Forage News

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Establishing Alfalfa in Mississippi

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Research findings at Mississippi State along with on-farm demonstrations have indicated that alfalfa can be a very successful crop across the state (Fig. 1). This is mainly due to development of improved conventional and Roundup Ready® varieties that presently exist in the market. Alfalfa is one of the highest quality forages and can be used for hay, silage/baleage, or grazing for a several types of livestock. A properly manage stand of alfalfa can remain productive for 3-4 years or longer in Mississippi. One of the advantages of alfalfa is that it can be planted as a pure stand in a prepared seed bed or inter-seeded in perennial summer pasture such as bermudagrass.

Establishing an excellent stand is very critical to ensure persistence. Therefore, paying careful attention to the planting process will ensure a successful establishment. There are several elements that need to be considered such as site selection, soil nutrient level, land preparation, variety selection, seed inoculation and seeding rates.

Site selection is very critical for alfalfa persistence. Alfalfa is a deep-rooted perennial legume (up to 1 to 3 feet) that will require soils with good surface and internal drainage. It will not persist in poorly drained soils or sites that flood most of the year (especially during the winter months). Although some heavy clays in slope areas can maintain alfalfa production, medium texture soils such as silty loams and sandy loams and loams might be more ideal for alfalfa production. If a producer has shallow soils with hardpans or plow plans that can restrict plant growth, it is recommended to use deep tillage (4 to 10 inches) to break any pans that restrict root growth or chose a different site. Information related to your soil type can be obtained through the Natural Resource Conservation Service and/or the Web Soil Survey online at http://websoilsurvey.sc.egov.usda.gov.

The establishment and persistence of an alfalfa field will also depend on good soil fertility. Before thinking about planting alfalfa, soil samples should be taken (0-6 inches) at least six months ahead of the planting time. This will allow proper time to start correcting nutrient deficiencies and neutralizing soil acidity. Incorporating the lime and fertilizer into the root zone will promote rapid germination and root development. It is recommended to apply recommended lime rates based on the neutralizing value of the lime and to in-

Figure 1. Alfalfa management practices and production fields across different locations in Mississippi.

corporate the lime to increase its reactivity due to greater soil surface area. Optimum pH should be maintain in the 6.0 to 6.8 range along with phosphorous (P) and potassium (K) levels that are above 90 and 250 pounds per acre, respectively. Depending on the P and K levels, commercial fertilizers or poultry litter can be used to maintain optimum nutrient levels. Boron is recommended at a rate of 2 to 4 pounds per acre.

Producers tend to indicate that fertilization for alfalfa is much higher than bermudagrass production due to the increasing cost of fertilizer use, which in many cases is not true.

Table 1. Comparison of yearly fertilizer recommendations over a three-year period for alfalfa and hybrid bermudagrass in the same field based on actual soil nutrient levels.

	Soil nutrient levels (lb/ac)			
Actual soil sample report	***pH***	***Phosphorus (P)***	***Potassium (K)***	***CEC, %[1]***
	5.7	51	64	18.1
	Less than optimum	*Medium*	*Very Low*	

	Fertilizer recommendations based soil nutrient levels (lb/ac)			
Crop	***Lime[2]***	***Nitrogen (N)***	***Phosphate (P_2O_5)***	***Potash (K_2O)***
Alfalfa	5,000	--	60, 60, 60[3]	180, 200, 180
Bermudagrass	5,000	200, 200, 200	50, 50, 50	100, 200, 200

[1]Cation exchange capacity.
[2]Lime to be applied in year 1.
[3]Represent applications in year 1, 2 and 3, respectively.

Alfalfa does not need nitrogen. It can produce its own nitrogen in a symbiotic relationship with the rhizobium. Bermudagrass production in a four-cut system will require 50 units of nitrogen per cut of hay (e.g. 100 pounds of urea or 150 pounds of urea ammonium sulfate per cut). That means 200 units of nitrogen per year. If the soil pH and potassium levels are low and need to be adjusted, the requirements are very similar in both cases for bermudagrass and alfalfa. Table 1 provides an on-farm example of the recommended fertilization if two crops (hybrid bermudagrass and alfalfa) will be grown in the same field. The recommendations for lime, phosphate and potash are very similar for the three-year cycle. The advantage is that alfalfa will not require any nitrogen application. Keep in mind that grasses and legumes will respond differently to fertilizer applications due to soil type, moisture availability and other management differences across hay fields. For these reasons, soil testing is essential to determine which nutrients are needed and in what amounts for forage production.

Alfalfa varieties should be selected based on the fall dormancy (FD), intended use and the seed cost. Varieties with dormancy ratings of 5 to 9 are more suitable for Mississippi depending on the area. Varieties with FD5 to FD8 are adapted statewide. Many of the seed companies produce both conventional and Roundup Ready (RR) varieties. There is a large number of varieties in the market and with new ones added each year. One of the advantages of RR varieties is helping with weed control. This is especially true with weeds during the winter and spring months of the establishment year. The disadvantage of the RR technology is that if not properly managed, glyphosate resistance can be developed in weed populations making the use of this technology less valuable and creating a higher economic risk. For more information on alfalfa varieties in the market visit https://www.alfalfa.org/varietyLeaflet.php. Information on varieties tested in MS can be found at http://mafes.msstate.edu/variety-trials/forage.asp.

When selecting a variety for your area seed cost should also be considered. Conventional varieties might have a lower cost of establishment than RR varieties due to the increase in the technology fee. The intended use (hay, grazing, or dual-purpose) should be also be considered along with disease resistance. Varieties with traffic tolerance will have better persistence and could in some circumstances have better yield. Because of the wet winters and springs across the state, varieties with a high rating of diseases such as bacterial wilt, anthracnose, Phytophthora crown root rot, sclerotinia crown rot, and Fusarium wilt should be considered. It is recommended to use varieties with a "moderate resistance" (MR) rating (or higher) to each of these diseases. Contact your local county Extension office to determine which variety might more suitable for your area and the existing soil type.

The recommended seeding rate for a pure stand of alfalfa in Mississippi is 20 pounds per acre when drilling into a prepared seed bed. If broadcasting into a prepared seed bed or using a no-till system, those rates should be increased to by 25% (25 pounds per acre). Because of the heavy rains in the spring, alfalfa should be planted in fall from September 15 to October 30. If a spring planting is implemented, plating should be done from February 20 to March 31. Planting beyond those spring dates can result in losing one to two cuts of hay or having stand failure due warmer temperatures

that can impact root development and persistence. It important to make sure that seed is properly inoculated at the time of planting. Most alfalfa seed is currently coated and pre-inoculated. If the seed has been stored for a long period of time, it is recommended to check the inoculant expiration date and re-inoculate to assure that the rhizobia bacteria can infect the new seedlings. Keep in mind that hot and humid storage conditions can reduce or destroy the viability of the inoculant. If an inoculant needs to be applied, use ***Type A*** inoculant. One pound of inoculant should be sufficient to treat close to 100 pounds of alfalfa seed.

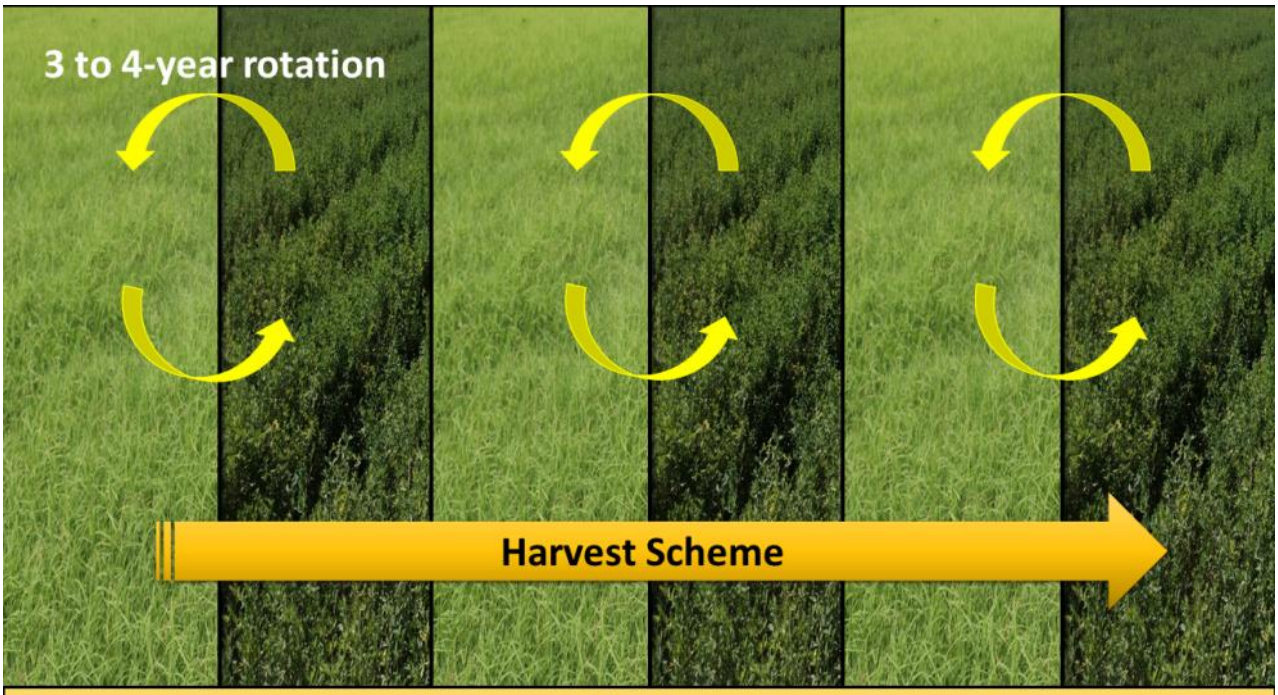

Figure 2. Strip system for a grass/alfalfa mix. Alfalfa can be rotated every 3-4 years to maintain continuous production system and strips harvested in opposite direction to maintain a grass/legume mix in the bales that could help improve forage quality. Grasses can benefit from the residual N provided by the alfalfa after three years of production.

We have discussed the necessary components that needs to be considered for establishing alfalfa, but it is also important to make sure that proper planting method and seed placement is implemented. This means that the drill needs to be properly calibrated before pouring that seed into the hopper. Alfalfa is a very small seed and should not be planted deeper than ¼ inch. Under optimum moisture, temperature and planting depth, alfalfa seedlings should start to emerge within 7 to 12 days. If the drill was properly calibrated, a range of 20-30 plants per square foot should be present within 30 days of planting. There are two main planting methods: plating into a prepared seed bed or no-till planting into an existing sod.

Planting into a prepared seed bed will involve tilling to have a clean, smooth and firm seed bed. The number of times the field needs to be plowed depends on the field conditions and weed populations present. It is recommended to plow in mid-summer and allow a new flush of weeds to germinate that can again be sprayed with glyphosate. Let the seed bed sit for at least 45 days before it is broken again. A glyphosate application at least a week before planting can reduce any weed population before plating. A firm seed bed can be determined by measuring an adult's foot print. If the foot print is more ¼ inch deep, then cultipacking is recommended to avoid the seed being placed too deep. If alfalfa is broadcast instead of drilled into a prepared seed bed, it is recommended to cultipack, broadcast and then cover the seed with a roller or cultipacker. Broadcasting the seed into a loose seed bed will increases the chances of placing the seed too deep leading to a stand failure.

Planting alfalfa into an existing sod can be achieved by using a no-till drill. This could be used to plant alfalfa into a fescue or bermudagrass stand to improve forage quality. This could be ideal for improving forage quality of summer perennial grasses. This establishment method might require chemical burndown (8 oz of glyphosate or one quart of paraquat) or a close clipping (less than two inches) to aid in germination and suppress canopy competition. Also, because of lime and fertilizer applications, under a no-till system, soil conditioning should start at least twelve months ahead of the planting time. A three-year study at Mississippi State University indicated that alfalfa can be incorporated into bermudagrass to maintain forage yields and improve forage quality. Alfalfa persistence was maintained for four-years. Comparison of establishment methods (chemical burndown + no-till, minimum tillage, and close clipping) did not affect alfalfa establish-

Figure 3. Overview of alfalfa production and management.

ment. Using alfalfa strips in an existing sod might be a strategy that could maintain a long-term rotation system in the same field (Fig. 2).

The persistence and productivity of an alfalfa stand will depend on selecting a good soil type, a forage variety adapted to the area, and providing optimum pH and nutrient levels (Fig. 3). Mississippi's producers need to remember that land will be dedicated to alfalfa production for only one or two years if mistakes are made during the establishment period. The type of variety (conventional vs. RR) will have a big influence on the cost of establishment. It is recommend to do your homework and take time to develop a plan and make the necessary adjustments before investing in alfalfa production.

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

September 15-17, 2015 – MS Grazing Land Coalition Initiative, Natchez, MS
September 23, 2015 – Cattlemen's College, Prairie, MS
September 24, 2015 – Cattlemen's College, Poplarville, MS
October 2, 2015 – Hay Contest Entries Due
October 27, 2015 – Southwest Mississippi Fall Forage Field Day, Meadville, MS
November 6, 2015 – Mississippi Forage & Grassland Conference, Newton, MS