

How to Germinate *Rhus Integrifolia*

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Rhus integrifolia, the Lemonade Berry, is a common shrub or small tree in Southern California coastal regions. It stays evergreen in the summer and it produces pink flowers and sticky red fruit. Lemonade Berry is one of the most popular native plants for gardens because it is such a beautiful and versatile plant, and because it grows well in typical garden conditions. It is a mainstay in low water gardens because it remains green and attractive with little or no water.

How to germinate Rhus integrifolia

1) You must first separate the seeds from the gooey fruit. The Rancho Santa Ana guide's [1] process for *Rhus trilobata* will work as well for *Rhus integrifolia*. When the fruit is ripe, you can also extract seeds from the fruit by squeezing them in your fingers. An alternative is to collect seeds after they fall to the ground. The seeds (Fig. 1) are large enough to be seen on the ground, and apparently birds eat the fruit and drop the seeds. I collected hundreds of seeds this way in the fall and winter, which I found to be less trouble than extracting the seeds from the fruit.

2) Lightly sand an edge of the seed, just enough to penetrate the impermeable outer coat of the seed, but not through the entire seed coat (Fig. 2).

3) Hydrate seeds by soaking them in water. Hydrated seeds are visibly thicker, and the seed coats often split at the edges. The hydration rate depends on temperature and how much of the seed coat has been removed. Seeds hydrate at room temperature in about four days, and more quickly at 80°F.

3) Sow or stratify¹ hydrated seeds at room temperature or even warmer (i.e. 80°F). Germination begins in a few days and continues for perhaps another week. Here are some alternatives:

- a) Check stratifying seeds every day or so, and as radicles appear, transplant the seeds to pots.
- b) Place hydrated seeds into a flat of potting soil, then keep the flat moist and at room temperature until the seedlings are ready to transplant to pots.
- c) Plant seeds directly into soil. This can be done immediately after the seeds hydrate, after seeds have stratified for a few days, or when radicles begin to appear. Seeds planted after radicles appear do particularly well (see below).

Hydration and germination

Hydration is the key to germinating these seeds, but their hydrophobic coats resist hydration. Hydration requires penetration of the seed's outer hydrophobic layer. While I did this by lightly sanding the seeds, another options is to nick the edge with a sharp knife. Connie Beck [2]

¹ Stratification consists of keeping seeds in a moist environment at a controlled temperature. The author places seeds in small plastic food storage containers on top of a mixture of sifted organic material with about 20% clay topsoil.

suggests fingernail clippers. Seeds hydrate gradually, gaining weight over several days. Hydrated seeds weigh around 60% more than dry seeds, and they increase their volume mainly by becoming thicker. One sign of hydration is the formation of cracks along the edges (Fig. 1).

Soaking untreated seeds in water produces no change in weight. Both Emory [3] and DeHart [4] suggest hot water treatment² or soaking them in sulphuric acid. I tried treating *Rhus* seeds with hot water, and none of the seeds either hydrated or germinated. Three weeks later, I nicked some of these seeds, which hydrated, but did not germinate. The hot water appears to have killed the seeds. Given the success of simply nicking the seed coat, I did not bother trying sulphuric acid.

Warmth accelerates hydration and germination. Seeds hydrate in a day at 80°F, germination starts in another day, and 80% of the seeds germinate within three or four days.

Stratified untreated seeds germinate sporadically and slowly. Germination took one to several months. Few batches produced more than 50% germination and some produced no germination. Some seeds germinated after being completely covered by fungus, then grew into healthy plants.



Figure 1. Rhus integrifolia seeds. Left: dry seeds are roughly 6 mm across and 2 mm thick. Right: a radicle has just appeared from a hydrated seed. Hydrated seeds are visibly larger and thicker. The seed coat has separated into two clam shell halves.



Figure 2. A lightly sanded seed showing a thin impermeable layer on the outside of the seed coat.

² Connie Beck's [4] standard hot water treatment is to pour a few inches of water at 180°F over seeds in a styrofoam cup and to leave them in the cup overnight.

Figures 3 and 4 illustrate the value of planting *Rhus* seeds immediately when they germinate. Native seeds often germinate irregularly and at unpredictable times. This may be a good strategy for coping with California's climate, but it is not helpful when we put them into the ground at times and locations we know to be optimum. If we first germinate the seeds, they start growing immediately, and with better results.



*Figure 3. This is a roughly 2' x 2' square of dirt in which 80 untreated *Rhus* seeds were placed 20 to a square. The seeds were planted in late November 2013, and this photo shows six seedlings in late June 2014. The germination rate was 7.5%.*



Figure 4. These are 16 seedlings, also in late June and only two feet from the ones above. These seeds were planted when they germinated, which was when the seed's radicle first appeared. These were planted in February 2014, and nearly 100% survived. They are larger and more vigorous than the ones above.

I have tried no experiments to see if seeds will germinate while still inside the fruit, but that is not likely. Deno [5] explains why fruit inhibits germination.

References

- [1] Michael Wall and John Macdonald, *Processing Seeds of California Native Plants for Conservation, Storage, and Restoration*, Rancho Santa Ana Botanic Garden, 2009.
<http://www.hazmac.biz/Seed%20Processing/2009S.pdf>
- [2] Connie Beck is a past chair of the CNPS San Diego's Propagation Committee, and is widely acknowledged as a top expert on how to propagate plants from seed.
- [3] Dara E. Emory, *Seed Propagation of Native California Plants*, Santa Barbara Botanic Garden, 1988.
- [4] De Hart, "*Propagation Secrets for California Native Plants*", CNPS San Diego, 2004.
- [5] Deno, N. "*Seed Germination theory and Practice*", Second Edition, 1993 (available for download on the web).