

Plant Competition In Pastures

Carl S. Hoveland

Crop Soil Sciences Dept., Univ. of Georgia, Athens, GA

Competition is an essential part of our free-enterprise economic system. It's great for the winners but no fun for the losers. Business failures are common in the competition struggle in our marketplace. Competition is also an important factor in the success or failure of plant species in our pastures. Although sometimes the outcome of this struggle is controlled by weather conditions over which we have no control, often we can do something to guide this competition to favor our livestock enterprise.

What is competition?

Competition can be defined as the act of trying to gain something sought by another at the same time. Plant competition is the struggle for existence between each plant and its habitat (which includes all factors of the environment including other plants).

We can group factors affecting competition into two areas: (1) those we have little or no control over and (2) those we can directly affect by our actions. In the case of human beings and their success or failure in competition with each other, the first category would include physical size, mental ability, and state of health and physical handicaps; while the second category would include attitude, work ethic, personality, and organizational skills.

Factors which affect pasture plant competition

In the case of pasture plant competition, factors over which we generally have little control include rainfall, temperature, elevation, slope and aspect (direction of slope), drainage, and soil texture. The farm which we own is located in an area with a particular rainfall and temperature pattern, the land has a particular topography and drainage pattern, and soils of a particular texture and depth. There isn't much we can do about this except at great expense. So, we are stuck with what we have and need to grow pasture plants best adapted to the environment on our farm. It is true that we can plant new species and varieties and sometimes they work but generally

we end up with the species best adapted to climate and soil of that area as modified by the management or lack of it that we impose on a perennial pasture. We often can maintain a new superior perennial species or variety for quite a long time as a highly managed hay crop but when we reduce the inputs, we revert to what tolerates a lower level of management. This should be readily apparent when we notice the pasture species that dominate farms in different areas of Georgia. In the Coastal Plain, bahiagrass and bermudagrass are the main pasture species. In the Limestone Valley and mountains of the northern Georgia, tall fescue covers everything. Over most of the Piedmont, there is a mixing of the warm season and cool season species with bermudagrass and tall fescue competing with each other.

Changes in weather conditions can have a dramatic effect on the dominance of either tall fescue or bermudagrass in the transition zone of central and north Georgia where these two species coexist in pastures. A year or two of drought conditions will favor more bermudagrass while cooler and wetter summers will encourage tall fescue. Likewise, in south Georgia, an early frost and good autumn rainfall will encourage rapid regrowth of GA-5 tall fescue in bermudagrass or bahiagrass while a late frost and very dry conditions will result in poorer growth of tall fescue.

The pasture manager has control over a number of other factors which affect pasture productivity and quality, including planting of other grasses and legumes. These items include selection of added pasture species, light (shading), plant nutrients, soil acidity, defoliation (leaf removal) by cutting or grazing, fire, and weed control. Let us look at how they can affect plant competition in a perennial pasture.

Forage species

Even in an area where there is a dominant pasture species, differences in soil texture, drainage, and slope may affect competition and allow planting of other desirable species. A good manager will observe the pastures, get the advice

of others, try different species that might have potential, and watch the outcome. Generally, pasture species are not adapted in widely different climatic zones. Plant breeders are making progress in developing varieties more tolerant to difficult environments so you may find something suitable for your farm.

Light

Shading of one pasture plant by another greatly affects competition. Tall growing grasses can shade out shorter grasses and clovers if they are undergrazed for long periods of time. Undergrazing of tall fescue-white clover during late spring is a common problem and results in weakening and loss of the clover. Undergrazing of ryegrass overseeded on Coastal bermudagrass not only delays bud development and growth of the bermudagrass in late spring but often greatly reduces stand and allows growth of annual weeds in summer.

Plant nutrients

Bahiagrass pastures can tolerate relatively low levels of fertility and maintain good stands. Overseeding them with winter annuals will not succeed unless fertilizers are applied. Likewise, annual lespedeza is more competitive at lower fertility. Well-fertilized tall fescue or tall fescue bermudagrass pastures are usually too competitive for this high-quality legume to make much growth. This is an excellent reseeding summer legume on pastures with lower inputs of fertilizer. Overseeding of tall fescue pastures with red or white clovers may not be successful because the soil fertility is too low. It is important to know the fertility requirements of each pasture plant.

The time of nitrogen application greatly affects species competition. Application of nitrogen in summer will favor bermudagrass in a mixed fescue-bermudagrass pasture while application of nitrogen only in February or March and again in autumn will favor the tall fescue and still allow satisfactory growth of the bermudagrass. Nitrogen can be applied to tall fescue clover in February to stimulate early production without

Plants

(Continued from page 32)

injuring the clover while later applications will favor the grass and reduce the clover plus wasting money.

Soil acidity

There is a wide difference in tolerance of acid soils by pasture plants. Clovers and alfalfa will not compete with grasses when soils are very acid. On the other hand, sericea lespedeza and annual lespedeza are quite tolerant of soil acidity and will compete with grasses under those conditions. Ryegrass and rye will tolerate acid soils better than wheat or oats.

Soil acidity, often accompanied with low fertility, results in poor grass growth which often allows weeds to grow in the pasture because of reduced competition. Many weed species are very tolerant of acid soils and low fertility and may dominate the pasture because of noncompetitive grasses.

Defoliation (grazing and cutting)

The intensity and frequency of grazing or cutting can have a tremendous effect on the competitive ability of many pasture plants. Continuous close grazing of Coastal bermudagrass over an extended period of time may result in invasion by bahiagrass or common bermudagrass arising from seed transported by cattle. In contrast, well-fertilized Coastal bermudagrass cut for hay will resist invasion by these species because the rapid regrowth after cutting shades out new seedlings that develop. Well-fertilized alfalfa cut for hay at 5 to 6 week intervals will resist invasion by bermudagrass and crabgrass seedlings. Likewise, rotationally stocked alfalfa that has a rest period of 4 to 5 weeks between grazings will resist invasion by these grasses but with continuous stocking will usually result in decline of the alfalfa and increasing amounts of grasses.

Pasture species vary greatly in their tolerance to grazing. Johnsongrass will often increase in Coastal bermudagrass when cut for hay but when grazed closely it disappears from the pasture as it cannot tolerate frequent close defoliation. Bahiagrass is one of the most tolerant of grasses to close continuous grazing. Tall fescue is also fairly tolerant of close grazing in the upper Piedmont and mountain areas but in central Georgia this type management will usually result in

dominance by common bermudagrass which is normally present in the pasture. Endophyte-free tall fescue is generally less competitive than endophyte-infected tall fescue with bermudagrass. However, our research shows that rotational stocking of cattle to allow a 3 week rest period between grazings maintained excellent stands of tall fescue in bermudagrass, resulting in more winter production and 31% less hay fed to beef cows. Orchardgrass is weakened by close continuous grazing and stands decline and are invaded by Kentucky bluegrass and tall fescue in the mountain and Limestone Valley region.

Close continuous grazing favors white clover in a mixture while red clover is favored by less severe grazing pressure as it is not as tolerant of abuse. Alfalfa has a reputation for being very intolerant of grazing unless strictly rotationally stocked to allow rest periods of 4 to 5 weeks between grazings. However, Dr. Joe Bouton at the University of Georgia has developed the grazing-tolerant alfalfa varieties, Alfagraze and Amerigraze 702, that tolerate grazing well and are more competitive than hay-type alfalfa varieties with grasses. Current research is centered on selection of white clover and red clover that will be more competitive and tolerant of grazing in grass pastures. Results to date are very promising.

Fire

Burning of Coastal bermudagrass pastures and hayfields is often done in late winter to control spittlebugs. It also accomplishes something else in respect to competition. Winter weeds often develop in the dormant bermudagrass and can result in a heavy smothering mass of vegetation that prevents initiation of new growth by the Coastal bermuda sod, delaying and reducing the yield of grass. Fire can also be a useful tool in eliminating volunteer woody shrubs that have developed as they are less tolerant of fire.

Weeds

We often wonder why weeds are so competitive in pastures. Weed seeds are transported in many ways - wind, water, birds, farm animals, and wild animals such as deer. Weed seeds can lie dormant in the soil for many years and germinate when conditions are favorable. Many weeds are more tolerant of drought, low fertility, and acid soils than the forage species. Some weeds are very unpalatable to livestock and so are left ungrazed

when the forage species may be overgrazed. Even weeds that are reasonably palatable when young tend to become unpalatable more rapidly with maturity than forage species. Thus, it is no wonder that weeds continue to increase in pastures, especially with poor management such as overgrazing.

Management to favor the forage species in a pasture can do a great deal to resist weed encroachment. Liming, fertilization, good grazing management all help to maintain a dense stand of improved forage species. Clipping can be

useful in killing many annual broadleaf weeds if cut at the proper time so they are cut off below their growing point. Goats can be used to control weeds because they graze many of those that are unpalatable to cattle such as persimmon, briars, spiny amaranth, and curly dock. Generally, application of herbicides may be needed to control troublesome weeds before they become dominant in a pasture. The important thing here is to apply herbicides at the proper time to be effective. See your county extension office for weed control recommendations.