***Suaeda suffrutescens* S. Wats.** desert seepweed
CHENOPODIACEAE

Synonyms: *Dondia suffrutescens* (Wats.) Heller
S. nigrescens I.M. Johnst.

General Description.—Desert seepweed is also known as inkweed, iodinebush, and quelite salado. Desert seepweed has stout stems and branches, woodiness greatest toward the base, side branches generally short, although the plant is highly branched. It could be classified as a subshrub. The plant is erect and ascending, or spreading. Desert seepweed ranges in height from about 50 to 120 cm, often forming mounds as broad as 150 cm. Young stems and leaves are soft and felty with numerous hairs. Leaves are simple, alternate, numerous, fleshy, linear to linear-lanceolate, 5 to 20 mm long, narrower at the base, semirounded to somewhat flat (Correll and Johnston 1970, Great Plains Flora Association 1986, Ivey 1995, Kearney and others 1951, Martin and Hutchins 1980). Two varieties have been recognized: *S. suffrutescens* var. *suffrutescens*, and *S. suffrutescens* var. *detonsa* I.M. Johnston. The latter variety (*detonsa*) has three synonyms: (1) *S. duripes* I.M. Johnst., (2) *S. nigrescens* I.M. Johnst., and (3) *S. nigrescens* var. *glabra* I.M. Johnst. (Allred 2002, Great Plains Flora Association 1986, Kartesz 1994). The latter variety, *S. suffrutescens* var. *detonsa* (*S. nigrescens* var. *glabra*) is distinguished by having smooth, or relatively smooth (hairless) stems and leaves. This variety is more common in Mexico, but extends into southern Texas.

Range.—Desert seepweed occurs from western Oklahoma and Texas across central and southern New Mexico into Arizona and California, and south into Mexico. It occurs at elevations from about 750 m to 1,830 m.

Ecology.—Desert seepweed is a perennial shrub of saline or alkaline soils in plains and valleys. These habitats include the margins of ephemeral lake beds, salt flats, and flood plains of rivers and streams. Some moisture needs to be relatively near the surface for part of the growing season. This species is classified as a halophyte, or salt tolerant plant. Desert seepweed may dominate alkali sink habitats in association with other salt tolerant species, including other species of *Suaeda* (seepweeds), *Salicornia* spp. (glasswort or saltwort), *Distichlis spicata* (L.) Green var. *stricta* (Torr.) Beetle (inland saltgrass), *Allenrolfea occidentalis* (Wats.) Kuntze (burro weed or quinine bush), and *Heliotropium curassavicum* L. (salt heliotrope), to name a few (Hendrickson 1974, Dick-Peddie 1993).

Halophyte Ecology and Physiology.—Although little if anything is reported about desert seepweed, much is known about the common salt tolerant characteristics of the genus *Suaeda*. Chapman (1942) used the term halophyte in describing species that could grow in an environment with greater than 0.5 percent sodium chloride (NaCl). Halophytes can be divided into two groups: (1) those requiring salt for survival and best growth, and (2) those tolerating or resisting salty environments (Waisel 1972). The second group, the salt tolerators, have adapted to saline habitats and survive there because salt-sensitive plants (glycophytes) cannot survive there. Halophytes accumulate salts obtained from the soil solution

within their tissues during the transpiration process. Many members of the genus *Suaeda* readily translocate salts to upper portions of the plant. This second group of halophytes can be subdivided into three more categories of tolerance. Salt enduing species simply tolerate the presence of salt in their cells. Salt excluding species may excrete salt from shoots, including those with specialized hairs on the plant, or transport them back to the roots. Salt evading species have mechanisms to prevent transport to the leaves or prevent absorption from the soil solution (Waisel 1972). Some members of the genus *Suaeda* fall into the first group requiring salt for survival, while others are salt enduring halophytes. Salt (NaCl) and other ions (including sulfate and potassium) may be sequestered into cell vacuoles where they do not interfere with normal cell biochemistry. These plants will generally have higher water potential gradients between the soil and the leaves, which may add to succulence. Waisel (1972) proposed a new order to the classification of halophytic plant communities: Suaedetalia--persistent communities in dry desert saline habitats, dominated by annual and perennial members of the family Chenopodiaceae (as well as other families). Zahran (1982) likewise includes a *Suaeda* community classification. Some shrubby members of the genus (*S. fruticosa* Forsk. and *S. monoica* Forsk.) are reported to accumulate large amounts of salt annually when in dense stands, as much as 2 to 4 tons/ha (Waisel 1972). In this function they may help to desalinate some saline habitats.

Reproduction.—Flowers are small and greenish, and occur in spiked clusters of three to nine flowers in the leaf axils. The corolla is absent. The five-lobed calyx has all parts equal, may be hood shaped, and lacks appendages, that is, it is not winged. Seeds are small, black, and 0.7 to 1 mm wide. Desert seepweed blooms from March to September, depending on local environmental conditions (Correll and Johnston 1970, Great Plains Flora Association 1986, Kearney and others 1951, Martin and Hutchins 1980). Many of the salt tolerant members of the Chenopodiaceae have physiological seed dormancy (Baskin and Baskin 2001). Although no seed germination reports regarding this particular species were located, numerous studies have been performed on other members of the *Suaeda* genus. Three of four members of this genus required prior cold stratification of the seeds with optimal daytime germination temperatures of 25 to 27 °C (summarized in Baskin and Baskin 2001). NaCl concentrations ranging from 0.17 to 0.90 molar have depressed maximum germination of 75 to 100 percent down to 10 percent in four different species of *Suaeda* (summarized in Baskin and Baskin 2001).

Growth and Management.—Desert seepweed can grow relatively quickly. It has been observed to resprout readily in managed and mowed areas adjacent to levees along the lower Rio Grande floodplain in New Mexico. This species is restricted to saline and riparian habitats and is not highly browsed. Consequently, it does not pose as a major management concern on most rangelands. It does not typically form dense stands.

Benefits.—Desert seepweed leaves and young shoots have been added to vegetable greens or cacti fruits by Native Americans during cooking to add flavor. It has also been added between layers of cacti fruit and sotol butts (stems of *Dasylirion* sp.) during the 24 to 48 hour cooking process in mescal pits (Warnock 1974). Pima Indians would eat the plant for greens and the roasted seeds, called pinole. Coahuila Indians extracted a black dye from the plant used for artwork (Dodge 1985). This species is not browsed much by livestock but may be utilized when other vegetation is in short supply (Warnock 1974, Dodge 1985).

References

Allred, K.W. 2002. A Working Index of New Mexico Vascular Plant Names. http://web.nmsu.edu/~kallred/herbweb. [not paged].

Baskin, C.C. and J.M. Baskin. 2001. Seeds: Ecology, Biogeography, and Evolution of Dormancy, and Germination. Academic Press, Sand Diego, CA. 666 p.

Chapman, V.J. 1942. The new perspective in the halophytes. Quarterly Review of Biology 17: 291-311.

Correll, D.S. and M.C. Johnston. 1970. Manual of the Vascular Plants of Texas. Texas Research Foundation, Renner, TX. 1,881 p.

Dick-Peddie, W.A. 1993. New Mexico Vegetation: Past, Present and Future. University of New Mexico Press, Albuquerque, NM. 244 p.

Dodge, N.N. 1985. Flowers of the Southwest Deserts. Southwest Parks and Monuments Association, Tucson, AZ. 136 p.

Great Plains Flora Association. 1986. Flora of the Great Plains. University Press of Kansas, KS. 1,392 p.

Hendrickson, J. 1974. Saline habitats and halophytic vegetation in the Chihuahuan Desert region. In: R.H. Wauer and D.H. Riskind, eds. Transactions of the Symposium of the Biological Resources of the Chihuahuan Desert Region, United States and Mexico. U.S. Department of Interior, National Park Service Transactions and Proceedings Series, No. 3, U.S. Goverment Printing Office, Washington DC. p. 289-314.

Ivey, R.D. 1995. Flowering Plants of New Mexico, 3rd Edition. Published by the author, NM. 504 p.

Kartesz, J.T. 1994. A Synonymized Checklist of the Vascular Flora of the United States, Canada, and Greenland, Vol. 1, 2nd Ed. Biota of North America Program of the North Carolina Botanical Garden. Timber Press, Portland, OR. 622 p.

Kearney, T.H., R. Peebles, and Collaborators. 1951 with 1960 supplement. Arizona Flora. University of California Press, Berkeley, CA. 1,085 p.

Martin, W.C. and C.E. Hutchins. 1980 (reprinted 2001). A Flora of New Mexico, Vol. 1. Bishen Singh Mahendra Pal Singh (India) and Koeltz Scientific Books (Germany). 1,276 p.

Waisel, Y. 1972. Biology of Halophytes. Academic Press, NY. 395 p.

Warnock, B.H. 1974. Wildflowers of the Guadalupe Mountains and the Sand Dune Country, Texas. Sul Ross State University, Alpine, TX. 176 p.

Zahran, M.A. 1982. Ecology of halophytic vegetation of Egypt. In: D.N. Sen and K.S. Rajpurohit, eds. Contributions to the Ecology of Halophytes.. Dr. W. Junk Publishers, The Hague, Netherlands. p. 3-20.

James E. Nellessen, Botanist, Biologist and Environmental Scientist, Taschek Environmental Consulting, 8901 Adams St., NE, Albuquerque, NM 87113