

'Ephraim' Crested Wheatgrass—a Rhizomatous Grass for Western Ranges and Disturbed Sites

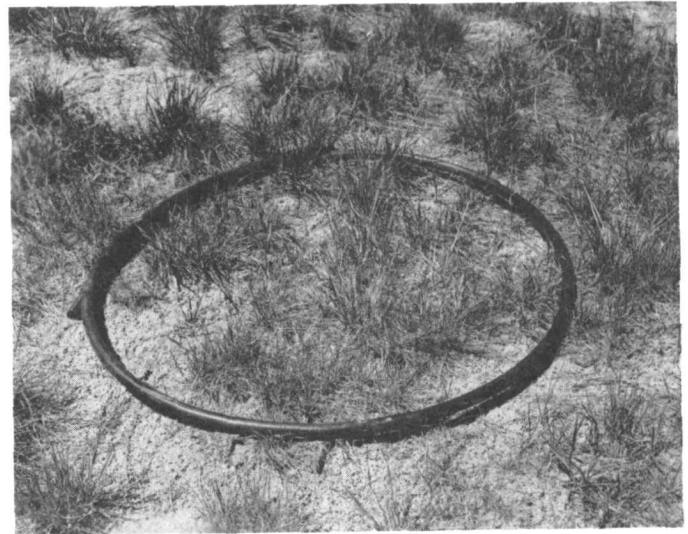
Richard Stevens and Stephen B. Monsen

For more than 50 years, crested wheatgrass has been successfully seeded and has dramatically changed the forage characteristics on western ranges. However, the crested wheatgrass varieties presently used today are bunchgrasses. There is a need for a rhizomatous grass that has many of the desirable characteristics of crested wheatgrass. A rhizomatous variety of fairway wheatgrass *Agropyron cristatum*, named 'Ephraim' after the community in which it was developed, was released in 1982 by the Utah Division of Wildlife Resources; Intermountain Forest and Range Experiment Station, Forest Service, and the Soil Conservation Service, USDA; and the Agricultural Experiment Stations of Arizona, Idaho, and Utah. Because it is rhizomatous, 'Ephraim' is especially well suited for stabilization of disturbed sites, on lands that have potentially high erosion characteristics, on areas of high impact or use, and on areas that are repeatedly burned.

'Ephraim' was collected off a dry, gravelly, clay soil in Ankara, Turkey, and introduced into the United States as P.I. 109012. The first planting in Utah was made in 1946 at Major's Flat near Ephraim. From Major's Flat, A. Perry Plummer collected seed and planted them on the John K. Olson farm, also at Ephraim. Continued testing was conducted on the Gilbert Jorgensen farm northeast of Ephraim. Plummer made selections (clonal material) from the Jorgensen planting which has been used in all subsequent plantings. Evaluation plantings have been made in northern Arizona, Utah, Idaho, and Montana by various State and Federal agencies. Individual plants are fairly uniform in vegetative traits and areas of adaptation.

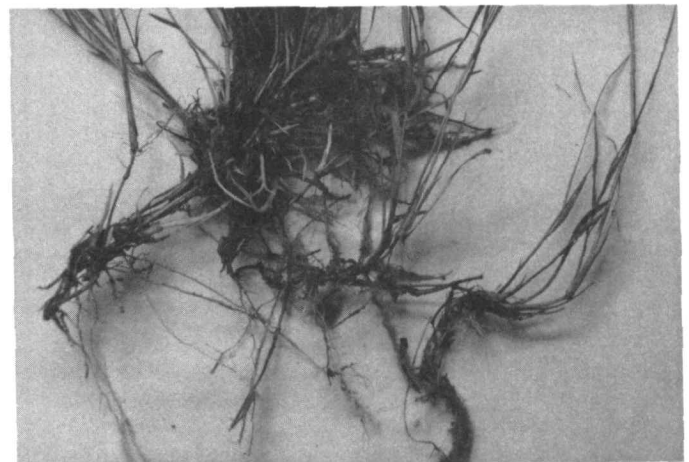
'Ephraim' was selected for its ability to produce rhizomes as opposed to 'Fairway' *Agropyron cristatum* or 'Standard' crested wheatgrass *Agropyron desertorum*, which are bunchgrasses. Under irrigation, 'Ephraim' will develop rhizomes in 1 year. On most pinyon-juniper and sagebrush-grass sites, rhizomes will develop by the third year and in some cases the second. Rhizome development is dependent on site conditions—the harsher the site, the slower rhizomes develop.

Although 'Ephraim' has been established in areas that receive as little as 8 inches annual precipitation, it does best between 10 and 14 inches. The higher the precipitation, the sooner the rhizomatous characteristics develop. For best



Two-year-old seeding 'Ephraim' crested wheatgrass. Rhizomatous characteristics beginning to appear. Pinyon-juniper site—12 inches annual precipitation.

production, winter and early spring moisture is needed. It is adapted to salt-desert shrub, sagebrush-grass, pinyon-juniper, aspen openings, and mountain brush communities. It does well in a wide range of soils including disturbed areas and mine spoils. Salt and alkali tolerance is moderately high.



Rhizomatous root system of 'Ephraim' crested wheatgrass.

'Ephraim' has done well when seeded with other species. Like other crested wheatgrasses, 'Ephraim' in pure stands is susceptible to the black grass bug.

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Leaf height and forage production are comparable to 'Fairway' crested wheatgrass. Culm length is, however, a little shorter. Spring and fall green-up, palatability, and maturing dates are also similar to 'Fairway'. Robust, unused, non-palatable plants have not developed in stands of 'Ephraim' such as occur in stands of 'Standard' crested wheatgrass. Full, vigorous stands have been maintained by seed and the strong rhizomatous characteristics for over 15 years.

Seeds of 'Ephraim' (approximately 200,000 per pound) are larger than seeds of 'Fairway' crested wheatgrass (300,000 per pound). Seedling vigor of 'Ephraim' appears to be similar

to the vigor of 'Fairway' seedlings. Seed germination of 'Ephraim' has averaged better than 90%. Under irrigation and with good management, a yield of approximately 400 pounds of seed per acre may be expected. Seed production on arid rangelands has been as high as 250 pounds per acre. 'Ephraim' crested wheatgrass is a tetraploid ($2n = 28$).

Breeder and foundation seed are maintained by the Soil Conservation Service Plant Materials Center at Aberdeen, Idaho. Foundation seed is available through Soil Conservation Districts, University Agricultural Experiment Stations, and Crop Improvement Associations. Commercial certified seed of 'Ephraim' has been available since the fall of 1984. ●

Fourwing Saltbush: an Emerging Hero for West Texas

Ted M. White

For 40 years ranchers of West Texas have tried to kill brush because it competes with native grasses and because many species of brush are not desirable forage for livestock production. One exception, however, is fourwing saltbush. This brush is one any rancher would love to have if only he knew more about it.

Fourwing saltbush or *Atriplex canescens* is a woody shrub which is on the average 3-6 feet in height. It is native to the western half of Texas, from Mexico northward to Canada, and westward to California. It was likely a very common sight around the 1900's, but continuous yearlong grazing has reduced the plant to small areas where grazing is at a minimum. It is a plant which has a very deep tap root that allows it to reach deep sources of water. This tap root also allows the plant to survive in areas which have very little rainfall. The fibrous root system allows it to utilize the light showers which frequent West Texas and provide shallow soil moisture.

Fourwing saltbush has many attributes which make it a very valuable commodity for the rangeland of West Texas. One of these attributes is its adaptability to a wide range of areas. It can grow in many types of soils, including saline and alkaline soils. It is also extremely adaptable to cold and hot temperatures. The shrub can therefore, survive in places where the weather is as cold as in Canada, or as hot and dry as in northern Mexico.

A second attribute which adds to its value is that it is an evergreen plant and is a palatable forage for use with nearly all its leaves throughout the winter makes it a source of feed when the native warm season is over and perennial grasses have lost most of their nutritional value due to maturity and weathering.

Fourwing saltbush has a very high nutritional value. In

research tests taken at the Texas A&M University Research Center at San Angelo, fourwing saltbush had a maximum crude protein level of approximately 21 percent as compared to sideoats grama (one of the major native grasses of Texas) of only 9 percent. The lowest protein level fourwing saltbush reached was around 15 percent while sideoats grama fell to a low of 4 percent. Fourwing saltbush may become invaluable as a source of feed for livestock in the winter when native grasses are dormant. Most livestock and wildlife species will be searching for green material to consume to meet their nutritional requirements, and fourwing saltbush has a high phosphorus level which usually meets or exceeds the level needed for livestock maintenance.

Fourwing saltbush has proven to have a very high livestock carrying capacity under proper management practices. In a test conducted by Dr. Darrell N. Ueckert, a researcher in range with the Texas Agricultural Experiment Station, twenty-five head of goats were placed on a one acre paddock of fourwing saltbush for a period of thirty days. After the given period, the goats had utilized 98 to 99 percent of the available forage. Over this period, the goats averaged a gain of 1.5 pounds per head, even though no supplemental feed was provided other than salt. After the grazing trial, the plot was rested during the spring. The bush showed a quick recovery over the rest period through the stimulation of new growth. This bush cannot survive under a continuous, yearlong grazing system because it needs rest periods to ensure regrowth. The suggested management grazing system for saltbush is to graze it in the winter and for a short period at the end of the summer. The rest of the year, the shrub should be allowed to recover in absence of grazing. Although a great deal of management is required for fourwing saltbush, established stands have a longevity of many years.

Fourwing saltbush can be used to reclaim disturbed or abused sites of rangeland such as oil well pads, slush pits,

Note: This paper by Ted White received Second place in the 1985 High School Youth Forum paper competition held at Salt Lake City, Utah.