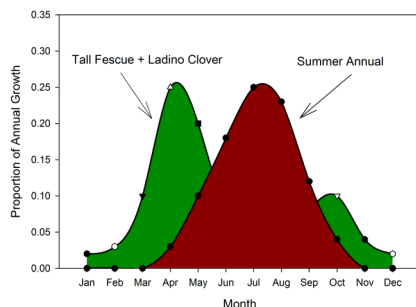


# Warm Season Annual Grasses in Kentucky

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In Kentucky, cool-season grasses produce ample forage in the spring and fall, but high temperatures and short-term drought stress often limits growth during the summer months. Warm-season annual grasses can fill this gap with relatively high quality forage when properly managed (Figure 1). The purpose of this publication is to provide an overview of the various summer annuals for Kentucky. For more information, please see the link referenced within or at the end of this publication.

Advantages of summer-annual grasses include fast germination and emergence, rapid growth, high productivity, and flexibility of utilization. Disadvantages include the cost of annual establishment and the increased risk of stand failure due to variable rainfall in late spring and early summer. Summer annual grasses are best used in a rotation with small grains or annual ryegrass to optimize productivity per unit of land area. They also have great utility as transition crops prior to the establishment of improved perennial forage species. The sorghum species have prussic acid potential and are hosts for the sugarcane aphid. In addition, nitrate toxicity can be a problem during drought conditions and high N fertilization. Table 1 summarizes major characteristics of these grasses.



**Figure 1.** Relative monthly production of tall fescue plus clover versus a typical summer annual grass. Summer annual grasses are productive than cool season species such as tall fescue and clover in June, July, and August.

## Summer Annual Grasses Adapted to Kentucky

### SUDANGRASS

Sudangrass is a rapidly growing annual grass of the sorghum family. It is medium yielding and well suited for grazing (Figure 2). Sudangrass regrows quickly after harvest and can be grazed several times during summer and early fall. This grass has finer stems than most other summer annuals making it well suited for hay production. For more information, see [AGR-234: "Sudangrass and Sorghum-sudangrass Hybrids."](#)



**Figure 2.** Sudangrass.

### SORGHUM-SUDANGRASS

Sorghum-sudangrass hybrids are developed by crossing sorghum with true sudangrass (Figure 3). The result is a tall growing annual grass that resembles sudangrass, but has coarser stems, taller growth habit, and higher yields. Like sudangrass, hybrids will regrow after grazing if growth is not limited by environmental factors. The coarse stems are difficult to cure as dry hay, therefore these grasses are best utilized for grazing, chopped silage and baleage. For more information, see [AGR-234: "Sudangrass and Sorghum-sudangrass Hybrids."](#)



**Figure 3.** Sorghum-sudangrass head stage.

### FORAGE SORGHUM

Forage sorghum can reach heights of 6 to 15 feet and is best harvested as silage (Figure 4). 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. Like corn, forage sorghums 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. For more information, see [AGR-230: "Forage Sorghum."](#)



**Figure 4.** Forage sorghum head stage.

## FOXTAIL MILLET

Foxtail millet (German millet) is fine stemmed, has no prussic acid potential and is well suited for hay-making (Figure 5). Susceptibility to sugarcane aphid is not known. It is the lowest yielding of the summer annual grasses since it will not regrow after cutting. It is a good smother crop to be used before no-till seeding another crop such as fescue or alfalfa. Foxtail millet is also used as a wildlife planting to produce food and cover for doves, quail, and other birds. For more information, see [AGR-233: "Foxtail Millet."](#)



Figure 5. Foxtail millet head stage.

## PEARL MILLET

Pearl millet is not related to foxtail millet and is higher yielding. It will regrow after harvest, does not have prussic acid potential and is not a host of the sugarcane aphid (Figure 6). Dwarf varieties are available which are leafier and better suited for grazing. Pearl millet is better adapted to more acid soils and soils with a lower water holding capacity than sorghum, sudangrass or sorghum-sudangrass hybrids. For more information, see [AGR-231: "Pearl Millet."](#)



Figure 6. Pearl millet head stage.

## CRABGRASS

Crabgrass is sometimes considered a weed, but possesses significant potential for supplying high quality summer forage (Figure 7). Crabgrass does not have prussic acid potential and is a poor host for the sugarcane aphid. Crabgrass is the general term for many *Digitaria* species. Commercial seed usually contains *Digitaria sanguinalis* (large or hairy crabgrass) or *D. ciliaris* (southern crabgrass). A primary advantage of crabgrass is that it is well adapted to Kentucky and occurs naturally in most summer pastures, especially those that have been overgrazed. It is also highly palatable and a prolific reseeder. Planting an improved variety of crabgrass is recommended because the production of naturally occurring ecotypes varies greatly. Crabgrass is best utilized by grazing. For more information, see [AGR-232: "Crabgrass."](#)



Figure 7. Crabgrass.



Figure 8. The brown midrib trait in forage sorghum.

### The Brown Midrib (BMR) Trait

The brown midrib or BMR trait is outward expression of a genetic mutation in forage sorghum (Figure 8), sorghum-sudangrass, sudangrass, and pearl millet. In most cases, plants possessing the BMR trait contain less or altered lignin, making the plant more digestible and increasing animal production. Therefore, it is desirable to seed summer annuals that have the BMR trait in addition to other desirable characteristics such as high yield. With BMR varieties, the midrib of the leaf appears brown or tannish in color.

### Sugarcane Aphid

In recent years, sugarcane aphid (*Melanaphis sacchari*) has become more problematic for sorghum species raised for forage or grain. Heavy infestations of this aphid can reduce forage quality and yield. Although differences in varietal susceptibility exist, all sorghum species (forage sorghum, sorghum-sudangrass, and sudangrass) and johnsongrass are hosts. Pearl millet, foxtail millet, and crabgrass are thought to be poor hosts of sugarcane aphid.

**Table 1.** Characteristics of commonly used summer annual grasses.

Summer Annual	Yield potential in Kentucky	Seedling vigor	Tolerance to			Suitability for			Host for sugarcane aphid	Nitrate toxicity potential <sup>1</sup>	Prussic acid potential <sup>2</sup>
			Soil acidity	Poor drainage	Drought	Silage	Hay	Grazing			
Crabgrass	Good	Fair	Poor	Fair	Good	Fair	Fair	Excellent	Poor	Low	None
Forage sorghum	Excellent	Good	Poor	Poor	Excellent	Excellent	Poor	Poor	Good	High	High
Foxtail millet	Fair	Good	Good	Fair	Good	Fair	Good	Fair	--- <sup>3</sup>	Low	None
Pearl millet	Good	Fair	Excellent	Poor	Excellent	Good	Fair	Good	Poor	High	None
Sorghum-sudangrass	Good	Excellent	Poor	Fair	Good	Good	Fair	Good	Good	High	Medium
Sudangrass	Good	Excellent	Poor	Fair	Good	Good	Good	Good	Good	High	Medium

<sup>1</sup> See ID-217: "Forage-related Cattle Disorders—Nitrate Poisoning"

<sup>2</sup> See ID-220: "Cyanide Poisoning in Ruminants"

<sup>3</sup> Little information available.