Understocks for Rare *Acer* Species

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This short summation of the trials of interspecific grafting represents only about 25% of the almost 200 species of *Acer* (maple). New species are still being identified, especially out of China. These tests were made over a twenty-year period to determine the compatible and acceptable understock for the desired species and/or cultivars of some of the common and rare maples.

Grafting on proper understock is necessary because:

1) Cultivars generally do not come true from seed, cannot be named for the parent, and must be propagated only asexually.

2) Seed from most desirable species is extremely rare, unobtainable, or the germination often may be entirely undependable. Also, many species are quite easily hybridized in open pollination situations found in collections or arboreta.

3) While it is possible to put roots on almost any species or cultivar, these rooted plants often lack vigor and will fail in a period of one to eight or more years. There are exceptions to this within certain species.

Compatible understock is quite specific in most cases. The scion or "bud" may be rejected in one to three or more years if the correct understock is not used even though a graft union may appear successful the first month or so.

For commercial use the understock should have a wide range of adaptability for soils and climate. For example, although *A. circinatum* will accept all cultivars of *A. palmatum* and other related species, it will not grow well in many regions. *Acer palmatum* is very widely adaptable and grafts more readily Understock should be chosen for the ready availability of seed and seedlings. Many species are too rare to consider

A good general rule for selecting understock species is to follow the taxonomic SERIES classification, or certainly choose within the SECTION (Van Gelderen, 1988). Also, there are "milky" sap groups and"non-milky" groups Grafting must be within that character. For example, *A. platanoides* (milky) would be the choice for *A. cappadocicum, A. catalpifolium, A. lobelii* and their cultivars They would not graft on *A. pseudoplatanus* (non-milky). The reverse would also be true.

Immediately, there are exceptions Occasionally successful grafts are made on distantly related species. *Acer griseum* is difficult to propagate (Fordham, 1969). I have had success using *A. rubrum* for *A. griseum, A. triflorum,* and *A. maximowiczianum.* Several of us (Hughes; Cave, personal correspondence) (Vertrees, 1987) have had success using *A buergerianum* for *A. triflorum, A. maximowiczianum,* and *A. mandschuricum*; the latter species being very difficult to propagate. Success of these grafts is low (percentage) and limited, but at least is possible

I would caution evaluating interspecific grafts too soon. Incompatibility may not appear for three years or more and rejection may be only partial, giving a constantly weak graft.

The list in Table 1 is far from complete. Many rare species and their cultivars should be tried Other propagators have approached this problem with varying

success, and I am sure others will find new successes in various interspecific trials in the future.

Table 1. Species that can be used for interspecific grafting of selected *Acer* species.

Acer scion	*Acer* understock choice
aidzuense	*ginnala, tataricum*
amplum	*platanoides*
buergerianum cvs	*buergerianum*
campbellii	*palmatum*
campestre cvs	*campestre*
capillipes	*davidii*
cappadocicum	*platanoides, campestre*
circinatum cvs	*palmatum*
coreaceum	*pseudoplatanus*
craibianum	*crataegifolium, davidii*
(*creticum*) *sempervirens*	Which see[1]
davidii cvs	*davidii*
diabolicum	*rubrum* (L)
divergens	*campestre*
erianthum	*palmatum* (L)
flabellatum	*palmatum*
forrestii	*davidii*
franchettii	*pseudoplatanus* (P) *rubrum* (L)
fulvescens	*platanoides*
ginnala cvs	*ginnala, tataricum*
griseum	*griseum* (L) *rubrum* (L)
grosseri	*davidii*
heldreichii	*pseudoplatanus*
hookeri	*davidii* (L) *crataegifolium* (L)
hyrcanum	*pseudoplatanus*
ibericum	*campestre* (L) *monspessulanum*
japonicum cvs	*palmatum*
kawakamii	*davidii*
laevigatum	*palmatum*
lobelii	*platanoides*
macrophyllum cvs	*macrophyllum*
mandschuricum	*rubrum* (L) *buergerianum* (L) *griseum* (P)
maximowiczianum (*nikoense*)	*rubrum* (L) *buergerianum* (L) *griseum* (P)
maximowiczii	*davidii*
mayrii	*platanoides*
micranthum	*davidii*
miyabei	*platanoides, campestre*
mono cvs	*truncatum ssp mono, platanoides*
monspessulanum	*campestre*
(*morrisonense*) *rubescens,*	Which see
(*nikoense*) *maximowiczianum,*	Which see
oblongum	*buergerianum*
obtusifolium (*syriacum*)	*campestre*
oliverianum	*palmatum*

Table 1. *Continued*

(*orientale*) *sempervirens,*	Which see
paxii	*buergerianum*
pectinatum	*davidii*
pensylvanicum cvs	*davidii, pensylvanicum*
pentaphyllum	*pseudoplatanus, saccharinum, saccharum, rubrum*
platanoides cvs.	*platanoides*
pseudoplatanus cvs.	*pseudoplatanus*
pseudo-sieboldianum cvs	*palmatum*
pycnanthum	*rubrum*
rubescens (*morrisonense*)	*davidii*
rubrum cvs	*rubrum*
rufinerve cvs	*davidii*
saccharinum cvs	*saccharinum*
saccharum cvs	*saccharum*
seminovii	*ginnala*
sempervirens (*orientale*)	*campestre*
shirasawanum cvs	*palmatum*
sieboldianum cvs	*palmatum*
sterculianum	*pseudoplatanus*
(*syriacum*) *obtusifolium*	Which see
takeshimense	*palmatum*
taronense	*davidii*
tataricum	*ginnala, tataricum*
tegmentosum	*davidii*
tenuifolium	*palmatum*
triflorum	*rubrum, griseum* (P), *buergerianum* (L)
truncatum	*truncatum* ssp *mono, platanoides*
turcomanicum	*campestre*
tschonoskii cvs	*davidii*
wardii	*davidii*(L), *palmatum* (L)
wilsonii	*palmatum*

Note
cvs = cultivars of species
(P) = Poor success, (L) = Limited success, worth more testing
[1] which see = see text

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VOICE: This is for Linda. How do you know what procedures or guidelines to use in propagating native plants when you can find nothing in the literature—such as for seed germination?

LINDA McMAHAN: We use some standard, easy germination tests, using a limited number of seeds. We do not have a laboratory yet, so we just try germinating seeds in small quantities in petri dishes under a variety of conditions. Then if these don't work we go to more sophisticated trials.

VOICE: Have you considered using tissue culture with your natives?

LINDA McMAHAN: Yes, we do—mainly as a means of getting rid of any diseases in some kinds of plants. But tissue culture is generally geared to get a lot of plants of one kind, whereas we want to propagate a few plants of a lot of different kinds in our work with the rare plants.

VOICE: Could one of you comment on thorniness in regard to juvenility?

KEITH WARREN: Juvenility is a phase of plant growth, characterized by non-flowering growth and often thorniness There is a period where the change takes place gradually. We don't understand juvenility in plants too well. Plants can move back and forth—we know that—in and out of juvenility, in one direction or the other. Repeated heavy pruning of honeylocust (not tissue-cultured honey-locust) will cause juvenility to return. Plants started from budding or from cuttings in our fields do not have thorns but will flower, whereas the same age tissue-cultured plants do not flower but will have thorns.

VOICE: Will thorns persist permanently in 2-year seedlings trees, especially if there are a lot of thorns?

KEITH WARREN: No If you grow crabapples from seed you will see that there are a good percentage with thorns. 'Snowdrift' probably produced thorns when it was a young seedling. The adult, thornless phase is brought on by slow growing conditions or by being grafted onto a dwarfing rootstock.

VOICE: Why do *Acer* trees fail after so many years when they are on their own roots?

J.D. VERTREES: I don't know—but the root systems are not as strong as those from seedlings They don't have the seedling vigor. Many kinds of plants are like that. Many Asiatic maples on their own roots have poor root systems This is also the opinion of many people over the world who are propagating and growing maples