



Beef Cattle Sciences

# Beef Cattle Library

## Grazing Management of Improved Pastures <sup>1</sup>

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### Introduction

Improved pasture and proper grazing management allows producers a way to keep production costs to a minimum by efficiently producing high quality forage. When properly managed, grazed forage is higher in feed value than hay or silage because harvesting is frequent and there are little or no harvest or storage losses. Proper grazing management allows for sustained pasture production by keeping plants in a higher quality and more productive vegetative state, and by allowing plants to recover carbohydrate stores for increased persistence and pasture longevity. The study of how forages grow and respond to livestock grazing has provided us with the knowledge needed to manage pastures for efficient and sustained production.

Successful grazing and pasture management requires planning. Many ranchers are accustomed to allowing livestock free run of pastures. Cattle are frequently turned out without considering how to manage the pasture to stretch feed supplies or extend the grazing season. If pasture resources are not sufficient, production decreases and supplemental feed often becomes necessary. Developing and implementing a grazing plan forces one to consider the economic and ecological consequences of different management decisions and alternatives. To do this, work with your local Natural Resources Conservation Service or Extension Service, to develop a written Grazing Management Plan. Start with a list of goals and objectives. Then utilize farm

maps to account for soil type and texture, plant species present, and climatic characteristics specific to your operation. Be willing to adjust the plan throughout the grazing season.

Establish goals for your pasture and specific steps needed to accomplish them. Put these in writing. Include livestock and forage production goals as well as livestock grazing plans. Begin with at least one long-term goal (2-5 years) and one or more short-term goals (1 year). Short-term goals should support your long-term goals and should include a pasture and livestock enterprise budget. A simple monthly cash flow budget will help you plan production and marketing inputs and outputs throughout the pasture year.

Developing a pasture and grazing management system for livestock requires planning as well as an understanding of : 1) forage growth phases, 2) managing forage growth, and 3) grazing systems.

### Description of Forage Growth Phases

Maintaining grass height is key to managing perennial ryegrass, orchard grass, meadow brome, and other cool season grasses. Clover and grass pastures grow most efficiently if they are managed to maintain a 2 to 5- inch height, when plants are in the vegetative state. Different grass species have different minimum and optimum grazing heights, illustrated in Table 1. Figure 1 shows how perennial ryegrass pastures in Phase I (1 inch high) grow very slowly because they lack leaf area for optimum

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photosynthesis. Grasses cannot regrow rapidly after close grazing or mowing because they do not have enough stored energy or enough leaf material to quickly regrow. Phase I growth represents minimal forage quantity but excellent forage quality.

In Phase II (2 to 5 inches high) the plants make the most rapid and efficient growth; their leaf area is great enough to use all the sunlight falling on the area. Phase II growth represents adequate forage quantity and quality with rapid plant growth. The highest quality forages can be found toward the end of Phase II.

Pasture growth slows in Phase III (5-12 inches high) as lower leaves become shaded and die. This is the beginning of plant reproduction and slower vegetative growth. Plant resources are used more for reproduction rather than vegetative growth, and forage quality begins to decline rapidly. As a grass plant matures, lignin content increases and palatability, protein, and total digestible nutrients decrease. Allowing plants to get too tall or grazing when plants are too short will seriously reduce the pasture regrowth.

For optimum quality and quantity of nutrients, plants should be grazed and maintained in Phase II growth. When available forage falls below the Phase II height, livestock nutrition and total intake drops. The animal may increase grazing time to some degree, but usually not enough to offset the decline in bite size. Production decreases because livestock are simply unable to consume the required quantity of nutrients even though forage quality may be adequate.

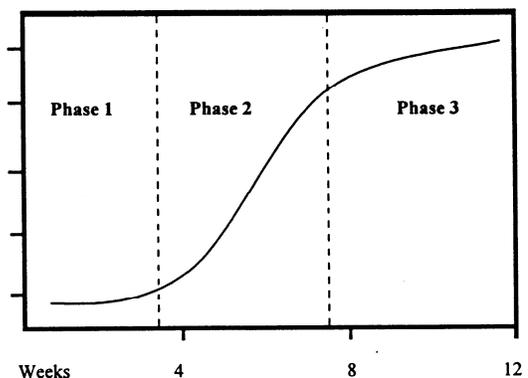
**Table 1.** General stubble height guidelines for some common cool-season grass species. Adapted from Johnson and Bohle, 2009.

Grass Species	Minimum Stubble Height (inches)
Orchard Grass	3-4 inches
Smooth Brome	3-4 inches
Meadow Brome	3-4 inches
Tall Fescue	3-4 inches
Bluegrass	3-4 inches
Perennial Ryegrass	2 inches
Timothy	4-6 inches

## Managing Forage Growth

Pasture is the least expensive feed for livestock. Ensuring that animal nutrient needs can be supplied by pasture for as many days as possible will help your operation become more economically viable. The production system should take advantage of natural cycles in forage supply to meet animal requirements. Different livestock enterprises are better adapted to different forage supply scenarios. Determine the type of livestock production system that matches the quantity and quality of forage on the farm. Management decisions such as determining optimum milk production, breeding season and timing of calving, or when to purchase and sell animals determine the efficiency or economic viability of a pasture-based livestock enterprise.

Selecting the type of animal best suited to your forage environment is important. One way to accomplish this is to compare the energy requirements of different age classes of livestock throughout the year. The nutrient demand of the cow is cyclic and seasonal. The timing of the cycle is driven by the annual calving process, and the degree of fluctuation in nutrient demand is closely tied to the lactation curve (Fig. 2-4). Matching forage resources to animal needs allows a more efficient system. Another important consideration, however, is marketability of product. A particular livestock production system may fit the forage environment better but if there is no market for the product or the new system requires additional capital investment, the current system may be a better choice.



**Figure 1.** Rate of pasture regrowth after grazing. Adapted from Ministry of Agriculture and Fisheries, New Zealand, 1983.

An understanding of cow behavior is useful in making grazing management decisions. Cows prefer grazing grasses over legumes and, when given a choice, will graze those species that are most palatable. For example, they will graze ryegrass before tall fescue. Their forage intake is directly affected by the amount of feed that you allocate in the pasture. Cattle on pasture typically graze 8-10 hours a day and spend an additional 3-4 hours ruminating. A cow's forage intake is controlled by her biting rate. The ease with which the animals can tear off and consume the pasture plants, and the quality or maturity of the pasture, greatly influence biting rate. Research studies show that a 1000 lb cow will take about 36,000 bites per day consuming a maximum of about 24 lb. of dry matter if conditions are ideal. Under less than ideal conditions, the amount of pasture dry matter consumed will be considerably less. In addition, feed intake is reduced if you do not control livestock's tendency to walk considerable distances while grazing.

By controlling the height of the grass or legume plants, size of the grazing area, and percentage of pasture allowance, feed can be allocated to the animal. Keeping the plants in the pasture in a vegetative state by grazing at the proper height and moving the animals to new pastures as soon as the minimum height is reached are important strategies.

### Grazing Systems

The choice of a grazing system is an important component of an economically viable pasture-based operation. Common grazing systems include continuous and rotational. Rotational grazing refers to a broader category of grazing systems including rest rotation, deferred rotation, and management-intensive grazing. Successful operations may also use a combination of these, depending on conditions. It is difficult to determine the exact number of animals that can be grazed in a particular pasture. There is variation from year to year so managers should check utilization often. By grazing 50% of the forage and leaving 50%, plants will be able to recover quickly and produce more total feed. Too many animals on a pasture for too long can decrease pasture and livestock production, even into the next season (Phase I). Too few animals can also be a problem because the pasture will be underutilized, reducing feed quality and substantially lowering plant growth (Phase 3).

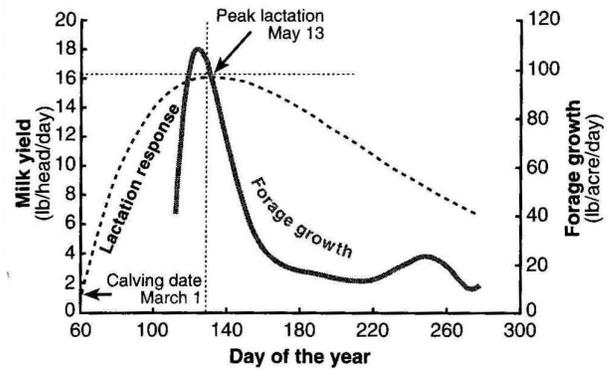


Figure 2. For cows calving on March 1, increase in nutrient demand occurs before pasture growth. Adapted from Missouri Grazing Manual, 1999.

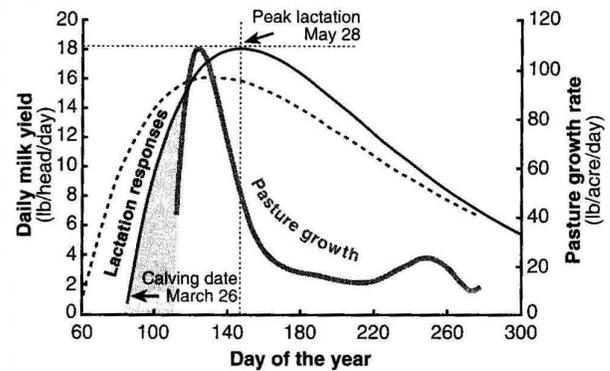


Figure 3. Later calving date reduces cows' nutrient demand that must be met from hay or feed (shaded areas) before pastures grow. Adapted from Missouri Grazing Manual, 1999.

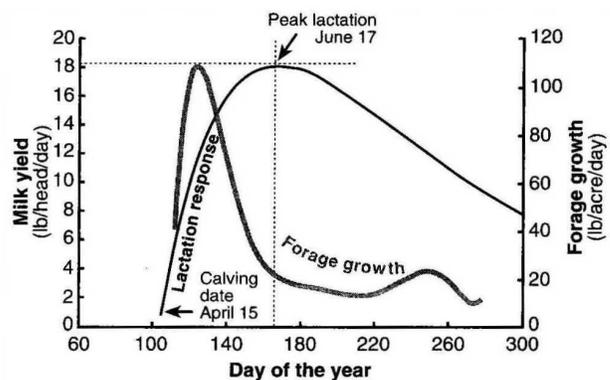


Figure 4. April 15 calving date synchronizes cows' nutrient demand with pasture growth, minimizing need for hay or feed. Adapted from Missouri Grazing Manual, 1999.

In a continuous grazing system, livestock producers allow animals to graze one pasture for the entire grazing season. This system can be detrimental to the pasture as forages are not allowed to rest and build root and crown reserves. In

addition, livestock will graze the most palatable species such as ryegrass, and allow less desirable species such as tall fescue, to mature and dominate. Populations of undesirable forage plants and weeds will increase in a continuous grazing system, while preferred plants will be eliminated, reducing the feed quality.

Rest and deferred rotational grazing systems are centered around adjusting the timing (seasonality) of grazing from one year to the next. Both systems may be used in non-irrigated, improved dryland pasture. In a rest rotation grazing system, pastures are rested for a specified period of time. At least two or three pastures are needed in this system. One pasture is allowed to rest for the entire growing season. For a three pasture system, in the first year livestock graze the first pasture, then the second pasture, and the third pasture is rested. The second year, the second and third pastures are grazed in sequence and the first pasture is rested. The rotation then starts over again.

In a deferred grazing system, a particular pasture is not grazed for a specific period of time until plants reach a certain maturity level. At least two pastures are needed in this system. In the first year, the first pasture is grazed at the beginning of the grazing season and the second pasture is left ungrazed. After a specified amount of time, the second pasture is grazed. The following year, the pastures are grazed in reverse order.

Rotational grazing systems can be more productive in regions where adequate soil moisture ensures regrowth of forage. This system utilizes small pastures (or paddocks) where livestock are rotated from one pasture to the next after they have grazed forage down to a specific level height or amount of forage left in a short period of time. The rotational grazing is in sequence from paddock A to B to C to D and then back to A to B to C to D regardless of forage regrowth.

In a management-intensive grazing system, animals are moved to a new paddock in no specific order. Pastures are grazed when they are producing the most readily available forage. There is no set grazing sequence of pastures, time period, or specific number of days to graze. The time animals spend grazing a certain paddock depends on conditions in the current pasture and pastures yet to be grazed. Forage in previously grazed areas is allowed to rest and regrow to be grazed when forage plants reach the appropriate growth stage (Phase II). Production can be increased by 40 percent or more with management-intensive grazing. If changing

management, it may take a few years to achieve this increase by making new management decisions.

## Guidelines for Management Intensive Grazing

One way to begin management intensive grazing is to subdivide existing pastures with one or two electrified high-tensile wires. Managing these divisions will give you and the animals a chance to try out the system. Your skills will develop as the animals become familiar with the changes.

An aerial map of the farm can be useful in determining fencing location, water supplies, and existing forage resources to aid in developing a plan. Management-intensive grazing requires subdividing the land into paddocks, providing access to water, adjusting stocking rates, and monitoring grazing duration.

Proper fencing is essential to improved grazing management and pasture production. Design and construct a cost-efficient fencing system that will keep the cattle in and be easy to manage. A low-impedance, high-voltage charger will be needed. Check the internet, your local farm store or manufacturer catalogs to get an idea of products available and compare prices. High-tensile wire is most often used, offering a more permanent solution than polywire. One wire can be used for interior fences with good perimeter fences. The wire should be strung about shoulder-level of the animal. At this height, calves can go into the next field to graze more abundant, higher quality feed and cows will clean up feed under the fence.

Animals need to be trained to electric fences. A small area can be used to help animals learn to respect the electric fence. Once that is accomplished, electric fences become more of a psychological rather than physical barrier.

Construction of a solid laneway that will not turn to mud when the rains come or to dust during the dry season will improve cattle access to pasture year around and decrease respiratory problems caused by dust. Many producers have found this to be an important part of a successful management-intensive grazing system.

Watering system design is also important. Design a watering system that ensures cattle have an adequate supply of fresh water at all times. It may pay off to design the system for future expansion. Portable water systems are often used which can provide flexibility in location and reduce the problems associated with an accumulation of

nutrients such as parasites, disease, erosion, and weed problems around permanent water sources. Heavy livestock traffic around ponds, springs, and streams can destroy vegetation and have a detrimental effect on water quality. Piping water to troughs away from these areas provides livestock with higher-quality water and reduces these problems.

A well-designed system still needs to be managed and adjusted as forage supplies change seasonally. Cattle should be moved quickly through paddocks during periods of rapid plant growth. As plant growth slows, delayed rotations will give plants adequate time to rebuild root reserves and regrow. Management-intensive grazing is very labor intensive compared to other systems. There are often competing demands for labor resources in a livestock operation and this should be considered when choosing a grazing system.

## Conclusions

Improving your pastures and grazing management system will result in more, higher quality feed produced. Remember that one of the goals of grazing management is to maximize intake. To accomplish this, continuously monitor and manage grasses in the vegetative state, graze when appropriate, initiate irrigation early enough in the season to keep plants growing, and fertilize according to soil test results. Monitor fields regularly to ensure consumption and production of forages are in balance. Walk each field at least every 10 days making careful observations. Make sure that the plants are always in a growing state. Proper grazing management that includes a plan of action will pay off with more production of higher quality feed.

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