

use Dip-n-Grow diluted 1 ounces/5 ounces (water) plus 1/2 teaspoon of the K-IBA (potassium salt of IBA). For other easier-to-root types like 'Miss Kim' and 'James McFarlane', we use Dip-n-Grow (1 : 9, v/v) by itself. The cuttings are stuck in sand flats in a pit house with 25% shade, frequent misting, and very little ventilation. Misting is gradually reduced and ventilation increased as cuttings begin to root, often within 3 weeks. The cuttings are periodically drenched with Banrot or sprayed with Greenshield to control diseases.

As the roots develop, we liquid fertilize with 200 ppm nitrogen on a regular basis. It is important to get them back into growth in order to get the best liner for the following spring. This is relatively easy with the March/April cuttings and more difficult with cuttings stuck in May. The rooted cuttings after hardening-off are potted into cell packs using a peat and sand mix (2 : 1, v/v). I should add that our water pH and carbonate levels are high enough that we can get away with using a low-pH medium like peat/sand. The pH rises as time goes by. The potted liners are watered, fertilized, sprayed, and sheared as needed.

This growing scheme works well for us because we can dedicate a large portion of a gutter-connected greenhouse to lilacs. Additionally, our lilac liners are not bedded out until early June (which gives us the opportunity to get the juvenile cuttings off the liners to be bedded out).

While we have been more successful rooting lilacs than in the past, there are still problems. Foremost is bacterial lilac blight, *Pseudomonas syringae*. We rotate sprays of Agristep and Greenshield along with a culling regime. As different cultivars become popular and others go by the wayside, we hope to maintain a high level of production to meet our market needs.

Propagation of Hydrangeas at Half Hollow Nursery

Bruce L. Amundsen

Half Hollow Nursery, P. O. Box 652, Laurel, New York 11948

INTRODUCTION

With the recent popularity of hydrangeas comes renewed interest in their propagation. Following is an overview of the most common methods currently used for popular taxa with specific techniques used at Half Hollow Nursery. Methods using seed, layering, tissue culture, and cuttings are discussed; propagation from cuttings is emphasized, since this technique is the easiest and most cost-effective.

METHODS OF PROPAGATION

Seed. Growing hydrangeas from seed is easy for most species since they have no dormancy and will germinate without pretreatment. The seed is small and therefore I suggest shallow sowing in the greenhouse during early winter using standard media at a temperature of approximately 70F. *Hydrangea anomala* ssp. *petiolaris* (climbing hydrangea) is one exception—germination is improved by cold stratification (moist chilling) for 2 to 3 months before sowing. Seed can be placed in a plastic bag with a damp medium, such as peat-lite, sealed, and refrigerated at around 40F for the stratification period.

Layering. Although slow, this method may be useful where only a few plants are desired and if space for the mother plant is not limiting. Layering has been demonstrated for the following species: *H. paniculata* 'Grandiflora' (pee-gee hydrangea), *H. aspera* ssp. *aspera*, and *H. quercifolia* (oakleaf hydrangea). The French or continuous method has been used and will probably work with other species and cultivars. Propagation from cuttings is usually a faster method and therefore generally favored.

Tissue Culture. Several *H. macrophylla* (bigleaf or florist's hydrangea) cultivars and possibly others are propagated from tissue culture. Plants grown from tissue culture tend to be free from disease or pest problems which may accompany cutting-grown plants, and also tend to have a very bushy habit. This method is useful for rapidly increasing inventory of a new cultivar.

Cuttings. Because it is so simple and reliable for almost all hydrangea species and cultivars (with the possible exception of *H. anomala* ssp. *petiolaris*), I recommend this method over all others. By following a few basic procedures outlined here you should encounter no major problems.

Timing. Cuttings can be taken almost any time, from softwood to hardwood. Advantages of summer propagation are that no bottom or additional heat is necessary and a salable plant can be produced much faster. I have had best results taking softwood cuttings in June or July from current season's growth firm enough to snap. Cuttings should be collected in early morning when stock plants are fully turgid and then stripped to leave 2 to 4 leaves. Leaves should be left uncut if possible, but some larger-leaved types, such as *H. quercifolia*, may need to be trimmed. Cuttings should be taken approximately 4 to 6 in. long and kept moist until stuck. No wounding is necessary.

Hormone. Use of a hormone improves rooting, although concentration is not critical. Some authors call for a liquid dip in IBA or K-IBA at approximately 500 to 5000 ppm or dry dip in talc-based powder at 3000 to 8000 ppm. I use Wood's 1 : 20 (v/v) quick dip with good results.

Water Control. The literature recommends using mist, fog, or high humidity chambers (e.g. polyethylene plastic tents, cold frames, or burlap clouds). I use mist timed to keep foliage wet from dawn to dusk with as little runoff as possible. Gradually wean off or reduce mist as rooting starts, usually after around 4 to 6 weeks.

Medium. A well-drained medium, such as a peat-and-perlite-based mix, is essential for good aeration, rooting, and disease management. Cuttings rooted during the dormant season or under mist require a more porous medium than cuttings rooted during the summer or under fog. Under mist, I usually use a mix containing coarse perlite and peat moss (7 : 3, v/v) with no other additives. Prepared cuttings are then stuck in 50-cell Pro-trays (cells approximately 1.8 in. diameter, 2.5 in. deep, 2.25 in. on center). Although this is rather crowded for such large cuttings we are still successful despite our space constraints. If possible, however, I would recommend using trays with a wider spacing between cells.

After Care. After approximately 4 to 6 weeks, plants should start rooting and can be weaned from high humidity and hardened off. When roots appear and are

sufficiently large, fertilize lightly or transplant to a fortified mix containing a low level of fertilizer. Cuttings can be lifted at 6 to 8 weeks. Plants are pruned often to develop a desirable bushy form. We typically transplant around mid to late August into a mix containing fine composted pine bark and well-aged leaf mold (1 : 1, v/v) fortified (per cubic yard) with 5 lb dolomitic lime, 1 lb of triple super phosphate, and 2.5 lb (=1 lb N equivalent) of 20N-3P-10K slow-release fertilizer. Plants are transplanted to 18-cell trays (3 in. × 3 in. × 3.5 in. deep) and overwintered in a greenhouse at 40F. Cuttings should be checked often during rooting. Our success rate runs 84% to 99%. Among cultivars we propagate, *H. quercifolia* tends to be somewhat more difficult to root and has slightly higher losses than other hydrangeas.

Hydrangea anomalasp. petiolaris. This plant is an exception among hydrangeas, being more difficult to propagate than other popular species. A summary of guidelines for producing rooted cuttings follows.

Timing. Softwood cuttings should be taken as early as possible—around May-June is best—before wood turns brown and flower buds begin to form. New leaves should not yet be fully expanded (i.e. around 1/2 size). Some authors recommend forcing and heavily pruning stock plants to produce a high level of juvenile growth. Others recommend taking cuttings with a small portion of the old wood. Double wounding is also recommended to improve rooting.

Hormone. A liquid dip containing 8000 to 10,000 ppm IBA is recommended; either Wood's from 1 : 5 or 1 : 8 (v/v), or a talc powder dip at 8000 ppm can be used.

Water Control. Either mist or fog can be used.

Medium. A very well-drained peat-, perlite- and/or sand-based medium is usually called for. It is important to maintain the root zone at 70 to 75F, using bottom heat, if necessary.

After Care. Bark splitting from freezing is a common problem, so dormant plants should be stored in a protected facility above 32F for the first winter and perhaps for the second winter as well.

CONCLUSION

Now in high demand, major hydrangea cultivars are generally easy to propagate. Although hydrangeas can be grown from seed, layers, and tissue culture, cuttings are easy to root and (using the basic steps outlined above) provide the most reliable way to produce common taxa.

Propagating hydrangeas: taxa grown and procedures used at Half Hollow Nursery

- Timing: June-July, softwood.
- Hormone: Wood's 1 : 20 (v/v) or 3000 ppm IBA powder.
- Mist: Leaves wet dawn to dusk.
- Medium: coarse perlite and peat moss (7 : 3, v/v).
- Cultivars:
 - H. arborescens* 'Annabelle'
 - H. macrophylla* 'Mariesii Variegata'
 - H. macrophylla* 'Nikko Blue'
 - H. macrophylla* 'Soeur Thérèse' (syn.'Sister Theresa')
 - H. macrophylla* 'Merrit Supreme'

H. paniculata 'Grandiflora'

H. quercifolia (oakleaf hydrangea) (a little more difficult than others listed)

- Rooting: 84% to 99%, 4 to 6 weeks.

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Korean Stewartia Propagation

Robert J. Gouveia

Jackson Nursery, Inc., Norton, Massachusetts

Stewartia pseudocamellia Koreana Group (syn. *S. koreana*), Korean stewartia, is a beautiful, easy-to-grow, small- to medium-sized tree. It has white camellia-like flowers in midsummer, striking autumn foliage, and attractive exfoliating bark. It was recognized with a Styer Award of Garden Merit in 1990.

At Jackson Nursery, we have tried to propagate this plant from seed but have achieved erratic results. The seed is doubly dormant and requires both warm and cold stratification. Thus we prefer to propagate Korean stewartia from cuttings. We have found that the procedure described below also works for other *Stewartia* species that need a dormancy period.

We take three-node cuttings from plants in the nursery, starting around mid-June and finishing in mid-July. Length is not particularly important as long as three nodes are available, but most cuttings average 4 to 6 in. long. We prefer to use terminal shoots.

We collect the cuttings in the morning and keep them in plastic bags until we can process them (usually, the same day). If for some reason we cannot handle the cuttings right away, we refrigerate them until we are ready. We strip the bottom set of leaves but have found wounding, pinching, and disinfection to be unnecessary.

Cuttings are treated with a 5-sec quick dip in about 2000 ppm indole-3-butyric acid [Wood's Rooting Compound : water (1 : 7, v/v)]. We then stick the cuttings into flats filled with two parts perlite and one part sand (2 : 1, v/v).

We have rooted the plants in both a glasshouse and in outdoor propagation frames. We use no shading or bottom heat in either area; the plants do not seem to mind full sun. The cuttings receive intermittent mist, which varies according to the weather.