

Legumes - Do They Have A Future?

Carl S. Hoveland, Crop & Soil Sciences Dept., Univ. of Georgia, Athens, GA

Legumes are mighty nice to have in pastures. They obtain free nitrogen from the air, with amounts of 75 to 150 lb N/acre annually. Legumes can reduce the toxic effects of endophyt infected tall fescue. Even a small amount of legume in any perennial grass pasture can often improve cow conception rates and calf gains. Legumes generally have colorful flowers and furnish a bonus of beautiful scenery during certain times of the year. White flowers of ball, berseem, and ladino clovers; lavender of red clover; brilliant red of crimson clover; pink of arrowleaf clover; yellow of hop clover; and orange-yellow of perennial peanut. Unfortunately, legumes are not dependable in pastures but there are ways to help this problem and better legumes are on the way.

What are legumes and where did they come from?

Legumes are broadleaf plants that produce seed in a pod, usually have a tap root system, and usually have nodules on the roots containing bacteria which obtain nitrogen from the air and make it available to plants. A few legume species such as sicklepod (coffee weed) do not fix nitrogen but can be weed pests in crops. The largest number of legume species are tropical trees and shrubs. The legume shrub leucaena is widely planted in warm season grass pastures of northern Australia to supply high-protein forage to cattle and nitrogen to the grass. Two common ornamental legumes in our region are the native redbud tree and the wisteria vine, both with beautiful spring flowers. All of the clovers and vetch we use are originally from the Mediterranean



region of Europe. Alfalfa is a native of Iran. Sericea lespedeza, annual lespedeza, and kudzu are from eastern China and Japan. Perennial peanut is from southern Brazil. Most of the native legumes in the southeastern USA are small and none are useful for forage production.

Legumes grow best alone, not mixed with growing grasses

The most important perennial legume in the USA is alfalfa with most of it grown alone as a crop that is harvested for hay or silage. Legumes do not compete well with grasses unless they are very carefully managed or "pampered" to favor the legume by adequate fertilization with potassium, phosphorus, maintaining the correct soil pH, and using good grazing management. When potassium soil levels drop in pastures, grasses can manage as they are better scroungers than legumes for this nutrient. Grasses can survive and grow on more acid soils than clovers and alfalfa. Thus, soil testing and application of lime and fertilizer are essential when needed in order to maintain good stands and growth of most

legumes except for sericea, annual lespedeza, and kudzu. High rates of nitrogen fertilizer favor grasses so they will often outcompete the legumes. Mixed grass-clover pastures that are undergrazed during peak growth periods generally result in grasses shading the legume, reducing vigor and stands. Good grazing management to utilize surplus grass will favor legume persistence in the pasture.

Legumes can be a pain to get established, especially in a grass sod

Failures with legume establishment are far more common than with grasses, even on a well prepared seedbed. Not only are most legume seed small but most importantly, they have the handicap during soil emergence of having to pull their two cotyledons or seed leaves above ground in contrast to grasses where the seed remains below ground. Thus, when soil crusts as after a hard rain the legume seedlings may not be able to penetrate the crust as well as grasses. Even the large seeded legume, soybean, has more

trouble emerging from crusted soil than corn or sorghum. Shallow placement of small seeded legume seed in the soil at planting is critical. If a crust develops, it may be necessary to break it with very light tillage such as a rotary hoe.

No-till planting of legumes in a grass sod has special problems. Since grass competition can be severe from the existing sod, special precautions must be observed. Planting must be done at the correct time of year, depending on whether it is a bahiagrass, bermudagrass, or tall fescue sod. Pasture sods are often low in potassium and may be acid so soil fertility and pH should be checked and corrected. It is essential to reduce competition from existing grasses by close grazing, mowing, or a herbicide suppressant. This is usually the most important cause of failures in no-till legume seeding. It is important to check on possible damage to legume seedlings from insects such as striped ground crickets which can be abundant in grass sods and will destroy seedlings, especially in autumn. Application of an insecticide at the proper time can save a legume stand in grass sods.

Most legumes don't tolerate close grazing very well

White (ladino) clover is a legume which tolerates close grazing very well, a result of having abundant stolons (runners) with buds and leaves close to the ground to maintain growth under these conditions. However, current ladino clover varieties do not survive long in grass sods under close grazing, probably a result of disease problems and poor competitiveness with the grass sod. Perennial legumes such as alfalfa, red clover, and sericea lespedeza do not tolerate close continuous grazing with the result being reduced productivity and stand losses. Unfortunately, most all commercial varieties of these legumes were selected when grown alone and harvested as hay, not grown with a grass and grazed as is normal in the southern USA.

With all the problems of growing legumes, why not give up?

Many cattle producers have given up on legumes and switched to a grass nitrogen fertilizer system because of its greater dependability. Relatively low priced nitrogen fertilizer has made this attractive. However, there are some problems with grass-nitrogen systems.

With endophyte-infected tall fescue pastures (the vast majority of tall fescue), toxicity symptoms will likely be greater with no legumes. Legumes normally result in higher cow conception rates and calf weaning weights on all perennial grass pastures. Legumes, wisely used, are less costly than nitrogen fertilizer even at today's prices. To overcome the problem of poor persistence and short stand life, some cattle producers plant clover seed each year which can improve pastures at relatively low cost.

Better legumes are coming!

Breeding of winter annual clovers has made progress in developing more winter productive crimson clover such as AU Robin and Flame. R-18 rose clover has a longer productive season than other varieties of this excellent reseeding clover. Progress is being made in Texas on developing resistance in arrowleaf clover to a fungus root disease which greatly reduced acreage of this valuable long-season reseeding legume.

Although perennial legume breeding in the USA formerly ignored grazing tolerance and grass competition, that has changed. The breakthrough came in 1990 with the release of Alfagraze alfalfa which was selected under close continuous grazing by Joe Bouton at the University of Georgia. This legume was widely adopted as a pasture crop in the upper South and Midwest. Since then, breeding of grazing-tolerant legumes has become more widespread. In the breeding program at the University of Georgia, red clover and white clover lines are grown in

both tall fescue and bermudagrass sods and grazed continuously and closely during the selection and testing process. Most entries fail but a few succeed.

A new Georgia white clover experimental selection has shown very good persistence and probably will be released later this year with seed supplies being available by 2001 or 2002. This white clover selection survived the extreme 1998 drought of central and north Georgia in closely grazed tall fescue sod and even in bermudagrass. All commercial ladino clover varieties in these tests were lost. None of the commercial red clover varieties survived these conditions under close grazing last summer. However, some selections show improvement so there is hope for better red clovers but it will take awhile.

Legumes - do they have a future?

Even with the limitations of current legume varieties, they are still worth planting in pastures. The benefits of legumes make it worth the additional management effort necessary to grow them successfully. As new and improved legume varieties become available, they will make it easier to keep them in pastures and require less frequent replanting. Legumes do have a future!

"Closing the forage extension position last year resulted in a large volume of information requests that greatly added to my already full schedule of teaching and research. Until we have a new forage extension specialist to serve you, I regret that it will not be possible for me answer all of your requests."-Carl

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