APICAL GRAFTING OF *ACER PALMATUM* AND OTHER DECIDUOUS PLANTS

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WHY DO WE GRAFT *ACER?*

For brevity in this presentation we will use *Acer* for *A. palmatum*, or Japanese maple. Until 1980 we had been importing *Acer* from the North American West Coast and from Europe. These were well-grown plants but sometimes there was some difficulty in acclimatization to our harsher Ontario, Canadian winters. The root washing requirement for imports from Europe was also a negative factor. In addition, the great transport distances substantially increased the cost. Hence, the decision to propagate *Acer* at our nursery.

As to grafting versus growing from cuttings, we had observed that in some species, notably *Viburnum* and *Cornus*, plants from cuttings were more difficult to overwinter in the first years and also were slower growing than grafted types. Our conviction regarding Japanese maple was confirmed after hearing a report by William Flemer III of Princeton Nurseries at the IPPS Annual Meeting in Grand Rapids, Michigan, citing a recent experience with grafted and rooted *Acer* of the same cultivar, age, and size. He observed in the spring after overwintering that plants grown from grafts were all alive while plants grown from cuttings were all dead. While realizing that such drastic contrast would not necessarily always occur, our colder climate would increase the possibility of disappointment in overwintering. We resolved to graft all our Japanese maples and the results have been consistently satisfactory.

EFFICIENCY IN GRAFTING

Our topic is focusing on the economic efficiency of grafting, suggesting modification and simplification of traditional methods.

After seeing grafting in The Netherlands, where this art had been an important technique in ornamental arboriculture for centuries when skilled grafters were relatively plentiful and affordable, the question naturally came up whether all of the traditional elaborate steps were necessary. We share the view of an experienced nurseryman quoted by Bruce Macdonald in his book, *Practical Woody Plant Propagation*, that success in grafting depends 45% on preparation, 10% on the carpentry work, and 45% on aftercare. These three stages as handled in our nursery, are described below.

PREPARATION

We grow the seedlings, preferably from locally collected seeds for climatic reasons. The seeds are sown in November in unheated polyhouses, and covered with 10 mm (3/8 in.) of sand. Seedlings are dug the following October, graded, headed back to 15 cm (6 in.), and the roots are washed and shortened to pot depth. The seedlings are potted high, with the upper part of the root system protruding well above the pot rim, in 55 x 75 mm (2.5 in.) round clay grafting pots or square plastic pots of corresponding volume. The shallow potting places the tip of the hypocotyl about 50 mm (2 in.) above the pot rim, enabling the grafter to carry out the grafting operation. The potted understock is then placed in the bottom-heated raised benches at 13 to 16 °C (55 to 60 °F). Pots are covered with 25 mm (1 in.) of moist peat moss or perlite. No plastic tent is installed at this stage. Seedlings established in pots for one year are preferred over newly potted understock.

GRAFTING TECHNIQUES

Grafting is done at a table during January and February as soon as white roots appear along the perimeter of potballs.

Grafting is done apically (splice grafting) instead of by the traditional side veneer method. We cut the understock off immediately below the first node above the root neck. The scion is inserted on this top or apex. This method was experimentally implemented on a gradual scale over three years, 10% the first year, 50% the second year, and 100% the third year.

We use a modification of cleft or splice grafting. After three years, the results showed that elimination of the ''sap drawer'' part of the understock was a safe step, providing the other elements of care, such as air humidity, temperature, light, and water management are strictly applied. Some incidences of sap bleeding were occasionally observed, without harmful result. Note that the exact place of decapitating the seedling prior to grafting is immediately below the first (lowest) pair of buds, originally located in the axils of the cotyledons, which is at the upper end of the hypocotyl. In *Acer*, the hypocotyl is only approximately 25 mm (1 in.) long, contains no buds and will not sucker. Unlike some species such as *Malus, Prunus, Populus,* and *Rubus, Acer* appears not to produce suckers from any adventitious buds on the roots.

A vertical cut is made in the understock, approximately 20 mm (3/4 in) deep, at the diameter, or middle line of the understock, or at such a distance from the center and parallel with the diameter as will accommodate the thickness of the scion.

The scion is cut on both sides at approximately a 15 degree angle and slightly blunted on the outside bottom to avoid a dead point (without cambium) at the bottom tip. The outside cut is started slightly lower to ensure that the lip top matches the top of the scion cut. This way a ''church window'' is created on the inside cut of the scion.

Rubber ties are used, wrapped preferably only 4 to 5 times around, tight at top and bottom, forgoing the cosmetics of parallel and untwisted ties. Waxing of all grafts going under a plastic tent is eliminated as no desiccation occurs.

As soon as possible, the grafts are placed in the bench on a 10 cm (4 in.) layer of moist peat moss or perlite and the pots are covered 10 mm (1/2 in.) with the same material and covered with a 2 mil clear plastic tent, 20 cm (8 in.) to 45 cm (18 in.) high, supported by a ''duro-wall'' frame. At this time the heat under the benches is raised to 21 °C (70 °F). The grafts are not removed or handled in any way until April, when the plants are moved to polyhouses where the rubber grafting strips are taken off immediately before potting.

ADVANTAGES OF THIS METHOD

The graft carpentry is less time consuming than with the side veneer; and it is easier to hold the scion in place and apply the wrapping. The operation can be done successfully with a lesser degree of skill. Much greater is the advantage during the after-care period, as the grafts are left untouched until planting time.

In the side veneer method, the sap drawer part of the understock begins producing rapid growth much earlier than the scion. By the time scion growth begins, extensive understock growth takes so much light away from the tender new scion growth that they become flimsy, misshapen, and subject to decay, especially after dark days. Attempts had been made to remove the sap drawers while leaving the grafts in the bench. With the approach of pruning shears from the top, the angle was such that a close cut could not be made and much damage was done to the light-deprived, fragile stems and foliage of the scions. We found a proper cutting of the sap drawer only feasible after removal of the grafts from the bench. Even then the plants suffered considerably from being moved and handled at this tender stage. The removal of sap drawers was also time consuming at a very busy time in the spring when every skilled person was needed for activities of a more immediate urgency.

With splice grafting, the need for heading back and for sucker removal during the growing season the next two years is eliminated. A saving of 40 to 50% in after-care time (before potting in container growing pots a month later) and the lack of damage to the fragile plants by handling and moving are also obtained.

We have used the same splice grafting technique for the grafting of *Betula, Alnus, Amelanchier, Carpinus, Cornus, Corylus, Fagus, Ginkgo, Hamamelis, Quercus, Ulmus,* and *Viburnum*. In all our experiences the results were equal to or better than with more traditional methods and less costly.

CHARLES HILDEBRANT: By what method are you maintaining the humidity? What mechanism are you using to control fungus invasion?

TOM INTVEN: The poly tent keeps humidity high. It is sealed tightly and creates a sweat box. The peatmoss is moist and supplies the moisture. We keep it sealed for about 2 weeks.

We have no problems because of the lack of foliage and never have used a fungicide.

HENDRIK CLARK: When do you bring the rootstocks into the house for grafting?

TOM INTVEN: Late October or November and then keep them on the bench through December at 50 to 55 °F. The understocks are brought in after one or two good, hard frosts which cause leaf drop. We graft in January and February.