

GRAZING SYSTEMS FOR DAIRY

Donna M. Amaral-Phillips

Extension Dairy Nutritionist
University of Kentucky

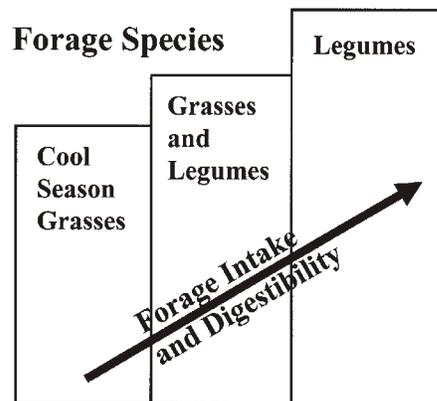
Forages which are grazed can provide anywhere from 25 to 100% of the forage consumed by growing dairy heifers, dry cows or the milking herd. In this paper, I would like to specifically deal with devising a grazing program for a dairy lactating or milking herd. Lactating dairy cows are a “high performance animal” and, as such, any decreases in the availability or quality of forage can quickly decrease milk production. Thus, the goal when designing a grazing system is to provide adequate quantities of high-quality, vegetative forage to prevent decreases in performance. These decreases in performance occur in all species of livestock but one difference with dairy cows is that milk production is monitored twice daily. Thus, dairy farmers can see what has or has not worked more quickly than other livestock species where performance is not measured as often.

When grazing high-performance livestock, several concepts are important to remember when designing a grazing system. These concepts, as they pertain to the management of all high-performance livestock, are outlined in this paper. These concepts include:

- #1: Forage species determines performance
- #2: Rotationally-graze pastures
- #3: Keep pastures young and vegetative
- #4: Leave some forage behind
- #5: Cows need a “full mouthful” of forage with each bite
- #6: Variety of forages needed over the length of the grazing season
- #7: Shade and water need to be provided in each paddock

Animal Concept #1: Forage species determines performance

The species of forage plants found in a pasture field will affect intake. Grazing legumes, such as clover and alfalfa, will increase forage dry matter intake of cattle. Legumes will pass out of the rumen faster than grass plants, they contain less fiber, and they are more digestible than grasses at similar stages of plant maturity. These differences result in legumes increasing dry matter intake of cattle when compared to grasses. In addition, endophyte-infected fescue has been shown to increase body temperature, decrease feed intake, and decrease performance (in this case, decrease milk production).



Animal Concept #2: Rotationally graze pastures

Pastures should be rotationally-grazed such that cows remain on a pasture paddock for as little as 12 hours (between two milkings) or up to three days and then the cows are rotated to a rested paddock where the forage has been allowed to regrow without cattle grazing. Cows return to these paddocks after the forages have regrown but the forage plants are still in the vegetative stage of maturity. Pastures which are rotationally grazed in this manner result in greater forage utilization, higher nutrient quality, and greater stand persistency compared to continuously grazed pastures.

Animal Concept #3: Keep pasture forages young and vegetative.

The amount of nutrients available to livestock is determined by plant maturity and forage species in a pasture paddock. As forages mature, their nutrient content declines. As shown in figure 1, as a legume or grass plant matures from the vegetative to the reproductive stage, the percentage of leaves decreases. With this decrease in leaf content, the percentage of crude protein decreases and, what is more important, the percentage of fiber and lignin increases in the plant. These changes result in a decrease in the amount of forage cattle will consume, as well as, a decrease in the digestibility of the forage consumed (figure 2). These changes in the plant result in less energy being available to support milk production, growth

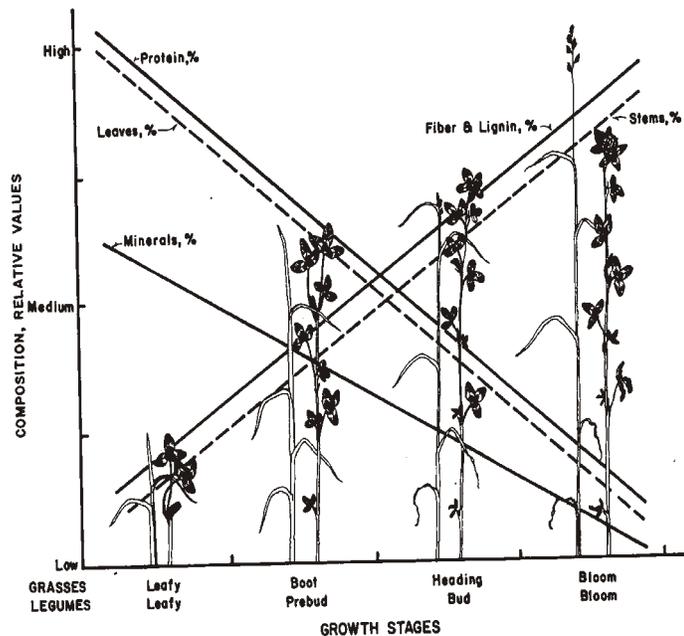


Figure 1. Change in the nutrient content as a forage matures from a leafy vegetative stage to a reproductive stage of maturity (Blaser 1986, VPI Bulletin 86-7).

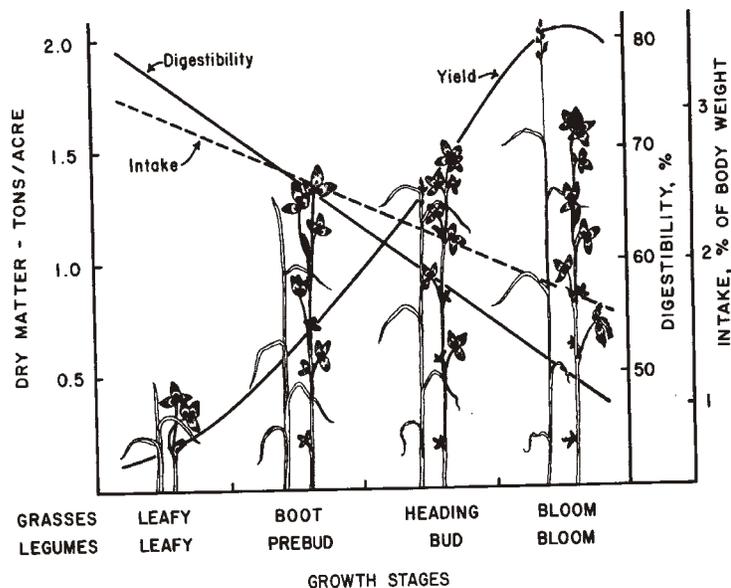


Figure 2. Changes in forage intake, digestibility, and yield with advancing stage of plant maturity. (Blaser 1986, VPI Bulletin 86-7).

or other productive purposes. The bottom line is that the stage of maturity cattle graze forage governs the amount of nutrients they receive and, ultimately, their performance. This relationship is extremely important with cattle which have high nutrient needs, such as lactating dairy cows, stockers gaining 2 pounds or more daily, early lactation beef cows nursing calves, and beef calves over 3 months of age nursing their dams. When managing a pasture system, the goal should always be to keep the pasture plants young and vegetative so that their nutrient content is the highest.

Animal Concept #4: Leave some forage behind

When grazing pastures with high performance cattle, plan on utilizing approximately 50 to 65% of the available forage. The forage left behind is often times less digestible and of lower nutritive quality than the forage consumed. In addition, leaving behind some leaf material of grasses results in the plant growing back quicker. Thus, pastures should not be grazed very close.

Animal Concept #5: Cows need a “full mouthful” of forage with each bite

Cattle graze by wrapping their tongues around the upper third of the forage plant and snipping it off with their lower teeth and upper dental pad. (Cattle do not have upper teeth.) Cattle spend approximately 8 to 9 hours a day grazing. **Cattle spend about the same amount of time grazing irrespectively of pasture quality or availability.** If cattle do not receive adequate nutrients within the grazing time period, performance will suffer. For example, dairy cows will give less milk, beef cows will wean lighter weight calves, cattle may not rebreed as quickly, and weight gains for heifers or stockers will be less, therefore, increasing the time needed to reach targeted calving or market weight.

The intake of pasture forages is related to the amount of time cows spend grazing, the number of bites per minute, and the size of each bite (Phillips and others, 1988). Cattle generally graze for a maximum of 8 to 9 hours per day. Because of a cow’s need to ruminant (chew her cud to digest her feed) and rest, she seldom grazes over 9 hours per day. The number of bites taken per minute does not vary appreciably, ranging from 55 to 65 bites per minute. Thus, dry matter intakes from pasture forages, and thus performance, is controlled by the size of each bite of forage. Bite size is directly related to the height and density of the forage stand being grazed. To maximize intakes, cattle must “get a full bite” of forage each time they take a bite.

Animal Concept #6: Variety of forages needed over grazing season

A variety of forages with different periods of growth need to be incorporated into a farm’s overall forage program. This premise is important so that a forage species or a combination of forage species are actively growing throughout the grazing season. Table 1 illustrates some of the forages that can be used during the three different growing seasons. When the availability of forages decreases as a result of changes in

the growing season or weather conditions, stored forages should be fed to prevent decreases in milk production.

Table 1. Examples of forage species which can be grazed during the three different grazing seasons for lactating dairy cows or other high-performance livestock.

Spring (April-May)	Summer (mid June-August)	Fall (Sept-Nov 15 th)
Rye (2 weeks earlier than wheat- depending on year- February 15 th -early March start grazing) Wheat Ryegrass Orchardgrass/clovers Alfalfa or Alfalfa/Grass Non-endophyte infected or "Clean" Fescue/clovers	Alfalfa or Alfalfa/Grass Annuals- Leafy varieties of Sudangrass or Pearl Millets (Warm Season Grasses ???)	Orchardgrass/clovers Alfalfa- up till Sept 15 th and after freeze down November 1st Sudangrass- till frost

Animal Concept #7: Shade and water needed

In each paddock, shade and water should be provided unless cows are supplementally grazed for less than one hour in the summer and two hours in the spring. Portable shades or numerous shade areas can be used in such a way that cows are rotated from shade areas to decrease the chances of environmental mastitis. Grazing in the early morning (after adaption to grazed forages) and late evening will decrease the need for shade.

Lactating dairy cows consume a tremendous amount of water. For example, a Holstein cow producing 60 pounds of milk will drink approximately 30 gallons of water daily. This amount increases with increasing environmental temperature and humidity. Waterers should be located within 600 to 800 feet of the available pasture for better manure distribution and better pasture consumption.