



How Can Summer Annuals Fit in a Livestock Operation?

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As temperatures warm-up and days start to get longer, it is time to start thinking about planting summer annual forages as part of the summer grazing or hay production system. Summer annual forage crops such as sudangrass, millets, forage sorghums, and sorghum-sudan hybrids are grasses that grow well under the Mississippi's environmental conditions (hot and humid climate). They are also well adapted to areas where soil moisture levels might be less abundant. Some of the advantages with summer annuals included rapid germination and emergence, rapid growth under proper conditions, high productivity and flexibility in utilization (grazing, hay or silage/baleage). One of the major disadvantages is the high annual cost of establishment and the increase in stand failure if establishment is hampered by lack of rain. Do not plant summer annual forages too early. Planting should wait until soil temperature remains above 65 to 70 degrees. This will be late April to mid-May in most cases exposing young seedlings to cool air (<50 degrees) or soil temperatures (<60 degrees) can permanently slow growth, greatly reducing seasonal forage production. Variety selection should be based on local availability and price and closer attention should be paid to management. For more information on variety selection consult the MSU Summer Annual Forage Crops Variety Test Bulletin.

Compared to corn, these summer annual forages only require 40% less water which make them more drought tolerant. Brown midrib varieties of forage sorghum and sorghum-sudan hybrids are also available that have improved NDF digestibility and energy content.

Table 1. Effect of planting date on total yield of different summer annuals in Starkville, MS.

Variety	Planting Dates				Mean
	June 17	July 1	July 19	July 30	
	----- Total Yield lb/ac -----				
Cowvittles II Forage Sorghum	9520	6513	6943	5159	7034
Forage King Sorghum-sudangrass	9357	8705	5881	4935	7220
FSG 300 Pearl Millet	6452	8337	6972	4906	6667
Green Grazer V Sorghum-sudangrass	7812	9674	6223	5969	7420
Hay King BMR Sudangrass (Promax)	7787	7300	6064	5837	6745
Piper Sudangrass	7517	6337	6912	4642	6352
LSD _{0.05}	NS	NS	NS	891	--
Mean	8074	7811	6500	5241	--

Source: Lemus, 2011

BMR indicates lower lignin content in the plants' cell walls. Lignin is a fibrous component of some plants that animals cannot easily digest. Lodging can be a problem with BMR varieties, especially with forage sorghum.

Forage Sorghums – They can grow up from 6 to 15 feet tall, drought tolerant and are usually preferred for forage production because of its higher yield potential. They can be grazed, hayed or harvested for green chop or silage. Forage sorghums tend to be adapted to well-drained soils with a pH of 5.5 or above while production is optimized if pH is maintained above 6.0. They should be planted at a rate of 15-10 lb/ac and a seeding depth of 1 to 1.5 inches. Apply 50 lb of nitrogen per acre after emergence followed by an extra 50 lb N/ac after harvest or intensive grazing. Phosphorus and potassium should be applied based on soil test recommendations. To reduce any changes of prussic acid, forage sorghums should be grazed when they reach 30 to 36 inches in height and do not graze closer than 8 inches. If hay or silage is to be produced, harvest the forage sorghum at the late boot to early head stage.

Sudangrass and Sorghum-sudangrass Hybrids – Sudangrass is characterized by fine stems and its rapid growth after grazing. Sorghum-sudan hybrids have coarser stems, taller growth habits and higher yields than sudangrass. Leaf percentage of hybrids appears to be generally lower than that of the sudan varieties; therefore, leaf yield may not be much greater. One of the disadvantages with hybrids is that they tend to have greater concentrations of prussic acid that can cause poisoning in cattle if they are grazed when too young or under environmental stress such as drought or frost.



Sudangrass can be planted at a rate of 25 to 35 lb/ac while hybrids can be planted at 30 to 40 lbs/ac at a depth of 0.5 to 1.0 inch. These grasses do not tolerate low pH and a minimum pH of 6.0 is required for optimum production. Both species can be adapted from well to poorly drained soils. Apply 50 lb of nitrogen per acre after emergence followed by an extra 50 lb N/ac after harvest or intensive grazing. Phosphorus and potassium should be applied based on soil test recommendations. Sudangrass and sorghum-sudangrass hybrids should not be grazed until they reach a height of at least 24 to 30 inches. The first grazing can occur 45-60 days after emergence. Do not graze closer than 8 inches. Although both species can be cut for hay, the curing process could be difficult because of the coarse stems. Using mower conditioner is recommended to increase surface area and reduce drying time.

Hay or silage should be cut at the late boot to early head stage.

Pearl Millet –
Pearl millet is usually of the most prefer summer annuals because it does not accumulate prussic acid.

Table 2. Forage quality of summer annuals harvested in Starkville, MS.

Variety	CP	ADF	NDF	TDN
	%			
Cowvittles II Forage Sorghum	16.6	35.2	62.6	62.4
Forage King Sorghum-sudangrass	16.8	35.7	62.4	62.0
FSG 300 Pearl Millet	15.9	36.1	63.1	61.2
Green Grazer V Sorghum-sudangrass	16.6	35.8	62.9	61.9
Hay King BMR Sudangrass (Promax)	17.5	35.5	61.7	62.3
Piper Sudangrass	16.6	35.7	62.4	62.0

Source: Lemus, 2011.

It is also better adapted to more acid soils with optimum production above a soil pH of 6.0. Apply 50 lb of nitrogen per acre after emergence followed by an extra 50 lb N/ac after harvest or intensive grazing. Phosphorus and potassium should be applied according to soil test recommendations. Pearl millet should be planted at a rate of 25 to 30 lb/ac in a firm bed and a seeding depth of 0.5 to 1.0 inch. Grazing should begin when pearl millet has reached a height of 18 to 24 inches in height. To allow regrowth, do not graze closer than 12 inches. Hay harvest should occur at the late boot to early head stage and a mower conditioner is recommended to crush the stems.

Summer annual forage species tend to be aggressive nitrate accumulators, especially in dry soil conditions. To avoid nitrate poisoning, do not apply excessive amounts of nitrogen fertilizer. Do not graze drought stressed or slow growing plants. A good forage producer should always have summer annual forages tested for nitrate levels before grazing or haying. Grazing annual forages with high nitrate levels is not generally a good idea, however, if a producer chooses to graze these summer annuals under stressed environmental conditions, using strip grazing and moving the animals frequently enough that they do not consume the lower one-third of the stalk where the highest nitrate concentrations typically occur is a recommended strategy. If nitrate levels are a problem, haying is likely the better alternative. Although the hay is still toxic in terms of nitrate levels, it can be ground and diluted into other forage stocks to minimize nitrate concentrations in livestock diets. Nitrates are stable in hay and can cause poisoning months later. When high nitrate forage is harvested as silage, nitrates can be reduced by 40-60% during the ensiling process, but there is still need to test for nitrate concentrations. Horses should not graze sorghum, sudangrass, and sorghum-sudangrass hybrids. These species can cause cystitis (an inflammation of the bladder), which can lead to urinary disorders, lack of coordination, and paralysis in severe cases.



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