

PROPAGATION OF ARCTOSTAPHYLOS UVA/URSI BY CUTTINGS

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Landscapers and gardeners have found kinnikinnick [*Arctostaphylos uva-ursi*] to be a very useful ground cover for dry, sandy, rocky or poor soil. The difficulties in getting the plant propagated and established are limiting factors to its wider use. In over 20 years of propagating, planting, and transplanting kinnikinnick, I have been at the bottom of dismal failure and to the peak of fantastic success. The last few years have settled down to a series of successes, and we are finally on the right track.

As in propagating many plants, I believe timing is of utmost importance. Cuttings can be rooted earlier or later than my schedule, but one has to consider transplanting from the cutting bed into pots. Losses of 50% or greater can take place at this critical time. Kinnikinnick seems to have two times of the year when root initiation is at a peak. One period is in the fall, from about September 15 to October 15, and the other from March 1 to April 1. In following these time periods then, the cuttings are stuck from September 15 to October 15, and transplanted from the cutting bench into pots from March 1 to April 1. In following this time schedule we have often had 85% or more saleable plants from the number of cuttings stuck. We recently went through a block of 2,500 plants during pinching operations and we found only 3 dead plants.

Our procedure is as follows: First, the old propagation medium from the year before is removed from the bench and the heating cables are rolled up. The saran shade cloth and cross boards are removed from the bottom of the bench. The entire area is then hosed down with high pressure water. The floors of my propagation house are solid concrete with a 4-inch drain tile at the lower end, and all of the old medium is washed out of the house. The sides and bottom supports of the bench are then re-treated with copper naphthenate. The entire greenhouse is then sprayed with LF-10 solution. The cross boards are dipped in copper naphthenate solution and replaced in the bottom of the bench, and spaced from $\frac{1}{2}$ inch to $\frac{3}{4}$ inch apart.

The saran cloth is then placed on top of the cross boards and the rooting medium is placed about 1 inch deep on top of the saran cloth. The heating cables are then put back in place after soaking in LF-10. The rooting medium is placed 3 or 4 inches deep on top of the heating cables. I do not pack the medium down, but keep it moist. I use a close spaced mist system. The

overhead pipes are 24 inches above the bench and run down the middle of 38 inch wide benches. The nozzles are spaced about 3 ft. apart. I use Monarch F110C nozzles which are supposed to have a 6 ft. coverage, but do not. I also have Flora-Mist nozzles with the $\frac{1}{32}$ in. orifice. I consider the Flora-Mist nozzles the best of the two systems. The misting cycle is 5 minutes, with 15 seconds on and 4 minutes 45 seconds off during daylight hours. On cool, cloudy, rainy days, I cut down on the number of misting hours. I like to see the leaves moist during daylight hours.

Cuttings are made from the current season's growth. Short cuttings seem to root better, but we go from 2 to 6 inches long. Tip cuttings are best, but we also use runners clear back to the old growth. Strip leaves only from the part of the stem that will be stuck in the medium. The more leaves, the more food manufactured for root growth. We retain 6 to 8 leaves on some cuttings. After stripping, cuttings are bundled about 50 per bundle (not counted) and held together with a rubber band. The cuttings are placed upright in a plastic dishpan with about 1 inch of plain water until they are ready to be stuck. Prior to hormone treatment, the cuttings are placed in a dry dish pan for about 15 min. We use "Dip and Grow" at one part "Dip and Grow" to 9 parts of water. After quick dipping — in and out — the cuttings are placed in a dry dishpan and allowed to dry out. I do this because "Dip and Grow" contains DMSO and I don't like to get it on my hands.

The cuttings are stuck with the mist system on, so sometimes it gets to be a wet job. I really prefer sticking cuttings at night with the mist off. The cuttings are stuck in rows about $\frac{3}{4}$ in. to 1 in. apart, and $\frac{1}{2}$ in. apart in the row. With this spacing I can put about 150,000 cuttings in our 1,000 sq. ft. glass house.

Cuttings from older plants root better for me. Cuttings from young plants or plants that are well watered and fertilized seem to turn black and die for no apparent reason. I think this is physiological rather than pathological. Healthy cuttings from older plants root perfectly well right next to cuttings from young plants which turn black.

The rooting medium is basically washed mason's sand. I have tried perlite, concrete sand, sharp Columbia River sand, and have found that the fine mason's sand works best. To every yard of sand, add one 4 cu. ft. sack of vermiculite and one 4 cu. ft. sack of perlite, $\frac{1}{2}$ bale of fine grind peat moss, $1\frac{1}{2}$ oz. Benlate, and $1\frac{1}{2}$ oz. Truban. The medium is not sterilized. I don't have the facilities for steam sterilizing, but if we are careful about sand selection we end up with very few weeds. Benlate and Truban should keep other pathogens out. This mixture is mixed with a soil shredder and placed in the bench.

Bottom heat is supplied with Roberson Y-227, 1,400 watt ca-

bles. The cables are spaced about 3 inches apart. I want all the heat I can get out of this arrangement, so I plug the cables in without thermostats and let them run all the time. Bottom temperature stays close to 72°F. Kinnikinnick cuttings do well in full sun and I have had best results propagating them in a glass house with little or no shade.

After the cuttings are in, I spray with Benlate about once every 4 weeks, and with Plantvax about every 4 weeks. Plantvax really does a good job of stopping the reddish spots that get on the leaves.

Transplanting is a very critical time. First of all it should be done during the month of March. The rooted cuttings are potted into 2½", 3" or 4" peat or plastic pots. I think the French "Fertil Pots" work very well for *Arctostaphylos*. We put the cuttings in the pots one at a time and pour the potting mix around the roots. Do not tamp the soil around the roots. The flats of potted cuttings are then taken to the greenhouse and watered down by hand with a hose. After hand watering once, the overhead sprinklers and mist system are used to keep the soil damp at all times. This is hard to achieve, but I would be inclined to give newly-potted kinnikinnick plants more water than less. I like to keep the leaves wet during the initial transplanting period. Kinnikinnick plants are extremely sensitive to lack of water, or to too much water. Watering should be as even as possible. I haven't found a sprinkler system yet that will give even distribution of water, so I use two watering systems over a bed of plants. One system is for heavy watering and the other system is for light watering. I like the Floral-Mist nozzles with the 1/32 in orifice, plus overhead Thompson sprinkler heads spaced about 8 ft. apart. With two watering systems you can more easily balance large amounts of water with small amounts of water to give the evenness of watering you need. I keep trying different nozzles because I am still not satisfied with the coverage I am getting.

Any medium used for growing kinnikinnick should have very good air circulation and very good water drainage. There are a few more things I am going to try. Volcanic sand, pumice, or volcanic cinders, I think could be used with good success. My present potting medium is 4 large contractor wheelbarrow loads of washed mason's sand, 1 standard bale of fine ground peat moss, 2 cu. ft. of vermiculite, 2 cu. ft. of perlite, 1 lb. (454g) fine Mag Amp, 1 lb. (454 g.) 9 month Osmocote 18-9-13, 4 oz. (112g) Sequestrin 330 Fe, 1 lb. (454 g.) limestone flour, 1½ oz. (42 g) Benlate, and 1½ oz. (42 g.) Truban. Later feeding is done with 4 month 18-9-13 Osmocote about once a month, and liquid feed with 24-18-12 Peterson's soluble fertilizer mixed with Sequestrin 330 Fe. I feed to keep the plants growing fast with a good dark green color.

Summer sprayings of Plantvax are continued to keep the leaf spot down.

In summary then, I attribute my success in propagating kin-nikinnick to the following factors: 1) timing; 2) proper rooting medium; 3) good air and water draining; 4) use of Truban and Benlate; 5) proper selection of cutting material; 6) use of "Dip and Grow" hormone; 7) not packing the rooting medium down; 8) A short misting interval, but close spaced nozzles; 9) keeping as much rooting medium on the roots as possible during transplanting; 10) not packing or tamping the soil mix during transplanting operations; 11) proper water control; 12) fungus and leaf spot control; 13) continuous feeding with Osmocote after transplanting; and 14) liquid feeding as needed with heavy emphasis on iron.

PROPAGATION OF GAULTHERIA SHALLON (SALAL)

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Gaultheria shallon is perhaps the most common shrub in the understory of the Pacific Northwest forests. It reaches its largest size in the fogbelt along the Pacific coast where dense, extensive patches of the species often hinder the establishment of forest reproduction on cut-over and burned-over areas. Related species are found in northeastern Oregon and in the Rocky Mountains. The flowers are pink, about 1/4" long, borne in loose clusters. The fruit is bluish-black, edible, and approximately 5/16 in diameter. Plants are found on dry to moist, well-drained sites in the sun or shade in the western part of the states from British Columbia to southern California (1). It is a handsome broadleaf evergreen shrub, usually growing 1' to 3' but occasionally to 8' to 10' in height.

Because of the habit and range of *Gaultheria shallon*, it became of interest to the Washington State Highway Department as a candidate for roadside planting. In 1971 we contracted to grow 60,000 plants in 4" pots of salal for this use. As there was no information available concerning propagation techniques to insure such quantities, we experimented with three basic methods as follows:

(1) **Collecting clumps and rhizomes.** Small clumps of salal were collected in the dormant season. The stems were pruned back by two-thirds, and the roots trimmed enough to fit the 4" containers. These were drenched with Vitamin B₁₂ and Benlate. Maintaining the house temperature at 70°F, we observed root initiation in 3 to 4 months. We found this method most cumbersome, along with the inherent disease problems.