

HARVESTING SUMMER ANNUAL FORAGE CROPS

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Dennis Hancock

Extension Forage Specialist

The University of Georgia

Summer annual forages (such as pearl millet, sorghum x sudan hybrids, etc.) are known for their remarkable ability to grow fast and produce several tons of forage in a short time period, even during periods of drought. Fortunately, it is not too late to consider the use of some summer annuals as one part of the recovery from this year's poor growing season. Before they are planted, however, it is important to think through when and how these summer annuals will be harvested.

One major reason to consider your harvest strategy is that summer annuals are notorious for being difficult to cure down to a moisture level that is suitable for hay-making (15%), since their large stems do not give up their moisture easily. Furthermore, nitrate toxicity or prussic acid poisoning can be made better or worse by the harvest strategy that is used. In this article, specific methods and "rules-of-thumb" are presented to help you decide how best to graze, hay, or ensile these summer annual forage crops.

Grazing Management

By far, the most cost-effective way to harvest any forage is to let your four-legged harvesters graze the standing crop. However, unlike the mechanical harvesters, grazers are selective. If the forage growth is too mature when grazing begins, cattle will eat only the more tender parts of the plant and will trample or waste the less desirable forage. In general, grazing of summer annuals should be initiated at the pre-boot maturity stage. The height at which these plants will reach pre-boot varies with species and growth conditions. As a result, the target heights listed in Table 1 are merely "rules-of-thumb." Maturity stage should be the primary indicator of when to start grazing a stand.

Table 1. The approximate heights at which common summer annuals reach a maturity stage suitable for grazing or cutting for hay/haylage and the stubble height that should be left for regrowth.

Species	Grazing Management		Hay/Haylage Management		
	Height (inches)	Maturity Stage	Height (inches)	Maturity Stage	Stubble Height* (inches)
Pearl Millet	18-22	Pre-boot	30-40	Early Head	8-10
Sorghum x sudan	22-30	Pre-boot	30-40	Early Head	6-8
Sudangrass	24-28	Pre-boot	30-40	Early Head	6-8

* Stubble grazed or cut below these height ranges may result in poor or no regrowth.

It is also important to turn out enough animals on each paddock or strip to graze down the area within a few days or a week (at most). Continuous grazing (cattle stay in the paddock throughout the growing season) of summer annuals will not work. Animals must be rotated in and out of paddocks or strips within a paddock to allow rapid regrowth, minimize waste, and prolong the stand.

Summer annuals are also prone to nitrate and/or prussic acid toxicity issues. Care should be taken to evaluate the forage for these problems if the stands have been subjected to high nitrogen fertilization, drought stress, or frost. Since hydrogen cyanide (prussic acid) is volatile and will dissipate within a few days, do not allow cattle to graze sorghum, sorghum x sudan hybrids, or sudangrass (pearl millet does not accumulate prussic acid) for 4-5 days after a frost. To some degree,

toxic nitrate levels can be managed by ensuring the animals are not overly hungry when grazing is initiated and by limiting the grazing time on affected forage. Nitrates in the grazing animal's diet will also be reduced if the cattle are removed at an average stubble height that is 2-4 inches greater than the target specified in Table 1. Remember, a forage analysis (\$10) is a far cheaper test of the forage's toxicity than is treating or losing a poisoned animal. (More specific information on prussic acid and nitrate toxicity is presented on the "Drought Management Information" page at www.georgiaforages.com.)

Hay Management

By far, the most common way that summer annuals are harvested is by cutting and baling the forage for hay. Despite the difficulty that thick stems pose to timely hay curing, hay production can be successfully achieved. The drying rate is greatly improved by using a mower-conditioner that uses intermeshing rollers that squeeze and crimp the thick stems as they pass through the machine. Adjust these rollers to squeeze the forage as tightly as recommended by the manufacturer. In my personal experience (no data), summer annuals that have been planted in 15 in. rows or wider tend to bridge over the stubble and allow more air movement through the forage. As a result, they seem to dry quicker than broadcast-established stands. Though tedding may help speed the drying time, tedding thick-stemmed summer annual hay is generally too hard on most hay tedders.

Prussic acid poisoning is much less common when the affected summer annual is cut and baled as hay, since hydrogen cyanide (prussic acid) dissipates within a few days. However, toxic nitrate levels in hay will not go away, no matter how much time it is given. Thus, an analysis of any forage suspected of high nitrate levels is crucial in understanding how to deal with the affected forage. As with grazing management, nitrate levels would ideally be measured prior to harvest. If nitrate levels are found to be high, increase the cutter bar height to 2-4 inches above the target specified in Table 1 so that the nitrates that are highly-concentrated in the lower stalk are avoided.

Haylage Management

In recent years, baled silage equipment has become more common. Wrapping and conserving summer annuals as baled silage is an excellent option. Summer annuals are relatively high in soluble sugars and, thus, ferment very well. In general, baled silage is much more palatable (i.e., they love to eat it) than hay made from the same crop. In addition, well-fermented silage will reduce nitrate levels by 30-60%. Despite this reduction, nitrate levels may still be dangerously high. There have been reports of summer annuals having nitrate levels of over 15,000 ppm. Even if these nitrate levels are reduced by 60%, the forage could still be over the critical level (≥ 5000 ppm). However, baled silage is an expensive way to harvest summer annuals. Bale wrapping equipment costs \$10,000-\$18,000 and the plastic wrap will cost \$1.80-\$4.00 per bale (depending on the style of wrapper).

Summer annuals can provide a substantial amount of forage in a short time and can fill a critical gap during a drought year. However, the way that summer annuals are harvested can greatly affect your operation's bottom line and susceptibility to the risks associated with using summer annual grasses. To learn more about using and harvesting summer annuals or other strategies for managing forage supplies during a drought, visit our website at www.georgiaforages.com or contact your local University of Georgia Cooperative Extension Service office.