

MIST PROPAGATION OF CUTTINGS FROM NATIVE CALIFORNIA PLANTS

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During the past 6 years the author has propagated native California plants from cuttings, under mist spray, for use in the University of California Arboretum on the Davis Campus. In many instances only a limited number of plants has been desired, and propagation of a particular species has been attempted on only one or two occasions. In other instances, especially with ground-cover plants, a number of lots involving many cuttings have been grown. Records have been kept of each lot of cuttings.

In general, California native plants respond to attempts at cutting propagation under mist in much the same manner as do other plants. However, many species require better drainage, both in the rooting medium and after potting, than do most plants.

Several factors must be taken into account in this type of propagation. First, the condition of the stock plant from which the cuttings are to be taken must be considered. Rather soft, leafy cuttings with a firm or even mature base are best, although very soft tips may dry or wilt before callusing. Most species produce suitable cutting wood in early summer or after fall rains under natural conditions in our area. Deciduous plants should be propagated early enough in summer to allow a flush of new growth before dormancy sets in. Propagation from relatively young seedlings or cutting-grown stock plants is more often successful, even when these plants are still in the nursery, than propagation from older plants.

Another factor is the freshness of the cuttings. They must not dry out. If held in transit, the cut material should be stored in polyethylene bags in the shade. Cuttings should, however, be planted as soon as possible or at least placed under the mist.

The rooting medium we use generally is a coarse sand or granite grit. Sometimes a mixture of perlite and vermiculite is used. Cuttings are soaked in Panogen soil drench and, after drying a few minutes, the bases dipped for 10 seconds in a 4,000 ppm solution of indolebutyric acid.

During the first week, the cuttings must be covered thoroughly by the mist, especially when the sun is shining on them. Available sunlight is an important factor in callus and root initiation, which are greatly delayed by prolonged cloudy or foggy weather. In Davis, October is a good month for taking cuttings of most species; the work should be completed by mid-November for best results. Our spray is not heated nor do we have bottom heat; in winter this is an undesirable factor. Too much water in the rooting medium is also undesirable; therefore it is important to have the best possible drainage, especially in winter. The 3¾-inch deep flats have holes drilled in the bottom and are set above the bench on ½-inch stakes. Once the cuttings are fairly well rooted, with several 1-inch roots, the cuttings

should be potted. The longer they remain in the rooting medium under the mist, the more likely they are to rot. This is especially important in the case of slow-rooting species which take 8 weeks or longer to root.

We plant the cuttings into 3-inch peat pots. Potting soil is one part sand to two parts rich clay loam containing humus. The proportion of sand may be increased in winter. Hardening-off the cuttings is a problem. The roots and stem bases are subject to rotting, and the tips easily dry. The potted plants are left under the mist for several days and then are removed to a humid environment and shaded. After a few days, the newspaper shading is removed. As soon as roots appear through the pots or the tops begin to push out new growth, the pots are moved to a less humid area. Here they are kept until the plants have hardened sufficiently to be placed under lath.

It is important to remember that most native plants must never be over-potted, over-watered, or over-fertilized. We keep them for some time in peat pots, then in 4-inch pots before moving to gallon cans. They are given water only when the peat pots or soil appears dry. Distilled water is used in the greenhouse to avoid serious salt and boron injury caused by use of the local well water. No fertilizer is used as the potting soil is sufficiently fertile.

Records of results may be summarized by placing the species in three groups:

- 1) Species rooting readily — more than 50% potted up and usually established.
- 2) Species and varieties in which approximately half the cuttings have rooted. In many instances, however, only a few of the cuttings have been successfully carried on to established plants.
- 3) Those difficult to root, or which have failed to root under the conditions of the tests.

Propagation under mist of cuttings from native California plants
University of California Arboretum, Davis, California. 1956-1962

1) Easily Rooted and Established

Arctostaphylos densiflora 'James West'
A. hookeri
A. insularis
A. uva-ursi
Baccharis pilularis
Ceanothus arboreus
C. gloriosus
C. griseus
C. var. horizontalis
C. maritimus
C. x 'Ray Hartmann'
C. x 'Sierra Blue'
Diplacus hybrids (firm wood)
Encelia spp.
Eriophyllum spp.

Eriogonum arborescens
E. x *blissianum*
Lepechinia calycina
Malvastrum spp.
Monardella spp.
Penstemon spp. (most)
Ribes sanguineum
Salvia spp.
Solanum spp.
Trichostema lanatum
Zauschneria spp.

2) Approximately 50% Rooted and Established

Arctostaphylos densiflora 'Sentinel'
A. *edmundsii*
A. *pajaroensis*
Artemisia spp.
Ceanothus purpureus
C. x 'Mountain Haze'
Eriogonum fasciculatum
E. (prostrate)
E. *grande*
E. *rubescens*

3) Failed or Very Few Rooted and Established

**Arctostaphylos manzanita*
A. *viridissima*
A. *viscida*
Carpenteria californica
 **Ceanothus impressus*
C. *integerrimus*
 **C.* *lemmonii*
 **C.* *megacarpus*
C. *papillosus*
C. *papillosus* var. *roweanus*
C. *thyrsiflorus* var. *repens*
C. *tomentosus*
C. x 'Julia Phelps'
Eriodictyon spp.
Eriogonum crocatum
E. *giganteum*
Fremontia mexicana
Garrya spp.
 **Lupinus* spp.
 **Rhamnus californica*
R. *crocea*
R. *crocea* var. *ilicifolia*
 **Rhus integrifolia*
R. *ovata*
Ribes speciosum

*Asterisk indicates species in which a very few cuttings were rooted and became established.

MODERATOR HARTMANN: Thank you, Don. We will hear a series of three talks from the Four Winds Nursery at Mission San Jose, California, dealing with a most interesting operation of rooting cuttings and healing a graft union simultaneously under mist. The speakers will be Mr. Floyd Dillon, Mr. Fred Real, and Mr. Don Dillon. Floyd Dillon will start. Floyd.

SIMULTANEOUS GRAFTING AND ROOTING OF CITRUS UNDER MIST

Part One—"Environment and Mother Plants"

FLOYD DILLON

Four Winds Growers

Mission San Jose, Fremont, California

Optimum citrus environment is the reason for the location of our growing grounds at historical Mission San Jose, Alameda County, California. We are now a part of the new City of Fremont.

Here, in 1797, the 14th Mission of the ultimate 21 Mission chain, was established. It proved to be an ideal climatic location.

In the 1840's Captain Fremont, after exploring most of the West, selected Mission San Jose as the place for his future permanent home, "Casa Fremontia."

I quote a portion of a letter, now in the Bancroft Library, University of California, from Fremont, written at Mission of San Jose in September, 1846.

"This is a pretty place — this Mission. The gardens or orchards might be made handsome places, but to render them valuable, possession of the water which comes from a ravine in the hills is essential. A handsome plain of good lands extends from the hills towards San Francisco Bay and could be well watered."

I will add — he didn't get this land — but Fremont is a rightful name for our city. Our 6-acre growing grounds are on Mission land, on the foothill bench, sloping to the west.

The drainage of cold air is ideal. The Mission elevation is 300 feet, ours about 200 feet, while Niles, about 3 miles from us has an elevation of 45 feet.

This is a thermal belt, relatively frost free (but we had snow last winter!) Orange trees are common here in the dooryard gardens of the older homes. The sun gives ample heat. The area is free of noxious weeds, difficult scales, and free of the lethal virus, Tristeza — commonly called "Quick Decline." We ship pinto tag. Our water is from Hetch Hetchy reservoir (San Francisco water supply), and of exceptionally good quality. The right climatic environment is basic because all of our propagation is from mother-plant twigs. These mother plants are grown in the open air, without shelter from the elements. Having the right wood to propagate is essential. However, the propagation of these twigs and their simultaneous healing and rooting is done under controlled hot house conditions.