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Seed Propagation Techniques for Selected California Natives at Suncrest Nurseries®

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INTRODUCTION

After many false starts, a wide variety of California native plants have finally begun to join the horticultural mainstream. Their most striking successes have involved specific cultivars, propagated by vegetative means (mostly cuttings). However, seed propagation is still a desirable and economical means of propagating many species and seed strains for ornamental use and, of course, indispensable in propagating for site restoration and revegetation. Success with native seeds involves attention to climate and habitat for each species, unique plant and seed features, and those of the grower's own location.

Generally speaking, lowland and middle-elevation natives are adapted to a cycle of moist, cool winters and early springs, warm dry summers and early falls. Many natives of these regions require cool, but not necessarily freezing, temperatures to germinate at high levels. In some cases, active growth is also limited to the cool season. Plants of our higher mountains are faced with something more similar to a continental climate, with truly cold (often subzero) winters. However, winter snow-fall provides the bulk of available moisture for the growing season, with summer rainfall irregular and often light. Summer temperatures are mild to cool, depending on elevation.

Our own situation on the Central Coast permits us to work with plants from a wide range of elevations, coastal as well as interior. Winters are cool but not excessively cold (with minimum temperatures normally in the mid- to low-twenties), spring warming comes as early as late February, and summer days are generally mild (mostly in the 60s and 70s), often with morning and evening fog. Under these conditions, seeds of many species can be planted outdoors, in simple open shade houses, to receive an acceptable degree of winter chilling for good germination.

We plant most native seeds in ordinary propagation flats (for us, 17 × 18-inch ("California propagation flats") of our basic cutting medium (90% medium grade perlite, 10% screened peat moss) and usually barely cover them with the same. Those especially subject to damping-off and other diseases are further dressed with coarse sand or small gravel. Other details vary with the species involved.

SELECTED CALIFORNIA NATIVES

Madrone or Madroño — *Arbutus menziesii*. Madrone is a picturesque tree occupying many different habitats scattered over much of California and the Pacific Northwest. Given this, it is a surprisingly difficult and unpredictable tree to grow, both in the nursery and in the landscape, often succumbing to root rots from species of *Pythium*, *Phytophthora*, and *Rhizoctonia*.

Seed propagation of madrone is straightforward, but requires attention to detail. Berries are collected from the trees as they ripen in fall (usually late-October on

the Central Coast) with luck ahead of the flocks of cedar waxwings and other birds that relish them.

The berries are soaked for a few days to soften the skins and mashed in a large bowl or dishpan. The pulp is removed by simple flotation and pouring off in successive rinses and the seeds are either planted immediately outside in a protected, shady setting or mixed with moist perlite and refrigerated for storage. Starting them in a cool greenhouse, with or without bottom heat, also works well. In any case, it is extremely important that they not be planted too densely, to avoid damping-off at the seedling stage. Germination begins in 3–8 weeks.

The seedlings should be transplanted as soon as they are easy to handle and always before they become crowded. They grow rapidly and can produce well-rooted plants in 1-gal containers 12 months or less from sowing.

Shrubby Legumes: Western Redbud (*Cercis occidentalis*). Western redbud is one of our showiest native shrubs and small trees. Given reasonably well-drained soil, it responds well to cultivation over much of California and beyond.

Seeds are borne in few-seeded flat pods and are retained for several months or even multiple seasons, making them easy to collect at our convenience (many other California legumes, like the lupines that follow, have explosive pods). The pods are easily split and the seeds extracted. The seeds may be planted immediately or held in dry storage for up to a year, perhaps more.

Typical of shrubby legumes, western redbud has hard, dense seeds with a waxy coat. This coat is softened and made more permeable to water by placing the seeds in a convenient container, pouring in hot (not quite boiling) water and allowing them to cool and soak overnight. A further soak in a commercial smoke extract, like Super Smoke Plus, may be of benefit, though this is not clear from our comparisons. Our best germination has been with simple outdoor planting in February or March, though the seeds may be refrigerated for a month or two in moist perlite or other medium, and then planted out during the warmer months for extended crop staging.

Seedlings are ready for transplanting to rose pots or deeper tubes (which minimize root-binding) by May to July. Roots are trimmed to promote branching. The seedlings grow strongly during their first season but often cease growth in late summer. Accordingly, we find it best to hold them as liners until the following spring.

Shrubby Lupines. The shrubby lupines present a slightly different set of challenges, beginning with collection of the seeds. Pods actually “explode” as they dry, flinging seeds in all directions. Catching them at the right time is almost a matter of luck in the wild and the result of persistent observation and multiple collections in the nursery. We collect the pods before they actually dry, and let them open (often sounding like little firecrackers) in large *closed* paper bags.

The rest is much as described for Western redbud, using a hot water soak, followed or not by a soak in smoke extract. However, they sprout quickly outdoors once night temperatures have descended to the 40s. They grow rapidly and will produce salable 1-gal plants within 8 months of sowing.

The Giant Poppies: *Dendromecon* and *Romneya*. The bush poppy (*Dendromecon rigida* and *D. harfordii*) and Matilija poppy (*Romneya coulteri*) have become quite popular as ornamentals in California, in spite of some serious challenges they present for cultivation. Those challenges begin in the nursery, with seedling production, and are similar for both genera.

Dendromecon is a large spring-blooming shrub, whose season may be extended to most of the year with irrigated plants in a coastal climate. This makes seed collection an almost constant process for us. When each cheery yellow flower has faded, a long beak-like seed pod develops, separating with some force when it dries and flinging the seeds for a few feet.

We collect the pods, like those of the lupines, well before they dry and hold them in paper bags for seed release. The seeds resemble small buckshot, hard and dense and are covered with a nearly impermeable wax.

This is dissolved with white gas or a similar solvent (the old method involved actual burning, which had the disadvantage of incinerating a portion of the seeds). Then, the seeds are soaked in Super Smoke Plus, containing both smoke extracts and gibberellic acid and sown in flats with a dressing of sand to inhibit damping-off.

Normally they are sown in open shade during the cool months, under a rain roof to control moisture, though we have not fixed the actual range of temperatures at which germination takes place. They germinate at high rates and grow rapidly. The next hurdle is careful transplanting to rose pots, teasing them apart to minimize root breakage. Generally they are grown on for a couple of months in an unheated greenhouse, responding well to warm days, then finished in an open shade house. Once planted to 1-gal containers, they can be ready for sale within 3–4 months.

Romneya is a gigantic semi-shrubby perennial, with an extensive underground network of fleshy roots and rhizomes. It produces its huge crepe-paper-like flowers in summer, then develops large upfacing pods that open at the ends in typical poppy style. Each contains dozens of small hard seeds. We treat these just as we do the seeds of *Dendromecon*, with both solvent and smoke soaks and outdoor planting under a rain roof. However, the flats are dressed with small gravel ($\frac{1}{16}$ – $\frac{1}{8}$ inch) to further inhibit damping-off and watered very carefully on a strict demand schedule. The seedlings are quite small and grow much less strongly than those of *Dendromecon* at first. They are potted while still small and delicate, because they re-establish more rapidly after potting at this stage. They are teased apart gently with tweezers (not a job for the clumsy or impatient!), with care not to break the brittle roots. Once potted, and particularly under the same greenhouse conditions as *Dendromecon*, they grow rapidly and are ready in a few months for 1-gal containers.

Wild Buckwheats — *Eriogonum*. Our native buckwheats are becoming popular landscape perennials and shrubs in California, as their ornamental features, drought tolerance, and general ease of culture are finally recognized. They are also a joy to handle in the nursery. We produce them primarily by seeding, though a few selected cultivars are propagated by cuttings.

Seeds of both lowland and highland species are collected in the fall (mostly September and October), by which time the clusters of tiny achenes have dried on the stems. They are easily stripped from the stems and held in cool, dry storage until needed.

All species are sown outdoors in an open shade house. Because of the danger of frost damage to the young seedlings, sowing is delayed until the danger of hard freezes has passed (for us, usually mid-February). Seeds of high-elevation species are normally refrigerated in bags of moist perlite from January to March, then sown in the same manner outdoors, though several species will germinate well with no refrigeration.

The seedlings are initially quite small, but they are usually ready for potting within 2 months of germination, further transplanting to 1-gal containers in another 2 months, and salable by September of the first season.

Toyon — *Heteromeles arbutifolia*. Toyon is a large evergreen shrub, admired for its bushy form, dark glistening foliage, and dazzling red to orange berries in fall and winter. It is an adaptable plant in the landscape, though it certainly has some quirks in commercial cultivation.

Berries are collected in midwinter, usually early January in northern California. Seeds will be well-developed by this time (note that the berries color well long before the seeds are mature, sometimes by the end of October). Then begins the real fun.

The berries are stripped from their stems and place in dishpans or similar containers, then the resulting mass is barely covered with water. They are allowed to soak and ferment for up to 2 weeks to soften both skins and pulp. Then, they're mashed (a potato masher is a good, nondestructive tool for the job) and given a series of rinses, in which the lighter skins and pulp are poured off, leaving the seeds behind.

Once the mixture consists mostly of visible seeds (these are light yellow to white and fleshy), it is either planted directly or refrigerated in bags of moist perlite or similar medium for storage up to 2 months. Seeds will germinate under a wide range of temperatures, outdoors in an ordinary shadehouse or in an unheated greenhouse. The seedlings grow strongly and are ready for potting to rose pots within 2 months of sprouting and transplanting to 1-gal containers by midsummer. The "quirks" have to do with their susceptibility to water molds, particularly pythium. We avoid overcrowding of the plants at all stages, remove infected plants at once, and apply fungicides as necessary.

Iris. Our native *Iris* species — and even more, their larger-flowered hybrids — have become popular garden perennials in California. Most of ours are selected cultivars, propagated in fall by divisions. However, seed propagation remains important for both species material, notably of *I. douglasiana* and our own hybrid batches raised for reselection.

Pods are collected in mid- to late-summer, just before they dry. While seeds of our native iris may be started in a cool, shady setting during much of the year, germination is greatly improved by subjecting them to normal winter cold (for us, night temperatures mostly in the 30s and low 40s, with occasional nights in the middle 20s) for 1–2 months. An open shadehouse has served this purpose nicely. Sprouting and growth commence at this time, usually in January.

The plants are ready for potting within 2 months and rooted sufficiently for 1-gal containers by midsummer. If shaded to reduce summer temperatures, they will continue growing throughout the first year, rather than showing their typical native summer dormancy.

Succulent Delights. The succulent genera *Dudleya*, in the stonecrop family (Crassulaceae), and *Lewisia*, in the purslane family (Portulacaceae), include some of our most ornamental native perennials. Both form crowns of succulent leaves and the crowns may branch to form tight clumps or mats. The two groups are handled a little differently, due to both native habitat and seeding structures.

Dudleyas have many tiny seeds in each pod, with multiple pods per stem. Stems are simply cut and placed in paper bags to dry once a good portion of the pods have matured or dried. Seeds are usually planted in early spring on heated benches in the greenhouse (they seem to respond to mild to warm conditions). They are scat-

tered over the medium after mixing them with several times their volume of coarse sand, for more even distribution, and dressed over with the same coarse sand. Seedlings are tiny when they sprout and must be watered gently (they're also subject to damping-off if kept too moist). However, they will be ready for potting within 3–6 months and grow rapidly thereafter.

The lewisias have larger seeds, a few to each papery capsule. They are extracted and stored for planting in (usually) winter and early spring. These are mostly mountain plants and seem to germinate best after about 2 months' stratification in moist perlite (often they will begin to sprout in the refrigerator). Then, they are planted much like the dudleyas, with sand used to disperse clumps of seeds (or seedlings) and perlite. They sprout quickly, if they haven't already and will be ready for potting in 2–4 months, gallon containers in another 2 to 4 months.

Native Bulbs and Corms. Native bulbs have always been a joy to have in the nursery, though not always successful commercially (many are a little too wispy to compete with more robust perennial "color" in the marketplace). They're also fun and relatively easy to grow from seeds. The two groups described here represent both distinct categories of growth and dormancy and somewhat different seeding techniques.

Brodiaea. Brodiaeas are mostly small, grassy, cormous perennials of the lily family. They are divided into three genera (*Brodiaea*, *Dichelostemma*, and *Triteleia*) according to botanical distinctions that needn't concern us here. These are plants of summer-dry meadows and slopes, all with similar growth and dormancy cycles (winter/spring growth, spring flowering, and summer/fall dormancy induced by drought). Seed pods are easily collected just as they dry and the seeds shaken out when the pods split, then laid away in dry storage for fall.

They are sown as the weather cools, usually in October and November, in an open shade house and usually sprout within 2 months. They grow until either warm weather or drying out triggers their dormancy response, though we often maintain growth under shaded conditions until June or July. Though they can be transplanted at any time during active growth, it is usually most practical to let them finish their first season in seed flats, then transplant them in clumps when new growth resumes in late fall.

Usually they're allowed to "bulk up" in rose pots for a second season, each initial corm producing several offsets, then transplanted as strong liners to 1-gal containers at the start of the third season.

Native Lilies — *Lilium.* The California lilies are found mostly in moister habitats where summer drought is not a factor. They follow much the pattern of other lilies around the world: The bulbs sprout as the weather warms in spring, grow rapidly, flower in summer, set seeds in late summer and fall, and pass winter and early spring in a dormant state. The seed pods are large and easy to collect, each containing many fairly large flat seeds, with the appearance of parchment.

Even the lowland species seem to benefit from a cool to cold period beyond that they receive in our open shade house. Accordingly, they are stratified in bags of moist perlite in December or January, refrigerated for 2 months, then planted out in the usual manner, sprouting in March and April. Usually they produce only a single broad leaf in the first season, though sometimes there is a second cycle of growth during summer. The bulbs are usually potted just after new growth commences in the second spring, forming their first true stem at this time. Some are ready for 1-gal containers during the second summer. Others are held for the third spring.