

PROPAGATION OF CULTIVARS OF STEWARTIA, ACER PALMATUM, AND FAGUS SYLVATICA FOR OPEN GROUND PRODUCTION

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STEWARTIA SPECIES

A group of small to intermediate sized trees that is not widely known or used, but sought after, is the genus *Stewartia*. Comprised of about six different types, all are somewhat similar, differing mainly in flower size and tree size or shape.

Stewartia pseudocamellia is probably the best known with closely related *S. koreana* being very similar. We have worked with *S. ovata*, *S. sinensis*, and *S. monadelphica*, also with limited success in each species. At Ekstrom Nursery we have had the most success with *S. pseudocamellia*, *S. monadelphica*: *S. pseudocamellia* as rooted cuttings and *S. monadelphica* as seedlings. Because there is little written on this genus most of our knowledge has come from trial and error experiences.

As I said, we use seed propagation and softwood summer cuttings. The seed is held in five-valved pods which we try to collect, generally, just prior to pod opening, usually in October. As they dry they will open but the seed is not easy to remove. Once the seeds are extracted we stratify them, using moist peat at a warm 70°F. Generally the seed takes two seasons to germinate but if the seed has been collected early enough it may begin to germinate. We watch it closely for the first month. By December, if we see no sign of activity, we will sow the seeds in flats and place them in our greenhouses. The flats will remain throughout the following summer and good germination is then obtained the following spring, basically 1½ years after collection. We grow them one more full season before transplanting. Flats are used for sowing rather than field seed beds so as to control the environment where the growth takes place. The plants must not be moved when dormant. This is very important. The young plants are tender and we let them establish themselves in 4 × 6 in. deep pots before taking them to the field to grow on.

We also have had some success propagating softwood cuttings. The cuttings are taken when the wood has become turgid, generally in mid-July. We collect cuttings in the early morning and process them quickly. We like to use 6 to 8 in. cuttings, sticking them about 2 in. deep in 2¼ × 5 in. pots. The medium is made up of about 50% perlite, 25% bark, and 25% peat. The medium must be dry enough to prevent over-wetting but also provide some growing capabilities, because we do not transplant them for at least one full

year. As with the seedlings the young plants are tender. It is possible we are overly cautious, but we have lost a large number due to speeding the process.

We use Dip & Grow or Wood's Rooting Hormone at a 1:5 rate, using a quick-dip. Regarding misting of the cuttings, we have used Pate nozzles and an electronic leaf control system. We tried fog also and it works alright but it is more difficult to control. We use band pots with open bottoms, allowing us to place the pots on expanded metal benches, providing air pruning of the roots as they begin to grow. The process sounds slow but we have had very poor results rushing the process. We have been working with *Stewartia* for six or seven years and I understand why it is not widely grown in the industry. Even with the time and difficulties involved it is a plant that should be grown.

ACER PALMATUM CULTIVARS

We grow rooted cuttings of upright red Japanese maples, *Acer palmatum* 'Bloodgood' and 'Oshio-beni'. They are all done in a very similar manner. We find we can use 100% pumice for the rooting medium. After rooting we can transplant the cuttings the following spring as growth has begun. Here again, the key we have found is not to allow the cuttings to become overly wet. Another grower in our area has used lights to extend the photoperiod with excellent results.

FAGUS SYLVATICA CULTIVARS

Many cultivars of *Fagus sylvatica* exist but probably less than ten are commercially produced in any great numbers. The cultivars that are most popular from our experience are: *F. sylvatica* 'Purpurea Pendula', 'Riversii', and 'Roseomarginata'. The other cultivars that have commercial interest for us are: 'Asplenifolia', 'Pendula', 'Rohanii', 'Spaethiana', and 'Dawyckii'. Another one called *F.* 'Purple Fountain' is a seedling of 'Weeping Purple', introduced in Holland by Grootendorst in 1975. It has narrow upright growth and a central stem or leader. The purple foliage seems to be as dark as 'Purpurea Pendula' and appears to have a little glossier leaf.

Propagation of *Fagus sylvatica* cultivars is normally done in the greenhouse by grafting during January or February or by utilizing the hot callusing pipe method in outside or inside beds during the same months. We grew these cultivars for about 15 years using the winter grafting method, either buying or producing our own grafts. The change in our propagation method occurred about ten years ago. I visited a neighboring nurseryman who was stick budding some 'Roseomarginata'. He was budding the trees up about 2 or 3 ft above ground level. He encouraged me to try a few stick buds at

home and I decided that was a good idea. I double-budded a couple rows of trees and got about 60 to 70% bud take.

Let us now go through the process we use today. The seed we buy is received in December or January and sown immediately or stratified in sand at 34° to 40°F. for approximately 40 days. We plant the seeds when the weather permits or as near their germination date as possible. We watch them closely as the germination date gets closer. The seedlings are grown one summer in beds, undercut, and graded the following winter. We also purchase seedlings from a couple of local growers to add to our own seedling production.

The rootstocks are trimmed, especially the tap root, and heeled in sawdust outside. We tried holding the seedlings in the cooler but we would rather get them planted early and see bud initiation early, normally in April. This way we can get maximum growth the first year.

Spacing of the seedlings in the row is 7 to 8 in., but I would prefer a 10 to 11 in. space if land was available. The width of our rows is 54 in. We try to plant ¼ in. or #1 grade bare-root plants to be able to bud the tree the first year it is lined out. If the plants are not big enough we will bud them the second year.

One other possibility exists that we have not tried, that is planting a potted liner to reduce the shock or setback problems sometimes encountered with bare-root liners. We have the added cost of potting and holding the plant—but more bud uniformity probably could be achieved.

We use about 700 to 800 lbs. per acre of 10-20-20 fertilizer incorporated into the soil as a preplant, along with about two tons of dolomite lime per acre. Each year we side-dress in the same amount of fertilizer. We also put on about 150 lbs. of 34-0-0 in February.

BUDDING PROCESS

The “stick bud” method can be used with *Acer palmatum*, *Fagus sylvatica*, and other plants with good success. *Fagus sylvatica* stick budding generally is done in July and August. Scionwood should be cut so that it will match up with the size of the understock. The flat cut on the scion must match up against the round surface on the understock. Usually two-year-old trees are ready for budding about mid-July and one-year-old trees are ready from late July to mid-August.

Procedure:

1. Scionwood should be mature, a little firm or stiff.
2. Cut the scions and de-leaf by pulling the leaves off.
3. Keep scions in damp burlap in a cool place.
4. Make a slanting cut 1 in. long, close to the bottom of the bud on the scionwood.
5. Make a T-cut in a flat, smooth place of the understock and insert

the stick between the two flaps of bark. The T-cut generally is from 2 to 8 in. above ground level.

6. Tie the stick bud with a budding strip, leaving no gaps between the turns. Sealing compounds can be used on the tip of the scion to help prevent desiccation.
7. We generally use two buds per stick bud, choosing the best one the following spring as our leader.
8. We cut the understock off in April after the buds start to swell, about 1 or 2 in. above the bud.
9. We tie up the new shoots as soon as they are long enough.

Advantages of stick budding *Fagus sylvatica* cultivars during summer

1. The production cost is less as compared to a greenhouse graft.
2. Faster growth both in height and caliper can be achieved.
3. A strong bud union is produced.
4. A well developed root structure and branching structure is facilitated by transplanting a 5/6 ft tree.
5. *Fagus* can be included in the summer budding program easily.
6. No greenhouse space is necessary, thus requiring less handling and initial care than a greenhouse graft.
7. The cost of losses are less based on initial outlay, i.e. budding vs. grafting expense.

Disadvantages of Field Budding

1. There may be inconsistent bud success based on many variable factors, including: climatic conditions, length of season, type of soil, and others.
2. The cost of transplanting a larger tree (4/5/6) and the equipment that is required.

Stick budding of *Fagus* provides another alternative for the commercial producer if climatic conditions exist that make it feasible. The soil and climate in our area is suitable for using the above method but may not be in other locations. In light of these variables, each nursery must determine the feasibility of stick budding *Fagus*.

ACER PALMATUM—FIELD PROPAGATION

The propagation of *Acer palmatum dissectum* cultivars at Ekstrom Nursery utilizes stick budding similar to the *Fagus* procedure.

Budding usually begins about the middle of July and ends about the middle of August. The rootstock must be actively growing and the bark slipping for a successful union.

We use the early spring growth from our field-grown stock, using primarily tip buds. Tip buds refer to the ends of the new

growth on the stock plant. We use two to four sets of buds on the stick.

The scionwood is mature if it is firm or stiff and has a slight streaking on the bark. The procedure from this point is the same as the *Fagus* stick budding process, except for our spring pruning.

Usually in March we begin to see bud swelling on those stick buds with a successful union. We cut the understock back to one foot above the stick bud and will cut it back to about two in. above the stick bud after the initial growth occurs, usually three to four weeks later.

Stick budding of both *Fagus sylvatica* and *Acer palmatum* cultivars has proven to be a very useful method for open field production.

STRANGE GRAFTS I HAVE KNOWN

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Because grafting involves living organisms, it is not too surprising that there are as many exceptions regarding compatible stock/scion combinations as there are rules. For instance, in most cases a cultivar of a particular species will flourish when grafted onto a seedling of the same species, but there are examples, such as *Acer rubrum* cultivars and *Quercus palustris* 'Sovereign', where grafting onto the species can result in eventual failure of the union resulting from delayed incompatibility. There are many documented cases of graft compatibility between species in the same genus, and a smaller number of successful grafts recorded between members of different genera within the same family. The success of these less closely related combinations offers sufficient encouragement for propagators to continue trying to use more common, readily available species as rootstocks when confronted with unfamiliar species or cultivars to be propagated. In my career, I have encountered several unusual interesting grafts, some of which I will discuss and evaluate in this paper.

The rose family has provided both examples of compatibility between different genera, and incompatibility within a single genus. The medlar, *Mespilus germanica*, is a pome fruit, and when grafted on *Pyrus ussuriensis* will unite and grow, but displays the symptoms of localized delayed incompatibility, (2). Bark is not con-