

# Improving Culturing Techniques for *Eriogonum cinereum* in a Nursery Setting

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*Eriogonum cinereum* plant in a PV nature preserve

## ~ Abstract ~

Plant growth experiments conducted in a nursery setting can be useful in developing successful culturing techniques for native California coastal sage scrub plants. A controlled propagation experiment is being performed using various germination soil mixes with differing fungicide application regimes to determine the most effective methods for growing healthy ashy leaf buckwheat (*Eriogonum cinereum*) plants. Five different soil mixtures were used in a total of 17 germination flats, with each flat receiving a specific fungicide application schedule. Success rates have been evaluated by examining levels of germination and fungal infection, as well as recording rates of transplantation from germination flats to gallon pots. So far, we have witnessed better survivorship and higher transplantation rates in flats with intermediate textured soil mixtures, combined with monthly fungicide application. However, continued investigations are needed in order to achieve a formula for optimal survivorship.

## ~ Introduction ~

The Palos Verdes Peninsula Land Conservancy manages approximately 1,500 acres of coastal sage scrub on the Palos Verdes peninsula and conducts habitat restoration using plants grown at our nursery from locally-collected seed. Ashy leaf buckwheat is an important component of the peninsula's coastal sage community, but is frustratingly difficult to culture. Germination is generally high; however seedlings often succumb to fungal infection within a few weeks of germination.

This interim report describes the details of the ongoing ashy leaf buckwheat growth experiment. The goal of the experiment is to elicit the most effective conditions for germination within a nursery setting. It is theorized that more porous soil mixtures may be better for raising *Eriogonum cinereum* plants because of soil moisture reduction, which could discourage fungal growth. Regular fungicide treatment might also reduce the number of infected plants. The results of this investigation can benefit the Land Conservancy, as well as other nurseries who may grow ashy leaf buckwheat for coastal sage scrub restoration.

## ~ Materials and Methods ~

**Seeding & set up-** Seed collection was conducted on several nature preserves throughout the Palos Verdes peninsula. Seeds were spread over approximately 1.5 inches of base soil in germination flats and were covered with 0.25-0.5 inches of soil. Watering was carried out immediately after seeding. Flats were placed on nursery prep tables under shading screens. Tables lined with one-inch PVC piping were used to aid soil aeration.

**Soils-** Two types of pre-mixed soil blends and one soil component (perlite) were used to create five soil mixtures used in the experiment. The first pre-mixed soil, Sunshine brand 'Sun-Gro Professional Blend', is a bagged soil that contains composted peanut hulls, peat moss, coir, perlite, vermiculite, pumice, cinders, gypsum, dolomite, limestone and clay. The second pre-mixed soil, used most frequently by the nursery, is provided by local grower, Tony Baker. It contains soil with fertilizers and vermiculite. Soil mixtures and corresponding germination flats are shown in Table 1. Due to varying porosity, certain soil mixtures required more frequent watering regimes than others.

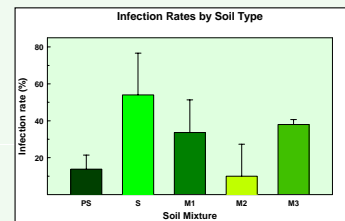
Mix Type	Description	Flats
Sunshine	100% Sunshine soil	3
Potting soil	100% potting soil from local grower	5
Mix 1	75% potting soil, 25% Sunshine soil	3
Mix 2	75% perlite, 25% Sunshine bagged soil	3
Mix 3	75% Sunshine bagged soil, 25% perlite	3



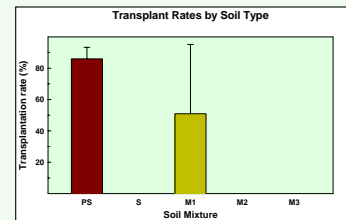
Germination flats on nursery prep table

**Fungus & Fungicide-** Three fungicide application regimes are being used in the experiment. Fungicide is applied to the germination flats at 10-day or 30-day intervals, or not at all. Each soil mixture receives at least three different application regimes. The fungicide's active ingredient is clarified hydrophobic extract of neem oil. A garden hose operated sprayer is used to apply fungicide to the flats. Flats are separated during fungicide application to ensure that only scheduled flats are sprayed. Flats containing fungus-infected plants are moved away from 'healthy' flats to minimize the possibility of airborne fungus contamination.

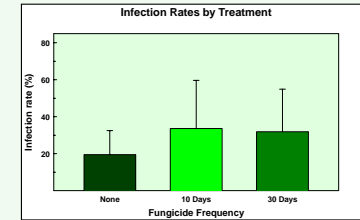
## ~ Results ~



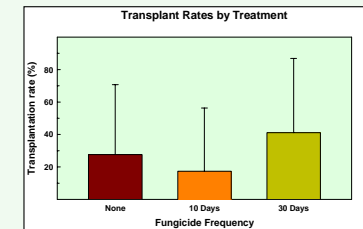
Infection rates by soil mixture showing the lowest occurring in Potting Soil (PS) and Mix 2 (M2). Results are significantly different when tested by Pairwise multiple comparison ( $p < 0.05$ ).



Transplantation rates by soil mixture showing only Potting Soil (PS) and Mix 2 (M2) produced transplantable young. Results are significantly different when tested by Pairwise multiple comparison ( $p < 0.05$ ).



Infection rates by fungicide treatment. Results are not significantly different when tested by one way ANOVA ( $p < 0.05$ ).



Transplantation rates by fungicide treatment. Results are not significantly different when tested by one way ANOVA ( $p < 0.05$ ).

## ~ Conclusion ~

To date, the experiment has yielded 335 healthy plants, 185 of which have been successfully transplanted into gallon containers. The optimal soil mixture for low fungal infection and high transplantation has been potting soil from a local grower. Contrary to our hypothesis, more coarsely grained soils have been largely ineffective for germination. Sunshine bagged soil, the most finely textured soil mix, has also proven ineffective. At this point in the experiment, the optimal fungicide treatment regime is indeterminate. However, the least effective fungicide treatment regime has been once every ten days. The newly implemented procedure of relocating infected flats seems to be a promising practice. Fungus appeared in non-isolated flats, but the highest rates of fungal infection occurred in flats previously separated from the others. The ongoing results of this growth experiment will continue to be tracked in an attempt to determine methods for optimal plant survival. There is also the possibility of further experimentation in the future, which may include the use of soils collected from local nature preserves.

A healthy young transplant (right) and a plant destroyed by fungus (below)

