

**PLANT GUIDE
MANAGEMENT AND USE OF**

FOURWING SALTBUSH

October 2001

DESCRIPTION

Fourwing saltbush (*Atriplex canescens* (Pursh) Nutt.) is one of the most widely distributed and important native shrubs on rangelands in the western United States including the Intermountain, Great Basin, and Great Plains regions. Its natural range extends from below sea level to above 8,000 feet elevation. It is a polymorphic species varying from deciduous to evergreen, depending on climate. Its much-branched stems are stout with whitish bark. Mature plants range from 1 to over 8 feet in height, depending on ecotype and the sites soil and climate. Its leaves are simple, alternate, entire, linear-spatulate to narrowly oblong, canescent (covered with fine whitish hairs) and ½ to 2 inches long. Its root system is branched and commonly very deep (to 20 feet) when soil depth allows.

Fourwing saltbush is generally dioecious, with male and female flowers on separate plants. Male flowers are red to yellow and form dense spikes at the ends of the branches. The female flowers are axillary and nondescript. However, some bisexual plants may be found within a population. Fourwing saltbush plants can exhibit hermaphroditic (male and female parts in one flower) characteristics. The seed is contained in utricles that turn a dull yellow when ripe and may remain attached to the plant throughout winter.

Fourwing saltbush derives its name from the four membranous ‘winged’ capsule, which encompass its seeds. It is most commonly called fourwing saltbush, but is also known as chamise, chamize, chamiso, white greasewood, saltsage, fourwing shadscale, and bushy atriplex.

RELEASES

‘**Mariana**’ fourwing saltbush was released in 1979 by the NRCS Plant Materials Center in Lockford, California. It originated from plants near El Cajon, California and was selected for ease of establishment and drought resistance. It is best adapted to areas in the southwest including southern New Mexico, southern Arizona and southern to central California.

‘**Rincon**’ fourwing saltbush was selected by the Forest Service, Shrub Science Laboratory in Provo, Utah and cooperatively released with the NRCS Plant Materials Center, Meeker, Colorado in 1983. The original seed was collected at Rincon Blanco near Canjilon, Rio Arriba County, New Mexico at 7,800 feet elevation. Rincon is an erect, leafy form with early season green-up. It is best adapted to the southwest areas of central Utah, central Nevada, western Colorado, to central New Mexico and central Arizona.

‘**Santa Rita**’ fourwing saltbush was cooperatively released by the NRCS Plant Materials Center, Tucson, Arizona, ARS, and University of Arizona in 1987. It is best adapted to areas in the southwest including southern New Mexico, southern Arizona and southern to central California.

Snake River Plains Germplasm fourwing saltbush was selected by the NRCS Plant Materials Center, Aberdeen, Idaho and cooperatively released by the Aberdeen PMC, Pullman, Washington PMC and University of Idaho in 2001. Snake River Plains Germplasm is a composite of 4 accessions of fourwing saltbush collected throughout the Snake River Plains of southern Idaho. It was selected for superior establishment and cold hardiness. It is better adapted to the northern range of fourwing saltbush including southern Idaho, eastern Oregon, western Wyoming, northern Utah and northern Nevada than other fourwing saltbush releases.

‘Wytana’ fourwing saltbush was released by the NRCS Plant Materials Center, Bridger, Montana in 1976. Wytana is a natural cross between fourwing saltbush and Gardner or Nuttall saltbush. It is a small, herbaceous type that is best adapted to the Great Plains and mountain foothills of Montana and Wyoming.

USES

Rangeland/Grazing – fourwing saltbush is a highly palatable forage for most livestock and big game. It is used primarily in the winter at which time it is high in carotene and averages about four percent digestible protein. The leaves may be as high as 18 percent total protein. It is grazed by all classes of livestock except horses.

Wildlife – fourwing saltbush provides excellent browse for deer season long. It is a good browse plant for bighorn sheep, antelope, and elk in fall and winter. It is also a food source and excellent cover for sharptail grouse, gray partridge (Huns), sage grouse, and other upland birds, rabbits, songbirds, and small mammals.

Erosion Control – fourwing saltbush makes excellent screens, hedges, and barriers. It is especially useful on saline-sodic soils. It has excellent drought tolerance. It has been planted in highway medians and on road shoulders, slopes, and other disturbed areas near roadways. Its extensive root system provides excellent erosion control.

Reclamation – fourwing saltbush is used extensively for reclamation of disturbed sites (mined lands, drill pads, exploration holes, etc.). It provides excellent species diversity for mind land reclamation projects.

ADAPTATION

Fourwing saltbush is adapted to most soils but is best suited to deep, well drained, loamy to sandy to gravelly soils. It is sometimes found growing in dense clay soils. It is very tolerant of saline soil conditions and somewhat tolerant of sodic soil conditions. Under saline conditions plants take up salts and accumulates it in the plants scurfy leaf coverings.

Fourwing saltbush has high tolerance to boron. It does not tolerate high water tables or late winter inundation. It is extremely drought tolerant and has fair shade tolerance. It is not very tolerant of fire, but may resprout to some degree if fire intensity was not too severe. Its ability to tolerate extreme cold conditions varies with ecotype.

Fourwing saltbush most commonly grows in areas that receive 8 to 14 inches annual precipitation. It can be found from sea level to 8,000 feet elevation. Depending on ecotype, fourwing saltbush grows in association with bluebunch wheatgrass, basin wildrye, bottlebrush squirreltail, Indian ricegrass, Sandberg bluegrass, sand dropseed, blue grama, galleta, black grama, alkali sacaton, inland saltgrass, globemallow, greasewood, rabbitbrush, shadscale, Nuttall or Gardner saltbush, winterfat, bud sagebrush, black sagebrush, low sagebrush, Wyoming big sagebrush, and basin big sagebrush.

ESTABLISHMENT

Fourwing saltbush begins growth in mid spring to late spring. Seed matures 3 to 4 months after flowering. It typically spreads via seed distribution, but may also root sprout following wildfire or layer if covered with sand. Stands typically take three to four years to establish, but once established the plants are fairly competitive with other species. Fourwing saltbush can be established by transplanting in early spring, direct seeding in late fall, early winter or very early spring or by stem cuttings.

An adapted cultivar/release or local seed source should be used to ensure the ecotype is compatible with the site. Seed should be after-ripened for ten months and dewinged prior to planting. On moist fine soils, seed should be planted ½ inch deep. On sandy to coarse gravelly soils, plant up to ¾ inch deep. Seeding rates of 0.25 to 0.50 pounds per acre is recommended for rangeland seeding mixtures (3 to 7 percent of the seeding mix). Dewinged seed is preferred because planting depth can be controlled more easily. There is no prechilling requirement for fourwing saltbush seed. See Seed Production section for additional planting recommendations

Seedling vigor is generally outstanding and depending on ecotype, young plants may reach heights of 18 inches by the end of the first growing season.

MANAGEMENT

Fourwing saltbush is palatable to cattle, sheep and deer season long. It provides nutritious winter forage on many areas and is a good fall and winter browse plant for bighorn sheep, antelope, and elk.

In new plantings, utilizing good seedbed and weed control techniques should enhance establishment and reduce competition with other plants. In interseedings plantings competition should be reduced by scalping, furrowing or other techniques that help control existing vegetation and weeds. Animals utilizing the area should be removed from new plantings for at least two growing seasons or until plants are well established and reproducing. Irrigation may be needed for transplants on harsh sites to ensure establishment. Young seedlings are not tolerant of excessive insect, rabbit, and rodent damage and plantings may require control measures if damage appears severe.

In established plantings, deferred rotation grazing systems are recommended for fourwing saltbush management. Plants can be grazed from late spring through winter, but plant health is best maintained if used primarily as a winter forage. Fourwing saltbush tolerates grazing very well, but will decrease in abundance under continuous close grazing. Proper use of fourwing saltbush as browse is approximately 40 - 50 percent of current year's growth.

Excessive use results in damage or loss of plants from breakage of brittle branches. During dry periods, branches and stems may be brittle and trampling by livestock may damage plants. Damaged plants generally recover if rested, but production will be reduced until fully recovered. No injury to livestock results from grazing this plant. However, it can cause bloat and scours in spring if it is the primary dietary source. Rabbits, rodents, and grasshoppers utilize fourwing saltbush and may damage stands under severe conditions requiring pest control measures.

ENVIRONMENTAL CONCERNS

Fourwing saltbush is native, long-lived, and spreads primarily by seed distribution. It is not considered "weedy", but could slowly spread into adjoining vegetative communities under ideal climatic and environmental conditions. This species is well documented as having beneficial qualities and no negative impacts on wild or domestic animals.

SEED PRODUCTION

Establishing plants in a greenhouse either by seed or root cuttings and transplanting to the field will result in the most satisfactory stands for seed production. Plant spacing under transplant conditions should be 6 - 8 feet within row and a minimum of 6 feet between rows. Planting one male plant to 5 female plants is recommended. Transplanting into weed barrier fabric can also improve plant establishment, seed production, weed control, and moisture conservation. Transplanting is recommended in the early spring prior to summer heat. Full seed production is usually reached the third year following transplanting.

Plantings can also be established with seed. A minimum of 15 seeds per linear foot of drill row should be planted. Hand seeding in late fall or very early spring may also be an option. Plant 5 to 10 seeds in a close group at desired spacing and thin to 1 or 2 plants after emergence. Full seed production may be reached the fourth year following direct seeding.

Fourwing saltbush requires an equivalent of 10 to 14 inches annual precipitation for seed production. Irrigation may only be needed for establishment and during drought years to ensure a seed crop. Expected seed yields may range from 200 to 400 pounds per acre. Fertilization is not generally recommended unless soil tests indicate severe nutrient deficiencies. Rabbits and rodents can damage stands and may destroy seedlings. Insects such as grasshoppers and Mormon crickets infrequently damage stands beyond recovery.

Seed generally ripens in late August and September and can be harvested from mid September through December. Harvesting seed is best accomplished for woody ecotypes by hand stripping. Mechanized harvesting has been used on Wytana, but seed requires additional conditioning to properly dry and clean excessive trash (leaves, stems, other inert matter). Harvested seed is usually threshed (dewinged) by processing seed through a hammermill (1500 rpm) equipped with a ¼ inch screen and then running seed through a fanmill to the desired grade.

Dewinging may hasten after-ripening of seed resulting in shorter viability of seed. Seed can be stored and remain viable for 6 to 10 years. The dewinging process greatly enhances the ability of the seed to flow through planting equipment. Removing the hull that surround the seed can injure the seed resulting in reduced viability, seedling vigor, and stand establishment. One must be extremely careful when threshing seed to limit the amount of mechanical action on the seed to minimize seed damage.

Fourwing saltbush seed requires about 10 month's after-ripening following harvest before accurate percent germination can be determined. Germination of fresh after-ripened seed can be as high as 85 to 90 percent. Seeds per pound will vary by accession or ecotype, but averages 38,000 seeds per pound winged and 78,000 seeds per pound dewinged.

Compiled by: Daniel G. Ogle, Plant Materials Specialist, NRCS, Boise, Idaho and Loren St. John, Team Leader, Plant Materials Center, NRCS, Aberdeen, Idaho.