

General Guidelines for Managing Pastures for Dairy Cows¹

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The decision to use pasture as a major source of nutrients for milking cows must be accompanied by a strong commitment to properly manage the pasture. Determining soil fertility status, choosing a fertilization program, selecting appropriate forage species, and controlling grazing are important elements of a pasture management program.

Soil Testing and Pasture Fertilization

Soil nutrient status varies widely from field to field on many conventional dairy farms. Soils in "herd pastures" that serve as lounging areas for cattle, often are very high in phosphorus and potassium, but soils from an adjacent field where harvested forage is grown may be low in these nutrients. Soil testing allows identification of soils that are high in nutrients, where only nitrogen fertilizer is needed to grow grass, and those that are low in nutrients, where phosphorus, potassium, and perhaps other nutrients will be needed in addition to nitrogen.

How often should grazed pastures be fertilized? A good starting point is to think about what fertilization does for the pasture. Generally, we fertilize to increase the yield and/or nutrient density of the forage. In Florida soils, a shortage of nitrogen almost always limits grass yield, so nitrogen is the most-needed fertilizer nutrient in many cases. Nitrogen is easily leached from sandy soils by heavy rains, so fertilizer applications may need to be fairly frequent and at rates of 40 to 60 lb/acre per application. When temperature and rainfall are high in summer, monthly applications of nitrogen may be needed to keep the grass growing well and maintain a relatively high crude protein. During other times of the year, fertilization can be less frequent. If there are a relatively large number of cows per acre (high stocking rate) on the pastures, correspondingly high rates of nitrogen fertilizer will be needed to provide enough grass. Lowering stocking rate will allow for a lower rate of nitrogen. It is important to keep in mind that grazed pastures will require less fertilizer than hay fields because a high proportion of the nutrients consumed by grazing livestock are returned to the

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pasture in their feces and urine instead of being harvested and moved off the field as in a hay operation.

What about phosphorus and potassium? Because phosphorus and potassium generally are less likely to be leached out of the soil than nitrogen, they can be applied less often. One to two applications per year according to soil test should be adequate. If the soil test report does not recommend these nutrients, **do not add them**. Using unneeded fertilizer wastes a limited natural resource, costs money, and may hurt the environment.

Soil pH can affect growth of forages, and lime is applied to raise the pH when soils are too acidic. What pH is too acidic for grasses? If soil pH is lower than 5.0, liming of bahiagrass pastures is recommended. For other perennial grasses, like bermudagrass, stargrass, limpograss, and rhodesgrass, liming is recommended when the pH is lower than 5.5. For economic reasons, apply at least one ton per acre whenever lime is applied. The ammonia forms of nitrogen fertilizer acidify the soil, so the higher the ammonium nitrogen rate the more often lime will be needed. A general rule for heavily fertilized pastures is that liming will be needed every three to five years. Always soil test before deciding to lime, however. Don't overlime because high soil pH (more alkaline) leads to plant deficiencies of micronutrients (manganese, zinc, iron, and copper).

Choice of Forage Species

In addition to fertilizer management, choice of forage species is important. The species chosen depends upon many things. Two of the most important are location in the state and soil type. North of Orlando, most producers choose bermudagrass, pearl millet, or sorghum-sudangrass hybrids for summer grazing and rye or ryegrass in winter. In south Florida, most producers are using either stargrass (sometimes called Giant Callie Bermudagrass) or bermudagrass in summer and ryegrass in winter. The hybrid bermudagrasses like Coastal, Callie, and Tifton 85 do not grow well on wet sites, but common bermudagrass tolerates wet soils well. The hybrid bermudagrasses outyield common bermudagrass and are more nutritious. Stargrass is

not cold tolerant enough for north Florida. In south Florida, stargrass is better adapted to wetter soils than hybrid bermudas. Pearl millet is an annual and best grown on moderately well to well-drained soils while the sorghum-sudangrass hybrids, also annuals, can tolerate wet soils better. Young growth of sorghum-sudangrass hybrids after drought or cold can contain prussic acid, a very potent toxin, so care is required if this forage is used. Rhizoma peanut is a high quality legume for dryer sites. It does not yield as much as the grasses, but doesn't require nitrogen fertilizer, and stands last for many years. Annual ryegrass and clovers (red, white, or crimson) are good choices in north Florida for cool-season grazing on moist soils or when irrigation is available to get them established. Rye is adapted to dryer north Florida sites, but grows well in a mixture with ryegrass on moderately wet sites. In south Florida, the growing season for cool-season annuals is quite short and as a result they may not be an economical alternative for some producers. Those who use cool-season forages generally have greatest success with annual ryegrass. Establishment of the annuals (pearl millet, sorghum-sudangrass, and all of the cool-season forages) is risky without irrigation. During some years, timely rains will ensure good stands, but in other years rain will not come and stand failures will occur. Having access to irrigation reduces risks associated with grazing dairies.

Grazing Strategies

Once we have these forages, how do we graze them? For most dairy situations the choice of rotational stocking (also called rotational grazing) is a good one. Cows are moved every 12 to 24 hours to a new pasture and the pasture where grazing just ended is given time to rest and regrow before it is grazed again. The advantages of this practice over continuous stocking include better distribution of manure, more consistent diet for the cows, and higher yields and increased longevity of the pasture.

How close should the pasture be grazed? This depends on the forage being used, on production goals for the herd, and on how quickly the pasture will be grazed again. Taller growing grasses like hybrid bermudagrass, stargrass, and pearl millet generally should be grazed no lower than a stubble of

6-10 inches, while shorter grasses like bahiagrass and common bermudagrass can be grazed to 2-4 inches. Grazing close puts more stress on the pasture because it removes most of the leaves that the plant uses to produce its food. Short rest periods following close grazings don't allow plants time to restore their leaf area, and when grazed again these plants are forced to use energy reserves to regrow. As the plant's reserves are depleted, growth rates will slow and eventually plants will die. Close grazing also forces the cows to graze more stem, which reduces digestibility and intake and results in lower milk production.

Stocking rate determines how close the pasture is grazed and it is one of the most important decisions that a pasture manager makes. The ideal stocking rate in a given situation is affected by the forage, weather conditions, fertilization, amount of concentrate being fed, and production goals. We have found some ballpark numbers that can serve as a starting point. Well-fertilized bermudagrass, stargrass, and pearl millet have carried from three to four milk cows per acre during June through September when those cows were receiving approximately 20-25 lb of concentrate per head per day. Rhizoma peanut has carried from two to three cows per acre during the same period when cows were receiving the same amount of concentrate. Spring and fall stocking rates are less for all of these forages. When drought conditions hit, stocking rates are much less. Winter pastures carry fewer animals, between one and two animals per acre in many cases. Winter stocking rate may be greater than this if irrigation is available for drought periods and relatively high rates of nitrogen fertilizer are used.

Someone thinking of starting a grazing operation may ask how many acres of pasture are needed for each cow. If depending almost exclusively on pasture for their forage source, an approximation is one-half acre per cow. Using this ratio, for 600 milk cows at least 300 acres is needed. In summer, less is needed, so excess forage can be baled or ensiled. In late fall through spring more may be needed. If the systems are flexible enough that a one-shot or conserved forage can be fed during times of slow pasture growth, less than one-half acre per cow may be needed. In any case, someone starting with grazing

should stock conservatively. Learning to manage a grazing dairy takes time, and starting with too many cows makes the process all that more difficult.