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).

[1] This work was made possible through a grant from The Stanley W. Hayes Research Foundation, Inc.

A program was initiated to try and duplicate this technique on woody plant species native to Indiana and Ohio.

MATERIALS AND METHODS

Talc was mixed with two auxins and sucrose. No fungicide was added because prior research did not show any benefit (6).

A 1-1-20 mixture was made with indolebutyric acid (IBA), 1-phenyl-3-methyl-5-pyrazolone (PPZ), and 10× confectioners' sugar (6). One gm IBA and one gm PPZ were dissolved in 80 ml of anhydrous acetone, then mixed with 80 gm talc (Baker USP) in a bowl. The slurry was stirred constantly in a hood over gentle heat and under a gentle air stream until completely dry. The powder was ground and sifted down to 45 mesh. Twenty gms of confectioners' sugar was added, then ground with mortar and resifted. The mixture was sealed in a container, and stored at a cool temperature (4).

Over a two-year period (during April, May and June), tests were run on 25 species representing 16 families of native woody plants. Each specimen was air-layered on two branches which had a southern exposure.

As soon as leaves on the tree were fully expanded, a girdling cut, approximately 1 cm in width, was cut around each of the two selected branches at a point where second or third year growth occurred. All phloem and cambium was removed from the cut. A small amount of moistened rooting powder was immediately applied tó the distal part of the girdle. The girdle next was encased in a wet Oasis rooting cube that covered the entire cut area. A piece of Parafilm M was wrapped around the cube and then aluminum foil was wrapped around the film to slow solar heat buildup. The cubes were left on the plants for a period of 4 to 5 weeks (7).

If, after 4 weeks, the roots had penetrated the cube and the parafilm, the rooted layers were severed at the bottom of the cube and immediately put in a holding nursery. If the layered plants showed callus tissue but no root activity, they were allowed to remain on the parent plant for up to 8 weeks. Callused air-layers not rooting after 8 weeks were rooted in the nursery.

RESULTS AND DISCUSSION

Of the 25 species tried, only 4 did not produce roots or callus tissue (Table 1). If adequate care was taken with calused stock, there was no difficulty in rooting them in the nursery. A 70% success rate was achieved the first year with the 25 species and, with additional care and improved tech-

niques, an 85% success rate was accomplished the second year. Reasons for lack of success include: branches not in the best location (southern exposure), layering performed too late in the season for rooting to occur, failure to remove all phloem and cambium, all 2nd and 3rd year wood not used, cubes dried out, branch too thin to support weight of cube, woodpeckers, vandalism, and rotting.

Table 1. Response of certain native woody species to air-layering.

Species	Family	Rooted	Callused	No Growth
Acer. saccharum subsp. *nigrum*	Aceraceae	X		
Aesculus octandra	Hippocastanaceae		X	
Amelanchier arborea	Rosaceae	X		
Asimina triloba	Annonaceae	X		
Carya laciniosa	Juglandaceae		X	
Ceanothus americanus	Rhamnaceae			X
Cephalanthus occidentalis	Rubiacea	X		
Dirca palustris	Thymelaeaceae			X
Hydrangea arborescens	Saxifragaceae			X
Juglans cinerea	Juglandaceae		X	
Juglans nigra	Juglandaceae		X	
Juniperus communis	Cupressaceae	X		
Lindera benzoin	Lauraceae	X		
Liriodendron tulipifera	Magnoliaceae		X	
Lonicera prolifera	Caprifoliaceae	X		
Magnolia acuminata	Magnoliaceae	X		
Populus grandidentata	Salicaceae	X		
Populus tremuloides	Salicaceae	X		
Prunus americana	Rosaceae	X		
Quercus shumardii	Fagaceae	X		
Rhamnus lanceolata	Rhamnaceae		X	
Salix bebbiana [S. rostrata]	Salicaceae	X		
Sassafras albidum	Lauraceae		X	
Spiraea alba	Rosaceae			X
Ulmus thomasii	Ulmaceae	X		

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VICKI GINGAS: Did position of the air layer on the plant alter the percent rooting?

DON HENDRICKS: That was difficult to evaluate with as few air layers as we were taking.

BRIAN DECKER: What about using your technique for rooting younger specimens, such as 5 to 6 ft magnolia plants in a nursery? Could you stagger them along one branch? Have you tried one-year and much older wood?

DON HENDRICKS: Yes, you can do it with younger plants. We have not tried staggering them but it is a good idea. We have tried 1, 4, 5-year, and older growth but have had poor results.

SEED DISPERSAL AS IT CONCERNS THE PROPAGATOR

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In nature's scheme of things, many remarkable methods have been evolved for dispersal of seeds. Study of these methods is fascinating and sometimes essential to those involved in collecting seeds for propagation. To understand these methods allows one to collect seeds after they are properly developed for propagational purposes but before they are lost through natural agencies of dispersal.

Although the seeds of some woody plants are dispersed in late spring and throughout the summer, most do not ripen until autumn, rightly considered the time of fulfillment in nature — a season of natural abundance. As ripening occurs, changes come about in the appearance and character of fruits, and many plants become dispensers of food. Fleshy fruits containing seeds dependent for dispersal upon animals and birds become palatable and change to a wide variety of colors attractive to those responsible for their distribution. The pulp furnishes food to the bird or animal which, in turn, carries the hard-coated seeds about in its digestive tract until they are passed unharmed in its droppings, and thus are scattered about the countryside. Migratory birds may carry seeds far away from their point of origin.

In late summer, when the nesting season has passed and birds have reared their young, some species congregate in multitudes. These flocks roam the countryside, feeding on fruits and seeds as they ripen. Trees and shrubs that are