step is to identify non-productive animals. In an efficient cow-calf operation, a cow should produce a calf every year and heifers should calve for the first time around 24 months of age. Maintaining non-pregnant animals in the herd or delaying pregnancy for heifers has a major impact on operation economics and efficiency. The economic impact of maintaining these females that will not produce a calf can be even greater in years when hay and supplement costs are high. This is also a good time to cull animals with poor conformation and mouth and foot problems. To remove non-productive animals, it is necessary to schedule a pregnancy diagnosis with your veterinarian, and females identified as non-pregnant should be sold (culled) as soon as possible. In operations with a controlled breeding season, pregnancy diagnosis should be scheduled at least 30 days after bulls are removed. In operations without a breeding season, pregnancy diagnosis should be performed as soon as possible, and non-productive females identified. This is a bigger challenge, and producers can use the assistance of their veterinarian, Extension agents, or Extension specialists to help identify these females. It is important to remember that a non-pregnant cow will eat approximately the same amount of feed as a pregnant cow; however, these non-pregnant cows will not bring revenue in the next season.

Wean Calves Early and Evaluate Bulls Needed

In drought situations, another method to reduce dry matter demand is to wean calves early. Early weaning not only reduces the overall forage needs but also decreases protein and energy requirements. This could reduce the need for additional hay and supplementation. Next, it is important to assess the need to maintain a bull or the number of bulls maintained in the herd during this period. Either a non-pregnant cow or a bull (especially if deemed unproductive) could easily be replaced by two heifers or steers.

Cull and Wean in a Timely Manner

If culling and weaning are part of a drought mitigation strategy, it is important to do so in a timely manner. Delaying culling and weaning can result in animals that are in poor condition and are entering the market when prices are low. The best moment to market these animals identified as unproductive is during the fall or early winter before hay supplies are low and animals are still in good body condition. That way, it is likely that revenue from these animals will be greater and hay supplies can be stretched with a lower number of animals.

Forage Management

Improving Hay Storage and Feeding Losses

Hay losses can vary a lot with the storage method. Handling and storing hay on the ground can lead to up to 40% of dry matter loss (Figure 1). If hay is stored on gravel, tires, or a wooden rack, losses can be minimized when compared to storing on the ground, but losses are still high, from 30% to 40% (Table 1). More than 30% of the dry matter can be lost in the 6” outer layer of

a 5-ft round bale due to inadequate storage. In addition, bales of hay left outside are subject to nutrient losses as rain washes water-soluble nutrients reducing the total digestible nutrients, and the oxidation process negatively impacts crude protein and fiber contents.

Figure 1. *Impact of storing hay on the ground.*

Storage Method	Handling and storage losses (% dry matter)
On the ground	43
On gravel	32
On tires	37
On a wooden rack	31
On a wooden rack with plastic cover	12
In a pole barn	2

Table 1. *Hay loss due to storage methods.*
Source: B.D. Nelson, L.R. Verma, and C.R. Montgomery. Effect of storage method on losses and quality changes in round bales of ryegrass and alfalfa hay. Louisiana Agricultural Experimental Station. Bulletin 750.

Figure 2. *Storing hay in a barn to minimize long-term losses.*

Storing on a wooden rack with a plastic cover (hay tarp) can greatly minimize the losses to around 12%, which is a great alternative if a hay barn is not available or if the hay produced is greater than the barn stocking capacity. The best way to store hay is in a barn (Figure 2), where the losses should be from 2% to 6% (Ball et al., 2015).

After producing and storing hay, however, there is also a need to properly feed hay to the animals. Unrolling a bale of hay in a pasture can result in hay waste that can exceed 25% of the original bale weight. Therefore, using a cone or ring can improve forage use efficiency with losses from 3% to 7%. Hay trailers and cradles are also alternatives, but the losses can be a little higher, from 11% to 15% (Ball et al., 2015).

Nutrition by Supplementation

Stretch Hay with Commodity Feeds

Energy and protein supplements are used to improve daily weight gain and body condition, especially during the winter when animals are fed hay. However, if the hay supply is low, increasing the supplementation may help save a few bales of hay to be used towards the end of the season. By-product feeds, such as soybean hulls, corn gluten, or dried distillers' grains can be alternatives to help reduce hay intake. Obtaining, storing, and feeding commodity by-products can be challenging if there is not adequate storage space or equipment to handle large amounts of feed. Bagged commercial feed is an option if bulk feed storage is limited. Always start with a forage analysis to determine the quality of the available hay and use the information to strategically utilize forage resources and balance nutrients in the diet.

Consider using supplemental protein to improve digestion of low-quality hay. Providing a high-protein feed may increase hay utilization while keeping cows in optimal body condition. Convenience feeds like tubs can provide some amount of usable protein in the diet, but it is imperative to have enough forage available for cattle to consume alongside tubs. Otherwise, the protein may not be used efficiently and there is still likely an energy deficiency. Tubs and liquid feeds should not be a substitute for forage. Minerals are another consideration that cannot be ignored, especially if hay is poor quality. Provide a complete, free-choice mineral year-round to ensure that mineral requirements are being met.

For more details on using supplemental feed to stretch hay supplies visit: (https://utbeef.tennessee.edu/beef-cattle-nutrition/).

Preparing for Next Season

After a drought, forage stands tend to be thinner, resulting in increased weed problems in the upcoming growing season. Alternative forages may need to be considered with other management practices used for mitigation and rejuvenation.

- From December to March, it's crucial to stay vigilant for cool-season weeds. When the forecast indicates three or more consecutive days with temperatures exceeding 60°F, cool-season weeds will be actively growing, and herbicides can be applied. This window provides an opportune time to apply herbicides effectively. For detailed information on appropriated herbicides and rates check UT Extension publication: Weed Control Manual for Tennessee (https://utbeef.tennessee.edu/wp-content/uploads/sites/127/2022/02/PB1580_2022_DCFLS.pdf)
- If the soil moisture conditions permit, a short-term solution would be cool-season annuals such as spring oats planted in mid-to-late February. Spring oats can be planted at a rate of 100 to 150 lb/acre. While the optimal timeframe for planting is targeted for the last week of February and the first week of March, the window extends from February 20 to April 1. This strategic planting will contribute to enhancing forage production in early spring, facilitating grazing opportunities in April and May. This practice helps mitigate the need to graze perennial cool-season pastures early in the season when grass reserves are yet to be replenished. Another common way to improve quality and yield in cool-season pastures is by adding 2 lb of white clover and 4 lb of red clover per acre in the first two weeks of February.
- Additionally, it's highly recommended to get a soil analysis to define the best fertility program for the upcoming growing season. Ensuring the pastures or hay fields receive the necessary nutrients that may limit growth enhances the likelihood of achieving stand persistence, optimal growth, and economic benefits.
- In April, when cool-season grasses are expected to be growing fast, stands should be assessed to define the right strategy for each pasture. If more than 70% of the ground is covered by leaves, keep the fertilizer and herbicide program, but consider adding clover as described above. When the stand covers from 40% to 70% of the ground, the forage production is compromised, and it is recommended to enhance thickness by reseeding in mid-September. Mow or graze it short length (1 to 2 inches) and then drill at full rate (Table 2). If the forage stand covers less than 40% of the ground, it is time to start it over. The optimal planting window remains mid-September, however, burn down (i.e., glyphosate) the entire field 10 to 14 days before drilling in at the full seeding rate.

Grass	Seeding rate (lb/acre)	Depth (inches)	Seeding rate
Tall Fescue	15-20	¼- ½	Aug 15 – Oct 1
Orchardgrass	10-15	¼- ½	Aug 15 – Oct 1
Timothy	8	¼- ½	Aug 15 – Oct 1

Table 2. *Seeding recommendations for cool-season grasses in Tennessee.*
Source: Bates et al.,2020

To sum up, after having some hay produced or bought in a drought year (tight supply), consider reducing stocking rates. Implement strategies such as pregnancy diagnosis, early weaning, and efficiently culling non-productive animals to achieve lower stocking rates. Invest in proper hay storage and feeding devices, explore alternative supplements and by-products, and prepare for the upcoming growing season by evaluating stand losses and considering reseeding in the fall. With fewer animals and minimized hay losses, there will be more forage available to feed cattle.

References:

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