ROOT GRAFTING OF OAKS

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Each year after attending our Eastern Region, International Plant Propagators' Society meeting, I am motivated to try some of the ideas and procedures that are either presented or generated through personal contacts. Sometimes these applications may be far-fetched and slow to take hold. However, in 1983 a new procedure was initiated immediately because of necessity.

After returning from the 1983 meeting, I found that we did not have enough *Quercus robur* rootstock suitable for clay rosepots. Seeing all those well-branched root pieces, that had to be trimmed-off for the understocks to fit the pots, caused me to think that those root pieces might be the answer to my shortage problem.

Having just heard Moser (4) speak on root regeneration of oaks and also recalling papers by Lumis (1,2,3), and other articles and talks on hard-to-transplant tree species, led me to experiment with some of the same principles on *Q. robur* root pieces. While both authors mainly used auxins to stimulate root regeneration, it was brought out, especially by Lumis (1), that soil temperature was important. Since increased temperature is used by propagators to gently bring the rootstocks into growth, I decided to try the same technique with *Q. robur* root pieces.

On December 15, 1983 we potted 100 well-branched root pieces of *Q. robur* into our regular light potting soil using clay rose pots. The potted root pieces were placed together with the normal seedling understocks in the grafting house. The root pieces were covered with peat except for the very top. In addition a piece of opaque plastic was used as a cover. Temperature in our grafting houses ranges from 12°C at the start and is increased to 18°C weeks later. All understock pots are placed on peat, with root growth starting after 3 weeks. In the fourth week, we commence grafting with the evergreens and finish with deciduous material, such as *Fagus* and *Quercus*. On February 13, 1984 we grafted both understock and root pieces with *Q. robur* var. *fastigata*. The scions were 6 to 8 mm thick with 3 to 4 buds and were from the lower end of the current year's growth. Their size closely matched that of the understocks and root pieces.

A side veneer graft was employed on both the seedlings and the root pieces. We covered the finished grafts with damp peat and, in the case of the root pieces, the whole root piece was covered. There was considerable callus growth on the top of the root pieces at this time and good new roots were visible in the pot. The grafting case is covered with glass sash and shaded during sunny weather. The temperature is kept between 18 and 24°C.

The grafting case is kept closed for the first 14 days. Thereafter, it is aired for one hour daily to start, with the airing time being increased daily until, after 4 weeks, the sash is kept open. It is important to protect new growth against mildew.

We noticed that the scions on the root piece grafts sprouted very uniformly and with more than one bud, which is better than the seedling understock grafts. Also, the root ball of the root piece grafts had nearly filled the pot which does not occur with seedlings.

We planted 100 root piece grafts out at the end of May. The root portion was planted deep enough so that the root portion did not dry out. Little regrowth occurred but this is typical for one-year-old grafts of oaks and all piece root grafts survived. Up to this point there has been no suckering of the root pieces and I do not expect any suckers to develop as they often do on seedling stocks.

Our initial success with *Q. robur* led us to try *Q. rubra* and *Q. palustris* piece root grafts in April, 1984. A dismal failure was the result. There was no callus growth and the scionwood was near the bud breaking point. I believe that timing and callusing are essential in *Quercus* root piece grafts. New trials which incorporate auxin treatments are under way with *Q. rubra* and *Q. palustris* root pieces.

In summary, the advantages of *Q. robur* piece root grafts include uniform growth, better root development, and no suckering.

LITERATURE CITED

1. Lumis, G. 1982. Stimulating root regeneration of landscape-size red oak with auxin root sprays. *Jour. Arbor.* 8: 325-326.
2. Lumis, G. and C. Prayer. 1983. Increasing root regeneration of landscape-size and seedling trees with IBA and some IBA synergists. *Landscape Ontario* 11 (4):9-10.
3. Prayer, C. and G. Lumis. 1983. IBA and some IBA synergists increase root regeneration of landscape-size and seedling trees. *Jour. Arbor.* 9: 117-123.
4. Struve, D.K., R.D. Kelly and B.C. Moser. 1983. Promotion of root regeneration in difficult-to-transplant species. *Proc. Inter. Plant Prop. Soc.* 33:44.

WAYNE MEZITT: Why do you put your root pieces in pots if they regenerate so well?

JOERG LEISS: Because they have to be potted up after they sprout and it is easier to graft in a pot.

PETER VERMEULEN: How are you going to apply the auxins to your root pieces?

JOERG LEISS: Dip the bottom of the root pieces where I want the roots.

VOICE: How long after potting are they grafted?

JOERG LEISS: They were potted on December 15th and grafted on the 13th or 14th of February.

VOICE: How long were the new roots?

JOERG LEISS: We graft when new root growth is present on the outside of the pot.

AIR LAYERING OF NATIVE WOODY PLANTS[1]

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Since 1971, the Hayes Regional Arboretum in Richmond, Indiana, has been searching for a way to propagate its 181 native woody species in such a way that:

1) Single specimens can be collected without the aid of expensive greenhouses or facilities.
2) The original plant is not destroyed or altered where it is growing.
3) The genetics of native material could be duplicated.
4) Propagation could be done at the site where the plant grows.

In 1981, there appeared in the *Journal of Arboriculture* a reference to an article published on the air-layering of water oak cuttings by Dr. Robert C. Hare, Plant Physiologist of the Southern Forest Experimental Station, USDA Forest Service, in Gulfport, Mississippi (3). His technique involved the use of peat rooting cubes as aerial, *in-situ* chambers. Other species tried by Dr. Hare were slash and loblolly pine, southern red oak, sycamore, and sweetgum (1,2,5,6).

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