



## The Value of Perennial Clovers in Your Pastures

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Perennial legumes can provide some benefits to your perennial grasses such as tall fescue, bermudgrass, and bahiagrass. Planting clovers from mid-September to late October is the best time for reseeding permanent pastures and hay fields. Species selection is very important from the management point of view. Some of the selection factors to consider include soil type, fertility, geographic location, and forage management (grazing vs. hay).

The most two common perennial clovers considered in Mississippi include white clover (*Trifolium repens*) and red clover (*Trifolium pratense*). These perennial clovers usually have a tap or fibrous root and compound leaves that are usually arranged alternately on the stem. Once they are grazed or harvested for hay, most of new growth (shoots) in these perennial clovers originate from the crown of the plant while new growing points are located at the top of the shoot. Productivity of these clovers species can be vary across locations.

White and red clovers producer higher quantities of protein than grasses. They also have the capacity to use and fix atmospheric nitrogen, thus eliminating the need for the application of commercial nitrogen sources. Although legumes can contribute to increase in grass/legume mixes while reducing N inputs, there is a misconception among producers that clovers that supply nitrogen directly to grasses, but unfortunately there is no such direct pipeline. This nitrogen supply occurs indirectly through a process of "nitrogen mineralization" in which root nodules and mature leaves must decompose and be converted into nitrogen forms available to the grass. This is a slow process and nitrogen mineralization tend to increase in the summer with microbial activity to maintain grasses green and productive.



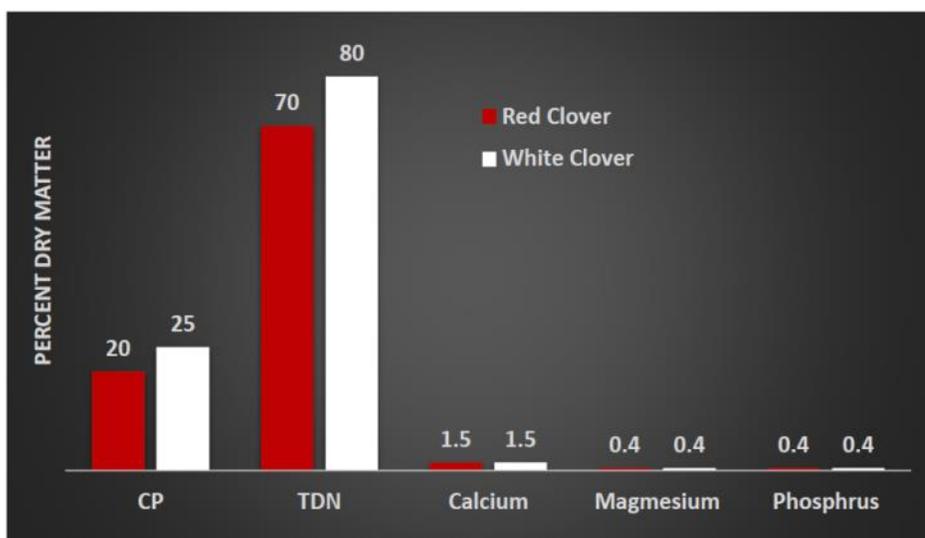
*Red clover has hairy hollow stems and leaves. The alternate leaf is formed of three hairy oval leaflets marked with a light colored crescentic "V." The edge of the leaf blade is entire (has no teeth or lobes). At the base of the leaflets there is a white or light green chevron (sheet) and surround the area. Flowers are clustered into pinkish to violet heads.*

**Red clover** is considered a short-perennial or biennial legume in Mississippi depending on environmental conditions and geographic locations. One of the advantages of red clover is its late maturity and the ability to grow in more wet and acidic soils than other legumes as well as good heat, shade, and drought tolerance. For optimum production, soil pH should be above 5.8. Yields tend to be higher in the establishment year and then decline significantly by the second year. Red clover should be planted at a seeding rate of 12 to 15 pounds per acre. Red clover plants grow from the

crowns and it is usually grouped by flowering type (early or late). There is no stolons or rhizomes and the plant develop a tap root the first year and secondary roots the second year. The early flowering red clover is also known as “medium red” and they are usually biennials with multiple cuts, but in the lower southern USA they act more as annuals. On the other hand, late flowering types (also known as “mammoth” or ‘single-cut”) tend to producer flowers in late spring and early summer and once they are harvested, they have little seasonal regrowth. Due to its short perennality, natural reseeding is not sufficient to maintain stands and a good strategy may be reseeding with two to four pounds of seed per acre every two to four years to maintain the stand. Red clover has larger seed heads than white clover and a better seedling vigor. A good stand of red clover (30 to 40% of the grass/legume mix) can fix 100 to 200 pounds of nitrogen per acre per year. To achieve optimal nitrogen fixation ability, red clover needs to be inoculated with *Rhizobium leguminosarum biovar trifolii*. It can be successfully grown with bermudagrass, bahiagrass, or tall fescue.



White clover has non-hairy true trifoliate oval leaves usually marked with a white or yellow “M” or “W” watermark. The leaflets are heart-shaped and membranous sheet at the base. It is slightly serrated/toothed on leaf edges. Flowers are clustered into white or pink to blue heads and seed is very small.



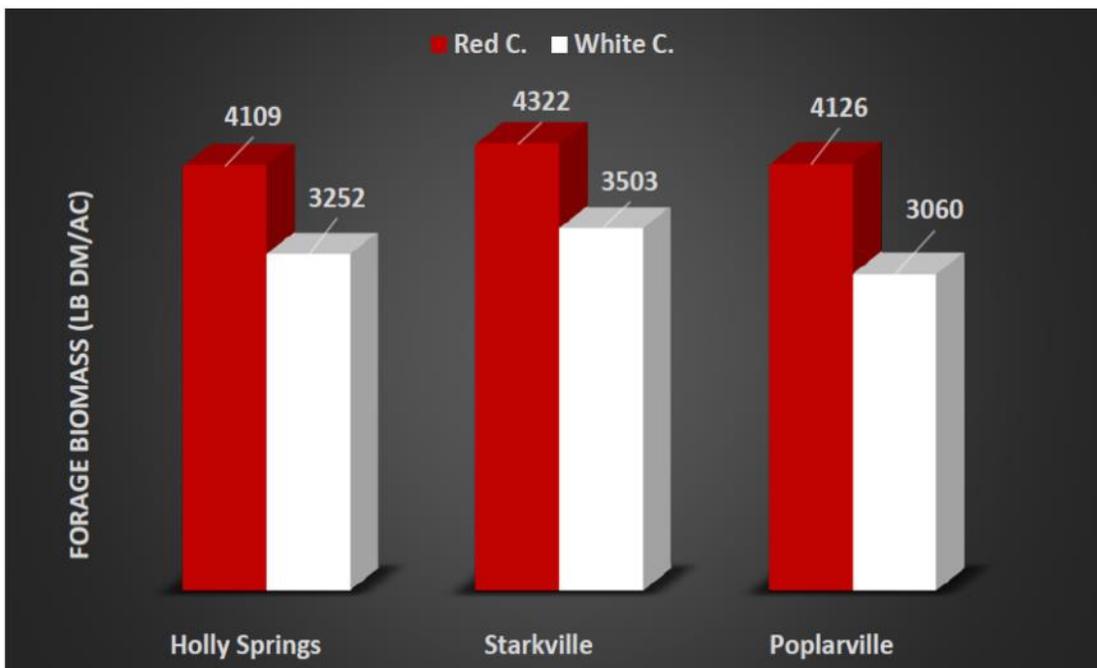
Estimated nutritive value and mineral concentrations of white and red clovers in pasture systems. Source: Hoveland, 2000.

In Mississippi, **white clover** is mainly used in pasture systems because of its good palatability and more tolerance to close grazing. White clover has the potential to reseed itself. White clovers have a tap root (in year one) with a fibrous and shallow root system in later years. All white clover types tend to develop stolons or runners (stems that grow above the soil surface and form adventitious roots at each node). It requires a pH of 5.8 to 7.0. White clover should be planted at a seeding rate of 2 to 3 pounds per acre. White clover has good tolerance to wet soils, moderate tolerant to grazing pressure, and low tolerance to drought. It is more productive in late winter (early march) to late spring (late June) and in mid-fall (October) to mid-winter (December). A good stand of white clover (30 to 40% of the grass/legume mix) can fix 100 to 150 pounds of nitrogen per acre per year. White clover is usually classified into three morphological groups: ladino (large), white Dutch (intermediate), and small wild type (small). Large or ladino white clover usually has large leaves, upright growth and it is later blooming compared to intermediate or small white clovers. One disadvantage of ladino clovers is that they produce fewer stolons and leaves close to the ground and they are not good reseeders. Intermediate clovers have medium size leaves and more of mid-maturing flowering stage compared to large and small clovers. Intermediate white clovers tend to have better reseeding potential that ladino types and they produce more stolons and leaves close to the soil surface. Small clover types rarely grow more than three inches tall, has low forage productivity with little grazing potential, and usually found in closely or overgrazed areas.

White and red clover can cause bloat problems in ruminants when the percent clover in the stand is over 50% or when livestock is allowed to transition to graze legumes without a condition period. Most legume bloat usually occurs in during the lush growth in the spring. Gazing legumes after a hard frost has been known to cause bloat. Bloat is usually cause

by the formation of a stable foam in the rumen of the animal that causes the entrapment of rumen gases. This gas entrapment create a pressure in the rumen that can lead to suffocation and death in a very short time. To avoid bloat, livestock may need to be moved or a bloat preventative may be required during such times. Poloxalene is a common bloat preventative that is consumed by livestock prior to grazing lush legumes. This bloat preventative can be mixed with a mineral to ensure that the livestock is getting an effective amount. It also important that the livestock has access to high fiber forage such as hay during the transition period. Minimizing grazing time (3 hours per day) during the transition period could help with preventing bloating. Some phytoestrogens have also been reported in red and white clovers.

The addition of perennial clovers can be beneficial to many grazing systems because they can improve yields, growth distribution, nutritive value, and reduce nitrogen rates and cost. This could lead to improve animal performance and net return. Adding clovers to endophyte infected tall fescue pastures can also improve animal performance by diluting the toxicity and livestock health issues associated with the endophyte. Before making a clover selection is important to determine your soil type and collect a soil sample to make sure that soil pH and phosphorus and potassium levels are within the recommended range to provide persistence of the clover. It is important to understand that perennial clovers are also slower to establish than some of the common annual clovers planted in Mississippi and that they might not persist well in the hot and humid southern coastal areas.



Average biomass production of red and white clovers across different locations in Mississippi.

Source: White et al., 2012-2017 Forage Variety Trials.

**Upcoming Events**

- October 25, 2018—Small Farm Outdoor Demonstration Workshop, Port Gibson MS
- October 26, 2018—North MS Beef Expo, Batesville, MS
- November 12, 2018—MCA Cattlemen’s College, West Point, MS
- November 13, 2018—MCA Cattlemen’s College, Hattiesburg, MS

For upcoming forage related events visit: <http://forages.pss.msstate.edu/events.html>



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