

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.

and other lands of this nature. Fourwing saltbush has been broadcast seeded on oil pads in West Texas, and over a one-year period, the value of the land in these test sites increased for grazing immensely.

Fourwing saltbush can be planted in a variety of fashions, but planting it by broadcast or in furrows has proven to be the most effective. The shrub, does not, however, grow well when seeded in a grass mixture. The young seedlings are not

competitive until firmly established.

In conclusion, it can be said that fourwing saltbush has many assets. A few are adaptability, high nutritional quality, high carrying capacity, being an evergreen, and palatability for livestock species. The plant also reduces supplemental feeding and can be used to reclaim disturbed sites to a useful level of productivity. As one can see from these many attributes, fourwing saltbush can be extremely valuable as an emerging hero for West Texas ranching. ●

New Rangeland Research Areas in Oregon

Sarah E. Greene

The Bureau of Land Management, U.S. Department of the Interior, recently established 13 Research Natural Areas (RNA's) east of the Cascade Range in Oregon. These areas provide outstanding opportunities for rangeland research and education. They will give land managers and researchers baseline knowledge of environmental and biological features of the various rangeland communities represented, an important prerequisite to basic and applied research. The Research Natural Areas are generally larger than 200 acres—big enough to reduce the effects of outside influences such as roads, grazing, and herbicide spraying, and to provide an adequate area for research sampling.



Extensive *Typha* marshes at North Lake, Jordan Crater Research Natural Area, Vale District, BLM

The USDA Forest Service established the first RNA in 1927, the Santa Catalina Research Natural Area, near Tucson, Ariz. In Oregon and Washington, the RNA program is

jointly supported by the Forest Service; Bureau of Land Management, Fish and Wildlife Service, and National Park Service; U.S. Department of Energy; and U.S. Department of Defense. The above agencies, along with the two states' natural area programs and privately funded Nature Conservancy, are cooperating in establishing a comprehensive system of natural areas representative of the diverse ecological environment in the Pacific Northwest. This ecological diversity is described as cell or element needs—specific plant communities or aquatic systems.

As of January 1984 there are 96 Federal Research Natural Areas in Oregon and Washington.¹ Research Natural Areas, as the name suggests, are areas set aside and maintained in their natural condition (ecological condition that has deve-

¹A partial list and a location map of established RNA's in Oregon, Washington, and Idaho can be found in "Atlas of the Pacific Northwest," by Richard M. Highsmith, Jr., and A. Jon Kimerling, 1979, Oregon State University Press, Corvallis, Oregon. "Federal Research Natural Areas in Oregon and Washington," by Jerry F. Franklin et al., 1972, USDA Forest Service, Pacific Northwest Forest and Range Experiment Station, Portland, Oregon, describes vegetation, soils geology, and animals on 47 RNA's; supplements to this guidebook describing 15 more RNA's are available from Sarah Greene, Research Natural Area Scientist, 3200 Jefferson Way, Corvallis, Oregon.



Dense stand of mountain mahogany in Mountain Mahogany Research Natural Area, Vale District, BLM, Photos taken by Robert R. Kindschy, wildlife biologist, Vale District, BLM.

The author is a research forester, USDA Forest Service, Pacific Northwest Forest and Range Experiment Station, Forestry Sciences Laboratory, 3200 Jefferson Way, Corvallis, Ore. 97331.