



Agriculture & Natural Resources

AGRONOMY

ALABAMA COOPERATIVE EXTENSION SERVICE / AUBURN UNIVERSITY, ALABAMA 36849-5612

Production Guide For Grain Sorghum

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Many farmers in Alabama and the Southeast have found the drought tolerance of grain sorghum makes it an attractive alternative to corn. By virtue of the short growing season, wide adaptation, and versatile planting date of grain sorghum, many producers also recognize the ease of fitting this crop into double-cropping and crop rotation systems with soybeans, wheat, and other crops.

Interest in the production of grain for animal feed in the grain-deficient Southeast has caused producers to reconsider grain sorghum—especially for soils which are too droughty for dependable corn production.

Adaptation

Grain sorghum is adapted to be grown on many different soils throughout Alabama. Although it will produce best on deep, fertile, well-drained loamy soils, it is much more tolerant of shallow soil and droughty conditions than corn. It can be grown successfully on clay, clay loam, or sandy loam soils. However, don't expect soils that produce poor soybean or poor corn crops to yield a bumper crop of grain sorghum. The best soils for other crops also produce the highest grain sorghum yields.

Fertility

The liming and fertilization of grain sorghum should be based on soil test recommendations. One of the most important points to remember is that grain sorghum is not tolerant of soil acidity. When the soil pH is lower than 5.8, sorghum yields will usually be extremely low. If the soil pH of your field is lower than 5.8, you should lime to bring it up to 6.5 before planting grain sorghum.

The amount of phosphorus and potassium needed for high grain sorghum yields will depend on the fertility status of the soil. Recommendations made by the Auburn University Soil Testing Laboratory vary from 0 to 80 pounds per acre for both P_2O_5 (phosphate) and K_2O (potash).

Applying nitrogen is essential for acceptable yields. Under good growing conditions, non-irrigated grain sorghum should receive 80 to 100 pounds of nitrogen per acre. On soils which are subject to leaching, apply only about half of this amount before planting. Then apply a nitrogen sidedressing when the plants reach a height of about 8 to 10 inches. On soils which do not leach

easily, all of the nitrogen may be applied during seedbed preparation.

Fertilizer applied before planting should be worked into the seedbed or banded near the row. If it is banded, place it at least 2 inches below and to the side of the seed.

Starter Fertilizer

Data from studies currently in progress at Auburn University indicate that the use of a small amount of starter fertilizer may increase yields of grain sorghum planted in cool soils and in reduced tillage systems. The application of starter fertilizer may also make grain sorghum mature faster. Such fertilizer should be banded 2 to 3 inches to the side of and below the seed.

Adequate application rates for starter fertilizer should be about 20 to 30 pounds per acre of nitrogen and 20 pounds of P_2O_5 . The nitrogen applied in the starter fertilizer should be considered as part of the total 80 to 100 pounds needed. Apply the remainder of the nitrogen three to five weeks after the grain sorghum emerges.

Hybrid Selection

Various hybrids perform differently in different parts of Alabama. Therefore, it is important to select hybrids which have performed well in variety trials in your area. Important factors to consider when selecting a hybrid are: yielding ability; susceptibility to lodging; maturity date; head exertion; head compactness; and damage from birds, insects, and diseases.

Yield data from a single year should be interpreted with caution. Yielding ability is a complex trait which is influenced by many environmental factors. It is not unusual for the performance of a particular hybrid to vary considerably from year to year depending on weather conditions, disease, and insect incidence. For this reason, data from a single year may be misleading.

Do not make a hybrid selection based on yielding ability alone. Hybrids which have good yielding ability can vary considerably in other important traits such as lodging resistance, maturity, and resistance to disease.

More detailed information on yields and other variety performance traits are available in the annual *Grain Sorghum Hybrid Performance Report* published by the Department of Agronomy and Soils, Alabama Agricultural

Experiment Station, Auburn University. Copies of the current report and hybrid recommendations are available at your county Extension office.

Planting Dates

Grain sorghum does not germinate and grow well under cool soil conditions. Poor emergence and seedling growth may result if grain sorghum is planted before soil temperatures reach 65°F. in the spring. Slow seedling growth may increase losses due to weed competition, diseases, insects, and herbicide damage.

Because of its relatively short growing season, grain sorghum is often planted in Alabama in June or even in early July. Such late planting may be unavoidable in double cropping situations, but earlier planting usually results in higher yields and should be practiced when possible. Plant grain sorghum during the following periods:

South Alabama - April 1 to July 15
Central Alabama - April 1 to June 30
North Alabama - May 1 to June 30

Seeding Rates

When planting into a good seedbed, expect about 85 percent of the sorghum seed to produce mature plants. The optimum population for high yields under good growing conditions will usually be about 60,000 plants per acre. However, on extremely sandy, droughty soils, a population of about 40,000 plants may be more desirable.

Under irrigation or high levels of management on highly productive soils, a population of 100,000 plants per acre is recommended.

A population of 60,000 plants per acre will usually require around 5 pounds of seed. But the weight of seed planted is not a good measure of population since seed size varies considerably among various hybrids. The seed spacings required for 60,000 plants per acre at three different row widths are shown in the table below.

Seed Spacing Required For 60,000 Plants Per Acre.*

Row Width	Inches Between Each Seed	Plants/Foot Of Row
20 inches	4.5	2.3
24 inches	3.7	2.8
30 inches	3.0	3.4

*Based on 85 percent of the seed producing mature plants.

Row Spacing

Row spacing studies have indicated that grain sorghum yields will generally be higher with narrow (24 inches or less) rows if other growing conditions are good. You must control weeds, however, to realize such benefits.

When cultivation is to be used for weed control, the row width will be limited by the cultivation equipment. Where weed control practices and equipment will allow, row widths of 20 to 30 inches are preferred.

Weed Control

Weed problems in grain sorghum include perennial grasses such as Johnsongrass and Bermudagrass, annual

grasses such as crabgrass and goosegrass, and broadleaf weeds such as cocklebur and sicklepod. Broadleaf weeds and many annual grasses are generally controlled by preemergence and early postemergence herbicide applications. Perennial grasses and some annual grasses are not well controlled by herbicides available for use in grain sorghum.

Avoid fields where Johnsongrass has been a problem. Good seedbed preparation, early cultivation, and narrow rows can help prevent these weeds.

An effective weed control program for grain sorghum will include the following practices: (1) identification of the problem weeds; (2) selection of the correct herbicides; (3) use of the correct rate and application method for the herbicides; (4) good seedbed preparation; (5) use of cultivation for control when needed; and (6) use of good production practices. For more information on chemical weed control practices, see Extension Circular ANR-429, "Grain Sorghum Pest Management."

Insects And Their Control

Several insects may attack grain sorghum in Alabama, and their control may be necessary if you are to have profitable yields. The extent of damage by insects in grain sorghum is often related to the planting date. When sorghum is planted late, more severe insect problems are likely to occur. Early planting often helps prevent severe insect damage.

Insects may attack grain sorghum from the seedling stage through maturity and even in storage. In addition to early planting, control practices include the use of recommended insecticides when damaging populations of insects are detected.

During the flowering period, examine plants frequently in the cool hours of the morning for signs of midge populations. Midge problems tend to be more frequent for late plantings or if Johnsongrass is present where grain sorghum is growing. For detailed information on grain sorghum insects and their control, see Extension Circular ANR-429, "Grain Sorghum Pest Management."

Managing Diseases Of Grain Sorghum

Anthraxnose is the most damaging disease of grain sorghum in Alabama. Serious losses have also been associated with Fusarium head blight and charcoal rot.

Anthraxnose develops as grain sorghum approaches maturity. Apparently, grain sorghum is susceptible to attack by the anthraxnose fungus after the seed head emerges from the boot.

Anthraxnose is rarely seen on seedling grain sorghum. Frequent showers from head exertion through grain fill favor rapid blighting of the leaves and seed head. Disease-resistant varieties are the most efficient and inexpensive means of controlling anthraxnose.

Until the last few years, most adapted grain sorghum varieties had good disease resistance. New strains of the anthraxnose fungus have broken the disease resistance of nearly all popular grain sorghum varieties except Funks G-1711. Johnsongrass control, early planting, and rotation of grain sorghum with non-host crops of the an-

thracnose fungus may also help minimize disease-related yield losses.

Fusarium head blight is an occasional problem in Alabama and is as potentially damaging as anthracnose. Swine are highly sensitive to a range of mycotoxins sometimes produced by the head blight fungus. Like anthracnose, head blight usually develops as grain sorghum approaches maturity. Alternating periods of wet and dry weather favor head blight development. Adapted grain sorghum varieties have only limited resistance to head blight.

Good crop management practices such as crop rotation and balanced fertility are the best defense against head blight. Double cropping of grain sorghum behind wheat should be avoided because the head blight fungus will attack both crops. Harvesting grain sorghum at 17- to 20-percent moisture may minimize head blight damage.

Charcoal rot develops primarily on maturing grain sorghum under severe moisture stress. High plant populations, which reduce the drought tolerance of grain sorghum, are also known to contribute to charcoal rot damage. Extensive lodging is largely responsible for yield losses related to charcoal rot. Most adapted grain sorghum varieties are tolerant to charcoal rot except under conditions of severe drought stress.

Following recommended seeding rates, fertility levels, and conducting timely harvesting to avoid losses due to lodging should reduce disease losses. Crop rotation is largely ineffective for controlling this disease due to the wide field crop host range of the charcoal rot fungus.

Zonate leafspot, rough spot, and gray leafspot are common foliar diseases of grain sorghum. Incidence of all three diseases is highest in fields where grain sorghum or its close relatives are frequently grown. The above diseases rarely have a significant effect on grain sorghum yield.

Harvesting And Storage

Grain sorghum remains green and the seed retain moisture for a long period of time, even after the seed are mature. For this reason, harvest the grain at 18- to 23-percent moisture and artificially dry it rather than field drying it. Field drying grain sorghum is likely to result in excessive harvest losses as well as high losses to birds, insects, lodging, and perhaps from sprouting of grain in the heads during prolonged periods of wet weather.

Alabama farmers who are considering growing grain

sorghum should take a critical look at their grain drying facilities before planting. The drying capacity of mechanical drying equipment is much lower for grain sorghum than for other grains. The importance of this aspect of growing grain sorghum cannot be overemphasized.

For safe storage over long periods in Alabama, grain sorghum should have no more than 12-percent moisture. For detailed information on harvesting and storing grain sorghum, see Extension Circular ANR-243, "Harvesting, Drying, And Storing Grain Sorghum."

Ratoon Cropping

Ratoon cropping is the technique of allowing grain sorghum to produce two crops of grain from one planting. This practice is possible with proper management in the area of Alabama which is south of U.S. Highway 80.

For a ratoon crop, plant grain sorghum in early April and harvest at about 20-percent moisture in July. Cut the stubble remaining after the first grain harvest to a 4- to 6-inch height and apply an additional 50 to 60 pounds of nitrogen to stimulate regrowth.

When cutting the stubble, make sure the mower blades are sharp. Shattered, split, or broken stalks may not put on new growth. With adequate rainfall, a second crop of grain (usually 40 to 50 percent less than the yield potential of the planted crop) may be produced before frost kills the plants. It is likely that insect pressure will be heavy on this second crop.

Using Stubble

After grain harvest (whether or not a ratoon crop is obtained), it is reasonable to use the stubble remaining for hay or grazing. However, immediately after frost or when regrowth is less than 24 inches tall, cattle should not be given access to sorghum forage due to the possibility of prussic acid poisoning.

When the forage has completely dried after a killing frost (this usually requires a week or so), it is safe to use the forage. Keep in mind, however, that a frost may only kill certain parts of plants or may only affect plants in certain portions of a field. Subsequent frosts may therefore kill previously unaffected green material and again make a field potentially hazardous after the initial post-frost waiting period has passed.

The use of certain pesticides may rule out the use of grain sorghum for grazing or hay. Follow pesticide labels carefully concerning restrictions on the use of stubble for hay or grazing.

CIRCULAR ANR-502

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UPS, 5M09, 5:88, ANR-502