

TOM PINNEY: I would have to guess but I think we grow them all at about the same pH 4.5-5.0. I know you can grow the Colorado blue spruce higher.

MODERATOR BRIGGS: How do you get mugho pine to make more than 2 flushes in a growing season?

BRUCE BRIGGS: In the west there was some research that showed very high fertility could keep them growing. They were using slow release fertilizer at 15-18 lbs/yard.

MODERATOR SHUGERT: Would *Malus baccata* or *M. sylvestris* be the better understock for grafting crabapples?

BILL FLEMER: *Malus baccata*, because it is slower growing and does not sucker as much. *M. baccata*, however, has a less fibrous root system and is more difficult to transplant.

BOB SIMPSON: Seed source with *M. baccata* is very important. An isolated seed source is one thing but cross pollinated *M. baccata* will give extremely variable understock.

MODERATOR SHUGERT: Has anyone had any experience with using *Pyrus calleryana* as an understock for edible pears?

BILL FLEMER: We have tried it and noted that it dwarfed the scion and also reduced fruit production.

PROPAGATION OF BETULA

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We used to propagate clones of *Betula pendula* by grafting them during the winter months on seedlings of the same species. We produced our own understock by collecting our own seed. We planted them in a greenhouse at 65°F in flats with a mixture of perlite and peatmoss. The seeding was done during September or October.

The seeds usually germinate very rapidly and with a little help from liquid fertilizer they grow very well all winter long. About May, when the danger of frost is over, we pick them off into 2¼" rose clay pots into our regular potting soil consisting of sand and peat moss with Osmocote, and place them outside in a growing area. By fall, they are the thickness of a pencil. Only a few weeks before grafting we bring them in the greenhouse. The greenhouse temperature is maintained at 65°F and we used a

modified veneer graft. This we find is the best way to produce understock because an unestablished understock is a sure failure in grafting birches.

I never had the opportunity to visit some of the large shade and ornamental tree growers on the west coast. I was told that some of the growers produce clones of birch by budding them close to the ground in field rows. They use large well established seedlings and use the same to stake the growing bud the following year. In other words, after the budding is successful they don't cut off the understock but girdle the seedlings just above the bud. The growers leave it there so it can be used as a stake.

In my opinion, grafting or budding is a long and costly task if you take into consideration greenhouse space, understock production, and unpredictable results. With this in mind, we were looking for a better and a more economical way. One year when collecting scions for grafting we came across some seeds of *Betula pendula* 'Youngii', 'Fastigiata' and 'Purpurea'. We planted them in separate trays in the greenhouse just out of curiosity. The only one that showed some promise was *Betula pendula* 'Purpurea' which had quite a few red seedlings. I feel that if plants of this clone were isolated, a good percentage of red seedlings could be obtained from seed. It would be interesting also to try some seeds of other clones from isolated specimens where cross pollination does not occur.

Looking through some catalogues from another country, we noticed that they were offering *Betula nana* as rooted cuttings. I had a little plant of it in my collection and tried a few cuttings and the results were amazingly good after a few failures. We felt that if *Betula nana* could be rooted then other birches might also root. We tried every combination of media, hormone, timing, and size of cutting till we found a combination that gave good results. We have been doing this for only a short time and the little bit of knowledge we have gained, we would like to share with you.

Source and type of cuttings. The stock plant should be healthy, vigorous, and free from insect and disease pests. The cuttings should be from current growth about 6 to 8 inches in length. A very shallow side wound is beneficial. Cuttings root best when taken from previously rooted plants.

Time of taking cuttings. A set date cannot be given because it varies according to the growing season. However, I take the cuttings just as the last leaf on the cutting reaches full size and the last bud has not fully developed

Rooting media. Perlite and peatmoss are mixed in a ratio of one 6 cubic ft bale of Canadian peat and two 4 cubic ft bags of coarse perlite.

Hormones. Hormodin No. 3 or 1% indolebutyric acid in talcum is satisfactory. This system works so well that we root the cuttings right in peat pots after adding 3 or 4 holes per pot for drainage.

Dormancy period. We found that in order for the cuttings to grow well the following year, they require a dormancy period. We place the well-rooted cuttings in a greenhouse where we try to keep them at a temperature of 32°F during the winter months. They start to grow, about late March or April, as the weather warms up and the days get longer. When the danger of frost is over the rooted cuttings go in containers and continue their growth outside. By following the combination of these old but simple rules, birches can be grown from cuttings.

For years nurserymen have tried to grow a perfect clump of birch. Nothing is more annoying to me than to see a clump of birch with 4 or more seedlings, one a 2 inch caliber pure white, another one ½ inch caliber and reddish brown, and the next a few other sizes and colors in between. Those seedlings were matched together when they were 6 to 8 inches high. Every seedling is a genetic variation and, as in a human being, it is hard to say how one will mature. We know that birches will root. If we select a good plant, root cuttings and then plant 3 to 4 rooted cuttings together, we can have uniform clumps.

Thursday Evening, December 11, 1980

The Thursday evening educational program on applied aspects of teaching plant propagation labs was convened at 8:00 p.m. with Dr. Elton M. Smith serving as moderator.

THE "KNOW-HOW" IN PLANT PROPAGATION EXPECTED FROM COLLEGE GRADUATES:

SEED PROPAGATION

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Over the 30 years or so that our establishment, Forrest Keeling Nursery, has been in operation, the production of tree and shrub seedlings has been a mainstay accounting for about 50% of