

FRANKENIA SALINA* (MOLINA) I.M. JOHNSTON*COMMON NAME: ALKALI HEATH, ALKALI SEAHEATH****FAMILY: FRANKENIACEAE****GROWTH FORM: PERENNIAL HERB****PLANTING**

During January 2003, seeds were hand-sown onto mounded planting beds, and a thin layer of soil was then raked over them. The seeds germinated readily without any form of pre-treatment. The first seed harvest from the plants was made during October 2003. The Tranquillity area has a semi-arid climate with low mean annual precipitation. However, the 2002-03 growing season was a favorable year for plant establishment at the nursery. Total precipitation received during the 2002-03 hydrologic year (1 August 2002 through 31 July 2003), 17.6 cm, was 80.2% of the 30-year mean¹, and precipitation received during April and May of 2003 was at least 25% above average (California Irrigation Management Information System, Station #105).

Seeds of *F. salina* were also sown during winter of the 2005-06 growing season and plants became successfully established. Though total precipitation received during the 2005-06 hydrologic year was only 68.5% of the 30-year mean, precipitation received during March, April, and May of 2006 was at least 25% above average. If *F. salina* seeds had been sown in years with scarce spring rainfall, plant establishment would not likely have been as successful.

¹ The annual and monthly means were calculated using 30 years of precipitation data (1976-2006) from four weather stations (Cooperative Station ID #'s 43083, 45118, 45119, 45120) located in the western San Joaquin Valley.

PHENOLOGY

Since *F. salina* plants have been established at the nursery for over 5 years, we have had few opportunities to observe the timing of germination. The species typically flowers from May through August, though plants have been observed in flower during September and early October. Peak seed harvesting time is late October to mid-November. During winter, the plants go dormant and the foliage dries and turns dark brown in color. Plants typically begin to display new growth during March.

SEED DORMANCY

Emery (1988) does not recommend any seed treatment. Young (2001) recommends soaking seeds in fresh water for 24 hours before planting. Professional germination tests performed on three seed lots² of *F. salina* all indicated that a portion of the seeds (47, 50, and 55%) were dormant. However, the dormancy mechanism is unknown.

SEED HARVESTING

The fruits of *F. salina* are capsules and are ready for collection when they are dry and brown and the seeds inside are a dark red-brown color. We would harvest fruit-bearing stems by clipping them from plants. So that the plants would persist from year to year, we harvested no more than one-third of the stems on each plant. It is ideal to minimize the amount of soil that is collected along with the plants; soil particles that are of a similar size and weight as the seeds can be very difficult to remove during seed processing. We would transport the harvested plant material to a warehouse and spread it out on tarpaulins to air dry. We would set up a few electric fans to facilitate drying and turn the plant material at least once a day.

SEED PROCESSING METHODS

We would begin by either 1) rubbing the harvested plant material over a screen or sieve to remove fruits from stems and break open fruits; or 2) hammer milling the plant material, which results in a coarse but uniform mixture of seeds and associated chaff (e.g., pieces of stems, leaves, floral structures). *F. salina* is a difficult species to process due to the small size of the seeds (less than 1 millimeter in length) and because the fruits sometimes do not open easily. Hammer milling is very effective at breaking open the fruits but also produces a lot of fine dusty chaff that will be difficult to separate from the seeds during later stages of the cleaning process.

We have successfully used a household blender on pulse mode to break open *F. salina* fruits. In order to prevent damage to the seeds, the blender blade needs to first be coated with a plastic dip (Thomas, 2003). We found this method to be effective for processing a small volume of plant material, but it would not be ideal for processing a large volume of material.

After seeds have been released from fruits using one or more of the methods described above, seeds can be separated from chaff using an air screen cleaner such as a Clipper Office Tester (made by the A.T. Ferrell Company). An air separator (Seed Tech Systems, LLC.) can be used to

² The three seed lots were not produced at our native plant nursery. Rather, two wholesale seed companies shared their seed testing results with us.

remove additional lightweight chaff. However, many of the chaff particles will be of a similar size and weight as the seeds and it is virtually impossible to completely separate the two portions.

CULTIVATION OVERVIEW

Numerous *F. salina* individuals derived from two wild source populations have been established in the nursery since 2003, and they have reliably produced seed every year. *F. salina* establishment would not likely have been successful without substantial manual weed control efforts (hand pulling) during the plants' first few years of growth.

The species attracts a variety of pollinators. The species has spread a short distance from its original planted area through seed dispersal. The species does not seem susceptible to herbivory, though we have observed some damage to plants (clipped stems), presumably caused by rabbits.

A horticultural entry included in The Jepson Manual recommends that *F. salina* does best in full or nearly full sun and requires moderate summer watering (Hickman, 1993). Though we typically do not irrigate the nursery during the summer, *F. salina* always survives and produces seed in the fall. But it is likely that an increase in plant vigor and seed production would occur in response to summer irrigation.

REFERENCES

- Emery, D.E. 1988. Seed Propagation of Native California Plants. Santa Barbara, CA. Santa Barbara Botanic Garden. 115 pp.
- Hickman, J. C. (editor). 1993. The Jepson manual: higher plants of California. University of California Press, Berkeley.
- Thomas, D. 2003. Modifying blender blades for seed cleaning. Native Plants Journal 4: 72-73.

ADDITIONAL INFORMATION ABOUT *FRANKENIA SALINA*:

Internet Resources

- Propagation Protocol from the Native Plant Network (Young, 2001):
http://nativeplants.for.uidaho.edu/network/view.asp?protocol_id=608
- Species profile from the Ransom Seed Laboratory:
http://www.ransomseedlab.com/genus/f/frankenian_salina.htm

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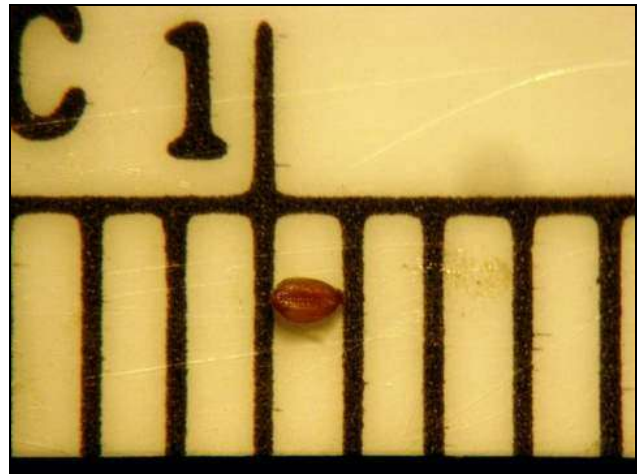
PHOTOS



The low-growing brown vegetation in the foreground is *F. salina* during February, after the plants have gone dormant.



F. salina seeds. Scale shown is millimeters.



F. salina seed. Scale shown is millimeters.