



CHAPTER 5. GRAIN SORGHUM



AUTHOR

Emerson D. Nafziger
Department of Crop Sciences
ednaf@uiuc.edu

Although grain sorghum can be grown throughout Illinois, its greatest potential, in comparison with other crops, is in the southern third of the state. It is adapted to almost all soils, from sand to heavy clay. Its greatest advantage over corn is tolerance of moisture extremes. Grain sorghum usually yields more than corn when moisture is in short supply, but it often yields less than corn under better growing conditions. Grain sorghum is also less affected by late planting and high temperatures during the growing season, but the crop is very sensitive to cool weather and will be killed by even light frost.

Although few side-by-side comparisons of corn and grain sorghum in southern Illinois are available, some indication of relative yields is available from the hybrid trials that are conducted annually. Averaged across 6 recent trials in southern Illinois, corn yielded about 40 bushels per acre more than grain sorghum (Table 5.01). Corn yields in southern Illinois were excellent in two of these three years. In general, grain sorghum tends to yield more than corn when corn yields less than 100 bushels per acre, and less than corn when corn yields more than about 120 bushels per acre. This illustrates the advantage that grain sorghum may have under unfavorable (dry) weather conditions and indicates that grain sorghum may provide more yield stability than corn if corn often yields less than 100 bushels per acre.

Table 5.01. Average Corn and Grain Sorghum Yields from Hybrid Comparison Trials in Southern Illinois, 1999–2001

Location	Corn	Grain sorghum
Brownstown	154	123
Carbondale	163	113
Average	159	118

FERTILIZATION

The phosphorus and potassium requirements of grain sorghum are similar to those of corn. The response to nitrogen is somewhat erratic, due largely to the extensive root system's efficiency in taking up soil nutrients. For this reason, and because of the lower yield potential, the maximum rate of nitrogen suggested is about 125 pounds per acre. For sorghum following a legume such as soybean or clover, this rate may be reduced by 20 to 40 pounds.

HYBRIDS

The criteria for selecting grain sorghum hybrids are very similar to those for selecting corn hybrids. Yield, maturity, standability, and disease resistance are all important. Consideration should also be given to the market class (endosperm color) and bird resistance, which may be associated with palatability to livestock. Performance tests of commercial grain sorghum hybrids are conducted at three locations in southern Illinois, and results are available (in the same report as the commercial corn hybrid yields) in Extension offices (usually by November) and on the World Wide Web at <http://vt.cropsci.uiuc.edu>. Because of the limited acreage of grain sorghum in the eastern United States, most hybrids are developed for the Great Plains and may not have been extensively tested under Midwest conditions.

PLANTING

Sorghum should not be planted until soil temperature reaches 65°F. In the southern half of the state, mid-May is considered the starting date; late May to June 15 is the planting date in the northern half of the state. Such late planting—along with a shorter, cooler growing season—means that hybrids used in northern Illinois must be early maturing to mature before frost.

Sorghum emerges more slowly than corn and requires relatively good seed–soil contact. Planting depth should not exceed 1½ inches, and about 1 inch is considered best. Because sorghum seedlings are slow to emerge, growers should use caution when using reduced- or no-till planting methods. Surface residue usually keeps the soil cooler and may harbor insects that can attack the crop, causing serious stand losses, especially when the crop is planted early in the season.

ROW SPACING

Row-spacing experiments have shown that narrow rows produce more than wide rows (Table 5.02). Drilling in 7- to 10-inch rows works well if weeds can be controlled without cultivation, but if weed problems are expected, wider rows that will allow cultivation may be a better choice than drilled grain sorghum. Using a split-row planter to plant 15-inch rows may also be a good practice, providing weeds can be controlled.

PLANT POPULATION

Because grain sorghum seed is small and some planters do not handle it well, there is a tendency to plant based on pounds of seed per acre rather than by number of seeds. This usually results in overly dense plant populations that can cause lodging and yield loss. Aim for a plant stand of 50,000 to 100,000 plants per acre, with the lower populations on droughtier soils. This is about 3 to 6 plants per foot of row in 30-inch rows at harvest and 2 to 4 plants per foot in 20-inch rows. Plant 30 to 50 percent more seeds than the intended stand, with higher rates if planting early. Sorghum may also be drilled using 6 to 8 pounds of seed per acre. When drilling, be sure not to use excessive seed rates; plant stands when drilled should not be much higher than those in rows.

WEED CONTROL

Because emergence of sorghum is slow, controlling weeds presents special problems. Suggestions for

Table 5.02. Yield of Grain Sorghum as Affected by Row Spacing in a Missouri Trial*

Row spacing (in.)	Yield (bu/A)
7	121
14	118
21	103
28	98
35	89

*Data are 3-year averages.

chemical control of weeds are given elsewhere in this handbook. As with corn, a rotary hoe is useful after the crop is rooted but before weeds become established.

HARVESTING AND STORAGE

Timely harvest is important. Rainy weather after sorghum grain reaches physiological maturity may cause sprouting in the head, weathering (soft and mealy grain), or both. Harvest may begin when grain moisture is 20 percent or greater, if drying facilities are available. Sorghum often dries slowly in the field. Because sorghum does not die until frost, the use of a desiccant (sodium chlorate) can reduce the amount of green plant material going through the combine, making harvest easier.

MARKETING

Before planting, check on local markets. Because the acreage in Illinois is limited, many elevators do not purchase grain sorghum.

GRAZING

After harvest, sorghum stubble may be used for pasture. Livestock should not be allowed to graze for one week after frost because the danger of prussic acid or hydrocyanic acid (HCN) poisoning is especially high. Newly frosted plants sometimes develop tillers high in prussic acid.