REGIONAL TREE TYPES INCREASE WITH CHANGES IN PROPAGATION

By DOUGLAS CHAPMAN

As tree production in the nursery becomes more complex, we the users, should stay abreast of current production techniques. Graft incompatibility or incongeniality became a significant problem during the last 15 years.

Davidson at Michigan State University first noted a problem with Red Maple (*Acer rubrum*) in 1965. The symptoms included early fall color (late July), vertical or longitudinal cracks in the trunk, and, finally, sudden collapse during mid-summer of the tree. Since his original determination, graft incompatibility has been confirmed on 'Sovereign' Pin Oak (*Quercus palustris* 'Sovereign'), numerous Red Maple cuttings, 'Rosehill' White Ash (*Fraxinus americana* 'Rosehill'), 'Autumn Purple' White Ash (*F. a.* 'Autumn Purple'), 'Bloodgood' London Planetree (*X Platanus hybrida (acerifolia)* 'Bloodgood'), and excessive suckering on 'Greenspire' Littleleaf Linden (*Tilia cordata* 'Greenspire'), to mention a few. A way to overcome this problem is to change the method of propagation. This change could be seed propagation, propagation by cuttings, or tissue culture.

Seed propagation has been and remains a valid technique. Obviously, the trees grown from seed don't have incompatibility as a problem. But the real reasons to move to propagation by grafting or budding included development of cultivars or superior trees, more uniform trees, lacking the genetic variation (one would expect from seed propagation), decrease production time (holding down the cost of tree production).

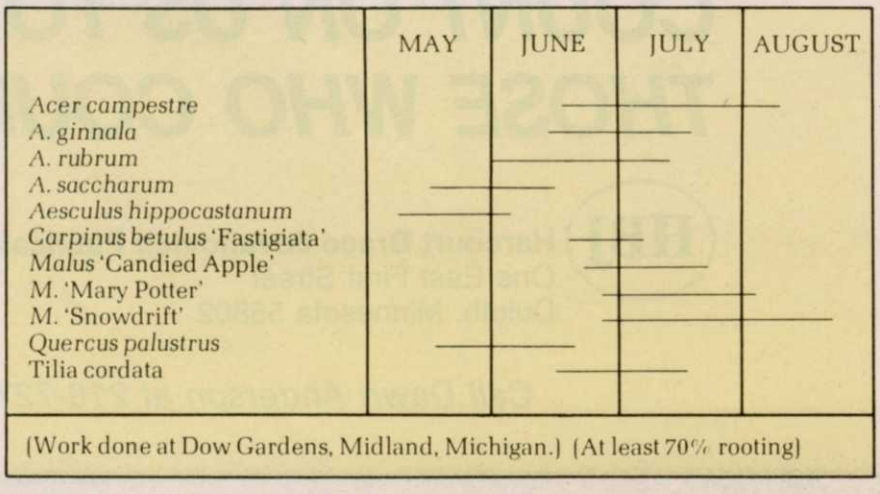
Propagation by seeds, especially seeds from your region of the country, e.g. Great Lakes States, Northeast, Southeast, is a valid technique where local adaption would be considered. Local adaptation, or provenance is the genetic adaption of trees to specific regions of the country. Red Maple is native from Northern Michigan to Northern Florida, but a Northern Michigan Red Maple would not survive in Florida, nor would a Florida native survive in Northern Michigan. It is, therefore, important to know the seed source. Further, it is important that this provenance be considered not only in seedling grown trees but also in the development or regional cultivars.

Propagation of trees by cuttage is a relatively new phenomenon. This is accomplished by simply taking a cutting of a desired tree or cultivar, sticking it in the propagation media, misting, and/or some other technique. Multiple propagation from sucker pieces of *A. rubrum* was first reported by Orton of Rutgers University. His work showed that one could take sucker pieces that develop on young trees and propagate the cultivars under mist and develop a viable root system and, therefore, total plant. His technique was unique in that more than one cutting was taken from each stem piece.

We, at Dow Gardens, initiated propagation studies aimed at production of Red Maple, Sugar Maple (*A. saccharum*), Hedge Maple (*A. campestre*), Common Horsechestnut (*Aesculus hippocastanum*), crab apple cultivars, hornbeam, oak, and linden. These studies have been ongoing since 1978 and reported in the proceedings of the International Plant Propagators Society. If the cuttings were taken at the right time, using the correct media, and other unique conditions, one can propagate cultivars of Red Maple, Sugar Maple, Hedge Maple, 'Mary Potter' Crab Apple (*Malus* 'Mary Potter'), 'Snowdrift Crab Apple (*M.* 'Snowdrift'), 'Candied Apple' Crab Apple (*M.* 'Candied Apple'), 'Fastiagata' European Hornbeam (*Carpinus betulus* 'Fastiagata'), Little Leaf Linden (*Tilia cordata*), and Pin Oak (*Quercus palustris*) by softwood cuttings. Further, a nursery in Ontario is

TABLE 1

Time to Take Softwood Cuttings, North Central U.S.



(Work done at Dow Gardens, Midland, Michigan.) (At least 70% rooting)

propagating Paperback Maple (*A. griseum*) by softwood cuttings and Ed Mezitt at Weston Nurseries, Hopkinton, Massachusetts, has been successful in propagating Japanese Maple (*A. palmatum*) by cuttings.

From some work done by Dirr, while at the University of Illinois, on crab apples, it would seem that timing of softwood cuttings was important. We tested this hypothesis and wholeheartedly concur. The chart suggests when to take cuttings of varieties of trees (under Midland conditions).

Tissue culture is another tool used in asexual propagation, or cultivar propagation, of trees. Sink at M.S.U. has been a leader in the development of tissue culture of *A. rubrum*. It is our hope, he will continue to work with various ash species, which we have had no success by using the cuttage technique, and the various oaks, e.g. White (*Q. alba*), Scarlet (*Q. coccinea*), and Bur Oak (*Q. macrocarpa*).

How does this affect the ultimate user, the urban forester, the landscape architect, and the landscape contractor? These developments in propagation mean that the problems we have noted in the past, related to graft incompatibility, can be overcome. Trees will be growing on their own root system, and, therefore, problems of rejection, incompatibility, or incongeniality (whatever term you want to use) would be eliminated.

Propagation changes allow more regional plants, higher resistance and greater urban tolerance

Further, it gives us an opportunity to have regional cultivars, that is plants native to a region of the country, that have been selected for disease resistance, environmental tolerance, or aesthetics, would be propagated and grown by our local nurseries. This will increase the diversity of plants available for landscape use, while fine tuning, if you will, quality trees for our difficult urban conditions. Specifically, diversity will result in increased environmental tolerance, while reducing maintenance requirements, insect and disease effects, and the need for supplemental water and fertilizer with the end product—healthier landscapes.

Presently, there are a significant number of nurseries offering trees propagated by cuttage. These include Frank Schmidt and Sons, Oregon; William Moller, Oregon; Lake County Nursery Exchange, Ohio; ('Bloodgood' London Planetree); and Weston Nurseries, to mention a few. These significant developments should help you, the designer-manager, or installer of landscapes, to select healthy, vigorous trees that will be best adapted for your unique landscape. **WTT**