

# Grazing Management Impacts on Forage Systems

► Grazing management is used as a tool to optimize forage utilization and sustain animal performance in livestock operations. Generally, grazing methods can have multiple effects on forage systems, but we often hear about negative ones such as overgrazing and compromised stand persistence. This is the third in a four-part series on grazing management.

Grazing methods include continuous and rotational grazing. Under continuous grazing, animals have unrestricted access to a specific unit of land during the grazing season. Under rotational grazing, the pasture system is subdivided into paddocks that will alternate between grazing and rest for plant regrowth during the grazing season. Generally, rotational stocking requires a higher initial investment (fences, waterers), level of management and labor but can provide better nutrient distribution and forage utilization than continuous grazing.

Appropriate grazing management can be an ally in keeping a healthy forage stand. However, it is necessary to understand what impact grazing management has on individual plants as well as the overall forage stand to properly enhance the competitiveness and resilience of desired forage species. Generally, the frequency (i.e., how often) and intensity (i.e., how closely forage is removed) of aboveground leaf area removal, or defoliation, directly affect the sustainability and longevity of forage-based livestock production systems. Grazing management influences (1) the ability of forages to recover following defoliation, (2) stocking rate capacity of the system, (3) nutrient cycling, and (4) stand persistence of perennial grasses over time. Following is a description of each of these impacts and how they influence forage production and persistence:

## Grazing management influences the ability of forages to recover following defoliation.

After a grazing event, it is crucial to have proper residual leaf area left so plants can rapidly grow. The leaves act as a “solar panel” by capturing sunlight and use this to help generate new growth. When there is very little leaf area remaining post-grazing, the more a plant has to rely on root carbohydrate reserves for regrowth. The



more often this happens, the more likely it is that this plant will deplete its root reserves, making the plant less persistent over time.

## Leaf Area and Recovery Following Defoliation

The recommended stubble height, or target grazing height, of individual forage species aims to allow for enough leaf area to be left post-grazing for the plants to recover and regrow without relying as heavily on root reserves. Higher than recommended frequency and intensity of grazing events may compromise the ability of forage species to recover and can lead to overgrazing. Under continuous stocking, animals have unrestricted access to plants, including new growth that is generally more palatable with greater nutritive value. In this scenario, animals repeatedly selecting new growth may lead to depletion of plant reserves and, consequently, plant mortality. This can be observed in forage mixtures, especially in grass-legume systems, when legumes may have growing points more exposed than grasses and management may need to be adjusted to avoid depletion of the stand. Generally, the use of rotational grazing can help manage this issue, where one may limit animal access to plants to ensure a proper regrowth period. Another strategy is to adjust the pasture stocking rate, which will be addressed later in the document.

## Root Reserves and Recovery Following Defoliation

After defoliation, new regrowth will also depend on carbohydrate reserves that supply energy to the plant. Usually, carbohydrate reserves are located in the lower stem bases and root system or rhizomes and are the source of nutrients for plant regrowth after defoliation (grazing or cutting) and after winter dormancy.

Frequency and intensity of defoliation interfere with the long-term storage of reserves that, once compromised, affect stand longevity. During grazing, it is common for animals to pull out a portion of plants from the soil and for portions of the root system to die afterward. Root death contributes to soil organic matter accumulation and nutrient cycling, but under frequent and intense defoliation events, the root system may be compromised. This limits water and nutrient uptake to sustain plant growth requirements.

The weakening of the root system associated with compromised carbohydrate plant reserves leads to slow regrowth and, potentially, to stand thinning. This causes open spaces in the stand canopy to favor weed competition, which may include toxic plant species that can harm the herd. In this context, it is crucial to understand appropriate management practices for each species that will be used to optimize its growth and longevity. For example, bahiagrass (*Paspalum notatum* F.) is highly tolerant of close grazing because of the location of its plant growth points and the ability to restore carbohydrate reserves. Pay particular attention to early spring grazing for perennial grasses. Heavy defoliation during this time period might deplete plants that have just started growing after winter dormancy and have limited energy reserves to spend.

## Grazing management influences the stocking rate capacity of a forage system.

The stocking rate (SR) should be determined by considering the forage base and animal performance requirements aligned with goals for the enterprise. Traditionally, farmers may want to stick with historical SR, because that is what they have done in the past, without considering adapting the SR based on pasture composition, level of pasture degradation, rainfall pattern changes, changes in animal size, or performance goals. Some grazing animals, including cattle, tend to prefer some forages over others when they have them offered together, which directly affects pasture composition. Changes in pasture composition can occur either in the mixture of forage species (i.e., grass and legume) or



by the invasion of weeds that are refused by animals and tend to increase in pastures over time. Among the alternatives to deal with this issue are choosing to associate different animal species (i.e., cattle and goats, which are nonselective grazers), mowing off or applying herbicide on weeds when needed, or adjusting SR. In this scenario, be careful to avoid overgrazing. Paying close attention to pasture composition can help prevent the increase of toxic plants that can potentially cause health issues or death of animals. Changes in rainfall total amount or distribution will directly affect forage accumulation and yield in a particular year. Prolonged droughts may even lead to loss of forage stands, especially when associated with elevated SR and overgrazing because of low forage availability. In this scenario, adjusting SR can be an ally to decide when to defer grazing, purchase extra feed, or sell animals if needed.

## Grazing management influences nutrient distribution, animal health, and treading.

Cattle usually retain about 20 percent of consumed nutrients, which means that 80 percent is returned to the pasture. Nutrient distribution from animal excretion is important to optimize forage accumulation, especially on low-input systems. Per day, one animal can urinate from 6 to 11 times and defecate 10 to 18 times. Urine is highly concentrated in N, while feces has higher P and K and, generally, most excreta is deposited on areas of shading and congregation within pastures. Thus, animals avoid grazing in areas where urine or feces is deposited for a period of time after excretion, reducing grazable forage sites. Better nutrient distribution can be achieved by using rotational instead of continuous grazing with animals remaining in the area for a limited time, which avoids the establishment of exclusion areas or excessive excreta deposition. Improved nutrient distribution enhances nutrient availability for the forage stand while increasing nutrient cycling and soil fertility.

Animal performance is directly affected by overall animal health, and underlying conditions can compromise weight gain. Grazing management strategies can be an ally in maintaining animal health. For example, rotational grazing can help reduce contact of livestock to infectious internal parasite larvae on pasture because of adequate rest periods between grazing events. This can often reduce parasite populations by disrupting reproductive cycles and decreasing recontamination; however, some parasites can remain dormant in the pasture requiring proper livestock deworming protocol. Another example is the management of grazing events in early spring on alfalfa pastures. To avoid bloat, animals should be progressively allowed to graze alfalfa pastures, while having free access to hay before turnout into pasture to ensure full rumen.

Grazing strategies will also affect the length of treading damage on pastures. Livestock can often cause damage to plants and growing points, increase compaction, and reduce water infiltration on pastures. Some grasses, such as bahiagrass and bermudagrass, are more tolerant to treading than others, while legumes are generally less tolerant. Particularly, crown-forming legumes, such as alfalfa and red clover, are less tolerant than white clover. Thus, environmental conditions can also determine the level of damage in some regions. Generally, damage from treading is higher in heavy clay soils and increases under high soil moisture, regardless of soil type.

## Grazing management influences stand sustainability and longevity in perennial grass-based forage systems.

Grazing management strategies for perennial grasses can help to improve and maintain the desired plant communities and increase animal performance while promoting nutrient cycling and soil health within grazing systems. Developing a grazing management plan requires knowledge of the species composition of

desirable plants, combined with an understanding of how those plants can meet animal nutrition demands. Avoid overgrazing that can lead to stand thinning, weed competition, and poor animal performance. In early spring, grazing can be used as a strategy to help reduce invasive species and weed seed deposition for next year. Then, using a proper rest period between grazing events throughout the year helps the desired species to regrow and spread in the pasture. This process is often better achieved when using rotational grazing. Another important point is to maintain stubble height close to 4 inches during the growing season because it favors important plant replenishment of its carbohydrate reserves.

## Summary

Proper grazing management can be an ally in optimizing forage utilization and improving yield and nutritive value, resulting in increased animal performance. It is crucial to leave adequate residual leaf area following each grazing event with sufficient rest periods to replenish energy reserves and root system recovery. However, some forage species might suffer from close grazing and treading damage. Consider this when establishing new or renovating existing pastures. Grazing management is an important tool for controlling nutrient distribution on pastures. Rotational management can optimize its distribution, which is particularly important for low-input systems. Generally, rotational grazing tends to improve pasture responses; however, it is important to consider that it requires a greater initial investment in fences and watering points, plus more labor and management decisions than continuous grazing.

## Resources

Vendramini, J.; Sollenberger, L.E. SS-AGR-133 – Impact of grazing methods on forage and cattle production. Available at <https://edis.ifas.ufl.edu/ag268>

Hancock, D.; Andrae, J. 2017. Grazing Impacts on grazing composition. University of Georgia, Bulletin 1241. Available at [https://secure.caes.uga.edu/extension/publications/files/pdf/B%201243\\_4.PDF](https://secure.caes.uga.edu/extension/publications/files/pdf/B%201243_4.PDF)



Liliane da Silva, Postdoctoral Researcher Fellow; Leanne Dillard, *Extension Specialist*, Assistant Professor, Animal Sciences and Forages, Kimberly Mullenix, *Extension Specialist*, Associate Professor, Animal Science and Forages, and Megan Griffin, TES Technician, all with Auburn University

For more information, contact your county Extension office. Visit [www.aces.edu/directory](http://www.aces.edu/directory). Trade and brand names are given for information purposes only. No guarantee, endorsement, or discrimination among comparable products is intended or implied by the Alabama Cooperative Extension System.

The Alabama Cooperative Extension System (Alabama A&M University and Auburn University) is an equal opportunity educator and employer. Everyone is welcome! Please let us know if you have accessibility needs.

New August 2020, ANR-2675 © 2020 by the Alabama Cooperative Extension System. All rights reserved.

[www.aces.edu](http://www.aces.edu)