Amelanchier. *Amelanchier* ×*grandiflora* 'Autumn Brilliance' is the primary cultivar propagated through tissue culture with other production being budded or grown from seed. 'Autumn Brilliance' liners are purchased as rooted microcuttings. We have had mixed results with tip cuttings from established liners; purchased plantlets are extremely consistent and very vigorous and are preferred.

Betula. *Betula utilis* var. *jacquemonti*, *B. mandshurica* var. *japonica* 'Whitespire' (syn. *B. populifolia* 'Whitespire', and *B.* 'Crimson Frost' are propagated through microcuttings. Once established, *B. utilis* var. *jacquemontii* and 'Crimson Frost' can be easily expanded using tip cuttings, while 'Whitespire' is more difficult. *Betula utilis* var. *jacquemontii* can be rooted rather easily from trees in the nursery row as well, even several years removed from tissue culture.

Syringa. We purchase unrooted microcuttings to propagate all of our *Syringa* ×*hyacinthiflora* and *S. vulgaris* cultivars. These root readily as tip cuttings from liners in the first year from the lab but rooting declines if liners are held over the winter. *Syringa reticulata* subsp. *amurensis* 'Ivory Silk' is available from tissue culture, but is limited in supply and quite expensive. From tissue culture it is vigorous and fairly easy to root for at least 2 years, although the cuttings should be soft. Other lilac cultivars we grow, such as cultivars of *S.* ×*prestoniae*, *S.* ×*prestoniae* 'Kim' (syn. *S. patula* 'Miss Kim'), and *S. meyeri* var. *spontanea* 'Palibin' are propagated using softwood cuttings.

Establishing and Aftercare of Tissue Culture Material©

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LET'S GET STARTED

It all begins with a reputable supplier, if you have a lab nearby that makes it all the better. I like to have the option to check up on the plants to see how things are progressing if the lab allows. Once you have your order of tissue culture material from a lab I recommend checking with them periodically to be sure everything is going as planned. Sometimes, plants don't respond to the treatments as well as expected.

UPON RECEIVING MATERIAL

You will receive the material in small trays. The plants are always callused with a pair of true leaves. Sometimes the plants may have a few roots also. It is actually easier to stick them if there are no roots and just the callus. Often the roots get damaged in the sticking process. Stick the explants immediately upon receiving. The explants in the agar do not hold well once removed from the controlled environment of the lab.

It definitely takes some delicate handling of the explants to achieve success with tissue culture material. The plants are more tender than the normal vegetative cutting. The employees sticking the plants should be instructed to handle plants carefully. The soil mix that we use is peat and perlite (7 : 3, v/v). The peat is a fairly coarse grade to allow adequate drainage. We also include a starter charge of

fertilizer and also have our soil supplier incorporate Rootshield™ into the mix. This soil mix is what we use with all our vegetative propagation.

Once the plants are stuck in the desired tray, place them on a mist table with bottom heat. At least moderate mist avoids stress on the explants and speeds up the rooting. Since the explants are callused, misting is usually only needed for 4-7 days.

Tissue-culture material should be treated like other propagated material. We give it the same regime of fungicide applications as everything else. One week after sticking it receives an application of copper hydroxide. We chose copper hydroxide because it adheres to the plant better under mist conditions. It also is a very broad-spectrum fungicide. Ten to fifteen days after sticking the second fungicide application is done. The most common diseases to protect the plants from in propagation are *Botrytis, Rhizoctonia, Pythium*, and various bacteria.

It takes from 5 to 10 weeks to achieve a fully rooted plant. Of the items we do from tissue culture, *Primula* root the quickest and *Hakonechloa* and *Geranium* the slowest.

PROBLEMS WITH SOLUTIONS

Botrytis is a real problem in the winter up north with our dark weather conditions. To control the disease threat, we began injecting Zerotol™ through our mist lines. Zerotol™ is a hydrogen peroxide and peroxyacetic acid mixture. It will really cut down on the active *Botrytis* spores in your propagation area. It also cuts down on the algae accumulation on the soil surface.

Routinely check with the lab on the status of your order. In early stages of planning be sure you are generous with lead times or finish times for your crop, especially if it is a new item for you and the lab.

Just like with any stock material, tissue-culture mother stock requires renewal. The frequency of renewal depends upon the plant. If you receive material from a lab and it doesn't perform like your experience in the past or after a few weeks doesn't seem to be growing, don't be afraid to contact your lab and question them. Tell them what is different or the problems you're having. They may have ideas on how you could remedy your problem or it may send them back to look at their books and see if their stock needs renewal.

If you run into obstacles as you are growing tissue-culture material or for that matter any plants, don't be afraid to ask questions. Contact universities, others in the industry, or even fellow workers to solve problems.

SO NOW WHAT

If you're interested in playing with tissue-culture material, go for it. Do some research on the plants you're interested in and contact some labs and give it a go. In some circumstances it takes a lot of advance planning to root and grow tissue-culture material. If you are requesting a lab to produce an item they don't currently offer, it may take up to a year for them to clean it up and bulk it up enough to get production going. So your best bet is to search out the lab that currently does the plant you are interested in or find a lab you want to establish a relationship with and be ready to practice patience. It all takes time.