



## Forage kochia has nutritive value and environmental benefit.

by **Troy Smith**

**W**hen discussing ways to improve the forage on western rangelands, some ranchers praise the value of kochia. To others, that name (pronounced ko-shuh) evokes disdain for a lowly weed. These people are thinking of annual kochia (*Kochia scoparia*), commonly called “firebush” because its stem takes on a bright red hue as it matures. It is not a desirable forage-maker and can be toxic to cattle.

However, when ranchers and range scientists refer to forage kochia, they are talking about an entirely different kind of plant.

Forage kochia (*K. prostrata*) is a perennial, shrub-like species native to the rangelands of Central Eurasia. That might worry people who already wage war on some nonnative plants that were introduced to U.S.

rangelands. Exotic weed species such as cheatgrass and Russian thistle come to mind as examples of foreign invaders that crowd out more desirable forage plants.

On the other hand, neither alfalfa nor crested wheatgrass is a native species. Both have become important to harvested and grazed forage production in the U.S. Now, forage kochia is earning a good reputation. Because of its nutritive value and positive impact on rangeland environments, forage kochia has been praised as “the alfalfa of the desert.”

Among kochia’s advocates is Utah rancher Bob Adams. Along with his son, Ben, Adams operates a 650-head commercial Angus cow herd in the northern part of the state. The Adams Ranch markets feeder calves and replacement-quality heifers grown in that

region’s often-unforgiving environment.

The country is high and dry, ranging from 4,500 feet (ft.) to 5,000 ft. in elevation and receiving 8-12 inches (in.) of precipitation annually. The Adams spread includes areas of highly alkaline or saline soil, particularly that area located just north of Great Salt Lake.

“Kochia seems to grow best in the poorer soils, and it provides good grazing. It’s fairly high in protein,” Adams says. “It’s done well for us, helping to improve both forage quantity and quality.”

Forage kochia really isn’t new to the United States. Adams says his dad became interested in it close to 15 years ago after reading about the plant’s forage production potential.

“He contacted people at ARS (the Agricultural Research Service) to ask for more information and to see if seed was available,” Adams says. “We got some seed and interseeded several areas of existing rangeland. It took a while to take hold — two or three years before we could see much. After about six years, we could tell that we really had something pretty good.”

During the winter, cattle thrived while grazing in pastures where forage kochia had become established. Adams also found that forage kochia could be established more quickly when seeded into summer fallow. In fact, he has harvested kochia seed from some fields just nine months after planting.

### Feed frenzy

With Adams’ encouragement, plant geneticist Blair Waldron launched forage kochia research through the U.S. Department of Agriculture (USDA)-ARS Forage and Range Research Laboratory near Logan, Utah. That work has included study of cattle response to grazing of kochia-wheatgrass pastures on the Adams Ranch. Waldron says forage kochia shines as a fall and winter forage because it maintains a relatively high level of crude protein (CP) and acceptable digestibility, while yielding a substantial volume of forage.

“In a two-year study at Bob and Ben Adams’ ranch, forage kochia-wheatgrass pastures yielded 1,300 pounds (lb.) per acre of forage in November, as compared to 250 pounds per acre in an adjacent grass pasture,” Waldron reports. “Cows grazing the kochia pastures gained in body condition score (BCS) without any supplementation (November through January).”

Based on pasture rental rates, grazing costs were estimated at \$15 per animal unit month (AUM), compared to \$45 per AUM when cows were fed purchased alfalfa hay. Subsequent economic analysis compared the

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cost to establish and maintain kochia pastures (\$0.70 per cow per day) with that of feeding alfalfa to cows in a drylot situation (\$0.94 per cow per day). Assuming a 100-day winter-feeding period, Waldron says producers could save \$24 per cow by grazing stockpiled kochia-grass pastures, compared to feeding alfalfa hay.

Adams has concentrated his efforts on establishing kochia in areas that typically receive the least winter snow. But, a little snow is not a problem, since kochia generally grows to a height of about 18 in. The best kochia pastures are saved as fall and winter grazing for Adams' youngest and oldest cows, with salt and mineral being the only supplements provided.

In August, kochia typically tests at about 14% CP. As might be expected, protein content declines as fall and winter progress, but seldom drops below a low mark of 7% in March.

"Forage kochia is an excellent fall-winter forage because it maintains a critical level of crude protein and acceptable digestibility throughout this season," Waldron states, noting that protein levels are higher than those of perennial grasses and legumes.

"Because of its nutritional value, wildlife resource managers are also interested in its potential to alleviate diminishing winter ranges for deer and elk, and provide habitat for sage grouse," Waldron adds. "Our research shows forage kochia can test over 20% protein in July, suggesting that it may be used to alleviate protein deficiencies faced by nonmigratory wildlife."

Waldron says forage kochia is tolerant of drought, as well as saline and alkaline environments. It does not cross with annual kochia and will not readily spread into established stands of perennial grass. Forage kochia is adaptable to most marginal rangelands, where it does out-compete rangeland invaders, including cheatgrass, Russian thistle and poisonous annual halogeton.

"Immigrant" is the name of the only forage kochia cultivar currently available in the United States. Waldron believes it could be used more widely to enhance winter grazing except that its short stature poses a problem in areas of abundant snow. However, forage kochia in Eurasia often reaches 4-5 ft. in height. USDA-ARS researchers have obtained taller strains from Kazakhstan and Uzbekistan, and are developing and testing forage kochia lines

offering greater stature and improved quality characteristics.

### **Fall forage**

Back in 1998, Wyoming's Joe Broadbent hoped he wouldn't regret planting Immigrant kochia. Wanting to improve his winter feed situation, and urged by university Extension personnel, the Evanston-area rancher seeded a mixture of perennial grasses and forage kochia on about 1,800 acres.

"I feared we were making a mistake and were just going to grow a bunch of weeds, but I was wrong," Broadbent states. "It came on so well that we grazed it the next fall and winter."

Wayne Asay, who oversees range improvement practices on Broadbent's ranch, says kochia doesn't show much early-season growth. Consequently, it doesn't provide much grazing in the spring and summer. Asay says cattle usually favor other more palatable grasses and forage plants during the growing season anyway.

"In our experience, the cattle eat it best in the winter, and they do well on it," Asay adds. "When we wintered cows on kochia, they actually gained weight and added condition. On average, we picked up two body condition scores (BCSs)."

More recently, since selling the cow herd, the Broadbent operation has grazed stocker cattle. Usually, kochia pastures are saved until later in the grazing season. Going into the fall, the quantity and quality of forage allow yearlings to maintain gains of about 2½ lb. per day.

To date, Broadbent Ranch has planted kochia on 7,400 acres. Yield has been variable, but forage production from kochia pastures always exceeds that of unimproved rangeland. While sagebrush range might yield 30-100 lb. of grazable dry matter per acre, forage kochia pastures often yield 900 lb. per acre or more.

During the last couple of years, however, yields have diminished on the 1,800 acres where kochia was first introduced. Asay is unsure whether that is due to drought or because that acreage was seeded too heavily. Other areas that were seeded at lower rates are yielding as much as ever — even areas receiving less than 8 in. of annual precipitation. Asay plans to pull an aerator over portions of those original stands to see if breaking up the soil and reducing the number of plants will stimulate more total forage production.

"It's still a lot more feed than we had before," Asay notes. "We're interested in the new strains [researchers] are developing. They've got some test plots here, on the ranch."

Broadbent agrees. He's anxious to try new, taller kochia strains as they become available. He says forage kochia makes pretty good feed — for a weed. **A**



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