A New Tool

Cloning and genetic recombination to tailor new cultivars to specific purposes.

by Douglas Chapman

Biotechnology, a tool for speeding up the process of evolutionary development, will have a significant impact on landscape horticulture. Biotechnology is the understanding and manipulation of biological systems to propagate new clones by genetic recombination or through selection.

One technique of propagation, specifically propagation of trees by cuttage, stimulates the introduction of regionally-oriented cultivars from superior trees, using current technology.

In selecting regional cultivars, a frequent concern is provenance, a photo-periodic response affecting vegetative growth, carbohydrate storage, abscission, dormancy, and overall winter hardiness. Further, when selecting cultivars, factors such as disease resistance, environmental tolerance, and/or unique phenotypic expression (habit, flower color, and/or fruit color) may be important. These new cultivars can result in designed or tailored trees for use in parks, street, home, or commercial landscapes.

TABLE 1. Trees Propogated by Softwood Cuttage

Species	Optimal Rooting Time
Acer buergerianum[11]	late June
A. campestre[5]	June - July
A. carpinifolium[12]	late June
A. ginnala[5]	mid June
A. griseum[10]	late June
A. palmatum[10]	June
A. platanoides[6]	mid June-mid July
A. rubrum[5]	mid June - mid July
A. saccharum[13]	June
A. saccharum subspecies Nigra[6]	mid June - mid July
A. tegmentosum[3]	July
Aesculus hippocastanum[6]	late May - mid June
Cornus florida[1]	mid June - July
Magnolia kobus[2]	June
M. X soulangiana[2]	June
Malus 'Donald Wyman'[7]	mid June - mid July
M. hupehensis[4]	mid May - June
M. 'Mary Potter'[6]	mid June - July
M. 'Profusion'[7]	late June - mid July
M. 'Red Jewel'[7]	mid June - mid July
M. sargentii[7]	late June
M. 'Selkirk'[4]	May - June
M. 'Snowdrift'[6]	mid June - July
Ostrya virginiana[7]	late June - mid July
Quorous palustris[6]	mid - late July

Literature Cited

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Propagation of trees by softwood cuttage (see Table 1) has been proven successful for certain species or cultivars.

From the aforementioned list of trees that can be clonally propagated by cuttage from current season's wood, it becomes apparent that many crab apple cultivars, a significant number of maples and several native trees, (American hophornbeam and pin oak, for example) can be produced using this technique.

This propagation approach, which is successful 65 to 100 percent of the time, should lead to the stimulation of selection, development, introduction, and use of new cultivars. With many plants being propagated by cuttage (that is using parts of the plant and regenerating the missing portion), regional cultivars should be available in increasing numbers.

The advantages of propagation by cuttage include reduced suckering and elimination of incompatibility. Yet it allows the introduction of superior native trees that are tolerant to disease, low-oxygen soils, and chlorides.

This should lead to the increased availability of clones from native trees such as *Ostrya*, linden, pin oak, dogwood, and magnolia.

Further, hedge maple, Japanese maple, and sugar maples, exhibiting tolerance of low oxygen-high water tables, can be selected and introduced. Plants which are normally difficult to propagate, such as paperbark maple (*Acer griseum*), can be propagated by cuttage relatively easy and should stimulate their additional use.

Finally, many crab apples, such as "Mary Potter," "Profusion," "Red Jewel," "Snowdrift," "White Angel," and Sargentii, are a few proven cultivars or species that are disease resistant and can be propagated by cuttage. Propagation by cuttage should become one more biotechnological technique which should stimulate the introduction of superior shade or flowering trees. **WT&T**