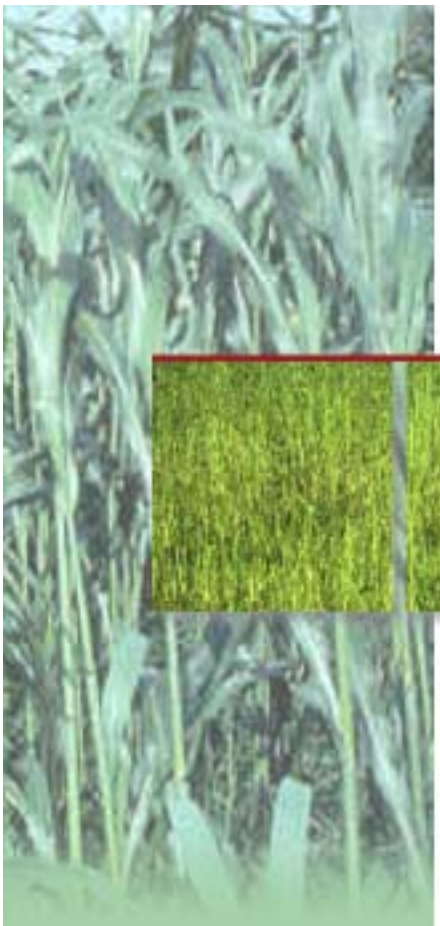

FORAGES FOR ALL SEASONS

Sorghums and Sudangrass: Management for supplemental and emergency forage

David W. Koch, Extension Agronomist, Department of Plant Sciences

These forages are in peak production when cool-season grass growth slows down due to summer heat and can produce a significant amount of forage in a short time.

Warm-season annuals are useful in complementing the cool-season forages on which Wyoming producers rely. Growing forage sorghum, sudangrass, and sorghum x sudangrass hybrids can add flexibility to the forage program, as these forages are in peak production when cool-season grass growth slows down due to the summer heat. In addition, these sorghum crops can produce a significant amount of forage in a short time (i.e., five to six weeks after planting).

Uses

The supplemental forage provided by the forage sorghums, hybrids and sudangrass allow pastures or range to rest, extend the grazing season, and / or provide additional winter feed. They provide emergency feed when range and pasture forage is diminished due to drought, fire, severe grasshopper invasion, or other causes. In general, summer annuals provide more feed in the year of seeding than perennials. They are more competitive than oats or barley and, therefore, should not be used as companion crops. Summer annuals are desirable in rotation with winter annual cereals because they help control problem weeds such as downy brome.

Crop selection

Forage sorghum (also known as sorgo or cane) has largely been replaced by hybrid crosses (forage sorghum x sudangrass). Hybrids are

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Forage sorghum is taller-growing and coarser-stemmed, therefore, more suited to silage and sudangrass, which is finer-stemmed, is better suited to grazing.

equally as vigorous but not as stemmy as the forage sorghums, and they are lower in prussic acid (hydrogen cyanide) potential. Grain sorghum can be used as forage in case of crop failure; however, like forage sorghum, it can be high in prussic acid potential. Most available sudangrass varieties and hybrids are low in prussic acid hazard. Sudangrasses are finer stemmed than forage sorghums or hybrids, regrow more readily, and, therefore, are more flexible in use (Table 1). Recently, sudangrasses have been windrowed prior to or just after light frost and left for fall and winter grazing. This technique preserves the nutrient value and alleviates the cost of baling, hauling, stacking, and feeding.

Adaptation

All sorghums (including sudangrass) have the ability to go dormant during periods of drought, then they resume growth as soon as sufficient rainfall occurs. Under irrigation, sorghum x sudan hybrids can be equal to corn in yield; however, the energy content of corn will be greater. Irrigated corn will tend to be more consistently high yielding year-to-year in Wyoming. Sorghums have a higher heat tolerance and heat requirement than corn, but in cool years, sorghum yield suffers.

Wyoming sorghum yields are shown in Table 2. Yields at Archer Research and Extension Center are lower than at other sites due to the elevation (6,000 feet), shorter growing season, and cooler temperatures. Sorghum crops and corn are among the most water efficient crops, producing a ton of forage with 2 1/2 to 3 inches of water. For more information, see *Crop selection for supplemental and emergency forage*, available from your local University of Wyoming Cooperative Extension Service office or on the web at www.uwyo.edu/ces/pubs3.htm. These crops make good "catch crops" in that they can successfully produce a forage crop after the full-season grain crop is hailed out or otherwise devastated. Above 5,500 feet elevation, sorghum x sudan hybrid and sudangrass production is marginal.

Seeding methods

The seedbed should be warm and mellow. Minimum tillage methods may be used as a way of conserving soil moisture; however, the soil warms more slowly due to the surface mulch, and this is a disadvantage. Sorghum x

Table 1. Culture of forage sorghum, sudangrass, and hybrids.

Crop	Preferred uses				Seeding date	Seeding rate[1]	Potential yield
	Hay	Silage	Green chop	Pasture			
						lb / acre	tons d.m. / acre
Forage sorghum and sorghum x sudangrass		x	x		late May-early July	10-15	3-7
Sudangrass	x	x	x	x	late May-early July	20-35	3-5

[1]Use lower rate for dryland and higher rate for irrigated.

sudan hybrids and sudangrass require a soil temperature of 55 to 60^0 Fahrenheit, compared to a soil temperature of 50^0 Fahrenheit for corn. The sorghums should be planted about two weeks after the normal corn planting time. For silage, sorghum x sudan hybrids should be planted in rows and cultivated or herbicides used to control weeds. For pasture or hay, sudangrass should be seeded with a drill.

Weed control

If planting is delayed until the soil warms, many weeds can be destroyed with cultivation during seedbed preparation. If planted in 30-inch or wider rows, weeds can be controlled with further cultivation. If weeds are not a problem and crops are intended for swathing or grazing, sorghums and sudangrass can be seeded in narrower rows or drilled. There are relatively few herbicides available for weed control in sorghum x sudan hybrids and sudangrass. Check the herbicide label or call your local University of Wyoming Cooperative Extension Service office for herbicide use and precautions. Particular attention should be paid to the minimum delay period following application before harvesting or grazing. Also, if a sensitive crop is to follow sorghums, a residual herbicide should be avoided or used with caution.

Crop rotation

On dryland, the summer annual forages generally follow winter wheat or fallow, but they could follow barley or oats. The sorghums and sudangrasses are noted for their ability to extract soil moisture to a low level. Therefore, in many locations, they will need to be followed by fallow to ensure adequate moisture for the next crop.

Fertilization

Response to nitrogen fertilizer will depend mainly on moisture availability. Nitrogen may not be necessary under dryland conditions if soil nitrate and organic matter levels are high. Nitrogen will more likely be necessary following small grain crops than after fallow. Under irrigated conditions, nitrogen will be needed in order to achieve maximum yields. Soil tests should be performed to determine the amount

Table 2. Yields of hybrid forage sorghums grown at five locations in Wyoming.[1]

Location	Year	No. of varieties tested	Forage yield[2]	
			Range	Average
			tons / acre	
		Irrigated		
Torrington	1968	8	11.7-33.5	21.4
	1969	7	9.9-21.0	17.1
Powell	1968	10	10.7-17.3	13.0
	1969	7	12.6-23.1	17.8
		Dryland		
Gillette	1968	10	11.4-15.2	13.4
	1969	7	11.6-19.4	13.9
Archer	1968	6	2.5-3.5	3.0
	1969	7	6.0-10.8	9.3
Sheridan	1968	10	10.9-19.5	11.8
	1969	8	8.3-11.0	9.6

[1]Adapted from Kail and Hoff, 1970.
[2]Adjusted to 70% moisture. Multiply by 0.30 for tons of dry matter per acre.

of nitrogen and phosphorus to apply. Toxic levels of nitrates may accumulate in summer annual grasses if high levels of nitrogen fertilizer are applied, followed by drought. Nitrate accumulation is more likely with inadequate phosphorus (see *Managing Forages to Reduce Nitrate Poisoning of Livestock*, available at your local University of Wyoming Cooperative Extension Service office or on the web at www.uwyo.edu / ces / pubs3.htm).

Grazing management

Livestock will better utilize sudangrass because it has finer stems than sorghum x sudangrass hybrids. Neither, however, should be used for horse pasture. To minimize prussic acid toxicity, sudangrass should not be grazed until it reaches at least 18 to 24 inches (see *Managing Forages to Minimize Prussic Acid Poisoning*, available from your local University of Wyoming Cooperative Extension Service office or on the web at www.uwyo.edu / ces / pubs3.htm). There will be less waste and better utilization with rotational or strip grazing. Confine animals to small enough areas so that forage is removed to a 4- to 6-inch stubble in 10 days or less. Two to three grazings can be expected if moisture is available. Sorghum x sudan hybrids can be grazed in a similar manner, but there will be less regrowth. Regrowth of the sorghums should not be grazed until it reaches at least 18 inches or after a frost kills the whole plant. Sequential plantings will help even out the supply of pasture.

Under irrigation, an acre will provide 180 to 250 grazing days for mature cattle (i.e., 2 ½ to

These cows are grazing sudangrass in western Nebraska. Sudangrass is finer-stemmed than forage sorghum and regrows better.

3 ½ head for 70 days). On dryland, carrying capacity will vary more, but will probably be about 1/3 to 1/2 that under irrigation. In a five-year grazing study at the Archer Research and Extension Center (dryland), F. Rauzi conducted a study in which sudangrass provided an average 94 ewe days and 138 lamb days per acre. Sorghum hybrids and sudangrass can be stockpiled (left standing) and grazed in the fall. Stalks maintain sweetness and are, therefore, very palatable; however, leaves can be lost after a killing frost. One way to preserve nutrients for fall grazing is to swath and windrow sorghums and sudangrass prior to frost and leave in the windrow. Grazing windrows, compared with stockpiling, likely will result in greater utilization.

Mechanical harvesting

As with grazing, at least 18 inches of growth should be present before cutting sudangrass for hay. Conditioning at the time of swathing will enhance curing. Also, cutting high (10 to 12 inches) speeds drying and may allow faster regrowth. Sorghum x sudan hybrids are difficult to cure as hay and are better suited to ensiling, particularly if planted in rows. If not needed for pasture, sudangrass can be ensiled. Greater feeding value per acre can be attained with ensiling, compared with grazing or storing as hay, because the crop can be allowed to reach a later stage of maturity. Since the forage is chopped and fermented, the crop will be more fully utilized.

In order to avoid seepage and loss of soluble nutrients, ensiled forage should contain not more than 70 percent water. If seepage occurs, soluble nutrients are lost and fermentation may not be adequate. Water content of the crop in the field can be 80 percent or more. Water content is reduced by allowing the crop to more fully mature or by wilting, a process of allowing swathed or windrowed forage to naturally dry. On a good drying day, 10 to 20 units of moisture may be lost in 2 to 4 hours.

Sudangrass and sorghum hybrids can be direct cut and ensiled safely at the late-dough stage. At this maturity, the water content will be less than 70 percent. A frost will help dry down the crop and allow the ensiling of less mature sudangrass and sorghum-sudan. With less mature forage or with succulent regrowth, it may be more practical to feed green chop.

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