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Forage Kochia

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“Immigrant” forage kochia (*Kochia prostrata*) has had much publicity in recent years. Its name “Immigrant” forage kochia lends itself to much misunderstanding about the plant. The word immigrant implies to many people that the plant is one that spreads rapidly. The most common fallacy is that it is an invasive, aggressive invader like annual kochia (*Kochia scoparia*) that invades croplands, roadsides, and disturbed sites throughout the United States.

Nevada has several million acres of rangeland that is dominated by cheatgrass and other annuals. This acreage is expanding every year with the major contributing factor being rangeland wildfires. Many rangeland managers thought that if given time and protection from grazing, native grasses would again dominate cheatgrass infested ranges. However, on low elevation rangelands (that comprised of Wyoming big sage before burning), cheatgrass has remained the dominant plant. Forage kochia can be an important tool for competing with cheatgrass, providing forage and habitat diversity for wildlife and livestock, and helping to control fire.

Forage Kochia or Annual Kochia

Despite the positive beneficial impacts of forage kochia, many people are skeptical, fearing that forage kochia will be similar to annual kochia. There are some key differences between forage kochia and annual kochia:

Forage Kochia

1. Belongs to a group of plants that consist of many valuable arid and rangeland species like saltbush, and winter fat.
2. Is a perennial shrub.
3. Does not establish in a site unless specifically planted, with little to no movement outside of the area of establishment (Clements 1997).
4. Is readily consumed by livestock and wildlife.

Annual Kochia:

1. Is an annual weed.
2. Establishes in disturbed sites throughout the United States.
3. Invades millions of acres of cropland.
4. Is rarely found on rangelands unless the area has been completely reduced to bare soil.
5. Is not a preferred forage plant for livestock or wildlife.

Forage Kochia as Livestock and Wildlife Forage

Forage kochia makes excellent feed for both wildlife and livestock. During winter periods or dry seasons the protein content of grass drops below the typical required 8 percent level required by most animals. Shrubs, such as forage kochia, are generally higher in protein than grasses. Forage kochia's protein content runs from 8-14 percent depending upon the time of year (Welch 1984). Its protein level peaks in August around 14.7 percent and drops to a low of 8.9 percent in March (Davis 1979 & 1985). Between August and March is when grasses are at their lowest protein levels; thus forage kochia used with grasses at this time can complement the nutritional levels required by livestock.

Forage kochia is palatable to livestock yearlong. A study comparing the winter diets of sheep grazing forage kochia and crested wheatgrass, and winter fat and crested wheatgrass found forage kochia amounted to 51.1 percent of the diet on the first year and 44.6 percent of the diet on the second year. Winterfat, a well-known, highly palatable shrub, was 27 and 19 percent of the diet in each of the years. In part the higher consumption of forage kochia can be explained by the greater amount of forage produced by forage kochia, but it also shows its high palatability (McKell, 1990). As long as adequate amounts of forage kochia are available, it will provide adequate protein to meet the needs of grazing animals during the late season (McKell, 1990).

In the Dunphy Hills area (Elko BLM District) forage kochia, grasses and shrubs were seeded on degraded rangeland that was considered "critical" winter habitat for mule deer. The first year after seeding, annual plants still dominated, however forage kochia was evident. Forage kochia becomes a stronger part of the plant complex, and after four years, evidence of Wyoming big sage, thickspike wheatgrass, and other native bunchgrasses and forbs were becoming visible. As a consequence mule deer fawn ratios have increased in recent year (Clements, 1994).

Replacing Cheatgrass on Nevada Rangelands

Cheatgrass is a winter annual. If adequate moisture is available, it will germinate in the fall or late winter. If winter moisture is inadequate it germinates in early spring. Cheatgrass grows very quickly in the spring, uses available water, forms seeds, and then dries out in early summer. The mature seeds are deposited on the ground and are ready to grow with adequate moisture. Cheatgrass can start growth earlier in the spring than the natives can. This usually results in cheatgrass out-competing the seedlings of perennial plants on the low precipitation/elevation rangelands in Nevada.

Fire is a recurring event on many rangelands in Nevada. Fires burn every 50-110 years in native range, while cheatgrass invaded ranges often burn every 3-5 years (Whisenant, 1990). Cheatgrass dries out early in the season, and forms an even blanket of fuel, which often allows fires to start and burn. This constant burning eliminates the range of woody plant species and decreases perennial forbs and grasses. The result is a replacement of the native vegetation with cheatgrass.

Cheatgrass provides a very limited grazing season for livestock and wildlife. Its seeds produce stiff awns that make the plant unpalatable once the seed has dried. Its palatable season is short, providing a brief grazing season for livestock and wildlife of only 4-5 weeks.

Because of cheatgrass's competitiveness for moisture early in the spring, it is difficult to get perennial grasses and shrubs established in cheatgrass dominated areas. However, forage kochia has been found to be extremely competitive on cheatgrass ranges. Forage kochia is one of the few plants found that can be seeded into cheatgrass ranges, establish itself, and over time out-compete cheatgrass.

Forage Kochia's Role in Fire Suppression

Forage kochia stays green most all of the year depending upon moisture levels in the soil. That provides two advantages. First, it is very palatable and nutritious for livestock and wildlife when grass and forbs have dried up. Second, it is green, and does not have volatile oils in its leaves, which reduces its flammability.

Forage kochia grows in bunches with bare soil in between the plants; it does not provide a continuous fuel, which slows down fire and makes it difficult to burn. Ranges seeded with forage kochia and other perennial bunch grasses are far less likely to burn than cheatgrass rangelands.

Forage kochia is an excellent plant to use in firebreaks. It has been effectively used as a greenstrip to help protect native shrub communities or private dwellings from fire. A greenstrip sometimes will stop a fire from burning through it. Fires can and do burn through greenstrips, however the fire is usually slowed down, which gives fire fighters a greater chance to control it. If forage kochia does burn, it has a high survival rate.

Forage Kochia Establishment

At the current time, seed for forage kochia is \$8-\$9 per pound. This price is expected to drop as more seed is produced. Typical seeding rates are from 0.5 – 3.0 pounds per acre Pure Live Seed (PLS) (PLS = Purity x Germination) depending whether it is seeded by itself or with grasses or shrubs. A common mixture is 1 pound of forage kochia with 5 pounds of crested wheatgrass or other perennial bunch grass. To establish a pure stand of forage for grazing would require 2-3 pounds PLS per acre.

Seeding

Research shows that forage kochia should be seeded in the late fall or early winter. Generally the months of November and December have proven to be the most successful time for dryland plants. Spring seedings, after mid-January, are not recommended. Spring seedings are often done after the peak moisture, which the new seedling does not get to take advantage of. In addition, later planting gives the seed longer to break the utricule that surrounds the seed and time for the embryonic plant to uncoil in preparation for growth.

Forage kochia should be drilled to a depth of 1/8 of an inch below the soil surface. Tilling and harrowing prior to seeding has produced slightly higher plant densities when compared to no seedbed preparation, but the additional cost is not economically feasible on large acres (Page, 1994). Care should be taken not to plant the seed too deep. If the seed is planted too deep emergence and survival is much lower or not at all. Forage kochia is adapted to dry sites, and will

establish in sites with as little as 5 inches of rainfall per year. It also establishes well in alkaline and saline sites.

Forage kochia can also be successfully established with broadcast seeding (Page, 1994). If the seed is broadcast, it is essential that it be done in the early winter before the majority of the winter snow is on the ground (November is optimal). This will allow snow, rain, and the freeze/thaw action of the soil during winter to lightly cover the kochia seeds.

Seed Viability

Proper storage of forage kochia seed can be difficult. Large reductions in germination rate can occur in a single year if the seed is not stored correctly (Young, 1981). The seed should be dried and stored under dry cool conditions to maintain adequate germination. Seed is normally harvested in October or November, making it difficult to dry enough for proper storage. Because of storage difficulties it is best to plant the current year's seed. Forage kochia seed will have the best germination if it is planted within a few months after harvest (November-December).

If forced to buy seed that is a year old, try to buy seed that has been stored in a cool, dry place. It is best if the seed has been stored at 50 degrees or less. A CURRENT germination test should be done on the seed and it should be purchased on a Pure Live Seed (PLS) basis. This is important as a germination rate of 50 percent or less is common in older seed.

Conclusion

Forage kochia has proven to be an adapted, highly palatable forage species for livestock and wildlife. It is competitive with cheatgrass and much more fire resistant. It provides diversity and cover when seeded with crested wheatgrass. With all things considered, forage kochia deserves greater use when seeding Nevada rangelands.

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