over 200 foot candles from 8:00 p.m. to midnight. For reasons totally unrelated to the experiment, the plants were removed from the supplementary light at the end of July for several weeks. Intermittent supplementary incandescent lighting was then resumed at 200 to 2000 foot candles, for 15 minutes out of every 45 minutes from dusk to dawn. By mid-August there was new growth on most, but not all of the rooted cuttings. Some of the plants continued to grow until the end of November, after which time all growth seemed to stop and gradually the leaves began to assume their fall color, despite the intermittent supplementary lighting. The temperatures in the greenhouse during the fall ranged from 50 to 80°F.

Preliminary indications are that a minimum temperature of 55°F or more, together with supplementary intermittent lighting, is necessary to prevent dormancy. Furthermore, it is questionable whether supplementary lighting is necessary during long periods of daylight in the summer months. Cuttings that did not put on new growth after rooting did not survive the winter.

LITERATURE CITED

1. Wells, James S 1980 How to propagate Japanese maples. *Amer Nurseryman* 151 (9) 14, 117-120

PROPAGATING DECIDUOUS HOLLY

ROBERT C. SIMPSON

Simpson Orchard Company, Inc.
Vincennes, Indiana 47591

Deciduous hollies should be of interest to growers because to date they have been overlooked as a valuable ornamental. The three species most commonly available are *Ilex decidua, I. serrata* and *I. verticillata.* Publications of the Holly Society of America list 25 or more named selections of species or hybrids (Table 1), few of which are commerically available.

Most seedlings are slow to fruit well, approximately half are male and fruitless, and are quite variable. The named selections are vastly superior but few of these are listed in nursery catalogs or garden publications and rarely available. Few ornamental shrubs can surpass these deciduous hollies for effective fruit display. Properly promoted they could fill a need for fall and winter color in the landscape.

I have been interested because this group of plants has such great potential To date little has been done even to propagate

Table 1. Named selections of deciduous hollies[1]

Ilex decidua		
'Byers' Gold' (Byers) — Registered		
'Council Fire' (Hartline) — Registered		
'Pocahontas' (Hartline)		
'Sundance' (Hartline)		
'Warren's Red' (Warren)		
Ilex serrata		
'Christmas Cheer' (Gulf Stream)		
'Leucocarpa' (white fruit — Hu)	(Dr Shiu-Ying Hu)	
'Xanthocarpa' (yellow fruit — Hu)		
Ilex verticillata		
'Bright Horizon' — Registered	→	Mrs Julian (Polly) Hill
'Earlibright' — Registered	→	Vineyard Haven, Mass 02568
'Cacapon' — Registered	→	O M Neal
'Fairfax' — Registered	→	1248 Oxford Place
'Jackson' (male) — Registered	→	Morgantown, W Va 26505
'Shaver' — Registered	→	
'Red Sprite' — Registered		Louis Sicbaldi
(previously listed as *I*		Hampden Nurseries
macrocarpa or *nana*)		Hampden, Mass 01036
'Christmas Gem' — Origin Unknown		
'Maryland Beauty' — Origin Unknown		
'Xanthocarpa' — Origin Unknown		
'Aurantiaca' (Gulf Stream)		
'Afterglow' (Simpson)		
'Winter Red' — Patent #29912 (Simpson)		
Hybrid (I serrata x I verticillata)		
'Harvest Red' — Registered	→	Elwin R Orton
'Autumn Glow' — Registered	→	Rutgers University
'Raritan Chief' — Registered	→	New Brunswick, N J
'Apollo' (male) — Registered	→	U S National Arboretum
'Sparkleberry' — Registered	→	Washington, D C 2002

[1] Taken from various publications of the Holly Society of American and nursery listings

and distribute the fine selections and hybrids already available. Evaluation of these selected cultivars over a wide area is needed. But first they must be propagated, advertised and made available. The U S. Plant Introduction Station, Glenn Dale, Maryland has distributed initial material to cooperators as has the U.S. National Arboretum, Washington, D.C.. It is up to commercial nurserymen to propagate these from stock plants and offer them to the public. Often the only source of propagation material is in the form of unrooted cuttings from the original plant. Little published information is available on propagation of the deciduous hollies.

MATERIALS AND METHODS

Ilex decidua. Of the three deciduous hollies, *I decidua* is the most difficult to propagate. Individual cultivars vary greatly in this respect. Harline, (6) reports the yellow selection, 'Byers Gold' very difficult to root. For other *I. decidua* selections he has found

fall rooting the most satisfactory method. Cuttings 8 to 10 inches long are taken after the first 2 or 3 frosts, or by mid-October. The leaves are stripped and the cuttings stuck in beds with bottom heat of 72 to 75°F. The medium is peat and perlite. Cuttings are side wounded and treated with Hormodin #3 (0.8% IBA). Beds are in a polyhouse, with an additional plastic cover. Cuttings normally root within 4 to 6 weeks, but root growth is slow. Top growth breaks about the same time. If dormant cuttings are taken, top growth begins before rooting and death results. Plants are maintained in beds until April or May, when they are transferred to one gallon cans for growing on. The container medium is hardwood bark and sand (5:11 v/v). A level teaspoon of Mag-Amp is placed in the root area and a top dressing of Osmocote added.

Because of difficult rooting, Hartline whip grafts 'Byer's Gold' onto established *I. decidua* understocks.

Bill Cunningham, Cunningham Gardens, Waldron, Indiana has rooted *Ilex* cuttings for us for many years. He prefers softwood cuttings under glass, with mist, timed according to weather conditions. Cuttings are taken in early July as growth begins to harden. The proper degree of maturity seems to be critical. Here again success varies with cultivars.

In his procedures cuttings 5 to 6 inches long are treated with 7,500 ppm IBA, quick dip, and stuck in flats containing equal parts peatmoss and polysyrene. Rooting requires 4 to 6 weeks. Plants are then transferred to 2¼" peat pots of standard potting mixture with a pH of 5.6 to 6 and placed in flats. The flats are carried in polyhouses with a combination of mist and fog. They are wintered at 33 to 35°F. New growth breaks about March first. The poly cover is removed in early May but Saran screening of 45 to 50% shade is maintained.

Around June first the first flush of growth begins to harden. At this time we pick up the plants. They are set directly in beds under lath for the remainder of the growing season, with field planting the following spring.

Ilex verticillata and *I. serrata.* Cunningham roots our *I. verticillata* and *I serrata* in the same manner. We supply vigorous growths of up to 24 inches. In most cases more cuttings are returned than shoots sent. These produce plants 10 to 30 inches in height and ¼ to ⅜ inches caliper by fall. Two years in the field give heavy fruiting well branched plants. The cultivar 'Winter Red' has rooted especially well.

The northern type of *I. verticillata* is much more dwarf, compact and has smaller harder leaves than the more vigorous southern type. Cultivars vary in ease of rooting, and subsequent growth is much slower than the southern types.

DISCUSSION

One problem arising with the production of named cultivars is that of appropriate male plants. *Iléx decidua* and *I. opaca* usually over-lap in blooming dates so *I. decıdua* will usually set well if male *I. opaca* are near by. *I. serrata* is not usually pollinated by the more common or southern type of *I. verticillata* as blooming periods may not over-lap. The northern type *I. verticıllata* may not be pollinated by males of the southern type, due to different blooming periods. However, most selections of the northern type *I. verticillata* and *I. serrata* do bloom together.

For the deciduous hollies to be popular and used over an extended range, consideration must be given to selected male cultivars, appropriate to the fruiting selections. Blooming periods may vary somewhat from year to year, depending upon weather conditions (1). Table 2 illustrates this difference for the year 1979.

CONCLUSION

As named and advertised cultivars become more generally available the demand for and use of deciduous hollies will increase. Where properly used and seen by the public they will be their own best advertisement.

Table 2. *Ilex* blooming dates, Vincennes, Indiana, 1979

I. decıdua (early)	May 13-26
I decıdua (late)	May 17-30
I opaca, most cultıvars	May 19-30
I serrata (well pollinated)	June 5-12
I verticıllata (northern type)	
'Aurantıaca'	May 30-June 4
Collected seedlıngs, (N H)	May 30-June 6
'Afterglow'	June 4-14
'Shaver'	June 6-15
'Cacapon'	June 6-15
'Jackson' (male)	June 6-15
'Fairfax'	June 9-18
I verticıllata (southern type)	
Earlier individuals	June 11-29
'Winter Red'	June 12-29
Most seedlings, southern type	June 19-July 3

LITERATURE CITED

1 Hansell, Dorothy 1973 Holly registratıon *Holly Newsletter* 46·4-5

2 Eisenbeiss, G K 1978 Holly-plaın and fancy *Proc Holly Soc Amer* 55 5-6

3 Dudley, Elizabeth 1978 Barnard's Inn Farm and Martha's Vinyard *Proc Holly Soc Amer* 55 14

4 Eisenbeiss, Gene and T R Dudley 1978 International *Illex* registration *Proc Holly Soc Amer* 55 17-18

5 Dudley, E 1978 Final report on grant for holly hybridization, Sept 1975 — 1978, other significant research noted by research and development committee *Proc Holly Soc Amer* 55 23-24

6 Simpson, Robert 1979 My work with *Ilex verticillata* and *Ilex serrata* *Proc Holly Soc Amer* 56 2-4

7 Eisenbeiss, G K and T R Dudley 1980 International *Ilex* registration *Proc Holly Soc Amer* 57 2

SOME TRIALS IN THE PROPAGATION OF *ACER SPECIES* BY CUTTINGS

TIMOTHY C. BROTZMAN

Brotzman's Nursery
Madison, Ohio 44057

The propagation of certain maples at Brotzman's Nursery began three years ago on a rather limited basis and remains so today. My initial efforts were stimulated by an interest in the genus and a desire to obtain some of the more uncommon and ornamentally desirable species Though by no means complete or absolute, I would like to share with you the results of my experiments.

Propagation facilities. The facility used is a 45 feet polyethylene covered hut with unheated ground beds 8 inches deep, filled with a propagation grade of silica sand. A 62% shade cloth covers the hut at all times. Inside summer temperatures and humidity can get very high, but neither seem to have an adverse effect on rooting.

Propagating procedures. Depending upon species and stage of growth, cuttings are taken from mature to semi-mature trees in late June through late July. Cuttings are of current season's wood, usually 4 to 8 inches long with the basal cut unrelated to node location. The bottom ⅓ to ½ of the leafier stems are stripped of leaves and the remaining leaves of such large leaved species as *A. macrophyllum, A. tegmentosum* and *A. cappadocium* are cropped back 50% Heavy cuttings are given two shallow wounds about 1 inch long, although most require a single wound. Following a 25% Choloromone-in-water quick dip, or an IBA in talc treatment, the cuttings are inserted in either the ground bed or 4-inch deep flats of fine sand and placed under intermittent mist. Once rooted, cuttings are weaned away from the mist to avoid saturation of the root zone.