FORAGES FOR ALL SEASONS

Foxtail millet: Management for supplemental and emergency forage

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Foxtail millets produce a ton of forage on as little as 2½ inches of moisture, making them one of the most dependable crops under semi-arid conditions.

Because of frequent drought, early farmers and ranchers relied heavily on millets for livestock feed. Of the many millet species, the foxtail types (*Setaria italica*)—which include Siberian, Hungarian and German—are most important for forage in Wyoming. In warmer climates, pearl millet (*Pennisetum americanum*) is an important forage. Proso millet (*Panicum miliaceum*) is grown for grain.

Adaptation

Foxtail millets grow rapidly during warm weather and are one of the most efficient water-use crops. They produce a ton of forage on as little as 2 ½ inches of moisture, making them one of the most dependable crops under semi-arid conditions. This has led to an increased acreage of this crop in Wyoming in recent years, and many producers grow millet each year as a type of insurance.

The millets have some limitations. Other crops have greater yielding capacity under irrigation. The regrowth capacity of foxtail millets limits them to one cutting or one grazing. Also, millet hay is not suited for horses because of its diuretic effect.

Situations in which forage millet may have an economic value are: (1) where drought has reduced growth of perennial native and introduced forages; (2) where fall-planted small grains have been lost to winterkill

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The foxtail (hay type) millets produce dense growth and excellent quality pasture for mid-late summer or hay, which can either be stored or left in windrows. This is a very water-efficient crop.

or to hail; (3) where an annual crop is needed to rotate with winter wheat to control winter annual weeds, such as downy brome; and (4) where there is a need for winter cover. Millet is drilled, and the stubble left after hay harvest or grazing provides an excellent winter soil cover, as well as a protective seedbed for stubble seeding of the following crop. Foxtail millet can be seeded as late as mid-July to produce a forage crop, making millet an excellent catch crop (a crop grown following the failure of the main crop). Millets require a soil temperature of 60^0 Fahrenheit or higher for rapid emergence, and they generally are not planted until early June. This allows time for one or more cultivations to control weeds prior to planting.

Forage production

After a very dry period from 1991 through May 1992 and the prospect of severe forage shortages, 54 acres of millet were planted on 8 different fields over a variety of conditions at the Archer Research and Extension Center (Table 1). Seedbeds varied from conventional to no-till into stubble to killed sod. Due to the dry conditions, no fertilizer was applied. Millet was drilled one inch deep at 13 pounds per acre with a double disk drill and seven-inch row spacing. Field 8 was used as a fallow comparison. All other fields had been used for growing crops in 1991. On July 5, Fields 1-5 were sprayed with 2,4-D at 0.38 pound active ingredient per acre to control broadleaf weeds. In subsequent years, German millet has produced yields equivalent to or better than Sibe-

rian and Hungarian millets, but German millet seed was not available at the time of this planting.

Seeded into a fallow field, Hungarian and Siberian millet yielded an average 650 pounds per acre more forage than the same varieties grown on fields that had been used for a crop the previous year. Millet seeded into a conventional seedbed out-yielded millet no-till seeded 2695 to 979 pounds per acre. Hungarian and Siberian millet yields, averaged over all fields, were similar. Pearl millet yielded less than either Siberian or Hungarian on the one field in which they were compared. Yields would likely have been higher had nitrogen fertilizer been applied, since 3.6 inches of rainfall was received in

Table 1. Previous crop, field preparation, seeding method, and varieties of foxtail millet seeded at Archer R&E in 1992.

Field no.	Planting date	Previous crop	Field preparation and seeding method	Variety[1] or type	Hay yield, 12% moisture
			Non-fallowed		
1	6-11	Triticale	chiseled, rod-seeded, harrowed	H S	3444 3381
2	6-17	Native grass	sprayed with glyphosate, no-till seeded	S	925
3	6-18	Sudangrass	chiseled, disked, harrowed	S H	2331
4	6-18	Millet	chiseled, disked, harrowed	S	2260
5	6-11	Barley hay	Glyphosate, followed by stubble planting	H	1032
6	6-24	Winter wheat sudangrass	chiseled, disked, harrowed	S	2412
7	6-13	Winter barley (winterkilled)	chiseled, harrowed	S	2412
			Fallowed		
8	6-22 6-22 6-22	Fallow Fallow Fallow	chiseled chiseled chiseled	H S P	3292 3407 2502

[1]H=Hungarian; S=Siberian; P=Hybrid Pearl Millet.

late June and July following seeding. The difference in fallow and non-fallow yields may have been due to differences in nitrogen levels. One of the benefits of planting millet in a fallow field is the accumulation of mineralized nitrogen during the year without a crop. Foxtail millets are warm weather crops and likely suffered some yield loss due to the below-normal temperatures in 1992. The elevation at the site is 6000 feet. At lower elevations in the state yields as high as 3 ½ tons per acre have been reported.

Over the last 10 years, foxtail millet seeded at the Archer Research and Extension Center has averaged 2.3 tons per acre (1.5 to 3 tons per acre) with 40 to 50 pounds per acre of nitrogen and 2 tons per acre (1 to 2 ½ tons per acre) without nitrogen fertilizer.

Ewe lambs grazed the millet in 1992. Despite limited utilization once millet had headed (60 percent use), lambs gained 0.40 pounds per day and 130 pounds per acre. Compared with grazed forage, millet hay has been observed to be more palatable and much better utilized.

Recent work with foxtail millet shows that it is a good species for swathing, windrowing, and leaving in the field until fall / winter grazing. Windrows maintain forage quality similar to that of baled hay; however, the cost is much lower because the operations of baling, hauling, stacking, and feeding are eliminated. For the windrow-grazing alternative, there is a small cost for fencing and grazing, and provisions for water need to be met. Millet left standing, on the other hand, deteriorates badly in forage quality and becomes unpalatable. In a 1999 study, the crude protein content of baled hay and windrows averaged between 10 and 11 percent, while standing millet declined to about 8 percent. Animals with access to windrowed forage did not graze adjacent standing millet. The utilization of forage is improved if grazing is controlled with cross-fencing to allow one week or less of feed. A report on this study appears in the 2001 University of Wyoming Agricultural Experiment Station Progress Report, and can be accessed at www.uwyo.edu / ag / ces / pubs2.htm.

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