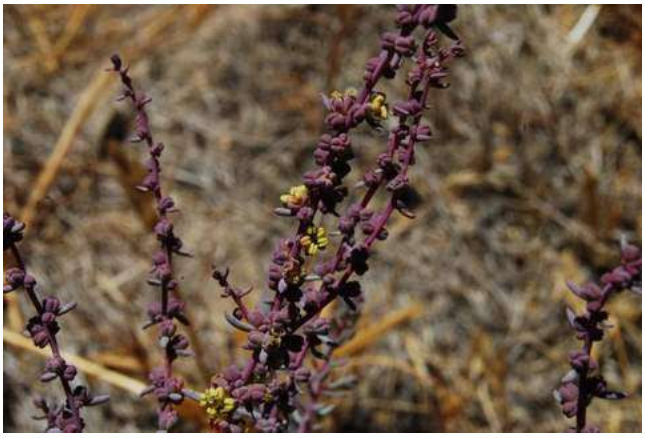
SUAEDA NIGRA (RAF.) J. F. MACBR. (FORMERLY *SUAEDA MOQUINII* (TORR.) GREENE)

COMMON NAME(S): MOJAVE SEABLITE, BUSH SEEPWEED
FAMILY: AMARANTHACEAE
GROWTH FORM(S): SUBSHRUB, SHRUB



Suaeda nigra flowering during August 2008.

PLANTING

Seeds were hand-sown onto mounded planting beds during four consecutive growing seasons from 2001 to 2004. The *S. nigra* plants that became established at the nursery during that period did not survive to the present (2009). Seeds were planted again during January 2008 and sprinkler irrigated in response to low rainfall. Several individuals germinated, but did not survive for more than a few weeks.

PHENOLOGY

We have not been able to observe the timing of germination for the species. In various years, we have observed *S. nigra* seedlings at the nursery during March, May, and June, but we are not sure which month is the most typical. We have observed the species in flower during August. Seeds can typically be collected from mid-September through October. During winter, the plants go dormant and drop their foliage.

SEED HARVESTING

The seed of *S. nigra* is a utricle enclosed in a calyx (a floral structure). Seeds are ready for collection when they are black and shiny, have a hard consistency, and the calyces that enclose them have turned brown and have a crumbly texture. It should be noted that many of the calyces are potentially empty (Ransom Seed Laboratory, see link below), though this is difficult to determine just by looking at them. One can rub a calyx between two fingers or against the palm of the hand to determine whether it contains a seed. When collecting seed, it is advisable to estimate the proportion of unfilled calyces in order to determine the quality of the seed collection. Seeds can be stripped from branches and stems by hand. We would transport the harvested plant material to a warehouse and spread it out on tarpaulins to air dry, before seed processing.

We have realized that during late summer and fall when seeds are maturing and foliage has begun to senesce and turn dark brown in color, *S. nigra* strongly resembles another native shrub species, *Kochia californica*. In areas of native habitat where the two species co-occur, extra care should be taken to properly identify the species before collecting seed. One of the more apparent differences between the species is that *K. californica* foliage is typically hairy, whereas *S. nigra* foliage is typically glabrous (without hair) and glaucous (covered with a waxy or powdery coating). However, the Jepson Manual (Hickman, 1993) states that *S. nigra* foliage is sometimes hairy.

SEED MORPHOLOGY

S. nigra has been described as having dimorphic seeds (Khan, 2001), soft brown and hard black. However, we have only observed the hard black seeds and the Jepson manual (Hickman, 1993) mentions only shiny, black seeds in its description of *S. moquinii* (a former name for *S. nigra*).

Seed Processing Methods

Using a hammer mill, raw plant material is reduced to a coarse but uniform mixture of seed units (seed plus calyx) and associated chaff (e.g., pieces of stems, leaves, floral structures). Many of the calyces remain attached to the seeds; it would require a lot of additional effort to remove them. Seed units are separated from chaff using either a Clipper Office Tester or Clipper Eclipse (both made by the A.T. Ferrell Company). For relatively small seed lots or in the absence of the equipment mentioned, plant material can be broken up by rubbing it over a screen or sieve. Wire mesh sieves with various screen sizes can then be used to separate seed units from chaff.

Cultivation Overview

Several *S. nigra* plants became established at the nursery during 2002-2005, but have died in recent years. We have occasionally observed some volunteer seedlings at the nursery that did not survive to maturity. As of summer 2009, the only *S. nigra* plants remaining at the nursery are small and low growing with dense foliage, and appear stressed. We have had limited success with cultivating *S. nigra* at the nursery, but the species has grown extremely well when utilized in some restoration trials at a site located within a few miles of the nursery. The soil type at the nursery is Tranquillity clay, whereas the soil type at the restoration site is Ciervo clay. Irrigation was not used to establish the plants at the restoration site.

S. nigra leaves are fleshy and typically light green in color, though we have observed some plants with aqua blue or purple colored foliage. The species is halophytic and it would likely tolerate the elevated soil salinity that is characteristic of the retired agricultural lands in the western San Joaquin Valley.

Research on *Suaeda nigra*

S. nigra (= *S. moquinii)* was utilized in a study that evaluated the potential for activated charcoal to protect native seeds from the effects of pre-emergent herbicides (Lair et al., 2006).

REFERENCES

Hickman, J. C. (editor). 1993. The Jepson manual: higher plants of California. University of California Press, Berkeley.

ADDITIONAL INFORMATION ABOUT *SUAEDA NIGRA*:

Internet Resources

Species Profile from the Ransom Seed Laboratory: http://www.ransomseedlab.com/genus/s/suaeda_moquinii.htm

Literature

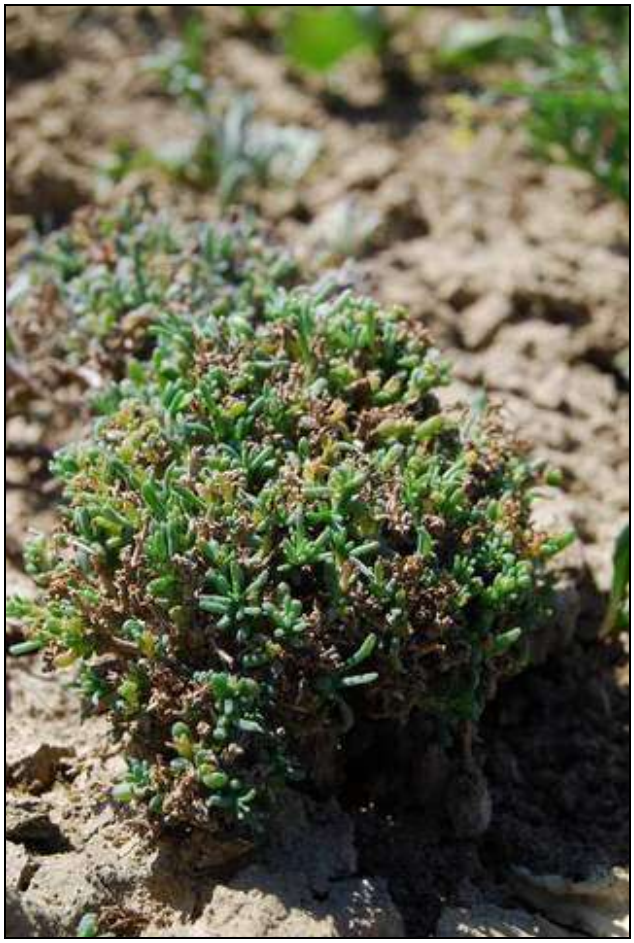
Khan, M.A., B. Gul, and D.J. Weber. 2001. Germination of dimorphic seeds of *Suaeda moquinii* under high salinity stress. Australian Journal of Botany 49: 185-192.

Lair, K., N. Ritter, and A. Howard. 2006. Use of activated charcoal to protect native seeds from herbicides (California). Ecological Restoration 24:122-124.

PREPARED BY

Brianna D. Borders, Restoration Botanist.

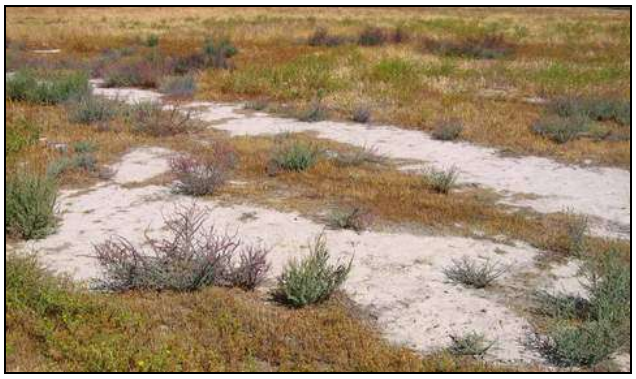
Other Contributors: Dr. Nur Ritter, Justine Kokx, Adrian Howard, and Graham Biddy



A few *S. nigra* plants growing at the native plant nursery appear stressed; they are small and low growing with dense foliage.

PHOTOS

S. nigra (plants with the sea green-purple colored foliage) growing in a roadside area of remnant habitat, Fresno County.



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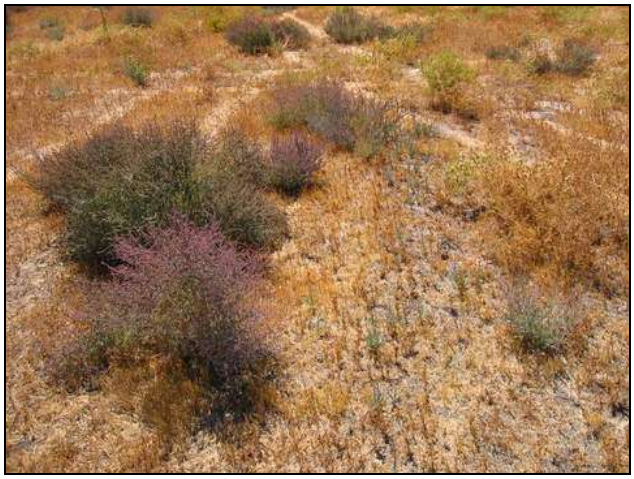

S. nigra growing in a roadside area of remnant habitat, Fresno County.

Each *S. nigra* seed is enclosed in a calyx (pictured).

S. nigra forming fruits during August 2008.

S. nigra seeds. Scale shown is millimeters.

S. nigra seeds are each enclosed in a calyx (pictured).