



CIRCULAR ANR-134

Summer Annual Grasses as Forage Crops in Alabama

THE SUMMER annual grasses are of considerable importance to livestock producers in Alabama. They have the advantages of making rapid growth, giving good forage yield, and, if cut at the proper stage of growth, providing good forage quality. The major summer annual grasses grown in Alabama are the sorghums (including forage, grain, and intermediate types), sorghum-sudangrass hybrids, sudangrass, and pearl millet. Of lesser importance are browntop millet, foxtail millet, and Japanese millet. Corn is also a summer annual grass, but except where specified otherwise, information presented in this publication does not apply to corn.

Summer annual grasses can be used for grazing, hay, silage, or greenchop, but the most common uses in Alabama are for grazing and for hay. Spring plantings result in the highest production. However, the summer annual grasses can be planted later in the summer than most crops and still produce a sizeable quantity of forage within about six weeks. For this reason the summer annual grasses are particularly useful in three different situations:

1. In emergency situations when forage supplies are low and quick growth is needed.
2. In double-cropping systems in which intensive land use is desirable.
3. When "salvage crops" are needed to make use of fertilizer applied to early-planted summer row crops which have failed (provided no harmful row-crop herbicides are present in the soil).

The economics of using summer annual grasses may or may not be good, depending on the need for forage, the class of animals being fed, and the price of cattle or milk. Land preparation, seed, and nitrogen fertilizer costs involved in growing summer annual grasses are relatively high. Although stocking rates are also relatively high, individual animal performance on summer annuals is generally little or no better than one would obtain from summer perennial

grasses. Although each producer must decide the value of summer annuals in his forage program, a generalization would be that most dairymen can justify growing them; most beef cow-calf operators can't, except in emergency situations; and stocker calf operators sometimes can depending mainly on the price of cattle. Horse owners or swine producers might also justify growing summer annuals depending on their need for forage and other forage production options available.

SPECIES DESCRIPTIONS

Sorghum-Sudangrass Hybrids

As the name implies, these plants are crosses between lines of sorghum and sudangrass. In Alabama, sorghum-sudan hybrids are the most widely grown type of summer annual grass—the greatest usage being in the central and northern parts of the state. Many varieties have been developed, and they are mostly used for either grazing or hay. Sorghum-Sudan hybrids are particularly well adapted to heavy soils and are not recommended for the deep, sandy soils of the Gulf Coast area.

Pearl millet (Pennisetum americanum)

Pearl millet, also called "cattail millet," is the second most popular type of summer annual grass in Alabama. Pearl millet is mostly used for grazing or hay, and the largest acreage is in the southern third of the state. Pearl millet is particularly well adapted to light, sandy soils and is not recommended for the heavy soils of Alabama's Black Belt.

Pearl millet has finer stems and a slightly higher leaf-to-stem ratio than sorghum-sudan hybrids and is, therefore, somewhat easier to cure. This also results in slightly higher digestibility than sorghum-sudan hybrids under similar management conditions.

In recent years, advances have been made in improving varieties of pearl millet, and it appears that pearl millet acreage in Alabama is increasing. millet can stand considerable drought stress, and there is some evidence that it is less likely than other summer annuals to be damaged by certain insect pests,

such as the lesser cornstalk borer. One disadvantage of pearl millet, however, is that it reportedly has some negative effect on milk butterfat production in dairy animals as compared to other forage crops.

Sorghum (Sorghum bicolor)

"Forage sorghums," or sweet sorghums, are tall-growing sorghum types which make high yields per acre but generally produce lower quality forage than other summer grasses. Forage sorghums are probably best suited for use as green chop or grazing. Most varieties reach a height of 8 to 10 feet at maturity.

"Intermediate sorghums" are lower-growing types (usually around 5 to 6 feet at maturity) which have higher grain-to-forage ratios than forage sorghums. Auburn University Agricultural Experiment Station research has shown that intermediate sorghums, which offer a compromise between the high grain content of grain sorghum and the high forage yields of forage sorghum, are generally the best choice of sorghum to use for silage. Sorghum-Sudan hybrids or pearl millet are better choices than intermediate sorghums for grazing or hay.

Sudangrass (Sorghum Sudanese)

Sudangrass, like the sorghum-sudan hybrids, performs best on medium- to heavy-textured soils and is most frequently planted in heavier North Alabama soils or in the Black Belt. While sudangrass often yields less than sorghum-sudan hybrids, it has much finer stems and a considerably higher leaf-to-stem ratio. When properly managed, sudangrass will usually produce forage having higher digestibility than sorghum-sudan hybrids. Sudangrass is also most frequently used for either grazing or hay.

Browntop Millet (Panicum ramosum)

Browntop millet, which is grown on many types of soils throughout Alabama, is used almost exclusively for hay. Although yield is not as high with "browntop" as with other summer annuals, its forage quality can be reasonably good. This species is often planted to attract and provide food for doves and other wildlife. It is quite sensitive to drought, but if adequate moisture is available, it is possible to obtain one cutting of hay before seedhead emergence and still make regrowth which will produce seed for wildlife. Sometimes producers allow browntop to "head out" and produce some seed prior to cutting it for hay. Although forage quality is much lower when this is done, it allows seed to shatter for wildlife and re-seeding.

Foxtail Millet (Setaria italica)

At one time, foxtail millet was a fairly commonly-used hay species in Alabama, grown either alone or in combination with soybeans. Although there is still

a small acreage in North Alabama, it is of little economic importance now. "German millet" and "Hungarian millet" are types of foxtail millet.

Japanese Millet (Echinochloa crusgalli)

This species has been used from time to time in Alabama for grazing or hay. There is a great deal of genetic variation within the species. Although some lines are much more productive than others, no economically important varieties have been developed. This plant volunteers throughout Alabama and is known by the common names "barnyard millet" and "barnyard grass." Japanese millet is adapted to wetter soils than other annual grasses planted for forage. It is often included in seed mixtures to be planted for waterfowl.

Corn (Zea mays)

Although most of the corn grown in Alabama is harvested for grain, corn harvested for silage is a forage crop. Corn is the leading silage crop in Alabama and as silage will produce more total digestible nutrients per acre than any other forage crop. It is predicted by some agricultural forecasters that as farmland becomes more scarce and as agricultural production intensifies, corn-for-silage will increase.

ESTABLISHMENT

Since the sorghum-sudangrass hybrids, sudangrass, and pearl millet are the major summer annual grasses used for forage production in Alabama, most of the information presented in the remainder of this publication pertains to establishment and management of these species only.

Summer annual grasses should be located on productive, well drained, reasonably level soils, in areas which are not extremely droughty. In general, land suited for corn or soybean production is well suited to summer annual grasses. Most summer annual grasses are planted on prepared seedbeds, but it is also possible to increase the productivity of unimproved pastures by interplanting rows of summer annual grasses with a sod-seeder.

When planting summer annual grasses on prepared land, it is highly desirable to prepare a good seedbed – one in which most large clumps of soil have been broken up, the soil surface is reasonably level, and most plant residue has been removed from the soil surface. After planting on prepared land, the area should be cultipacked.

Optimum planting dates, planting depths, and seeding rates vary somewhat with the various summer annual grass species. Auburn University recommendations regarding these points are given for major summer annual grasses in Table 1. Seed may be broadcast or drilled with similar productivity per unit area

Table 1. Auburn University Planting Recommendations for Major Summer Annual Grasses (North, Central, and South Alabama).

Species	Planting Dates	Seeding Rate (lb./acre)	Planting Depth (inches)
Browntop Millet	N: May 1-Aug. 1 C: Apr. 1-Aug. 15 S: Apr. 1-Aug. 15	D: 15-20 B: 25-30	0.5-1.5
Pearl-millet	Apr. 1-July 15	D: 12-15 B: 25-30	0.5-1.5
Sorghum-Sudan Hybrids	N: May 1-Aug. 1 C: Apr. 15-Aug. 1 S: Apr. 1-Aug. 15	D: 20-25 B: 30-35	0.5-1.0
Forage Sorghum S only	Late April-May 15 S only: Late as July 1	B: 15-20	0.5-1.0
Sudangrass	May 1-Aug. 1	D: 20-25 B: 30-40	0.5-1.0

D=Drilled; B=Broadcast

planted. Weed control is normally not a problem with summer annual grasses, due to their quick growth.

It is usually desirable to make two or three plantings of summer annual grasses at intervals of two to three weeks. By doing this, the entire acreage will not be ready to be harvested or grazed at the same time. Plantings may be made throughout the recommended period when there is enough moisture to germinate the seed. Under good growing conditions, there should be enough growth to begin grazing or make a hay harvest within four to six weeks from planting.

FERTILITY

Auburn University recommendations are to apply lime, phosphorus and potassium as indicated by soil test reports. IT IS EXTREMELY IMPORTANT TO ADJUST THE SOIL pH TO THE RANGE OF 5.8 TO 6.5--PARTICULARLY IN THE CASE OF SORGHUM-SUDAN HYBRIDS AND FORAGE SORGHUM. These plants are highly sensitive to soil acidity.

Nitrogen should be applied at the rate of 60 pounds per acre at, or soon after, planting time. Additional applications of 60 pounds of N per acre should be made after each cutting or graze-down up to September 1.

GRAZING MANAGEMENT

Grazing should be started on the following major summer annual grasses when they have reached these heights: pearl millet- 8 to 24 inches, sudangrass- to 24 inches, and sorghum-sudangrass hybrids-22 to 30 inches. If growth is too tall when grazing is begun, the animals will selectively graze and waste and

trample much of the forage. The plants should not be grazed lower than 6 to 8 inches. If the area is not grazed uniformly, mow it down to a 6 to 8 inch stubble height. In the last grazing period of the year, the pasture can be grazed to the ground. Summer annual grasses can produce as much as 90 to 100 days of grazing.

It is difficult to predict what stocking rate will be best for summer annual grasses, since the rate of growth depends on many factors, including weather, fertilization, plant population, species, and variety. However, a good rule of thumb might be to provide one acre for every 2 to 3 dairy cows or beef cows with calves; for every 3 to 5 stocker calves; or for every 4 sows with litters. For example, for 100 lactating dairy cows, make three plantings of 11 to 16 acres each. It is likely that during the growing season, adjustments will need to be made by raising or lowering the stocking rate or using part of a pasture for hay.

Continuous grazing (keeping cattle on the area all the time) is not a good method to use with summer annual grasses. One-third to one-half more acreage is required with this system to obtain the same benefit that can be gotten from a given acreage with other grazing systems. Rotational grazing (rotating cattle from one area to another every 7 to 10 days) is a much more efficient and economical system.

Strip grazing is another technique which works well with summer annuals. This involves using an electric fence to allow cattle access to only a small strip of pasture. When the area has been grazed down to the desired height, the fence is moved, providing access to another strip. If access to the first strips grazed is prevented, these areas should be ready to graze again about the time the rest of the pasture has been grazed down.

Limit grazing is the technique of allowing animals access to a pasture for only a limited time, usually three to four hours each day. This greatly reduces trampling and fouling losses while having little effect on animal performance.

Regardless of the grazing system used, the best approach is to allow animals having the highest nutritional requirements to have first access to a pasture. For example, a dairyman should first graze his high-producing lactating animals. When quality declines, he can move these animals to another area and graze lower quality forage with low producers, dry cows, and heifers for a few days before mowing and top-dressing with nitrogen.

MANAGEMENT FOR HAY

The summer annual grasses should normally be cut for hay when they reach a height of 30 to 40 inches. While waiting longer than this to cut for hay will

lower quality, it will also increase yield. However, the summer annual grasses should never be allowed to mature past the boot stage of growth (the stage just prior to seedhead emergence).

As with harvesting the forage by grazing, a stubble of 6 to 8 inches should be left with each cutting. This high stubble height allows quicker regrowth and also holds cut forage off the ground, allowing quicker drying and baling. The number of harvests will vary with the weather, fertilization, and planting date, but three or four is the usual number for late spring plantings. Yields vary from 2 to 5 tons of hay per acre for the entire season.

It is almost essential to use a hay conditioner when cutting summer annual grasses for hay. Otherwise, it may take five or six days for the large stems to lose enough moisture to permit baling. With the use of a conditioner, length of time from cutting to baling is usually about half what it would otherwise be. Even if baled in large round bales, hay of summer annual grasses should be put under shelter, since the forage of these species does not form a tight bale which resists weathering.

MANAGEMENT FOR SILAGE OR GREENCHOP

If a summer annual grass is to be used for silage, it is best to harvest it in the boot stage. Greenchop can be cut as needed any time from when the grass reaches 30 inches in height until it is in the boot stage.

Unless placing the forage in an airtight silo, the summer annual grasses should be wilted down to a moisture content of around 65 percent prior to being chopped and put in the silo. Silage quality will be much better if before ensiling an energy source such as cracked shelled corn is added to the material at a rate of 100 to 150 pounds per ton of silage. Chopping finely (1/4 to 1/2 inch) and packing the silage tightly will also improve the silage quality.

POTENTIAL TOXICITIES

Prussic Acid-Under some circumstances, prussic (or hydrocyanic) acid can build up to toxic levels in sorghum-sudan hybrids or (less likely) in sudangrass or forage sorghum. This is most likely to occur immediately after a killing frost, so these pastures should not be grazed for about a week after a killing frost.

Young plants, suckers, and growth during dry weather can also contain high levels of prussic acid. For this reason, cattle should not be allowed access to these pastures during periods of extreme drought or before at least 18 inches of growth have accumulated. Prussic acid poisoning is not a frequent occurrence in Alabama, and toxicity problems can easily

be avoided by exercising a little caution. There is no danger of prussic acid poisoning in hay.

Nitrate Poisoning--Nitrate poisoning in cattle is caused by feed or water that contains an excessive concentration of nitrate nitrogen. Nitrates sometimes build up to toxic levels in summer annual grasses when nitrogen has been applied but when, as a result of drought, little growth was made prior to hay harvest.

Nitrate toxicity occurs most frequently on farms using large round bales or large stacks where cattle are given unlimited access to the hay-particularly when the cattle are not fed frequently. Apparently, the animals over-consume and take in large amounts of nitrates in this situation. Since nitrates degrade very little with time, it is advisable to have a nitrate nitrogen analysis run on summer annual grass hay cut during periods of severe drought. If non-protein nitrogen is fed with high-nitrate hay, the likelihood of nitrate toxicity is increased.

Equine Cystitis-Horses pastured on sudangrass, sorghum, or (in particular) sorghum-sudan hybrids may develop a syndrome called equine cystitis. Symptoms include loss of hair, muscular incoordination, and staggering. The damage may be temporary or permanent, and may even result in death.

The condition does not affect all horses, but there is no way to predict which animals might be susceptible. Because there is no known preventive measure, horses should not be allowed access to pastures of these species. Hay of these species is safe to feed to horses, however.



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For more information, call your county Extension office. Look in your telephone directory under your county's name to find the number.

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