## The Oklahoma Cooperative Extension Service
### *Bringing the University to You!*

The Cooperative Extension Service is the largest, most successful informal educational organization in the world. It is a nationwide system funded and guided by a partnership of federal, state, and local governments that delivers information to help people help themselves through the land-grant university system.

Extension carries out programs in the broad categories of agriculture, natural resources and environment; family and consumer sciences; 4-H and other youth; and community resource development. Extension staff members live and work among the people they serve to help stimulate and educate Americans to plan ahead and cope with their problems.

Some characteristics of the Cooperative Extension system are:

- The federal, state, and local governments cooperatively share in its financial support and program direction.
- It is administered by the land-grant university as designated by the state legislature through an Extension director.
- Extension programs are nonpolitical, objective, and research-based information.
- It provides practical, problem-oriented education for people of all ages. It is designated to take the knowledge of the university to those persons who do not or cannot participate in the formal classroom instruction of the university.
- It utilizes research from university, government, and other sources to help people make their own decisions.
- More than a million volunteers help multiply the impact of the Extension professional staff.
- It dispenses no funds to the public.
- It is not a regulatory agency, but it does inform people of regulations and of their options in meeting them.
- Local programs are developed and carried out in full recognition of national problems and goals.
- The Extension staff educates people through personal contacts, meetings, demonstrations, and the mass media.
- Extension has the built-in flexibility to adjust its programs and subject matter to meet new needs. Activities shift from year to year as citizen groups and Extension workers close to the problems advise changes.



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# Bermudagrass Pasture Management

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**http://osufacts.okstate.edu**

Bermudagrass is a valuable forage resource across much of Oklahoma. It is tolerant of a wide range of environmental conditions and offers several management options, including grazed pasture, hay production, and also as stockpiled forage. In areas where it is adapted, it can survive with minimal inputs, but it is best managed using more intensive management practices. It produces an extensive root system and is somewhat drought tolerant. Bermudagrass responds well to fertilization and can produce a large amount of dry matter for hay production or grazing when moisture is adequate.

Bermudagrass is a sod-forming, perennial warm-season grass that spreads by stolons (above-ground stems), rhizomes (below-ground stems), and in some cases seed. With adequate fertility and moisture, bermudagrass can generate regrowth quickly following defoliation (grazing and haying) due to the large number of low, protected growing points. Each node on a stolon or rhizome can develop into a root, leaf, stem ,or another stolon. Erect stems, 4 to 6 inches tall, typically arise from the nodes of stolons and rhizomes.

There are many varieties of bermudagrass used throughout the southern US. For a more detailed description of the more commonly used bermudagrass varieties, please see OSU Fact Sheet PSS-2583 (Choosing, Establishing, and Managing Bermudagrass Varieties in Oklahoma). Another common topic throughout this Fact Sheet is the relationship of bermudagrass growth to fertility. For more information on fertilizing bermudagrass and the forage yield response to fertility, please see OSU Fact Sheet PSS-2263 (Fertilizing Bermudagrass Hay and Pasture).

With proper grazing management and hay production practices, animal performance can exceed maintenance levels for most livestock classes.. It is critical to note that bermudagrass nutritive value is seasonal. During the first 4 to 6 weeks of growth, nutritive value can be very high. However, during the midsummer, there is a sharp decline in nutritive value. The purpose of this publication is to provide information that will help producers make decisions on managing previously established bermudagrass pastures.

## Forage Nutritive Value

Bermudagrass management requires an understanding of how it grows and how the forage nutritive value changes during the season. Nutritive value refers to those nutrients found in the plant tissues, namely crude protein and digestibility. Digestibility is related to the amount and type of fiber found in the plant tissue. Based on this, fiber content is often used as an index or indication of forage digestibility. Nutrient concentrations are affected primarily by plant maturity, environmental conditions, and N fertilization. Since there is no control over environmental conditions, except for irrigation, the two major aspects under complete control are stage of maturity at harvest and fertilization. For additional information on forage nutritive value, please refer to Forage Quality Interpretations (PSS-2117).

There is a strong relationship among N fertilization, plant maturity, and crude protein concentration (Table 1). This means that more N available to the plant, the higher the crude protein up to approximately eight weeks growth. There is also a negative relationship between stage of maturity and overall nutritive value. Specifically, increased plant maturity results in reduced levels of crude protein and digestibility.

**Table 1. Influence of nitrogen fertilization rate and maturity at harvest on bermudagrass crude protein.**

| *N fertilizer rate (lb N/acre)* | *Maturity* | *Estimated crude protein (%)* |
|---|---|---|
| 0 | 4 weeks | 7 |
| | 6 weeks | 6 |
| | 8 weeks | 5 |
| 50 | 4 weeks | 9 |
| | 6 weeks | 7 |
| | 8 weeks | 5 |
| 100 | 4 weeks | 12 |
| | 6 weeks | 9 |
| | 8 weeks | 7 |

Rotational stocking and multiple hay harvests are two management practices that help to control forage maturity. When bermudagrass is properly fertilized and managed to provide forage less than four weeks of age, the nutritive value will generally meet the nutritional needs of most classes of livestock, excluding most dairy animals. Livestock that graze mature or improperly fertilized bermudagrass will likely need additional protein and/or concentrate supplementation.

## Grazing Management

Pastures can be either continuously stocked or rotationally stocked. Continuously stocked systems have one pasture and rotationally stocked systems have at least two pastures. Based on this, producers should develop a system that provides an optimum balance of harvest efficiency, individual animal performance, resource conservation, and economic return from the system. The most important characteristic to the success of each of these systems is stocking rate.

Once stocking rate is determined, there are several options for grazing bermudagrass. Continuously stocked systems are the most common because they require the least input and management. These types of systems are often criticized by some as being ineffective systems due to reduced harvest efficiency. With proper stocking rates and proper forage management, the primary advantage to this type of system is greater animal performance.

Individual animal performance, whether measured as liveweight gain, calving percentage, or milk production, is typically greatest for continuously stocked grazing systems under **low to moderate stocking rates.** The increased performance is due to a greater degree of selectivity by the animal. Grazing systems that move animals between pastures reduce the opportunity for diet selectivity. This results in reduced animal performance because animals are forced to consume forage that might not otherwise be selected.

The major disadvantage of continuous stocking is related to the uneven growth rate of bermudagrass. When bermudagrass is rapidly growing, the stocking rate must be increased to reach the desired harvest efficiency. Conversely, when it is slowly growing and the growth rate is declining, the stocking rate must be decreased. Thus, optimization of bermudagrass forage utilization under continuous stocking can be difficult. One method to ameliorate this problem is a variable stocking rate. Although this increases the input level, the flexibility to increase or decrease animal numbers as necessary or the ability to alter pasture size should be used to ensure proper utilization.

One requirement for rotational stocking is that at least two pastures be used. However, it is not important that these pastures be equal in size.

A general rule of thumb for estimating cattle rotation based on forage growth potential is to move the cattle before the residue height is less than 2 inches with 4 inches of growth being more preferable. Cattle should not be rotated into a pasture until the bermudagrass forage height reaches at least 6 inches with 10 inches of growth being more preferable (Table 2). Pasture rotations should not be based on calendar date alone. Movement between pastures should be based on current environmental conditions as well as forage growth rate. This means that grazing time may vary from as few as 1 day to 2 days up to 7 to 10 days per pasture.

**Table 2. Recommended initial and minimum grazing height for bermudagrass pasture.**

| | *Initial grazing height* | *Minimum grazing height* | *Recovery period* |
|---|---|---|---|
| Bermudagrass | 4 to 5 inches | 2 inches | 2 to 3 weeks |

During periods of excess growth, not grazing a pasture and harvesting it as a hay crop will increase the likelihood that forage growth will become overly mature and decline in nutritive value.

The major advantage of rotational stocking is increased harvest efficiency. This improvement typically allows for a small increase of 10 percent to 15 percent in livestock numbers compared with a less intensively managed continuously stocked bermudagrass pasture. There are also indirect effects related to animal management. Many times, potential health issues are identified earlier due increased time around the animals. Likewise, there may be some benefit to controlling early-season weed species. Even though beef gain per acre is usually greater due to the increase in animal numbers, individual animal performance is lower. Another disadvantage involves the added expense of fence construction and maintenance. Some fencing expenses may be reduced by using lower cost, temporary electric fencing.

From a practical point of view, rotational stocking has added advantages for managing bermudagrass pasture. Two specific examples are the ability to manage bermudagrass for season of production and ease of overseeding cool-season forages. Have separate or additional pastures facilitates the ability to fertilize different pastures during different times of the year. This management practice is useful for stockpiling bermudagrass for grazing during November and December. The ability to restrict grazing is helpful when overseeding cool-season forages such as annual ryegrass or pasture legumes. This will increase the chances of establishment and allow the pasture to be grazed in a more efficient manner.

## Pasture Rotation Process

Using more than 1 pasture allows greater control over the forage-budgeting process. As few as 3 and no more than 8 pastures are usually adequate for most livestock operations. Concentrate livestock into 1 pasture while allowing the other pastures to grow. The time spent in each pasture will vary and depends on the size of the pasture, the number of animals grazing, and the growth rate of the forage. Careful attention should be paid to the pasture conditions with animal movement based on pasture conditions. During droughty conditions, rotation is less critical and should be discontinued until forage growth resumes. Temporary fences may need to be removed and gates opened to allow livestock access to all of the pastures.

Whether bermudagrass is used for either pasture or hay, it is important to note that the majority of bermudagrass forage production and animal gains will occur by the middle of July. Temperature variations from year to year in March and April affect pasture growth. Warmer temperatures earlier in the spring usually relate to earlier grazing. Conversely, cooler temperatures mean later grazing. The differences in temperature, however, will usually translate to only a two week difference in beginning grazing date. Likewise, grazing termination will be dictated by first killing frost.

## Hay Management

Bermudagrass is well-adapted for hay production. It grows rapidly and responds very well to fertilization and has respectable yields on soils not suited for other hay crops. Many bermudagrass cultivars are capable of producing high yields in a short time period. The time of cutting is important for producing hay with acceptable quality. When properly fertilized and harvested at 4 to 5 weeks of growth, hay with 10 percent to 15 percent CP and 55 percent to 60 percent TDN is fairly easy to produce.

Nearly all bermudagrass varieties have been used for hay production at one time or other. However, some are better suited for hay production than others. The improved, hybrid varieties with a more upright growth habit usually have a much greater yield potential than prostrate-growing varieties. However, the costs associated with these greater yields are increased fertility levels.

Planning for hay production is easier if it is managed separately from grazing. Many times, hay production is used as means to control spot grazing and forage maturity. In this instance, hay production is a secondary benefit. A major disadvantage of harvesting hay from grazed pastures is the inability to accurately predict the yield and quality.

It is more desirable to graze the forage rather simply mowing it down. Excess, high-quality bermudagrass forage should be harvested for hay. This is especially true early in the season when nutritive value tends to be greater.

The number of times bermudagrass can be harvested for hay will vary by year and is dependent on soil fertility level and rainfall. Where soil fertility levels are adequate, bermudagrass hay yield will be dependent almost entirely on moisture. In years that have adequate amounts of fertility and precipitation, there could be as many as 4 hay harvests. Converesely, in years with little or no precipitation, there may be no hay produced at all. As a general rule of thumb, bermudagrass should be harvested every 4 to 5 weeks to optimize forage yield and forage nutritive value.

## Stockpiled Bermudagrass

Stockpiling is the process used to accumulate forage in a pasture to be grazed at a later time when growth is limited. For detailed information on stockpiling bermudagrass, please see Managing Bermudagrass Pasture to Reduce Winter Hay Feeding in Cattle Operations (ANSI-3035).

The general process for stockpiling bermudagrass is simple, but dependent on rain. In order to produce the highest quality bermudagrass pasture for stockpiled grazing, it is best to begin with a short bermudagrass pasture that has been grazed, hayed, or recently mown during August. Fertilize with no more than 50 to 60 lbs N per acre. With adequate rainfall, this amount of N fertilizer will produce about 1 ton of forage per acre. For stockpile use to reduce winter hay feeding, bermudagrass growth should not be grazed early September through first frost.

Stockpiled bermudagrass should be used prior to late December. Forage nutritive value remains adequate up until this time, but rapidly declines during late winter. Bermudagrass should only be stockpiled for one season. For example, it can be stockpiled during the summer for use in drought management during late summer. More commonly, it is stockpiled during late summer for use in December as dry standing forage to reduce hay feeding. The amount of forage contained in a single hay cutting is an approximate amount to stockpile.

## Summary

The three most critical aspects to managing a bermudagrass pasture program are a proper fertility program, stage of maturity at harvest, and stocking rate when grazed. These are important because these are the management options that are under complete control of the manager.

Where bermudagrass is adapted and properly managed, it can be a major forage resource for many livestock operations. It tolerates a wide range of growing conditions and is more tolerant of close grazing than many other forage plants. However, bermudagrass requires a sound fertility program along with other management inputs. By meeting these management requirements, bermudagrass can provide the warm-season forage base for a profitable forage-livestock production system.