

April 23, 2003

Forages for a Hot, Dry Summer

Submitted by Laura Paine

We haven't seen the last of the drought that gripped much of the Upper Midwest last season. If you look at the last 14 months, we've had below normal precipitation every month but two. That adds up to a moisture deficit of nearly 11 inches for south central Wisconsin, and it's been worse in other areas. Long-range forecasts suggest that drought conditions will persist or intensify this growing season. Whether your operation is pasture based or more reliant on stored forages, it might be worthwhile to plan for some alternatives if the moisture doesn't come.

Forage species vary widely in their drought tolerance. Cool season grasses tend to be relatively intolerant of hot, dry conditions. Legumes are better adapted to these conditions, especially alfalfa, with its deep taproot. I know several graziers on lighter soils who depend on alfalfa in their pastures for drought insurance. Some years, it's the only green thing out there in August.

Other perennials that are well adapted to hot, dry conditions are the native warm season grasses, such as big bluestem, indiangrass, and switchgrass. For more information on these species see my article "Native Grasses for Warm Season Pastures" at <http://www.uwex.edu/ces/cty/columbia/ag/grazing/articles/grazing17.pdf>. Or contact me for a copy.

Some of the best species for drought conditions are annual warm season grasses: sorghums, sudangrasses, and millets. Closely related to corn, these species originated in Africa and thrive on hot, dry weather. They are very leafy and multi-stemmed, allowing them to regrow after grazing or cutting. They can produce as much tonnage as corn with about 60% as much rainfall as corn needs and can be planted as late as July 15th and still produce nearly a full crop.

For those with a fully pasture-based system, it probably wouldn't be cost-effective to tear up established pasture to provide drought insurance with this annual crop. But if your system includes annual crop acreage, you might want to consider these annuals as part of your rotation.

Varieties

Sorghum varieties include grain types, which have greater seed production but grow to only 3 to 5 feet, and forage types which grow 8 to 12 feet tall and yield tonnages similar to corn silage.

Sudangrass is a more leafy species, growing from 4 to 7 feet tall, yielding less tonnage of more easily dried forage. Sorghum-sudangrass hybrids blend the best characteristics of each with higher yields but better drying qualities.

Millets, including pearl, Japanese, and foxtail millet, are managed similarly to sudangrasses, yield about the same, but are more tolerant of cooler, damper soils. They also head out more slowly than the sorghums (100 days versus 70 days) and are less likely to accumulate prussic acid (see below).

Brown Midrib Sorghums

In general, sorghums and millets tend to be somewhat lower in quality than either cool season pasture or corn silage. Protein tends to be similar, but fiber levels are higher, especially at silage harvest stage. Brown midrib (BMR) sorghums have shown great promise for addressing this deficit. The brown midrib trait, which has been introduced to both corn and sorghum reduces the lignin content of the plant, especially along the midrib of the leaf. This results in improved digestibility compared to normal sorghum.

Forage Quality

One study directly compared corn silage versus BMR sorghum silage. BMR sorghum yielded 26 t/a (versus 25 t/a for corn), crude protein was 7.5% (vs. 7.46% for corn), RFV was 124 (141 for corn), and digestibility was 80% (81.2% for corn). This was all with 40% less irrigation water (the study was conducted in Texas by Dr. Brent Bean, Texas A&M Extension Agronomist at Amarillo). We're testing some BMR sorghum here in Columbia County and I'm looking forward to seeing how it stacks up under our conditions.

Forage quality numbers for fresh, grazed sorghums and millets, should be much closer to fresh pasture numbers, but I found no research data on forage quality of sorghums or millets used for grazing. We do have some numbers from one farmer here in Wisconsin (see below).

Prussic Acid

The biggest issue with this group of warm season annual grasses is their tendency to accumulate prussic acid in their tissues. These species naturally produce a compound which, under certain conditions, breaks down into prussic acid (hydrogen cyanide). It is most concentrated in young plants under 15 inches in height. As the plants grow, the prussic acid is diluted in the tissue and once it over 20 inches tall, the risk is minimal. It is also dissipated when the plant tissue is harvested and ensiled or cured for hay.

Prussic acid content is greatest in sorghum, lowest in millets, and varies among varieties within a species. Prussic acid can be tested for by sending a sample to certain forage testing labs (unfortunately, the UW lab does not offer this test). Contact me for a list of labs.

Planting and Management.

Sorghums, sudangrasses, and millets are seeded at 20 to 50 pounds per acre between May 1 and July 1. Harvest can begin as soon as 6 weeks after emergence if it's being grazed. These grasses tend to be more efficient nitrogen users than corn. Although they yield best when fertilized like corn, they do produce well with as little as 70 pounds actual N per acre. They can be grazed, green chopped, ensiled or dried down for hay.

Pasture and Green Chop

For pasture use, sorghums and millets should be grazed when plants are between 20 and 30 inches in height and taken down to 6 to 8 inches. They should be strip grazed to reduce trampling damage. Regrowth is fast and 3 or more grazings are possible in a season, depending on when it's planted. Green chopping should be done under a similar harvest schedule.

Silage and Hay

Millet, sudangrass and the larger forage sorghums should be harvested at the mid-dough stage for ensiling. Although the heavy stems on these species make drying for hay a challenge, some growers have had reasonable success using grain type sorghums and harvesting them at 3 to 4 feet or waiting till after the first frost to bring the plant material into the proper moisture range.

One farmer's experience

One farmer who's worked with warm season annuals is Dan Vosberg. Dan and his wife Ruth graze about 200 mixed breed dairy cows on a hilly farm in southern LaFayette County. In Dan's experience, drought conditions occur nearly every year. Sometimes they don't last very long, but it's not unusual in the upper midwest to go

for 3 to 4 weeks in late summer with no rain. Last year, it was more like 8 weeks and Dan was glad he'd planted 10 acres of 'Mega Millet'.

Dan chose this pearl millet variety over sorghum or sudangrass to reduce the potential for prussic acid problems. Last year, he seeded the millet at about 20 pounds per acre in mid-June and fertilized it with about 70 pounds of ammonium sulfate. It quit raining. Finally, he got a light shower and that was enough to get the millet going. In spite of getting no further rain, the millet grew nearly 3 feet in 6 weeks.

Dan likes to graze his millet when it gets to about 30 inches. He tries to leave about 6 inches of residual to allow for regrowth. During the hot days of July and August, he puts his herd onto the millet after morning milking. Around midday Dan moves them onto perennial pasture. He's found that if he leaves them on the millet all day, they trample and waste a lot of it after they've eaten their fill.

Forage quality tests show that it is comparable to good quality pasture at 21 to 25% protein and 134 RFV. It regrows rapidly and he usually gets at least 3 grazings off the 10 acres he plants. In addition, it's green and lush and highly palatable at a time when pasture can be pretty poor. Dan's cows eat it well and last year they even went up a little on milk production.

So when you're planning for the hot, dry summer ahead, you might want to consider warm season annual grasses. Cool season perennials will always be the foundation of pasture systems and corn will always be king when it comes to silage production, but sorghums, sudangrasses, and millets may have a place in Wisconsin forage systems. They are easily grazed or ensiled, yield well with low fertilizer inputs, and outperform most everything else when rainfall is unpredictable.

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