Forage News

MISSISSIPPI STATE UNIVERSITY EXTENSION SERVICE
Center for Forage Management and Environmental Stewardship

Pearl Millet: Pinpoint Forage for Summer Grazing

Volume 8, Issue 4

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April 2015

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Sometimes producer are trying to decide what forage might fit into a summer grazing and hay production systems to follow land that was planted in annual ryegrass for winter grazing. Pearl millet is a tall annual growing grass that can produce several tillers (stems) from the base of the plant and can be used primarily for summer annual forage production for grazing, hay or baleage across Mississippi.

Establishment **–** Pearl millet should be established in a well-prepared seedbed to avoid weed competition. Seed usually germinates very quickly (within 5-7 days) after planting when temperatures are ideal for growth. Pearl millet seed germination is best when soil temperature is 65 °F or higher and soil moisture is adequate. Two weeks after planting, pearl millet can initiate a rapid growth phase. Pearl millet has relatively fast root development. Its extensive fibrous root system can grow both laterally and downward into the soil profile. This annual forage crop has a high temperature requirement for growth. Optimum growth occurs between 91 and 95 °F, minimum growth occurs at 54 °F with a soil temperature of 64 °F and minimum nighttime temperature of 50 °F.

Table 1. Pearl millet forage field collected across three locations in Mississippi during the 2013 growing season.

Variety	Holly Springs	Starkville	Poplarville	State Avg.
Brown Top Millet	3844	1601	1326	**2257**
Cal/West	5101	5628	1911	**4213**
Cropland BRM 4611	5221	5439	4055	**4905**
Dove Proso	1122	952	1351	**1142**
German Foxtail	1543	1468	2367	**1793**
Hybrid Pearl	4739	5823	4426	**4996**
Japenese	2919	1183	1902	**2001**
Leafy 23	4693	6396	5670	**5586**
Leafy 24	5992	6056	8518	**6855**
Tif leaf 3	4153	5613	4905	**4890**
White Proso	805	634	--	**720**
Mean	**3648**	**4284**	**3643**	**3858**

Source: White et al., 2014.

Pearl millet is one of the most drought tolerant summer annual forages. It prefers very well-drained soils and it is probably the less tolerant of the summer forages to water logging and flooding. Although pearl millet can be planted throughout the summer, best planting dates are from May to June. Later planting dates can affect forage production and should be considered for short-term grazing, hay production or emergency forage production. Total yield decreases as seeding date is delayed from earliest planting.

Seeding rates for pearl millet can vary depending on the type of utilization. Seed rates of 15 to 25 lb/ac at ½ depth are recommended when planting in a prepared seedbed and using a drill or 30 to 40 lbs/ac when broadcasting the seed. When using pearl millet for grazing, the lighter rate is recommended to allow more tiller production per plant. In a hay system, a heavier seeding rate is recommended to increase tiller competition and to have finer or thinner stems that that could reduce drying time. Keep in mind that when broadcasting the seed, the cost of establishment can be increased significantly. To avoid rapid maturity and extending the grazing capability over the summer, it recommended to make multiple plantings (stagger planting) of at least a two-week interval.

Fertility – Although pearl millet can grow at low pH (>5.5) and fertility, lime is recommended with application at least 6 months before planting to allow lime to react and neutralize soil acidity. Phosphorous (P_2O_5) and potassium (K_2O) should be applied based on soil test recommendations. Phosphorous can be applied at planting while potassium should be applied in split-applications if the recommended rate is above 60 lb K_2O/ac. If this the case apply half of the K_2O at planting and the remaining K_2O after the first grazing along with the recommended nitrogen rate. Nitrogen should be apply at a rate of 40-50 lb N/ac when the plants have reached 3-inches in height. Apply an extra 40-50 lb N/ac after the first grazing or haying period.

Forage Production – Seasonal production is generally from June to September with yields in Mississippi ranging from 1,100 to 6,800 lbs DM/ac (Table 1). When pearl millet is planting in May, it should be ready for grazing within 30 to 45 days after planting and if managed properly it could provide from 80 to 110 days of grazing depending on variety, fertility, growing conditions, and grazing management strategy. It is important to note that millets are most productive during the first 60 days of the life of the stand. During those first 60 days of production, a well-fertilized milled should be able to carry three to four stocker cattle (500-550 lbs) or two to three mature cows (1,000 lbs) per acre under rotational grazing.

Forage Utilization – Pearl millet should be subject to relatively frequent, but uniforom defoliation to maintain quality. When grazing pearl millet, animals can be allocated when plants have reached 18 to 24 inches in height. Animals should be removed at a target stubble height of 6 to 8 inches to allow plant recovery and regrowth, but best animal performance might occur when a 10 to 12 inches stubble height is maintained. New improved varieties are available and they can be combined with summer legumes such as cowpeas, lablab, or forage soybeans (Fig. 1) to improve forage production and animal performance. Pearl millet can also make good quality hay or baleage if cut when plants reach 24 to 36 inches. If forage reaches the boot stage, then baleage production can be considered to avoid loses in forage quality. The drying rate of millet hay can be sped up by the use of a roller/crimper-style conditioner.

Figure 1. Pearl millet variety trial (a) and integration with summer annual legumes (b) at Starkville, MS.

Forage Quality – Pearl millet can produce good quality forage, especially under frequent defoliation. Millets are moderately to highly digestible when the total biomass has a large leaf to stem ratio. Higher leave concentration contain higher protein and digestible nutrients and lower fiber concentration. Crude protein can range from 10 to 12 % when unfertilized to 14 to 16% under nitrogen applications. Millets are known to have high calcium and iron, but low in sulfur-containing amino acids. One of the advantages of pearl millet is that it does not produce prussic acid (hydrocyanic acid) and contain no tannins when compared to other species such as sorghum, sudangrass and sorghum/sudangrass hybrids. However, pear millet can accumulate high nitrate levels during drought stress. Nitrate accumulates in the plant when fertilized with high nitrogen rates due to insufficient moisture or by other factors such as cloud cover, shading, cool temperatures or frost.

Several pearl millet types and varieties have been developed for utilization across the southern USA. Although millets have the ability to produce good forage, the main factors that will determine yields are plating date, length of the growing season, season's growing conditions, and time of forage utilization. Research at Mississippi State University is continuing to look at the best agronomic practices of variety selection, fertilizer rates, legume competition, weed control and utilization methods (grazing, hay and baleage). Producers must also consider how pearl millets could compliment other available forages to meet their livestock's nutritional requirements.

For upcoming forage related events visit:
http://forages.pss.msstate.edu/events.html
May 2, 2015 – Beef Unit Field Day, Starkville, MS
May 12, 2015 – Sheep Field Day, Thaxton, MS (NRCS)
May 15, 2015 — Alfalfa Field Day, Starkville, MS
May 16, 2015 – Bull Test on Forage Field Day, Tylertown, MS
June 16, 2015 – Alcorn County Forage Field Day, Corinth, MS
June 19, 2015 — Warm-season Forage Tour, Starkville, MS
June 30, 2015— Coastal Plain Exp. Station Field Day, Newton, MS
November 13, 2015 – Mississippi Forage & Grassland Conference, Newton, MS