

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

heavily laden with fruit can be virtually stripped clean after one visit from such flocks. Removal is often so thorough that large trees bearing countless thousands of fruits one day can be denuded the next.

### FRUITS TAKEN BY BIRDS

Since autumn is a season of plenty, birds can exercise preferences. Some favorites are Asiatic sweetleaf (*Symplocos paniculata*), sassafras (*Sassafras albidum*), dogwoods (*Cornus* species), blueberries (*Vaccinium* species), and magnolias. These plants must be watched closely so fruits can be collected before they are taken.

Fleshy fruits which develop on plants exhibit a wide range of colors. Birds which feed on them, however, have failed to show color preference. For example, fruits of mountain ash (*Sorbus* spp.) appear in red, orange, white, brown, and yellow, with many intermediate shades of each — yet the same birds pass from one species to another to take fruits as they ripen. Ripeness obviously has been the factor that determined which fruits appealed to birds, while color seemed of no consequence. The observations which follow will just scratch the surface of this vast subject.

*Magnolia* species. *Magnolia* fruits are highly favored by birds; the fruits ripen and are ready for collection about mid-September. Dispersal of these seeds is most interesting. They are contained in chambers within colorful cones. At ripening, the chambers open and the seeds emerge and dangle on slender cords called suspensors. In this way they are available to birds while still on the tree. Those that fall from the trees can be eaten by rodents and dispersal is thereby defeated. Species of *Euonymus* and *Celastrus* also have this same dispersal adaptation.

*Sorbus* species. Large flocks of starlings and robins descend on the mountain ash trees in early autumn and the ripe fruits quickly disappear. They must be collected just prior to their final stage of ripeness.

*Cornus* species. Many species of dogwood are favorites of birds. Fruits of a number of species ripen erratically and birds make daily visitations to collect those that are ripe. Giant dogwood (*C. controversa*) has been noted as bearing ripe fruits from August 8 through September 7, while Korean dogwood (*C. kousa*) seeds ripen erratically from August through October. Flowering dogwood (*C. florida*) is a great favorite of birds. Fruits ripen about mid-September and disappear quickly. In 1964, a prolific year for this species, all the fruits in the Arnold Arboretum had been taken by October 1.

Fruits of cherries (*Prunus* species), spice bush (*Lindera benzoin*), viburnums and the like, must often be collected just prior to their final color change. At this point the seeds will have developed enough to be viable but the fruits will not have reached the stage where they would appeal to their carriers.

*Symplocos paniculata*. Asiatic sweetleaf, with its beautiful display of intense blue fruits, is another favorite of birds, such as starlings, robins, catbirds, and bluejays. Its fruits ripen about mid-September and can disappear in a day so, when seeds are needed for propagation, the fruits must be gathered before they are fully ripe.

*Viburnum* species. Many *Viburnum* species produce fruits that ripen erratically over a span of time and birds make daily visitations to take those that are ready. Seeds of these species must be collected before they are fully ripe.

Fruits of Sargent cranberrybush (*V. sargentii*) and of *V. dilatatum* have a disagreeable odor and perhaps are distasteful, for they are usually ignored by birds. However, during times of deep snow, starlings, house sparrows, and pheasants have been seen feeding on them, perhaps in desperation.

*Cedrus libani*. In the Boston area pollination of cedar of lebanon takes place about mid-October and the female cones start to develop the following spring, reaching maturity in mid-August of the second year. The cones which are vertical in position start to shatter at that time and the winged seeds are carried off in the wind.

*Cercidiphyllum japonicum*. Trees of the katsura tree are dioecious; the female trees bear heavy crops of many-seeded pods each year. The pods are borne in clusters on short stalks and resemble miniature hands of bananas. In autumn, when the trees are shedding their leaves, the pods turn from green to dark purple. A split which starts at the upper end of the pod opens the top of the cylinder-like structure from which the small winged seeds are then dispersed by the wind. Seed collection is best done just as the leaves are starting to fall.

*Aesculus* species. Most horsechestnut and buckeye fruits are ripe about the last week in September and are taken and buried by squirrels; this is the normal method of dispersal for seeds of this group. The squirrels sometimes carry horsechestnuts great distances to soil suitable for easy burying. It was not uncommon to find numbers of horsechestnut seedlings coming up in the Dana Greenhouse nursery of the Arnold Arboretum, although the closest trees are several hundred yards away.

*Juglans nigra*. Fruits of black walnut start to ripen and some of the nuts drop about mid-September; others remain on

the trees until after the leaves have been shed in mid-October. Squirrels gather them from the trees or ground and carry them away to be buried, which is the normal dispersal method for this subject. As any country boy knows, walnut husks contain a highly persistent staining substance which cannot be removed from the hands. In fact, this material is used in the manufacture of walnut furniture stain. Faces of squirrels that gather walnuts become darkly stained and they can always be spotted by this blemish.

*Albizia julibrissin*. Natural dispersal of silktree seeds take place during late fall and into winter. Pods, which develop in clusters, are firmly attached to the tree and require high winds to tear them loose. This method of dispersal allows wide latitude in time of pod collection. The suspended clusters of pods can be gathered quickly, a handful at a time.

*Abies koreana*. Pollination of Korean fir takes place in spring and the cones shatter to disperse the seeds about mid-September. Collection should be made about the first week in September.

*Pseudolarix kaempferi*. Golden larch, is a superb coniferous tree that produces seeds erratically. Patches of male and female flowers appear on separate parts of the trees in spring. Seed production varies enormously from tree to tree and from year to year. Shattering and dispersal of seeds by the wind takes place about mid-September.

ELWIN ORTON: What was the species of *Aesculus* whose seeds germinate immediately in the fall?

AL FORDHAM: *Aesculus parviflora*.

### **Tuesday Afternoon, December 11, 1984**

The afternoon session was convened at 2:00 p.m. with Mike Young serving as moderator.