



The Benefits of Clovers in Pasture Systems

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Summer perennial pastures dominate forage production across Mississippi. While these pasture might be of high quality in early part of the season, it is difficult for animals to obtain the necessary nutrients, especially in late summer and early fall. Improving pasture by incorporating legumes will allow livestock to acquire more nutrients efficiently through proper grazing. The use of legumes could empower cattle producers to provide those nutrients in a more economical way. The high cost of nitrogen and high cost of supplementation have increased the use of clovers as incentives to inputs.

There are two things that are essential when considering clovers in you operation: (1) select the proper species and (2) provide adequate fertility according to soil test. It is important to select species that might fit into the existing soil type, the type of forage production and that are resistance to grazing pressure. Annual legumes such arrowleaf, ball, berseem, crimson clovers usually tend to fit into annual cropping systems such as annual ryegrass or small grains. On the other hand, perennial clovers such as alfalfa, white clover, and red clover might be more suitable for a warm-season perennial grass systems. The soil types and moisture content can also affect suitability of specific clover species. Legumes require a higher pH and fertility that grasses do. Before establishing clovers, it is advisable to take a soil sample and adjust nutrient recommendations to avoid a crop failure or poor productivity.

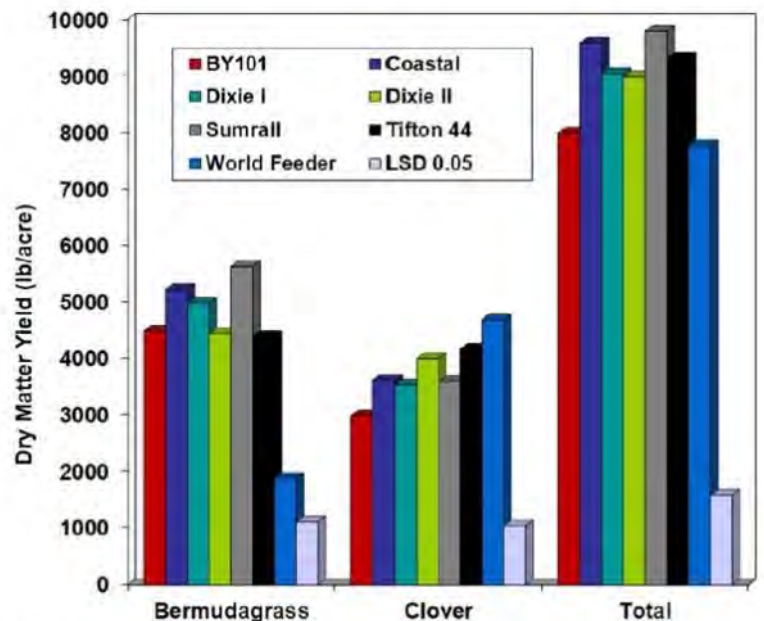


Figure 1. Five-year average yield (2004-2008) of bermudagrass yields when seeded with 'Durana' white clover. Source: Lang, 2013. Mississippi State University.

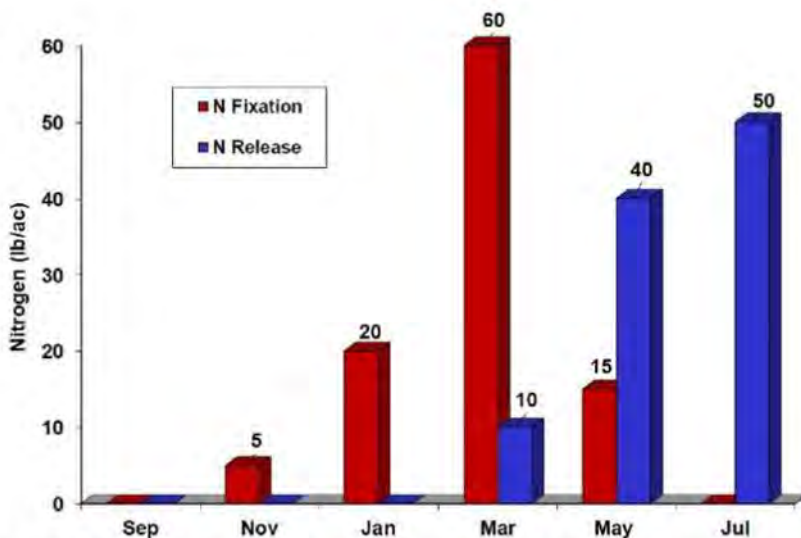


Figure 2. Release of nitrogen fixed by clovers to grasses during the growing season. Source: Lang, 2013. Mississippi State University.

Legumes (annual and perennial) can improve pastures and hay fields by: (1) increasing yield, (2) improving animal performance, (3) fixing atmospheric nitrogen (N) and boosting summer forage production. Studies conducted at Texas A&M University indicated that adding cool-season clovers to warm-season perennial grass was more profitable than supplying high N inputs to increase average daily gains in calves. Legumes could extend the grazing season while providing higher nutritive value. Although, legumes can add N to the pasture, keep in mind that higher contribution does not occur until dry matter from clovers start to decompose. Always remember that clovers might have limited weed control. Most of the herbicides labeled for forage production could be detrimental to the stand of clover. A few herb-

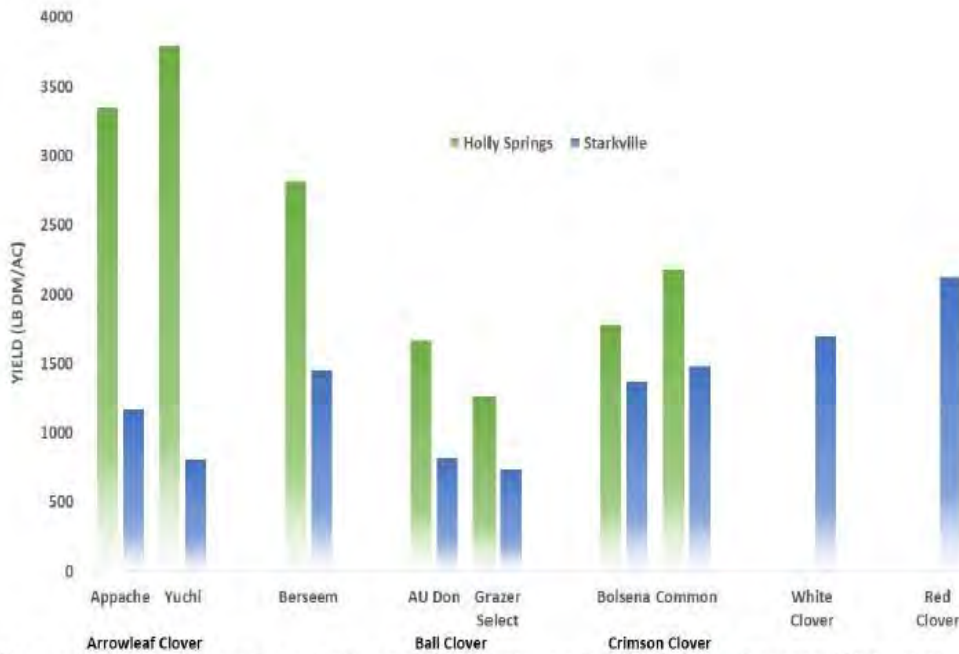


Figure 3. Dry matter yield production of different clovers in Mississippi. Source: White et al., 2012.

icides such as Butyrac (2,4-DB) and Pursuit (imazethapyr) have shown broadleaf weed suppression and control when apply at the correct weed growth stage and using recommended rates.



Legumes have shown to increase animal gains and conception rates because of the high quality feed. They are more digestible, higher in protein and lower fiber content when compared to grasses. Because of these attributes, they usually tend to improve palatability in warm-season grasses, which will increase daily forage consumption. Previous study at Mississippi State have shown animal daily gains that were 17% greater in annual ryegrass with clover

than compared to annual ryegrass fertilized with nitrogen. Livestock producers should also ensure that animals grazing on clover are eating enough fiber to avoid potential bloating.

A unique characteristic of legumes is the ability to fix nitrogen. This is achieved by a symbiotic (mutualistic) relationship with the Rhizobium bacteria. The bacteria takes atmospheric nitrogen and transform it into a form that could be used by the legume and the same time, the legumes provide the bacteria with carbohydrates and energy. Seed properly inoculated with the proper strain of the bacteria will ensure that this relationship exist. It is important to understand that the amount of nitrogen fixed by legumes varies depending on the type of legume used. Perennial legumes tend to fix higher amount of nitrogen compared to annual legumes. To have the benefit of the legume in a pasture, they pasture should contain at least 30-40% legume. This legume composition will reduce the need of nitrogen fertilization. Keep in mind that during the first year of establishment, grasses might not receive any nitrogen from the clover because decomposition of organic material might have not occurred to make the nitrogen available to grasses. After perennial clovers are well established, nitrogen will be released to grasses at a relatively constant rate as nodules decompose. Clover leaves and stems contain approximately 5 to 7% nitrogen by weight. This nitrogen can be made available to companion grasses through animal waste (urine and dung). With the use of a proper grazing rotation, this amount of nitrogen can be evenly recycled back into the pasture. Let's assume for instance that crimson clover fixes 50 pounds of N per acre. At fertilizer cost of \$0.65 per pound of nitrogen, that means a \$32.50 per acre per year. By taking into account fuel prices and labor during nitrogen application, a producer could achieve savings ranging from \$40 to \$50 per acre.



Figure 4. Research at Mississippi State focuses on incorporating alfalfa production into bermudagrass.

Legumes have shown to improve summer growth of warm-season perennial forages such as bermudagrass and bahiagrass. White clover, red clover, annual lespedeza, and peas have shown to improve forage production and quality during the summer months. During the summer months, it is important to mow or graze the pastures to favor the legumes. Keep in mind that maintaining excessive growth of the summer perennial pastures will shade and outcompete the clovers and defeat the purpose of improving production and quality. A good rotational grazing plan will help maintain the clovers productive.



Upcoming Forage Events:

SE Mississippi Forage Field Day, October 25, Petal (Simmons Farm).
http://msucares.com/crops/forages/se_ms_forage/index.html

NW Mississippi Forage Field Day, November 1, Batesville (Gordon Farms).
http://msucares.com/crops/forages/nw_ms_forage_day/index.html

Mississippi Forage & Grassland Annual Conference, November 15, Hattiesburg (Multipurpose Center).
http://msucares.com/crops/forages/grassland_annual_2013/index.html

More detail information on forage related events visit:

<http://forages.pss.msstate.edu/events.html>

<http://mississippifgc.org/events.html>