***Batis maritima* L.** saltwort
BATACEAE

Synonyms: none

General Description.—Saltwort, also known as turtleweed, pickleweed, barilla, planta de sal, camphire, herbe-à-crâbes, and akulikuli-kai, is a low, yellow-green shrub with succulent leaves. It is prostrate or upright and occasionally reaches 1 m in height, 2 m in lateral extent, and 5 cm in basal diameter. Stems are usually multiple as sprouts from the root crown, and as they become tall and heavy, lie down and root along the stems forming loose mats. Weak roots with light-tan, corky bark form tap and lateral root systems. The bark is grayish white; stem wood is weak and brittle. The glabrous leaves are succulent, linear or narrowly oblanceolate and round or three- to four-angled in cross section. Tiny, white male and female flowers occur on different plants. Fruits are axillary drupaceous, yellow-green syncarps 1 to 2 cm long (Liogier 1985, Stevens and others 2001, Wiggins and Porter 1971).

Range.—Saltwort is native to coastal areas of southern United States including California, Mexico, Central America, South America to Brazil and Peru, the West Indies, and the Galapagos Islands (Howard 1988, Wiggins and Porter 1971). It has been planted in a number of areas in the tropics and has naturalized in at least Hawaii (Neal 1965).

Ecology.—Saltwort is uncommon to abundant in low-laying areas near seashores. It grows in salt marshes, at the upper edge of tidal flats, at the edge of mangrove stands, and between scattered mangroves. It is recognized as a major colonizer after mangroves are destroyed by hurricanes. Although it is not a water plant, it can endure brief flooding and long periods of waterlogged soils (Nelson 1996). Saltwort grows slowly in soils with high salt concentrations and areas with seawater overwash where it suffers little competition from other plants. The species manages salts by sequestering them in cell vacuoles and eventually shedding the leaves (Barbuda Turf Company 2002). It also grows in soils without salt but is vulnerable to competition from nonhalophytes. The soils are usually sandy, marly, or gravely. Deposits of wrack (dead plant material) by high tides have been shown to be beneficial to the species (Pennings and Richards 1998). Saltwort is intolerant of shade. The species is not seriously affected by insects, disease, or grazing.

Reproduction.—In Florida, saltwort flowers in the spring and fruits in the summer (Long and Lakela 1976). Flowering and fruiting occurs year-round in Puerto Rico. Little is known about seed production or germination. Most effective reproduction of the species appears to be vegetative. Sprouting from the root crown occurs with and without disturbance. Layering is a constant process of prostrate stems. New plants can be started by cuttings and probably broken pieces of plants are carried to new habitat by water and machinery. It is speculated that whole plants washed to sea during torrential rains in South America were carried by currents to establish the species in the Galapagos Islands (Trillmich 2002).

Growth and Management.—Saltwart plants established in experiments from cuttings and irrigated with fresh and brackish water grew 65 cm and reached plant dry weights of 120 g in 13 weeks. Plants receiving saltier water grew much less but still added height and weight with water almost twice as salty as sea water. Tissue ash concentrations did not differ significantly between treatments (Miyamoto and others 1996). Wild plants in stands in Puerto Rico appear to extend their stems about 1 m/year. Leaf succulence increases as much as 1.5 times during the dry season to maintain a near static solute (chiefly Na^+, Cl^-, and $S0_4^{--}$) concentration (Lüttge and others 1989). Probably all planting for landscaping and environmental restoration is by rooted cuttings or uprooted wild plants. Except in Hawaii, where it is being suppressed as an exotic plant (Big Island Invasive Species Committee 2002), there is little reason to control stands of saltwort. It grows in disturbed areas where few other plants can survive.

Benefits.—The principal benefit of saltwort is that it grows in, covers, and protects salty low-laying areas where few other species will grow. It is used as an ornamental and ground cover on similar sites. Salt tolerance of the species allows it to be irrigated with brackish and sea water, as well as fresh water (Miyamoto and others 1996). Ashes of the plant were once used in the manufacture of glass and soap. The leaves are sometimes eaten as a salad (Neal 1965). However, it is toxic in large quantities (Austin 1998). Saltwort serves as the larval and adult hosts for the great Southern white and Eastern pigmy blue butterflies (Florida Cooperative Extension Service 2002) and is an important food source for the Galapagos marine iguana (*Amblyrhynchus cristatus*) (Wrege 2002). The species has applications in herbal medicine to treat eczema, psoriasis, and other skin conditions, rheumatism, gout, blood and vein disorders (Liogier 1990).

References

Austin, D.F. 1998. Poisonous plants of southern Florida. http://www.fau.edu/divdept/science/envsci/poison-pl.html. 9 p.

Barbuda Turf Company. 2002. Halophytes in deep. Barbuda Turf Company, Codrington Village, Barbuda, Antigua-Barbuda, West Indies. http://www.geocities.com/barbudaturf/hallophites%20in%20deep.htm. 3 p.

Big Island Invasive Species Committee. 2002. Pest prevention/suppression: eradication of incipient forest pest plants by the Big Island Species Committee. http://www.hear.org/operationmicronia/2002biiscannual.pdf. 9 p.

Florida Cooperative Extension Service. 2002. Butterfly gardening in Florida. University of Florida, Gainesville, FL. http://edis.ifas.ufl.edu/BODY_UW057. 24 p.

Howard R.A. 1988. Flora of the Lesser Antilles, Leeward and Windward Islands. Dicotyledoneae, Part 1. Vol. 4. Jamaica Plain, MA: Arnold Arboretum, Harvard University. 673 p.

Liogier H.A. 1985. Descriptive flora of Puerto Rico and adjacent islands, Spermatophyta. Vol. 1. Editorial de la Universidad de Puerto Rico, Río Piedras, PR. 352 p.

Liogier, H.A. 1990. Plantas medicinales de Puerto Rico y del Caribe. Iberoamericana de Ediciones, Inc., San Juan, PR. 566 p.

Long, R.W. and O. Lakela. 1976. A flora of Tropical Florida. Banyon Books, Miami, FL. 962 p.

Lüttge, U., M. Popp, E. Medina, W.J. Cram, M. Diaz, H. Griffiths, H.S.J. Lee, C. Schäfer, J.A. Smith, and K.H. Stimmel. 1989. Ecophysiology of xerophytic and halophytic vegetation of a coastal alluvial plain in Northern Venezuela. New Phytologist 111(2): 283-291.

Miyamoto, S., E.P. Glenn, and M.W. Olsen. 1996. Growth, water use and salt uptake of four halophytes irrigated with highly saline water. Journal of Arid Environments 32(2): 141-159.

Neal, M.C. 1965. In gardens of Hawaii. Spec. Pub. 50. Bernice P. Bishop Museum Press, Honolulu, HI. 924 p.

Nelson, G. 1996. The shrubs and woody vines of Florida. Pineapple Press, Inc., Sarasota, FL. 391 p.

Pennings, S.C. and C.L. Richards. 1998. Effects of wrack burial in salt-stressed habitats: *Batis maritima* in a southwest Atlantic salt marsh. Ecography 21(6): 630-638.

Stevens, W.D., C. Ulloa-U., A. Pool, and O.H. Montiel, eds. 2001. Flora de Nicaragua. Monographs of Systematic Botany Vol. 85, No. 1. Missouri Botanical Garden Press. 943 p.

Trillmich, F. 2002. El Niño in the Galapagos Islands: a natural experiment. International Council of Scientific Unions. http://www.icsu-scope.org/downloadpubs/scope45/ch01-1.3.1.html. [not paged].

Wiggins, I.L. and D.M. Porter. 1971. Flora of the Galápagos Islands. Stanford University Press, Stanford, CA. 998 p.

Wrege, P.H. 2002. Bee-eater research: Galapagos! Department of Ecology and Evolutionary Biology, Cornell University, Ithaca, New York. http://www.eeb.cornell.edu/wrege/pages/iggires.html. 4 p.

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