PROPAGATION OF SOME HAMAMELIDACEAE (WITCH-HAZEL FAMILY)

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PROPAGATION OF HAMAMELIS (WITCH HAZEL)

In August, 1973, I was part of the delegation of I.P.P.S. members from the United States that attended the Sixth Annual Meeting of the I.P.P.S. Region of Great Britain and Ireland. During the technical sessions held at Berkshire College of Education, G.V. Purcell of L.R. Russell, Ltd., Windlesham, Surrey, presented a paper pertaining to the budding of *Hamamelis*. In the discussion that followed we learned that in Britain propagation is by budding and grafting, using *Hamamelis virginiana* as understock. We also learned that seeds and seedlings are becoming unavailable in Britain and there was much concern about the future propagation of *Hamamelis*. Actually there is no problem, for experience at the Arnold Arboretum with 22 taxa indicates that all *Hamamelis* can be rooted from cuttings which can then be induced to survive the first winter.

In recent years many new cultivars of *Hamamelis* selected and named in Europe have been imported by the Arnold Arboretum. They were grafted plants, and shoots arising from understocks were a nuisance. It is not uncommon to see plants where the understock is taking over. Therefore, whenever we receive grafted plants they are propagated by cuttings at the earliest opportunity.

Collection of Seeds. Fruit capsules of *Hamamelis* are ready for collection toward the end of August in the Boston area. At this time the capsules are still soft and green, but the seeds within have developed hard shiny coats and are mature. Harvesting can continue until about the time the plants shed their leaves. The fruit consists of capsules, each of which contains two hard, shiny seeds. As the capsules dry they shrink and bring pressure to bear on the seeds within. Finally, with a sharp snapping sound the seeds are ejected with enough force to drive them surprising distances. To test the distance travelled, some branches bearing capsules were placed in a large room where flight of the seeds was unimpeded. Height from the floor was 4 feet. Many of the seeds were flung over 20, and one travelled 32 feet. By this means the seeds are propelled away and removed from competition with the parent plant.

After collection, the capsules are placed in a warm dry location where in a few days the seeds will have popped and can be separated from the capsules by screening. The capsules must

be contained in some way, for if not confined the seeds will be strewn all over the area as they are dispelled. A paper bag fastened at the mouth with a paper clip is satisfactory for small quantities.

Treatment of Seeds. Seeds of *Hamamelis japonica,* H. *mollis,* and *H. virginiana* have proven to be doubly dormant (two-year seeds). To be prepared for germination they require warm fluctuating temperatures followed by a period of cold. Pretreatment may be done in polyethylene plastic bags which have the property of being air-permeable yet water-proof, making them ideal for seed stratification.

The stratification medium can be composed of half sand and half peat moss mixed together and dampened. I emphasize the word "dampened", for a wet, soggy medium could exclude sufficient oxygen. In proportion the medium should be two or three times the volume of seeds. The proportion is important because at sowing time the entire contents of the bag are sown. The seeds are combined with the medium and the mixture is placed in the polyethylene bag, which is then bound at the mouth with a rubber band, making it water-proof.

For the warm period of stratification the unit is placed in a location such as a greenhouse bench where the day and night temperature will fluctuate. Direct sun should be avoided, for it could lead to a detrimental build-up of heat. The three species of *Hamamelis listed above have responded well* to exceptionally long periods of warm stratification. Twelve months of warm pretreatment followed by 3 months in a 40°F refrigerator led to a high percentage of germination in 2 weeks. An alternative procedure to prepare these seeds would be to sow them out-of-doors and let seasonal changes satisfy the requirements. *Hamamelis vernalis* germinated about as well after cold stratification only, as it did after two stages of pretreatment.

Propagation by Cuttings. There is a wide latitude in the time suitable for taking *Hamamelis* cuttings. Softwood cuttings collected in the latter half of June and cuttings of semi-ripe wood gathered throughout the month of July have all rooted in high percentages.

Cuttings can be treated with any of the several root-inducing formulations containing IBA at the rate of 8 mg in a gram of talc. We have been using one which contains this plus the fungicide Thiram at the rate of 15%. The cuttings are made in the usual manner, set in plastic trays and placed under intermittent mist. Wounding the cuttings on one side was tried and discontinued — it showed no advantage, as the roots arose only from the bases of the cuttings. A rooting medium composed of sand and perlite in equal parts has proven satisfactory.

Cuttings handled this way should be well-rooted in about 5 weeks.

First Winter Survival. Some plants that are propagated from softwood cuttings during summer present a survival problem during the following winter. They go into dormancies from which they never recover. Among these are the various taxa of *Hamamelis*. One means of overcoming the problem is to induce the newly-rooted cuttings to make new growth by providing supplementary lighting. First-winter loss can also be averted if the cuttings are not disturbed after they have rooted. To accomplish this the cuttings are rooted in plastic flats under mist as described above. When rooting has taken place the cuttings are left undisturbed in the flats and hardened off under polyethylene plastic. Work at an Arboretum involves handling a large diversity of taxa but small numbers of each. Cuttings are started at varying times and some root sooner than others. This makes it impractical to use a weaning procedure after cuttings have rooted. Therefore they are removed from under mist and placed under polyethylene for hardening off. In autumn the trays of undisturbed cuttings are drenched with a combination of Dexon and Terrachlor before being transferred to a cold-storage unit. Here the temperature is maintained at approximately 34°F. In about 3 months the trays are returned to a warm greenhouse where new growth soon appears. The time of return to the greenhouse is based on convenience to the work program rather than on a specific schedule. As soon as they start to grow the cuttings are transferred. Those to be planted out in spring are moved to peat pots, and those to be grown in the can section are placed in containers.

PROPAGATION OF FOTHERGILLA (WITCH ALDER)

Collection of Seeds. In the Boston area fruit capsules of *Fothergilla* are ready for collection in late August. At this time the still green capsules contain fully developed seeds. The seeds are dispersed by propulsion as described for *Hamamelis*. Scattering commences about mid-October and will be completed in a few days if the weather is dry.

Treatment of Seeds. Seeds of both *Fothergilla major* and *F. gardenii* have proven to be doubly dormant and pretreatment must be done in two stages. *Fothergilla major* seeds have germinated in high percentages after 12 months of warm stratification followed by 3 months at 40°F. *Fothergilla gardenii* responded well to 6 months warm pretreatment and 3 months at 40°F.

Grafting. Fothergilla species can be propagated by grafting, using established understocks of *Hamamelis virginiana*. But

grafting of *Fothergilla* is unjustified for as with Hamamelis, shoots arising from understocks can create a nuisance.

Cuttings. Both species of *Fothergilla* root well from softwood cuttings. Time of collection, cutting preparation, time of rooting and winter survival procedures parallel those of *Hamamelis*.

PROPAGATION OF LIQUIDAMBAR STYRACIFLUA (SWEET-GUM)

Collection of Seeds. The round spiny, aggregate fruit heads of *Liquidambar styraciflua* must be collected before dehiscence occurs or the winged seeds will be lost to dispersal by wind. Ripeness of the seeds is indicate by color change of the fruits which pass from green to yellow. In the Boston area this occurs about the first of October.

When provided with a warm dry location, the fruits will open to release the seeds in a week or two. Relative size of fruits and seeds makes cleaning by two screenings a simple process. First, the fruit heads are bounced in a screen of about 1/2 inch mesh. This completes the extraction and separates the sound and abortive seeds from the fruits. Second, a screen with 10 squares to the inch will retain the sound seeds but allow the small abortive seeds, which are always present, in large amounts, to pass through.

Seed Germination. Seeds of *Liquidambar styraciflua* exhibit dormancy that can be overcome by cold stratification. Seeds to be sown out-of-doors in spring can be stored until time for stratification. Either 2 or 3 months prior to sowing, the seeds are stratified as described for *Hamamelis*.

When seeds are processed in a greenhouse the same course of action would be followed but with the stratification period planned so the seedlings would grow during the lengthening days of late winter. When treated by this method, using either a 2 or 3 months stratification period, a general germination can be expected in about 18 days. *Liquidambar syraciflua* has an unusually wide geographical distribution. From northern limits in Connecticut and Illinois it grows southward to central Florida and eastern Texas. Isolated populations are found in Mexico, Guatemala, Salvador, Honduras and Nicaragua. Therefore, the recommendation given here would only apply to seeds from trees of northern origin.

Cuttings. *Liquidambar styraciflua* have rooted in high percentages when cuttings were made in early July using half-ripe summer wood.

Bud Grafting. *Liquidambar styraciflua* bud-grafts readily.

Cultivars may be propagated by this method using seedlings of the species as understock.

PROPAGATION OF PARROTIOPSIS JACQUEMONTIANA

Seeds. Following the procedures for *Hamamelis*, seeds of *Parrotiopsis* germinated when provided with 5 months of warm stratification followed by 3 months at 40°F.

Cuttings. Greenwood cuttings taken in mid-July and treated with 8 mg of IBA in a gram of talc rooted 100% in two instances.

PROPAGATION OF SINOWILSONIA HENRYI

Seeds. Three months of cold stratification at 40° led to a uniform stand of seedlings in 14 days.

Cuttings. Greenwood cuttings treated with IBA plus NAA at the rate of 2500 ppm each led to 80% rooting, and first winter survival when they were processed as described for *Hamamelis*.

PROPAGATION OF PARROTIA PERSICA

Cuttings. Softwood cuttings taken in late June were divided into two batches. Each was treated with a formulation containing IBA in talc. Lot #1 at the rate of 3 mg per gram and Lot #2 at 8 mg. One hundred percent rooting took place in each lot.

Grafting. In commercial practice *Parrottia* is grafted, using *Hamamelis virginiana* seedlings as understock.

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