

Forage Sorghum

By Chris Teutsch, Ray Smith, Tom Keene, and Jimmy C. Henning, Plant and Soil Sciences

Forage sorghum is the tallest of the summer annuals, reaching 6 to 15 feet in height and is best harvested as silage. Taller varieties produce high forage yield but can lodge, making them difficult to harvest mechanically. Some varieties have been developed that are shorter with increased resistance to lodging. Forage sorghums, like corn, are harvested once per season by direct chopping. While forage sorghum yields are similar to corn, they are lower in energy. The primary advantage of utilizing sorghum for silage production is its greater drought tolerance.

Sorghum is best adapted to fertile, well-drained soils that have a good water holding capacity. For more information on soil types, see [AGR-217: "Determining Soil Texture by Feel."](#) Although sorghum will grow at a pH of 5.5, optimum production is achieved when the pH is maintained between 6.0 and 6.5. Phosphorus and potassium should be applied according to soil test prior to seeding. For more information on fertilizing warm season annual forages like sorghum, see [AGR-1, Lime and Nutrient Recommendations](#). In the absence of a soil test, apply 60-80 lb/A of P₂O₅ and 70-100 lb/A K₂O. Apply 100 to 140 lb/A of nitrogen at seeding or 1.2 lb of N per the day rating of maturity. For example, 100 day forage sorghum would require 120 lb/A of N.

Sorghum should be planted after there is no chance of frost and when the soil temperature has reached at least 60°F. It can be conventionally or no-till seeded using a corn planter or grain drill. When using a corn planter (20 to 30 inch rows), seed should be planted at a population of 60,000 to 90,000 seeds per acre. Refer to seed tag for seeds per pound for the selected variety. Seeding depth should be between 1 and 1½ inches. Planting too early and too deep are common causes of poor sorghum stands. To control emergence of annual grass weeds, use Concept®-treated seed and pre-emergence

herbicides following label guidelines (See [AGR-6: "Weed Control Recommendations for Kentucky Grain Crops"](#)).

Forage sorghum should be direct cut and ensiled when the seed has reached the soft dough stage. If harvested at the late boot to early head stage, forage sorghum should be wilted to 55 percent to 65 percent moisture before ensiling. Using a mower-conditioner to crush stems and wide mower swaths will decrease wilting time.

Forage sorghums can accumulate toxic levels of nitrates under certain conditions, such as high nitrogen fertilization, drought, or sudden weather changes. Ensiling will reduce nitrate levels by 40 percent to 60 percent, but suspect forages should always be tested prior to feeding. Although forage sorghum has prussic acid poisoning potential, the ensiling process allows the prussic acid to be neutralized. For more information on nitrates and prussic acid see [ID-217: "Forage-related Cattle Disorders—Nitrate Poisoning"](#) and [ID-220: "Cyanide Poisoning in Ruminants."](#)

The Brown Midrib (BMR) Trait

The brown midrib or BMR trait is a visible expression of a genetic mutation in certain varieties of forage sorghum and some other annual grasses as well. In these varieties, the midrib of the leaf appears brown or tannish in color. In most cases, plants possessing the BMR trait contain less or altered lignin, a compound that makes plant fiber less digestible in the rumen. Lower lignin levels make the plant more digestible and increase animal performance.

In the sorghum species there are three mutations that have been commercially exploited, BMR-6, BMR-12, and BMR-18.

Brachytic Dwarf Trait

There are genes in forage sorghum that produce a type of dwarfism known as "brachytic dwarfism", which reduces stem length between leaves without impacting leaf size or number. The resulting plant is more compact, leafier and less susceptible to lodging.



Figure 1. Forage sorghum in the milk stage.

Forage Sorghum Facts

Common Name: Forage sorghum

Scientific Name: *Sorghum bicolor*

Origin: Northeast Africa

Growth Characteristics: Coarse stemmed, erect, tall growing annual grass

Adaptation: All of Kentucky

Major Uses: Primarily silage

Drought Tolerance: Very good

Soil Drainage: Well drained to somewhat poorly drained

Weight per Bushel: 56 pounds

Number of Seed per Pound: Varies from 13,000 to 20,000; check seed tag

Seeding Rate: 60,000 to 90,000 seeds per acre when planted in wide rows

Seeding Date: 1-2 weeks after corn, when soil temperature is at least 60°F

Seeding Depth: 1 to 1½ inches

Time to Soft Dough Stage: 85 to 120 days depending on variety

Expected Yield: Silage-15 to 30 tons silage per acre at 65% moisture

Soil pH: Will grow at 5.5, but optimum growth is obtained when pH is 6.0 to 6.5

Fertilization: Apply phosphorus and potassium according to soil test. Apply 100 to 140 lb/A of nitrogen at seeding or 1.2 lb of N per the day rating of maturity.

Seasonal Distribution: 90% of growth in June, July, and August

Wilted Silage Management: Cut at the late boot to early head stage. Use mower- conditioner to crush stems and wide mower swaths to decrease wilting time.

Direct Cut Silage Management: Chop when the seed has reached the soft dough stage.

Forage-related Disorders: *Prussic acid poisoning.* To reduce the chances of prussic acid poisoning, do not graze young, drought stressed, frosted, or damaged plants. *Nitrate poisoning.* To avoid nitrate poisoning do not apply excessive amounts of nitrogen fertilizer. Do not graze drought stressed or slow growing plants. For more information on nitrates and prussic acid see [ID-217: "Forage-related Cattle Disorders – Nitrate Poisoning"](#) and [ID-220: "Cyanide Poisoning in Ruminants."](#)