

Forage Kochia - a Forage with Winter Grazing Potential

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Forage for winter grazing in Wyoming is usually in short supply and/or poor in nutrient content. Drought and other factors accentuate this shortage. Forage kochia (*Kochia prostrata*, not to be confused with the weedy *Kochia scoparius*) is adapted to regions of the Western United States with annual precipitation of 6 to 16 inches, can be grown on a wide range of soil textures, and is very tolerant of salinity. Forage kochia shows very little aggressiveness and no tendency to cross with weedy kochia. The appearance and growth habit of forage kochia are also different from those of weedy kochia. Forage kochia is a semi-evergreen half shrub, growing to a height of 1 to 3 feet. It develops a very deep tap root and an extensive fibrous root system. Individual plants can live for 10 to 15 years, and the plant readily reseeds.

Forage Use

Forage kochia has been used for year-round grazing. Perhaps its best use is in winter, when range and pasture forage is low in nutritive value. At the Archer Research & Extension Center, forage kochia was included among 16 improved forages in a test to evaluate winter forage availability and nutritive value after season-long stockpiling (Table 1). In 1998, a normal rainfall year (9.4 inches of spring-summer precipitation), forage kochia produced the greatest amount of forage among 16 entries (3035 pounds of dry matter per acre); in 1999, a wet year (16.0 inches of spring-summer precipitation), it produced 2220 pounds of dry matter per acre, about average among the 16 forages; and in 2000, a dry year (5.5 inches from June through August), it produced 821 pounds per acre.

Forage Quality

Forage kochia tested 7.7 percent crude protein on February 26, higher than the 12 perennial grasses and three legumes in the test at the Archer Research and Extension Center. Neutral detergent fiber (NDF), which is related to forage intake and acid detergent fiber (ADF), which is related to forage digestibility, were lower for forage kochia than for all other forages, indicating superior forage nutritive value during the winter.

Forage kochia was planted in a pure stand in this study, although it is generally planted in a mixture with grasses and other species. In its natural habitat it will comprise up to 20 percent of total production and can be cut for hay.

During the winter of 2000-01, 280 beef cows grazed kochia on the Broadbent Ranch in Uinta County. Approximately 1500 acres were cross-fenced to limit grazing to 200 to 300 acres. Carrying capacity was about 0.5 AUM per acre. Cows grazed from early January until mid-March, a period in which there were 10 inches of snow cover. A seed crop had been harvested the previous fall, leaving most of the kochia below the snow. Cows were given a high-energy grain supplement (13 percent protein) at 2 pounds per day during the coldest period. Cows improved about two points in body condition score during the kochia-grazing period and calved in late March and early April. Kochia near the end of the grazing period still tested over 7 ½ percent crude protein. Although it appears unpalatable, cows readily eat forage kochia.

The ranch is located in an area receiving only 6 to 10 inches of precipitation. The summer of 2001 was very dry, with less than two inches of rainfall, yet the kochia produced 830 pounds per acre of forage dry matter. An adjacent sagebrush range produced 33 pounds per acre of usable grass.

Other Uses

Forage kochia competes well with annual weeds such as downy brome, Russian thistle, and halogeton. It can be planted in disturbed, dry areas for soil conservation. Since it maintains as much as 40 percent moisture in its stems, even in the winter, forage kochia has been used as a fire break.

Nitrates

Although nitrate accumulation has been observed in weedy kochia, nitrate accumulation has not been reported for forage kochia. Samples of forage kochia surviving a summer drought, taken in early November at the Archer Research and Extension Center, contained negligible levels of nitrates. Producers should always have samples of new or suspect forages analyzed for nitrate.

Establishing the Stand

The seedbed should be prepared as it would be for any other forage seeding. The seed is very small (there are more than 400,000 seeds per pound) and must be planted no more than 1/16 inch deep. It is commonly broadcast on the soil surface in winter or early spring, and spreading the seed on top of snow is a good practice. "Immigrant" forage kochia has been recommended in a seeding mixture with crested wheatgrass (Monsen et al. 1990).

The seed loses viability after one year, (earlier if improperly stored). Seed is expensive (currently \$15 to 25 dollars per pound); however, only ½ to 1 pound per acre in mixtures with grasses is needed. "Immigrant" is the only released variety.

Grazing Management

At this time, definitive recommendations on grazing management are not possible because grazing trial information is very limited.

References:

Gade, A.E., and F.D. Provenza. "Nutrition of sheep grazing crested wheatgrass versus crested wheatgrass-shrub pastures during winter," *Journal of Range Management* 39 (1986):527-530.

Harrison, R.D., et al. "Forage kochia - Its compatibility and potential aggressiveness on intermountain rangelands," Utah Agricultural Experiment Station Research Report 162 (2000). This report can be accessed at the following web site: http://agx.usu.edu/agx/special_research_frameset.html

Monsen, S.B., J.F. Vallentine, and K.H. Hoopes. "Seasonal dietary selection by beef cattle grazing mixed crested wheatgrass-forage kochia pastures," *Proceedings of the Western Section, American Society of Animal Science* 41(1990):300-303.

Table 1. Forage production, quality, and winter loss of stockpiled forages (Archer R&E).

Species	Crude protein		NDF ⁴	ADF ⁴	Forage avail. Nov. 5, 1998	Winter loss, Nov.-Feb.
	Nov. 5, 1998	Feb. 26, 1999				
	 percent				pounds dry matter per acre	percent
'Immigrant' forage kochia	9.5	7.7	56.3	37.4	3035	40
Legumes ¹	8.7	7.7	61.0	50.4	649	28
Wildryes ²	6.5	5.6	70.0	45.1	1734	11
Wheatgrasses ³	6.1	5.6	67.1	41.5	1471	35

¹Average of alfalfa, sainfoin and cicer milkvetch; ²average of five wildryes; ³average of seven wheatgrasses. From 2001 University of Wyoming Agricultural Experiment Station Progress Report, pp. 129-135 (available on internet at: <http://www.uwyo.edu/ag/ces/pubs2.htm>).

⁴Average of five winter sampling dates, Nov. 5, 1998 to Feb. 26, 1999. Estimated TDN = 88.9 - (0.779 x ADF).