

diameter that are hollow in the center. They need rejuvenation when they get to be about 5 ft in diameter.

PROPAGATION OF TOP-GRAFTED STANDARD TREES

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Nurserymen have been engaged in the production of top-grafted standards for many years. For example, the camper-down elm, *Catalpa bungei*, and more recently weeping forms of cherry, laburnum, and caragana. These are only a few of many kinds of deciduous trees grown in quantity by wholesale producers. This paper will deal mostly with top grafting of plants that are not produced commercially at this time, so far as I know, and are evergreen in nature.

The circumstances that led to our production of top-grafted standards was the availability of greenhouse space during the first week in March when plants forced for various flower shows are removed for the spring exhibits. Our winter greenhouse grafting is completed by this time, and we have personnel and space available for several weeks before our spring season begins. We have been doing this for about 20 years, and we are finding a good market for some of these plants.

The cultivars we choose for top grafting are mostly dwarf, slow-growing, or weeping. When grafted on standards, they grow rapidly undoubtedly because of the large and strong root system they have acquired. Their ultimate size, however, is still small, and the resulting plant becomes ideal as a feature in a small garden or patio.

We containerize, or ball and burlap in plastic burlap the understock to be grafted during the summer or fall and store them in our packing shed and lean-to unheated greenhouse. While in storage branches are pruned out leaving only the limbs on which grafts will be made. After the plants are moved into the greenhouse in March, we start grafting immediately. During the last few years we have also been grafting earlier in the lean-to greenhouse after increasing the heat.

Grafting is mostly a side-cleft graft with the scion placed on the top side of the limb 2 to 6 inches from the trunk. We tie with rubber grafting strips and then seal the graft with grafting wax. Some difficulties occurs when removing the strips later on during the summer because of the wax, but we feel that waxing is necessary to insure the take. Pines generally bleed enough to seal the wound and do not require waxing as a rule.

Humidity must be supplied either mechanically or by hand sprinkling for up to 3 weeks after grafting when the scion should be showing signs of growth. Our success is partially assured by the fact that we graft a number of limbs so that the failure of take on a few grafts on any tree still leaves enough top-grafts to make a good plant.

One of the most important procedures for successful production of greenhouse top-grafted plants is the attention given during moving them outdoors. This is done in June, preferably in cloudy or rainy weather. They are immediately shaded and misted for several days. We heal them in with sawdust in shaded woods where they are cared for by our container department. The plants are left there until the following spring when those that have survived are planted out in nursery rows.

We graft *Chamaecyparis* cultivars on *Thuja occidentalis* 'Filiformis' (Syn.: 'Douglasi'). In a few years the 5 to 6 limb grafts grow together to form a dense, mature dwarf tree many years ahead of a conventionally-grafted plant.

Pinus mugo 'Mops', or any dwarf cultivar, grafted on *P. nigra* makes a fine specimen bonsai-type head if pruned out to show its beautiful branching. Clippings that are pruned from the tree supply us with a good source of cuttings if done during the fall of the year.

Dwarf selections of *Pinus strobus* and *P. parviflora* are our most popular top-grafted standards. During their younger years the pompon effect is interesting, but not very pleasing to the discerning homeowner. Pruning out the branches that grow downward and all the twiggy growth, as the Japanese do with their pines, exposes the beautiful limbs and creates a picturesque tree. The grafts are exposed in this pruning process, but are hardly visible even to the discerning eye.

Pinus parviflora 'Hillieri' is a very slow-growing small-needed gem. Where it is grafted on several branches of *P. strobus* it soon becomes a small mature tree many years ahead of a normal grafted tree. The accelerated growth of this grafted tree also supplies plenty of scions for future grafts.

Weeping plants have more uses in the landscape when they are top-grafted. We graft *P. strobus* 'Pendula' on standards up to 10 feet. This gives the finished plant a good straight stem that does not need staking. *Tsuga canadensis* 'Pendula' and 'Cole's Prostrate' grow quite rapidly into beautiful landscape specimens when top-grafted on *Tsuga canadensis*.

Junipers are plants I know are being top-grafted, at least in California nurseries, but cultivars such as *J. procumbens*

'Nana' would probably be difficult to ship. We find *J. virginiana* 'Globosa' very good for top grafting, but are having difficulties with the weeping forms, such as *J. horizontalis* 'Wiltonii' (Syn.: 'Blue Rug') and 'Douglasi', as they grow too fast and splash onto the ground.

Taxus cuspidata is a good standard for dwarf cultivars such as *T. baccata* 'Adpressa Fowle'.

Rhododendron kaempferi, pruned to a single stem, is a good stock for *R. obtusum* or *R. kiusianum* cultivars. I have seen cultivars that would be tender for us grafted as standards on the West Coast, but we can enjoy those which are hardy in the northeast for use as standards.

Some deciduous plants we find very popular are *Syringa patula* (Syn.: *Palibiniana*) grafted on *S. reticulata*, *Cornus florida* 'Pygmy' and 'Pendula' grafted on *C. florida*, and *C. kousa* 'Pendula' grafted on *C. kousa*.

Perhaps the most popular fast-growing product of the top-grafted standards is *Cotoneaster adpressus* var. *praecox* or *C. apiculatus* grafted on *Crataegus phaenopyrum*.

As you have probably observed, there is considerable cost involved both in time and labor in producing these top-grafted standards. We charge a good price for them but cannot compute our costs with any degree of accuracy. We probably do not make much of a profit, if any, on them. But we feel that the challenge of growing something different for the more discriminating customer gives us a considerable advantage over our competition.

DANIEL HARTMANN: Could you recommend any other understock for *Cotoneaster* standards than hawthorn?

ED MEZITT: I hesitate because other understocks have problems.

VOICE: What was the name of the variegated euonymous you use?

ED MEZITT: 'Sheridan's Gold'.

HARRISON FLINT: *Cotoneasters* can be grafted to *Sorbus* understock.

PETER GIRARD: We have used *Sorbus* and it is compatible; however, we try to use hawthorn.

DAVE BAKKER: Has anyone used parafilm instead of wax to cover grafts?

ED MEZITT: Yes, I was in Australia this past month and visited Arnold Teese's nursery. He does all his grafting using parafilm. We have some on hand and we are going to try it. In

fact, he just side veneer grafts everything. He says that the side veneer is better than the cleft.

DON SHADOW: Have you ever grafted *Chaenomeles* on Washington hawthorn or calleryana pear?

ED MEZITT: No, but we are going to do some this winter. I grafted some on *Malus* 10 years ago but they are just struggling.

DON SHADOW: I grafted 'Texas Scarlet' and a contorted form on Washington hawthorn this past year and so far they look good. I grafted *Chaenomeles* on *Pyrus calleryana* seedlings but the understock became so big that it overgrew the scion and it died.

TOM McCLOUD: Peter Girard introduced me to a yellow latex to use in place of grafting wax. I was quite impressed with it. What is the name of that, Pete?

PETER GIRARD: It has a plastic base and it is called Gold Seal out of Washington State. We find it better than grafting wax, particularly with *Acer* species which get scald if the wax is too hot. It is put on cold and is very easy to get off.

DON SHADOW: I would like to comment on the Gold Seal. I think it comes in red, green, and yellow, and I think it is terrible. I used it on *Acer palmatum* cultivars and will never use it again because when peeling off the latex the bark and cambium came with it. I use a black asphalt emulsion material called Tree Heal that is applied at room temperature. It works better because the black color absorbs heat and the union heals better and growth starts faster.

PETER GIRARD: We discontinued the use of the asphalt emulsion because we found that it can leach into the graft. A lot of times if you get a graft that fails, and take them apart, you will find that the asphalt has leached in. The Gold Seal is made especially for grafting. We have had wonderful success with it and have used it for 2 years.

JOERG LEISS: Use Gold Seal in above freezing temperatures because it will peel off.

JACK ALEXANDER: I would like to comment on parafilm. We have been using it over budding strips for 2 years and like it very much. To remove you need to make only one vertical slice.

DAVE BAKKER: Wrap the parafilm around with a little tension, then dip the graft into paraffin wax. I feel that you can get away without cutting it off because it just stretches and the buds pop through.

WILLIAM VANDERKRUK: We cover our grafts with a plastic bag rather than wax. After the plastic bag is removed

the elastic will deteriorate in the sunlight.

VIRGIL DRAKE: What is the understock for camperdown elm. Can it be Chinese or Siberian elm?

JOERG LEISS: If you use Chinese elm you get a big bowl. We use a hybrid and I am not sure of the parents. There is no incompatibility problem.

Thursday Morning, December 16, 1982

The Thursday morning session convened at 8:00 a.m. with Charles Tosovsky serving as Moderator.

ROOTING *EUONYMUS* CUTTINGS OUTDOORS UNDER THERMO-BLANKETS OR UNDER GREENHOUSE INTERMITTENT MIST USING PROPAGATING MEDIA WITH AND WITHOUT COMPOSTED SEWAGE SLUDGE¹

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Abstract. Microfoam thermo-blankets can be used throughout the year to root *Euonymus kiautschovica* Leos. 'Sieboldiana'³ cuttings outdoors. Microfoam thermo-blankets help in maintaining cooler temperatures around the cuttings in the summer than white copolymer alone. *Euonymus* cuttings taken in March will root equally as well under microfoam covered with either clear or white copolymer with or without bottom heat. However, cuttings propagated in the fall rooted significantly better under intermittent mist than similar cuttings stuck under the thermo-blankets. Compost with other materials made from lime dewatered sewage sludge and woodchips blended at 1/3 by volume significantly reduced rooting and survival as compared to cuttings rooted and grown in equal parts by volume of milled pine bark and expanded shale.

Since the 1950s propagation of cuttings under intermittent mist has become widely accepted. However, skyrocketing production costs and inherent problems with intermittent mist propagation (5,6) have led some growers to seek alternatives.

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³ Bot. Ed. Note: *E. sieboldiana* = *E. hamiltoniana* but is sometimes confused with *E. kiautschovica*.