

Successfully establishing white clover in pastures.

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In a January 2002 *Georgia Cattleman* article (*Renovating Tall Fescue Stands*; archived at www.georgiaforages.com), I discussed two highly persistent white clover varieties under development by Dr. Joe Bouton at The University of Georgia. These varieties are currently available in limited quantities and are named Durana and Patriot. These clovers are quite different than others currently on the market, and have persisted far better than other varieties in trials at Tifton, Eatonton, and Calhoun. It is unknown how long Durana and Patriot will persist under grazing, but stands at Eatonton are still excellent after grazing in two drought years and small plots have performed well for over three years. However, even the most persistent clovers are not “bulletproof” and good management practices should be followed to aid establishment and encourage persistence. In this article I’ll review the needs of white clover during establishment.

White clover basics

White clovers are frequently classified in one of three morphological groups: small, intermediate, and large. Small types seldom exceed 3 inches in height and are found in closely grazed areas or lawns. These clovers have low productivity and contribute little to grazing animals. Large or ladino white clovers are larger leafed, later blooming, and more upright growing than either small or intermediate white clover types. Under optimal fertility and management, ladino white clovers are more productive than other white clover types, but do not dependably reseed and are therefore less persistent. Intermediate clovers are exactly as their name implies: intermediate. Flowering period, plant size and yields fall between small and large-type white clovers. Intermediate types reseed more dependably and persist well in grazing situations.

Available varieties

Durana is an intermediate-type white clover that produces more stolons or ‘runners’ than ladino-type white clovers. These stolons allow clovers to spread and improve grazing tolerance. Patriot is a cross between Durana and a virus resistant ladino variety. This cross resulted in more production during the establishment year and conferred much of the grazing tolerance of Durana.

Ladino clover varieties like Will, Regal and Osceola are also acceptable varieties, but are less persistent than either Durana or Patriot. Ladino varieties have higher clipped yields than Durana during the establishment year, but only persist for about two years. This results in similar two year yields for Durana versus ladino-type clovers. Patriot has yields that approach ladino clovers during the establishment year with better persistence under grazing.

Soil and site requirements

White clover has several soil nutrient requirements for satisfactory establishment and growth. Soil should be limed to a minimum pH of 6.0. As stated in previous articles, soil

acidity influences availability of several nutrients and also decreases survival of *Rhizobium* bacteria. Clovers are highly responsive to potassium and phosphate, so adequate amounts of these nutrients are critical for good establishment, persistence, and productivity. Below optimal levels of soil P and K are likely responsible for many clover failures in pastures. White clover also performs well on wet soils and persists far better on these soils than red clover.

The proper *Rhizobium* inoculum (type B) needs to be included at planting if white clover has not grown in the field for several years. Most clover seed currently comes pre-inoculated, but check the seed tag to be sure. Inoculum is inexpensive (about 10 cents per acre) and should probably be included in all clover plantings as insurance. Take advantage of the free 75- 150 pounds of N fixed by white clover every year.

Also be sure that no herbicide with residual broadleaf activity has been sprayed on the field in the year prior to seeding. 2,4-D has only a short residual activity (2-3 weeks) and should not pose many problems, but chemicals that contain dicamba or picloram have residual activity from 120 days (Weedmaster) to a year (Grazon P+D) after application and can severely impact clover seedlings.

Establishing white clover and cool season grass simultaneously

White clover seedlings can be extremely competitive with tall fescue and orchardgrass seedlings, so establishment mixtures should be planted with caution. Because of the low, creeping growth habit of white clover, seedling grass can be lost from ‘smothering’. Clover may need to be flash grazed to minimize this competition. Delaying clover seeding until after grasses are established is probably best.

Establishing white clover into existing pastures

The 2-3 pound per acre seeding rate of white clover is low for a simple reason- seeds are tiny! On average there are more than 750,000 white clover seeds per pound. For a relative comparison, there are only 11,000 wheat seed per pound. Because of this small size, clover seed must be planted at the proper depth for good emergence. Seeding depth should not exceed ¼”. If seeds appear to be planted too deep- they are.

It is difficult to adjust a standard grain drill to accurately deliver appropriate seed amounts at the proper depth. Drills with small seed boxes should be used. If planting with a no-till drill, use the coulters or disc openers to slice existing sod and *lightly* scratch the soil surface. Use press wheels to establish good seed-soil contact at a shallow depth.

Because of the shallow seed depth requirements of clover, seed can also be broadcast onto closely grazed sod during late winter and be “trampled” in with temporary high cattle stocking rates. Taking advantage of animal hoof action is a cheap (but slightly less dependable) alternative to a no-till drill. Frost can also be used to deliver clover seed to an ideal planting depth. Freezes form a “honeycomb” appearance on the soil and allow legume seeds to settle just below the surface after several freeze-thaw cycles. Broadcast seeding is more effective in February than in fall months, so first year production will be

lower when using this method. Increase seeding rates by 25% if broadcast seeding methods are used.

Consider companion plant competition

Clover seedling growth must be favored to allow establishment with competitive growing grasses like tall fescue or bermudagrass. Several management options are available to aid clover establishment. First, remove excess forage and thatch just prior to seeding. This will prevent shading, improve seed-soil contact, and help clover survival.

“Chemical frosts” can be used to suppress tall fescue growth and favor clovers at establishment. These chemical frosts are created by spraying low rates of Gramoxone onto well established tall fescue before clover seeding to suppress grass growth. Follow label requirements closely and calibrate the sprayer, as tall fescue can be excessively thinned or killed at improper herbicide rates or in environmentally stressful conditions. In many stands of tall fescue, clover can be established without chemical suppression.

If establishing clovers in bermudagrass wait until after a killing frost to minimize competition. Plant clover in fall or early winter to allow adequate rooting before bermudagrass spring growth.

Be aware of fertilizer/poultry litter application effects

Do not apply nitrogen fertilizer or poultry litter while clover is establishing as this will favor grass growth and increase competition. Fertility management in established stands will be discussed in next month’s article.

Manage grazing during establishment

At establishment, white clover produces a primary stem and root. The primary stem produces runners which allow the plant to spread. Like bermudagrass, these stolons provide a secondary root system and allow white clover to perenniate. The primary stem of white clover will eventually die, so it is critical to allow secondary root growth to occur soon after establishment. It is equally important to minimize grass shading and allow sunlight to reach the clover seedlings. Therefore, a balancing act must take place. Competing grass must be removed with minimal grazing damage to young clover seedlings. Flash grazing (allowing cattle access for a short period of time to remove grass growth) is a useful tool for balancing this grass/legume relationship. Once the white clover runners have rooted, it is safe to graze.

Don’t forget about other grazers

Insects can be a serious pest when planting legumes in the fall. Crickets can quickly and completely eliminate newly emerged seedlings. Scout fields closely if insects are present and be ready to apply an appropriate insecticide if necessary. Delaying planting until after a killing frost greatly decreases insect pressure.

Summary

These new white clover varieties are an exciting addition to Georgia forages. To maximize their persistence and productivity (1) choose an appropriate site, (2) supply

adequate nutrients, (3) minimize plant competition, and (4) manage grazing and pests during establishment.