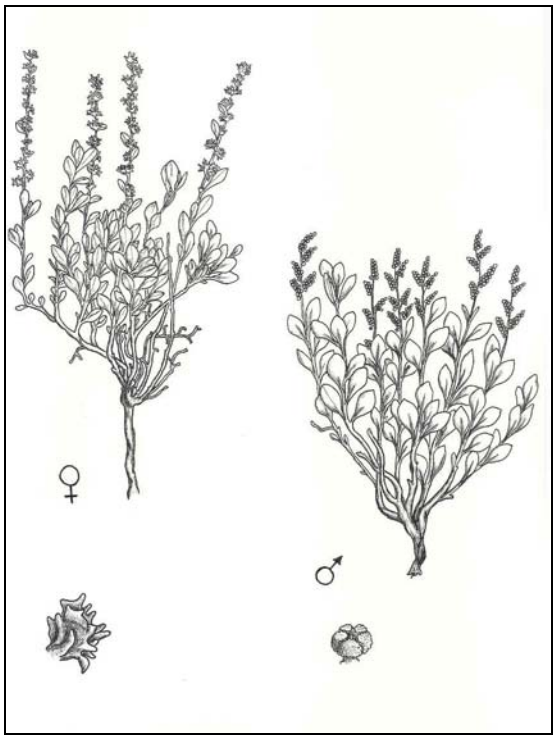
***Atriplex cuneata* A. Nels.** Castle Valley clover saltbush
CHENOPODIACEAE

Synonyms: *Atriplex gardneri* var. *cuneata* (A. Nels.) S.L.Welsh
*Atriplex acanthocarpa* var. *cuneata* Jones
*Atriplex nuttalli* subsp. *cuneata* H.M. Hall & Clem.



**General Description.**—Castle Valley clover saltbush, also known as Castle Valley saltbush and cuneate saltbush, is a low shrub 10 to 45 cm tall with a more or less prostrate, woody, much-branched base with erect branches. Leaves are evergreen, light-grey green, spatulate to broadly elliptic, 2 to 6 cm long and 0.5 to 2.5 cm wide (Hall and Clements 1923). Staminate (male) flowers are dark, almost black, and are borne in glomerules arranged in panicles. Pistilate (female) flowers are borne in axillary clusters and consist of pistils enclosed by wingless bracts. At maturity, bracts are 5 to 9 mm wide, irregularly toothed along their margins, and have numerous, crest-like tubercles on their side. Sex expression in Castle Valley clover saltbush is trioecious (Freeman and McArthur 1984). In this system, some individuals are consistently male, some are consistently female, and others can switch between the less energistically expensive male state, and the more taxing female state, depending on climatic conditions.

**Taxonomy**.—Castle Valley clover saltbush is one of several related saltbush species. It hybridizes with a number of other saltbushes, particularly with fourwing saltbush (*Atriplex canescens* (Pursh) Nutt.). *Atriplex cuneata* is tetraploid (2n = 36). Some taxonomists consider it to be a variety or subspecies of other woody saltbush species. Its exact taxonomic distinction remains somewhat unclear. Hanson (1962) described one subspecies for *Atriplex cuneata*, ssp. *introgressa,* found to be diploid (2n = 18) (Sanderson and Stutz, unpublished data). It is now considered to be a variant of *A. welshii* Hanson, also diploid. *Atriplex cuneata* hybridizes with other perennial *Atriplex*, especially with *A. confertifolia* Torr. & Freemont, a hybrid that has been named as *A.* X *neomexicana*. Populations of this hybrid and its derivatives may expand enormously during favorable years but are eradicated during drought (Sanderson and Stutz, unpublished data).

**Range**.—The distribution of Castle Valley clover saltbush includes portions of eastern Utah, southwestern Colorado, and northern New Mexico. It usually grows at elevations between 1,220 and 2,170 m (Welsh and others 1993).

**Ecology**.—This species often grows on fine textured soils, typically clay or soils derived from shale, that are moderately to highly alkaline. It grows on variably saline soils and may be associated with many other shrubby chenopod species and several of the sagebrush (*Artemisia* L.) species. It is often the dominant or codominant shrub with shadscale (*Atriplex confertifolia* Torr. & Frem.) or mat saltbush (*Atriplex corrugata* S. Wats.). It grows in areas with 160 to 310 mm of precipitation.

**Reproduction**.—Castle Valley clover saltbush blooms in April and May, or sometimes later depending upon rainfall. Fruits (utricles) ripen about 7 weeks after blooming (Hanson 1962).

Annual seed production is often erratic and only about 50 percent of utricles contain viable seed. Germination rates are also erratic and vary among ecotypes. Fruits are small and generally number about 180,000/kg (Blauer and others 1976).

This species should not be seeded in areas beyond its natural distribution. It is poorly adapted to big sagebrush (*Artemisia tridentata* Nutt.) and other upland habitats but can be seeded into most salt desert shrublands. Young plants grow vigorously and are competitive but can be suppressed by perennial grasses and annual weeds. It should not be seeded directly with herbaceous species but competes well when seeded with fourwing saltbush [*Atriplex canescens* (Pursh) Nutt.], green ephedra (*Ephedra viridis* Coville), and spiny hopsage [*Grayia spinosa* (Hook.) Moq.].

**Management**.—Castle Valley clover saltbush is preferred by livestock throughout the year. It remains green and succulent, even through winter. It is an important source of protein in winter months for both livestock and game when most other forages are dry (McArthur and others 1978). A stabilized hybrid between fourwing saltbush and Castle Valley clover saltbush has great potential to improve the forage quality on winter ranges. Such a hybrid would be taller than Castle Valley clover saltbush and retain more green foliage than fourwing saltbush.

This species shows particular promise in winter game range restoration and on disturbed alkaline soils. Like other woody saltbushes, it grows on freshly disturbed soils, such as exposed substrata created by mining or road construction activities (Blauer and others 1976, McArthur and others 1978).

**Benefits**.—Castle valley clover saltbush is a native shrub that is adapted to fine textured soils that are inhospitable to many other shrubs. It adds biological and structural diversity to the plant communities on these otherwise difficult sites. It helps stabilize the soil, can be useful in wildland restoration projects, and provides valuable and nutritious forage for wildlife and livestock on Western shrublands.

**References**


Blauer, A.C., A.P. Plummer, E.D. McArthur, R. Stevens, and B.C. Giunta. 1976. Characteristics and hybridization of important Intermountain shrubs. II. Chenopod family. Research Paper INT-177. U.S. Department of Agriculture, Forest Service, Intermountain Forest and Range Experiment Station, Ogden, UT. 42 p.

Freeman, D.C. and E.D. McArthur. 1984. The relative influences of mortality, non-flowering, and sex change on the sex ratios of six *Atriplex* species. Botanical Gazette 145: 385-394.

Hall, H.M. and F.E. Clements. 1923. The phylogenetic method in taxonomy, the North American species of *Artemisia, Chrysothamnus,* and *Atriplex*. Publication 326. Carnegie Institution of Washington, Washington, DC. 355 p.

Hanson, C.A. 1962. Perennial *Atriplex* of Utah and the northern deserts. M.S. thesis. Brigham Young University, Provo, UT. 133 p.

McArthur, E.D., A.P. Plummer, and J.N. Davis. 1978. Rehabilitation of game range in the salt desert. In: K.L. Johnson, ed. Wyoming shrublands: proceedings of the 7th Wyoming shrub ecology workshop; 1978 May 31-June1; Rock Springs, WY. University of Wyoming, Division of Range Management, Laramie, WY. p. 23-50.

Sanderson, S.C. and H.C. Stutz. 2003. Unpublished data. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Provo, UT

Welsh, S.L., N.D. Atwood, S. Goodrich, and L.C. Higgins, eds. 1993. A Utah Flora. Second edition, revised. Brigham Young University Print Services, Provo, UT. 986 p.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