Asexual Propagation of *Arctostaphylos* × *coloradensis*©

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INTRODUCTION

The Colorado Manzanita, *Arctostaphylos* × *coloradensis* is thought to be a naturally occurring hybrid complex between *A. uva-ursi*, *A. nevadensis,* and *A. patula.* A large population can be found growing on the Uncompahgre Plateau south of Grand Junction in Western Colorado. These beautiful broadleaf evergreens grow in association with *Pinus ponderosa* and *Populus tremuloides* at elevations between 7000 to 9000 ft in an area with average precipitation rates of 16 to 20 inches annually. Individuals from the wild range from 6-inch creepers to 3-ft-tall mounded shrubs. All have attractive exfoliating reddish bark and lantern-shaped flowers in various shades of pink blooming from late winter to early spring.

Other species of Manzanita have been widely used as landscape plants primarily in California and the Pacific Northwest. However, due to difficulties in propagation, the Colorado Manzanita is rare in the nursery trade. In the colder regions of the interior west, it shows great promise as a xeric broadleaf evergreen. Keep in mind, perfect drainage is a necessity for healthy establishment and success.

MATERIALS AND METHODS

Cuttings should be taken from the previous year's growth during the dormant season from February until early April. Cut the branch into 3-inch-long cuttings. As the internodal spaces are short, there is no need to worry about the location of the bottom cut. Strip off two or three of the bottom leaves and quick dip into 1 : 10 Woods Rooting Hormone®. Lightly moisten the cuttings with a spray bottle and place the prepared cuttings in a Ziploc bag and store them overnight in the refrigerator. This practice allows the cut end to dry down slightly to discourage the spread of pathogenic microorganisms, which might have caused the cutting to rot. The next day prepare a small tub of Zerotol® and water mixture (1 : 50, v/v). Be sure to wear eye protection and rubber gloves, as concentrated Zerotol® is as caustic as sulfuric acid. Quickly immerse the cuttings in the Zerotol®. Remove once completely wet and allow the excess to drain off. Zerotol® is a unique formulation of hydrogen peroxide, that kills microorganisms using a powerful oxidative chemical reaction on contact. Observe the cuttings and note the oxidation process at work. Small bubbles can be seen, especially at the attachment of the leaf petiole at each node where minute particles of dust and debris can easily collect and provide a good place for pathogenic bacteria and fungal spores to hide and wait. The cutting itself was the disease vector. Zerotol® effectively removes a point of the disease triangle and the chance of success is greatly increased. Stick the cuttings into individual pots filled with 3 perlite : 1 peat (v/v). We use Anderson Die 2 × 2 × 2½-inch bottomless bands in which 50 fit nicely into a standard 1020 web flat. By using individual pots the sides of the pot act as a mechanical barrier to the spread of disease should a pot or two become contaminated. Place the flats directly on a pre-sanitized bottom-heated bench set at 70 ºF. Mist intermittently according to local conditions. Here in Colorado where the sun shines brightly for over 300 days per year, we mist on sunny

days 5 sec on with the interval set at 10 min from dawn till dusk. After the cuttings are under mist, we inoculate the rooting media with a beneficial fungus product called Plantshield® and ectomycorrhizal fungi specifically for *Arctostaphylos*. We mixed both together in a diluted concentration according to package instructions and applied with a hand-held watering can directly over the cuttings. Plantshield® is the trade name for a naturally occurring beneficial fungus, *Trichoderma harzianum,* which colonizes the soon-to-be-formed root system and out-competes the damping off fungi such as *Pythium, Rhizoctonia,* and *Fusarium*. Research has also shown it to promote the growth of stronger and healthier roots. A seven-species ectomycorrhizal "cocktail", consisting *of Pisolithus tinctorius; Rhizopogon occidentalis; R. rubescens; R. vellosulus; R. luteolus; Scleroderma citrinum;* and *S. sepa*, act in symbiosis to increase the plants ability to take in food and water in exchange for carbohydrates, which the host plant supplies. The fungi release chemicals into the soil that unlock difficult-to-extract nutrients such as iron and phosphorous and they help the plant resist pests and diseases.

RESULTS

After 3 weeks under mist, the first of the cuttings begin to root. After 6 weeks, an average of 70% have rooted but some are not too happy under mist and have started to decline. At this point, we often remove those that have already rooted and place them in a weaning zone. We replace those, which have yet to root and wait an additional 2 weeks before weaning the remaining cuttings. We usually end up with over 80% success. We keep these rooted cuttings in the 2-inch cells for 1 entire year before shifting them up into #1-sized pots the following spring. We believe a vernalized plant grows better.

DISCUSSION

Over the past 4 years, we have rooted over 10,000 Colorado Manzanita using this method. Clonal selection is one factor that has lead to our success. We grow six different selections, 'Ponchito', 'Roundleaf Ponchito', 'Mock Bearberry', 'Chieftain', 'Sleeping Beauty', and 'Cascade'. The first five are from Colorado and the latter from Utah. Each one has a satisfactory rooting percentage. We have many other selections in our bullpen, each with their own desirable characteristics, but unfortunately, thus far each has proven to be more difficult to root.

I believe the Zerotol bath to be the key step in the propagation sequence and equally as important as mist and bottom heat for the success of rooting this plant.

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