

Kochia—Poor Man's Alfalfa—Shows Potential as Feed

Charlotte Foster

Who would have guessed that kochia—that common weed many of us call burning bush, fireweed, ironweed, and tumbleweed—may just turn out to be the cattle and sheep feed of the future.

There are several reasons for kochia's unexpected success as a forage. According to Dr. Dale Fuehring, an agronomist with New Mexico State University's Plains Branch Experiment Station, Clovis, "*Kochia scoparia*, which we've been studying, has turned in some unexpected production rates of about 800 pounds of dry matter per acre inch of water used." And that, the researcher adds, "is approximately three times the water efficiency of alfalfa."

But this is starting in the middle of the story. Let's go back to the beginning. During the past year, Fuehring has conducted both field and greenhouse studies to determine if kochia can be used as grazing or as hay with either a dryland or a limited irrigation situation.

"Our 1978 test results show kochia is a very high yielding, water efficient, self-seeding forage crop with no serious disease or insect problems," Fuehring says.

"Kochia will make five tons or so per acre under regular rainfall, which is 10 to 15 inches during a growing season at Clovis." He adds: "We got 4,000 to 5,000 pounds per acre on a May cutting last year and that was just in a dryland pasture situation."

Fuehring says four cuttings were made in the 1978 trials, and they yielded 23,000 pounds of dry matter from three irrigations and 250 pounds of nitrogen per acre.

"We also found that three to four clippings or grazing cycles are about right," he says, adding that "with more irrigation and nitrogen, yields of 20 tons forage per acre are feasible."

In addition to his own research, Fuehring says that researchers in South Dakota got yields in excess of 5 tons to the acre along with nutrition values in feeding trials approaching that of alfalfa.

At the same time other researchers working on an experiment station located north of Amarillo, Texas, grew kochia as a dryland crop. That volunteer stand received 12 inches of rainfall from November through July, and contained about 16 plants per square foot.

Between May and July, the researchers took three different clippings from three different areas of the volunteer stand.

When the first clippings were made on May 29, the Texas kochia was 17.5 inches tall and yielded 3,147 pounds of dry



Kochia scoparia

Introduced into this country from Eurasia, kochia superficially resembles smotherweed and occurs in similar habitats.

Physically, kochia has leaves that are placed alternately on the stem and usually have a conspicuous hairy margin. The flowers are small and grouped in clusters.

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Editor's Note: Kochia, an exotic from Eurasia, continues to attract the attention of our readers. This article by Charlotte Foster is a followup to the ones by Paul Sears and M.R. Moghaddam in the October 1978 issue of *Rangeland's Journal*.

matter per acre. It also registered a 25% protein content.

The second set of clippings, taken on June 20, were also from pastures that had not been previously clipped and, therefore, represented the total season's growth to that date. Plants in these pastures were 34.4 inches tall and yielded 7,724 pounds per acre. This time the protein content was 17%.

When these same Texas researchers took a third clipping on July 15 (again from pastures that had not been previously clipped), the plants were 52.6 inches high and yielded 10,081 pounds. The protein content from clippings taken on this date was 13.2%.

Those are impressive figures but, what happens when kochia is used for pasturing? According to Fuehring, one farmer near Clovis reported pasturing 1,600 head of lambs on 140 acres of kochia in wheat stubble. He pastured those lambs between July and October and got 200 to 250 pounds of gain per acre.

In addition to its high yields, kochia also grows early, usually coming up before other weeds. "Once it gets started," the NMSU researchers says, "kochia is so competitive for water that nothing can get in and grow."

The researchers are, of course, finding some problems. For starters, they have found that kochia's nutrient requirements are high, and farmers wanting high returns from their stands need to pay strict attention to the amount of fertilizer they use.

"Because kochia is not a legume which can make its own nitrogen, farmers must add nitrogen, especially when hay is removed," Fuehring says.

"One of the biggest problems with raising kochia involves matching the nitrogen fertilizer application to the yield potential and to the protein level desired. Because kochia is a high protein source, it requires 200–250 pounds or more of nitrogen per acre, depending on the yield level," Fuehring adds.

And that's where other potential problems come in. While two or more nitrogen applications may be necessary, if too much

nitrogen is applied at one time, it's possible that toxic levels of nitrate may accumulate.

A second problem centers on phosphorus levels. In the kochia grown at Clovis, those levels ranged from 0.1 percent in the check to 0.15% where 40 pounds per acre of actual phosphorus was applied. However, young cattle need at least 0.25% phosphorus in their diet, so it will probably be necessary to supply phosphorus if kochia is the only feed.

Still another problem centers on kochia's classification—is it *just a weed*, or is it a *poisonous weed*? According to Fuehring, Texas A&M bulletin B-1028 lists kochia as possibly poisonous to livestock due to its oxalate content. At Clovis Fuehring found the oxalate content of kochia was between 5 and 9%.

"That's probably not high enough to be dangerous," he says comparing kochia to the poisonous halogeton plant of the Western deserts, which has much higher oxalate levels. "However, under some conditions, and research is still so new on kochia those conditions haven't been determined, the oxalate might build up to dangerous levels."

But looking at the other side of the coin, Fuehring says. "Dr. Ralph Durham, Texas Tech University, has grazed straight kochia for 5 years without any problems. And he considers any toxicity problems as probably due to other plants that are growing in the pasture."

A final problem centers on kochia's seed production. "We think that properly managed kochia will reseed itself," Fuehring says. "One set of research shows that kochia produced seed yields up to 1,500 to 2,000 pounds per acre. However, finding a seed source may be a problem, at least for a while."

Despite these potential problems, Fuehring is enthusiastic about kochia. "It does seem to have considerable genetic variability. Thus, breeding for resistance to pests or drought as well as breeding for improved quality or high yields is entirely possible." ●

Extra Grazing Can Save Energy

In an energy conscious world, cattle producers can increase the efficiency of production and conserve fossil fuels by seeding grasses that grow earlier in the spring, or remain green longer during dry spells or in the fall, than native or presently cultivated species.

Cattle grazing fresh green forage gain weight faster than when fed the same grass preserved as hay. The difference in animal performance between grazed forage and hay is often attributed to the high moisture content and implied softness of the fresh forage. At the Lethbridge Research Station, fresh alfalfa and Altai wild rye were frozen and dried (freeze-dried) to simulate fresh forage or oven-dried to simulate hay. Samples of each of the forages were weighed and put in nylon bags then placed in the rumens of fistulated steers to permit digestion of the samples. Nylon bags were removed at intervals and the loss of dry matter, protein, and ash from the nylon bags was used as a measure of digestion in the rumen.—**R. Hironaka, Weekly Newsletter, Lethbridge.**