

Pastures are Dynamic Systems

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We often speak of a particular pasture as being a "Coastal bermudagrass", a "bahia grass", or a "tall fescue" pasture as though it contained only one grass species. In truth, it generally contains several grasses, sometimes clovers, and weeds. Complicating the picture further, the composition of pastures changes over time. Thus, perennial pastures are not stable in terms of species but are dynamic systems that fluctuate in their plant composition. This may have important consequences as to overall yield, seasonal productivity, and nutritive quality, affecting animal performance and the amount of hay fed in winter.

What causes these shifts in plant species composition of a perennial pasture? After all, we planted only one particular grass but ended up with several different kinds of plants after a number of years. Rangeland scientists in the drier western USA have known for a long time that shifts occur in plant composition of native grasslands. This knowledge of what affects these shifts has helped them devise management recommendations that assist livestock producers in managing these grasslands to maintain the best possible composition of grasses to favor livestock production. Likewise, in humid regions such as ours there are many factors that affect pasture stability or degradation. Some understanding of these dynamics and factors affecting them can help us in pasture management.

Although there are a host of factors that can affect plant species stability in pastures of humid regions, but some major ones are time and rate of fertilization or lack of it, periods of extended drought, soil drainage, slope and exposure, spread of seed by livestock, and grazing pressure. Many of these factors can be affected by the livestock producer, thus determining the kind of plants present in the pasture. Let us look at a few examples of these pasture changes and factors that caused them.

Heavy stocking and close grazing of Coastal bermudagrass over an extended period of time may result in invasion by common bermudagrass or bahia grass. This can be a particular problem when soil fertility levels decline or when cattle have access to bahia grass pastures or hay and transport seed into the Coastal

bermudagrass pasture. Invasion by these grasses under these conditions may eventually result in dominance of the pasture. Obviously, maintaining the soil fertility level to favor the Coastal bermudagrass, maintaining good ground cover of the Coastal bermuda to prevent seed germination of other grass species, and not spreading seed of the undesirable grasses will do much to maintain the desired pasture. Another problem may be that the Coastal bermuda may be planted on poorly drained soil that is better suited to bahia grass.

In the transitional zone of central and northern Georgia, tall fescue pastures generally contain some common bermudagrass. In the mountain region, tall fescue normally dominates the pasture and bermudagrass is a minor component because the hot weather season that favors bermudagrass is relatively short. Also, cooler temperatures and generally better rainfall favors tall fescue so that it becomes a vigorous competitor. Further south, higher temperatures, drier conditions, and a longer growing season for bermudagrass encourages this grass in the mixture. In this region, these two grasses tend to shift as they respond to changes in rainfall and temperature.

A year or two of drought conditions will favor more bermudagrass while cooler and wetter summers will encourage tall fescue in the mixed grass pastures. Management to encourage the tall fescue will result in pasture production over much of the year. The time of nitrogen application greatly affects the species composition of these pastures. Application of nitrogen in summer will favor bermudagrass and reduce the tall fescue. Application of nitrogen only in February or March and again in autumn will favor the tall fescue and still allow satisfactory growth of the common bermudagrass in the mixture. Very close grazing of this mixture in summer will favor bermudagrass at the expense of tall fescue. Ideally, rotational stocking of cattle in a multiple paddock system will maintain tall fescue in the system.

White clover is a desirable plant in tall fescue pastures. Grazing management greatly affects persistence of this plant. Undergrazing of the pasture in spring may

shade out the clover. White clover tolerates close grazing. Slope and exposure also affect survival and growth of this plant. On steep south and west-facing slopes which are drier and hotter the clover may be unproductive or fail to survive. However, on north-facing slopes the clover thrives because of lower temperatures and better moisture in summer.

The dominance of some pastures by broomsedge is affected by grazing management. Generally, broomsedge dominance is blamed on low fertility and soil acidity, both of which may contribute to the problem. This plant is never very palatable to livestock but they will consume it in spring when tender new growth emerges. However, the plant becomes extremely unpalatable as it becomes older, causing livestock to avoid it under almost any circumstance. The palatability problem of broomsedge allows it to become established in situations where pastures are undergrazed in spring and overgrazed in mid to late summer. With undergrazing in spring, young broomsedge plants are allowed to become mature. If pasture growth becomes short in summer, as may happen, the livestock refuse to eat the broomsedge and heavily graze the other improved pasture grasses, thus reducing their competitiveness. Had the pasture been stocked more heavily in spring and less in summer, broomsedge would have not been favored. With a heavy broomsedge infestation, herbicide application becomes imperative.

Grazing of goats with cattle can be effective in controlling many troublesome weeds in pasture that are unpalatable to cattle. Goats relish species such as periwinkle, blackberry briars, spiny amaranth, and curly dock. This is "biological" weed control in pastures and possible where goats are being grown for meat production.

There are many aspects of pasture species dynamics at work. Sometimes it is possible to adjust management to favor desirable pasture grasses. Other times, adverse weather conditions such as drought will determine the direction of pasture species changes. We need to be aware of this changing aspect of pastures and understand how we can encourage the direction of that change.