Tissue-Culture Acclimation at Carlton Plants©

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INTRODUCTION

Carlton Plants utilizes tissue culture to propagate targeted items where it has proven to yield more satisfactory results than other propagation methods. Tissue culture is used to propagate approx 150,000 plants every year, which represents about 6% of our planting needs.

METHODS

Liners are purchased from several tissue-culture suppliers as rooted or unrooted plantlets, depending on the item. They may arrive rooted in agar or in a Sunshine-mix-type potting medium, or as harvested microcuttings. They are typically planted in either a Lerio seedling trays or 2½-inch Anderson bands. We prefer to use Spinout-treated containers to avoid root circling. The medium used is peat and pumice (1 : 1, v/v) with Osmocote 19-6-12 and Micromax incorporated respectively at 2 lb and 8 oz per yard.

Trays are placed on benches with bottom heat at 70°F and mist is applied at variable frequencies depending on ambient conditions. The benches are covered with two to three layers of lightweight row cover material (Agribon or Agryl), supported by hoops formed from ½-inch galvanized electrical conduit. Unrooted items are in this environment for 3 to 5 weeks, while rooted items take much less time and generally are ready to be hardened off in 10 to 14 days. Plants are hardened off for a few days after rooting is complete and are then moved to an adjacent greenhouse for growing on under normal nursery conditions.

Crops can be multiplied by using tip cuttings from established liners to help offset the high initial cost of material purchased from labs. A number of cultivars will root readily from tips pinched soon after the plants are sufficiently tall to make 1- to 2-inch cuttings. These are handled in the same fashion as unrooted plantlets received from a lab, with the exception of using rooting hormone at a light rate. Results can be very good for some crops (see details that follow).

The bulk of problems encountered generally can be traced to heavy-handed mist application. Under the tents misting needs are less than in the open; care needs to be exercised in monitoring mist. Algae buildup can occur with items that are slow rooting; Zerotol and Agribrom have both been used with limited success (chlorine injection should provide better results). Fungus gnat populations can explode; we have had excellent results using the predatory mite *Hypoaspis miles* to combat them.

CROP DETAILS

Acer. We have elected to continue to use softwood cutting propagation for most of our *Acer rubrum* and *A.* ×*freemanii* cultivars. The use of tissue-culture liners has been limited to cultivars such as 'Bowhall' that are difficult to root as softwoods, that are purchased as rooted microcuttings. Maples can be rooted as tip cuttings from liners.

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