Forage News

MISSISSIPPI STATE UNIVERSITY EXTENSION
Center for Forage Management and Environmental Stewardship

Management Strategies to Increase Forage Diversity

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Forage diversity increases opportunities for better biomass production and distribution across the growing season in the southern USA. Although we have limited diversity of perennial grasses (bermudagrass, bahiagrass and tall fescue) in Mississippi, there are a large number of annual cool- and warm-season grasses that can be introduced into the grazing system along with annual and perennial legumes to increase forage production. There about 39 forage species that will fit into an integrated forage production system to extend the grazing season and reduce supplementation practices.

The nutritive value of different adapted forage species is high during periods of high rapid growth which occurs from spring to mid-summer. This means that livestock performance is highest when grasses are lush and leafy. Seasonal changes in the botanical composition of forage species present in a pasture correspond with plat growth and therefore, with livestock diets. This means that learning to determine when warm- and cool-season forages are elongating (change in leaf:stem ratio) or in a rapid growth mode becomes an essential component of the any grazing strategy and rotations.

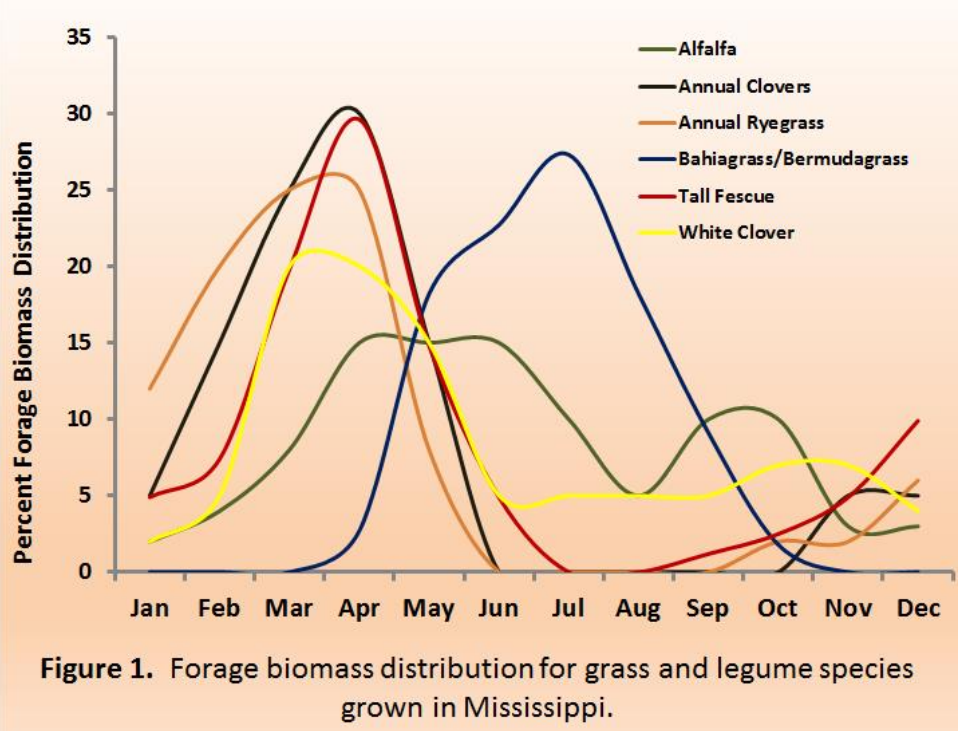

Figure 1. Forage biomass distribution for grass and legume species grown in Mississippi.

Most pastures in Mississippi are composed of both cool- and warm-season grasses and legumes. The initiation and peak growth windows are defined by growing degree days (heat accumulation used to predict plant and animal development rates such as the date that forage species will germinate, bloom or reach maturity). For example, grasses and legumes are classified as cool- or warm-season species based on their growth response to air temperature. Cool-season species will reach their maximum growth rates when air temperatures are 65 to 75 ºF and warm-season species will reach these rates when air temperatures are 90 to 95 ºF. Rapid growth of forage species is also defined when air temperatures and soil moisture content are simultaneously favorable during the growing season. This is why the growth initiation of forage species may change by one to two weeks as cumulative degree days may change from year to year due to climate change.

Increasing pasture diversity should be approached under the principle of selecting species that are compatible in growth habitat, growth distribution, palatability, and soil and climate adaption parameters. They should be able to complement each other in growth and distribution and have an ecological niche. In my personal experience, pasture diversity should be based on no more than three to four forage species grown together. Increasing the number of species beyond that number can have impacts in establishment, seeding rates, establishment rates, could be become very expensive and more difficult to manage. This is a difficult point because most of the forage species greatly vary in seed germination, seedling vigor, and the size of mature plants. In a mixed forage system, we need to be aware of the species response to

grazing management or mechanical harvest. Mixing species means that the stronger and more persistent species will outcompete the weakest species and it becomes more about the "survival of the fittest" than plant diversity and long-term benefit. For example, hairy vetch has very poor grazing tolerance, once it is grazed or cut for hay, it does not recover and produce subsequent biomass. Bermudagrass and bahiagrass are more tolerant of hot and dry weather than tall fescue. On the other hand, tall fescue is more tolerant of wet conditions. Growth distribution in forage species is a response to weather conditions and day length. Each farm might have an ecological niche that is different from an adjacent farm and it is related to microclimate, soil fertility, soil drainage, and grazing management. That means that introducing new species might require a change in management, choosing the adequate soil types and shifting soil fertility practices.

Although in Mississippi we receive over 50 inches of annual precipitation, soil water is still the most limiting plant growth factor because it can affect nutrient uptake and time of recovery after grazing. Utilizing different forage species that are properly grazed could help to maintain soil moisture and improve forage growth. Adequate plant clover must be left in the pasture to optimize water infiltration (water movement in the soil). Standing biomass and plant residue on the soil surface can reduce the impact of rain drops on the soil and reduce runoff. These two plant components can also help reduce evaporation losses by moderating soil surface temperatures. Leaving at least three inches of biomass and allowing the preferred species to maintain a healthy root system can optimize water use. Remember that overgrazing can cause drought-like conditions even with the amount of rain that we receive across the state.

Proper use grazing management strategies, will allow plants to compete better in a grazing environment. Implementing a grazing strategy that increases vigor and abundance of desirable forage species is one of the most effective ways to maintain healthy pasture systems. A grazing system should be a plan to accomplish short- or long-term objectives based on knowledge of the available resources (forage species, fertility, plant growth distribution, water, fencing, type of livestock, nutrient requirements), production (weight gains and body conditions) and marketing strategies (e.g. grass finished vs. grain finished beef). This means that decisions on where and where to graze should be based on the livestock nutrient requirements and target weights at a future date.

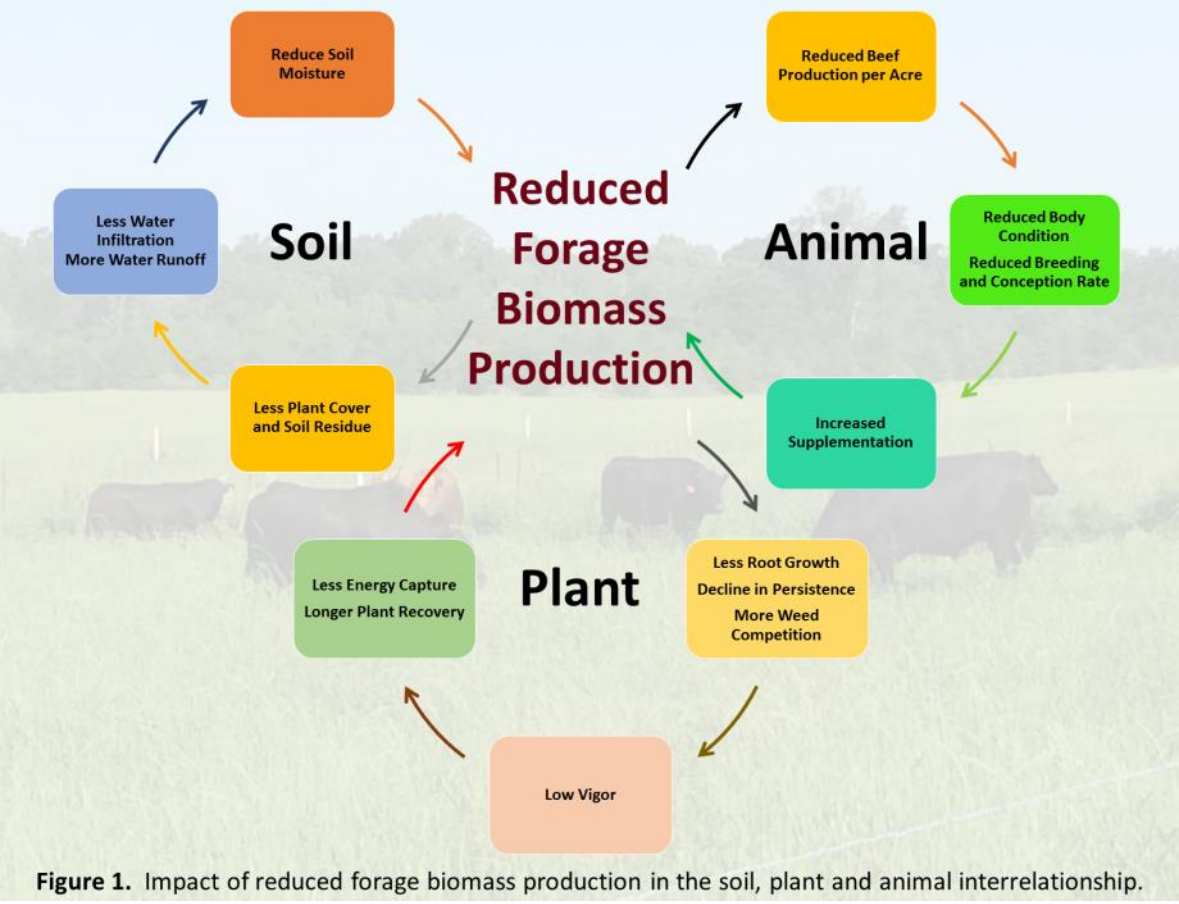

Figure 1. Impact of reduced forage biomass production in the soil, plant and animal interrelationship.

Plant growth and livestock performance are affected by the grazing strategy, which is usually defined by the stocking rate (animals per acre for defined period of time) and the time of grazing (how long they stay in the pasture and how long the pastures recover). When producers try to maximize the yield of animal production (beef produced per acre), it will require a high level of ecological and economic risk. Although high stocking rates can increase grazing pressure, it can also increase the risk of damaging the vegetation and increase soil compaction in wet soils. Overgrazing can decrease plant cover, increase water runoff and reduce soil water content. Using moderate stocking rates (one animal unit per acre) can reduce ecological impact by leaving more biomass as cover and can increase the opportunity to optimize net return per animal.

Pasture diversity based on species compatibility and reducing weed competition means more grazing opportunities and better utilization of the pastures. This could be translated into better nutritive value, increased livestock return (gain per acre) and increased net economic farm return. Healthy forage systems might be able to tolerate drought, weed pressure and increase profitability. Changing a grazing system also means that the objectives and priorities associated with the system may also change. There is not a "magic bullet" to how many desirable species a pasture may contain, but there is an increase in management to maintain those species in an ecological niche. Before increasing the diversity of forage species in your pasture, make sure that you select adapted species and understand their management to reduce risks and increase pasture stability.

Upcoming Events

May 12, 2016—Hinds Co. Forage Field Day, Utica, MS
May 19, 2016—Alfalfa Field Day, Newton, MS
June 3, 2016—Lawrence Co. Alfalfa Field Day, New Hebron, MS
June 7, 2016—Alcorn Co. Field Day, Corinth, MS
June 17, 2016—Clay Co. Forage Field Day, West Point, MS
June 28, 2016—Warm-season Forage Field Day, Starkville, MS

For detailed information relater to upcoming forage events please visit:
http://forages.pss.msstate.edu/events.html

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