

## PRACTICING BASIC PROPAGATION

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Cut-em stick-em root-em, we did it! We are now successful plant propagators. But wait a minute, why were we successful and what basic propagating principles did we practice? Many people in the world of plant propagation ask this question. We will present a very brief overview of our methods of achieving success. Planning ahead is our key to success.

**Propagating facility.** We no longer use solid benches with media. We prefer flats as they allow us to move the rooted cuttings to a hardening-off house as soon as they are rooted. Flats also allow for a more efficient use of our propagation structures.

Provisions for media heating, either hot water pipes under the bench or bio-therms on the bench, are necessary to maintain the 74°F medium temperature we use. We use hot water pipes.

Water quality should be checked. In addition to pH, chemicals added by the water supplier or naturally occurring chemicals in the water supply can cause failure.

The mist or fog system used must be reliable, so that it does not quit on a hot sunny day and allow the cuttings to dry out, and they must be easy to operate. We use an electronic leaf. We feel this mist controller is the easiest and most reliable for our operation, and does not require resetting during nights or cloudy days.

Provisions for air movement in the propagating facility must be provided as high humidity and stagnant air favors fungal diseases. We no longer use the fan set convection tube for air movement as this method moved too much air and interfered with the distribution of the mist. At Bigelow Nurseries we now use horizontal air flow fans that give us the air movement we need without interference with the mist systems. We think this method would also work well with a fog system.

Sanitary conditions in the propagating facility must be maintained. Clean floors and benches, removal of weeds and trash, hoses hung up, no feet on benches, and discarding cuttings that failed to root are just a few sanitary steps we follow.

When the above criteria have been met, we are ready to think about the cuttings.

**Planning ahead in the stock blocks.** Planning ahead ensures collecting only top quality cuttings because we have done the following: The stock blocks have been fertilized, irrigated, weeded, and visually observed and sprayed if necessary for any diseases or insect pest problems. Plants under stress from any of the preceding will not produce the best cuttings for propagation. This may sound

like a lot of extra work but it pays huge dividends in percentage of rooted cuttings.

**Fungicide dip of cuttings.** We do no fungicide dipping of cuttings because of our disease preventative program with stock plants in the nursery and greenhouse and a "spray only as needed" program. We feel that it would not be economical with clean stock.

**To "hormone" or not to "hormone."** Realizing that without the hormones available to us many plant species would be too costly to root, hormones are used on most of our cuttings. We are currently using Hormodin 1, 2, or 3, mixed with carbamate at a 10:1, v/v, ratio. We are also using Dip-N-Grow this year. There are some plants species that our experience indicates do not require a hormone treatment, as the percentage of rooting is the same with or without them. The following is a list of species, and cultivars on which we use no hormone:

*Acanthopanax sieboldianus*; *Clethra alnifolia* and *C. alnifolia* 'Rosea'; *Cornus alba* 'Argenteo-marginata', 'Sibirica', and *Spaethii*; *Euonymus alata* and *E. alata* 'Compacta'; *E. fortunei* 'Minima', 'Vegetus', 'Emerald and Gold', 'Emerald Gaiety', 'Kewensis', 'Emerald Cushion', var. *radicans*, 'Sarcoxie', and 'Colorata'; *Hedera helix* 'Baltica'; *Hydrangea arborescens* and *H. arborescens* 'Annabelle'; *H. macrophylla* 'Lacecap', 'Nikko Blue', and 'Domotoi'; *H. paniculata* 'Grandiflora'; *Pachysandra terminalis* and *P. terminalis* 'Silver Edge'; and many of the perennials we propagate.

**Propagation flats.** The use of flats permits easy movement of rooted cuttings to the potting area or removal of single flats from the propagating house if a cultural problem develops. When we made the decision to abandon bench propagation we looked for a flat that was easy to clean and handle, had good drainage, and was rugged and reusable. Wood and galvanized flats did not meet these criteria. Plastic flats were easy to wash but not rugged enough. We currently use Kadon flats that are 20 in. long, 15 in. wide and 2¾ in. deep. Although they are expensive, the cost is justified by their longevity—8 years and still going strong. The only problem we see is that they warp if not properly stacked. However, you need only restack them properly and they straighten out. They are easily cleaned with high pressure water.

**Propagation media.** Perlite is our best medium with the species we propagate and the mist controller we use. After the cuttings are removed, the perlite is mixed into the growing medium for our containerized hardy mums.

**Cleanliness of people, tools, flats, and work area.** We require all personnel to wash when leaving and returning to the propagating area. Tools are dipped in an Amphyl solution, and flats are washed and stacked. Perlite is used only from the bag, any that spills goes to the used perlite bin. The work bench is washed and the floor is swept daily. Cuttings are transported only in clean flats.

**Collection of cuttings.** All collected cuttings are transported in moist, clean burlap or flats. All our softwood and 85% of the hardwood cuttings are cut in the field with side cutting shears, and tied in bundles of 25 with an elastic which eliminates any further cutting or counting at the workbench. Preparation at the work bench includes removal of excess leaves and flower buds, wounding if required, cutting off the tail of heel cuttings, and application of hormones if required. Prepared cuttings are then sent to the propagating house to be stuck. The same procedure is used with our herbaceous perennials.

**Sticking cuttings.** Sometimes not enough attention is paid to this job. Insertion of the cutting should only be deep enough to keep the cutting upright. If inserted too deeply failure will likely result from basal rotting.

**Timing and types of cuttings.** With softwood cuttings we feel that the wood is ready for cutting when visual observations indicate that current growth is 75% completed. The onset of winter weather dictates the ripeness of hardwoods. Cuttings of broadleaves, such as rhododendron and leucothoe, can be taken either between growth cycles in summer or after fall growth. Almost all of our cuttings are made from current year's growth with the length of the cutting determined by the plant size, i.e. *Euonymus fortunei* 'Emerald Gaiety' 1½ to 2 in., *E. alata* 6 to 7 in.

**Table 1.** Schedule for rooting cuttings.

Species/Cultivar	Date	Hormone <sup>1</sup>	Cut Type <sup>2</sup>	Wound	Length (in.)	WTR <sup>3</sup>
<i>Cotinus coggygria</i> 'Purpureus'	6/3	#3	B		5	7
<i>Cotoneaster salicifolia</i>	7/6	#2	S		3	4
<i>Cytisus</i> × <i>praecox</i>	7/22	#2	S		6	4
<i>Euonymus alata</i>	6/25	—	S		7	5
<i>Ilex crenata</i> 'Greenluster'	8/15	#2	S		3	4
<i>Leucothoe fontanesiana</i>	1/15	#1	S		5	8
<i>Myrica pensylvanica</i>	7/6	#1	B		4	5
<i>Pachistima canbyi</i>	7/25	#2	S		2	4
<i>Rhododendron</i> (semi-evergreen azalea types)	7/25	#2	H		3-4	5
<i>Rosa rugosa</i>	7/28	#1	A		1-2	4
<i>Sciadopitys verticillata</i>	1/15	#2	B	2 sides	10	12
<i>Taxus</i> cultivars	11/15	#3	S		8	8

<sup>1</sup>Hormodin

<sup>2</sup>A = directly above node; B = ¼in. below node; H = heel cutting

<sup>3</sup>Weeks to root

**Care of cuttings after rooting.** Rooted cuttings are moved to a shaded greenhouse for acclimation. Care must be taken to ensure that they remain turgid by handmisting during acclimation. We pot most of our rooted softwood cuttings the same season (ground covers year-round), except types such as *Cornus kousa* and

*Hydrangea anomala* subsp. *petiolaris*, that are potted the following spring after bud break. Potting of softwoods continues until October 1st; after that date they are overwintered in the propagation flat. Fertilizer, Osmocote 17-6-10, is applied only to cuttings that have started growth. All rooted softwood cuttings are overwintered in polyhouses at a minimum temperature of 30°F. Our winter hardwoods are potted the following spring.

## CONCLUSIONS

We plant propagators should always keep excellent records of our work, our curiosity should never wane. If we experience failure, and all of us do, check the records for timing, weather conditions, health of the stock plant, disease and pest problems, hormone, or type of cutting. Do not let failure turn to defeat; rather, let it challenge us to strive harder for success.

RAY HESER: Have you noticed any problems with rooting cuttings after herbicide treatment of stock blocks?

CLAYTON FULLER: No.

TOM McCLOUD: What is your herbicide program?

CLAYTON FULLER: As I presented in my paper last year we use a program in which the herbicide and fertilizer are applied together. The herbicide combinations used include Goal/Dual and Goal/Simazine. We apply one application per year and alternate between the two combinations.