

Some Recent Experiences Breeding Magnolias in New Zealand

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It was about 1981 when I first developed a passion for magnolias. This was intensified while visiting some of the old layering beds in the back valley at Westown, New Plymouth, where Duncan and Davies were for many years before they moved to their current site at Brixton. There I found a remnant tree of the clone of *M. campbellii* subsp. *mollicomata*, later given the cultivar name of 'Bernie Hollard.' I thought it was quite amazing how these trees would produce such magnificent flowers on bare branches.

When people start to breed plants there are different aspects of the species that fascinate each breeder, and they tend to follow down different avenues and breeding lines. Dr Keith Hammett, a well known NZ plant breeder, recommended to me that plant breeding is essentially a process of diversity and sieves: "Create as much diversity as you can, then develop your criteria for sieving out what you want as desired characteristics."

I have always been attracted to the clean, formally sculptured form of different species such as the *campbellii* types, as well as the well-formed *soulangiana* types. Initially, the hybridizing I did while working at Duncan and Davies Nurseries between 1987 and 1993 was somewhat of a sweeping approach, covering the field quite widely. Essentially, I was aiming for smaller growing garden plants with disease resistance and capacity for prolific flowering. Much later, when *Magnolia* 'Genie' appeared in 2003, I crossed it with everything available that promised well formed flowers with another wide sweep. I may have overshot the mark with about 30% of those hybrids having *M. campbellii* parentage. Not quite the recipe for small garden plants, but the results are surprising.

Some successful hybrids so far

One of my favorite breeder plants is *Magnolia* 'Sweet Simplicity,' which is so named because of its simple, yet crisp form. All the tepals have the same color and form, which makes it look sharp in outline. In many hybrids, the outer tepals can be quite variable in color and shape, making some blooms look untidy. Originally *M. 'Sweet Simplicity'* was purchased from a garden center under the name of *Magnolia sieboldii*, but was clearly a *M. × soulangeana* type. It was root bound in a bag, but still had managed to set flower buds, so it had to be good. As I saw the results possible

with *M. 'Sweet Simplicity'*, I set about developing a line of smaller growing, free-flowering, garden plants, which is still improving with each successive generation.



Magnolia 'Old Port' (adjacent photo) is one of the first generation seedlings of *M. 'Sweet Simplicity'*. When this seedling (and its sisters) flowered, it reflected the strong crisp form of its mother, and this encouraged me to do more with this line. When I first saw 'Sweet Simplicity,' I thought it would be great to have this sharp form in red. It has taken a few years but there are several seedlings under evaluation that fit these criteria. 'Old Port' has been trialed for ten years now and certainly has shown its worth as a compact garden plant. It will be used in hybridizing with later seedlings too. Perhaps its only fault is that it tends to have yellow foliage in spring until the soil warms up.



Another excellent hybrid I raised at Duncan and Davies is *Magnolia 'Margaret Helen'*, (adjacent photo) which is named after my mother. This is a seedling from *M. liliflora 'Nigra'* crossed with *M. campbellii* var. *mollicomata* 'Bernie Hollard' pollen. It shows the classic cup and saucer form typical of *M. mollicomata* in a warm rose red, which pales to a

very pleasant pink. It is not an overly large tree, but forms a rounded habit, and begins flowering from the first season's growth from budding. The original flowered at five years from seed, and I now have seedlings of the next generation flowering at three years.

In the late 1990s I crossed *M. 'Sweet Simplicity'* with *M. 'Black Tulip'* to continue the breeding line I had started while working at Duncan and Davies. This cross has produced a range of growth habits from medium sized bushes to timber trees. The first seedling flowered at two years from seed and showed a great deal of promise, being propagated and hybridized immediately. This variety was named *M. 'Sweet Valentine'* due to its interesting glowing red color. *Magnolia 'Sweet Valentine'* is the first of my hybrids of 'Sweet Simplicity' 'Black Tulip' to be released. It had a "false start" with a few plants propagated and circulated. The original is in a somewhat difficult spot under big poplar trees and is not flowering that well but all grafted plants are generally performing reasonably well. I have used it several times in a later series of crosses, and back crossed to itself from there too.

Magnolia 'Sweet Merlot,' (adjacent photo) a sister to *M. 'Sweet Valentine'* is showing much more promise, and is currently under trial in Europe and about to go into production at a local exporting nursery. It is a rich wine red goblet-shaped flower with an almost white frosted reddish interior. It lasts well on the tree with heavy textured tepals, and should be trialed as a cut flower, as it has a good vase life. It sets buds on all terminals and would be easy to cultivate for pickable stems.



When *M. 'Sweet Valentine'* flowered at two years from seed, I crossed it with (*M. 'Sweet Simplicity'* × *M. liliiflora 'Nigra'*). This cross has produced some good reds that subsequently flowered two years from seed and are now under evaluation. *Magnolia 'Genie'* is the first result from these hybrids, flowering in 2003. A subsequent batch of hybrids crossed in 2003, including *M. 'Genie'* as both seed parent and pollen parents are beginning to show promise, but it is too soon to publish any of these results. A good percentage of these seedlings are setting flowers at two years from seed. *M. 'Genie'* is currently being trialed in the us, Europe, and Japan.

Hybrid production

Once seed is set, it is treated in the normal way and given its cold stratification, then sown in mid-September in outdoor beds that are raised either by building up the soil with a tractor and molding frame, or by putting down timber sides to hold the sowing medium. As early as 1988, I noted *M. 'Charles Raffill'* seedlings coming up wild in the nursery. This suggested magnolias could be easily raised in an open ground seedbed. Some of the initial results were mixed—some crosses with apparently good seed having complete failure, and other crosses with as much as 80% of the seed producing seedlings for planting out. By using this open ground method, I can minimize production cost, as the hybrids become another crop in the rootstock nursery, where 20,000 plus seedlings are grown for rootstocks each year.

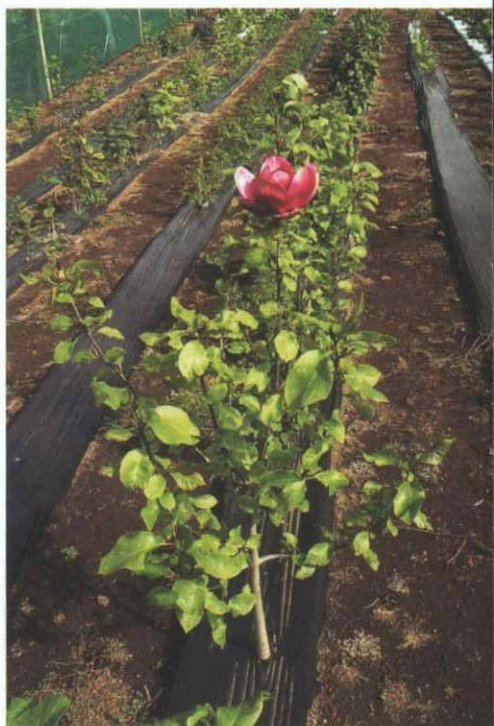


The seed is sown in a medium of granulated pine bark, with slow release fertilizer having been added into the soil below. The beds are shaded with cloche frames and kept damp. At germination time, water is applied twice daily to assist the cotyledons to shed their membranes and open properly. One of the main pests in this system is sciarid fly, which is controlled with granular lawn insecticide. This has the added benefit of also controlling other soil-borne insects.

After a full growing season, the seedlings, which are between 4in (10cm) and 27.5 in (70cm) tall, are planted out into polyethylene-mulched beds. This is laid by a tractor-mounted machine from a roll of polyethylene 27.5in (70cm) wide, and produces finished beds 14in (35cm) wide, slightly raised, and about 3.2ft (1m) apart. The seedlings are spaced according to parentage with minimum spacing of 16in (40cm) and maximum spacing of 47in (120cm). Every second bed is planted with seedlings to give a final spacing between the rows of approximately 6.5ft (2m). The beds between the seedlings have a 1- or 2-year crop planted as part of the cost recovery system.

During the first year, a supplement of slow release fertilizer of approximately 15-4-8 NPK 8-9 month (the same one used in the seedbed) is given individually to each plant with a dispenser at about 15 grams per plant. In the second year, similar NPK crop fertilizer is scattered along the ground between the beds as by this stage the roots are out in the ground beyond the polyethylene mulch.

The seedlings are grown with as little trimming as possible to maintain their natural shape as well as the juvenile growth to ground level. This allows cuttings to be taken to establish own-root plants for evaluation as soon as a seedling shows promise. Lax branches are removed to avoid herbicide contamination during weed control. Weed control is mainly with applications of Glyphosate at normal rates. Some pre-emergent herbicide is used in spring to help control spring germination of weeds.



Once a seedling shows promise, five or ten buds are put out onto seedling rootstocks either as dormant spring buds or summer buds as stage one of the evaluation process. Summer cuttings are also taken to evaluate rooting percentages and propagation options for the new clone. Seedlings that are to be discarded are reworked by top grafting to produce more wood of promising clones, or worked with clones of selected seed trees.

Magnolia seed is not reliably produced in NZ, so another medium-term goal is to establish our own seed orchard with hand-set seed from espaliered trees on windbreak fences. Currently, we drive four hours north in late summer to collect magnolia seed from a series of trees for rootstock production.

I have a couple of crosses with seedlings that consistently produce flowers in their second year. This enables many seedlings to be raised for rootstocks that are then summer budded or spring budded after flowering. Any seedlings showing promise can be kept back for further evaluation without undue expense.

As this article goes to print we have had a record breaking hot and dry summer. Fortunately we have enough water to give the hybrid beds as well as

the nursery at least three hours irrigation per week to avoid bud drop and keep the seedlings growing. Last spring about 40% of the seedlings flowered at three years of age, and this coming spring will see most of the rest flower too, including the *Magnolia campbellii* 'Sir Harold Hillier' hybrids.

Magnolia 'Genie' × *M.* 'Sir Harold Hillier' has a couple of seedlings flowering three years from seed, as well as some *M.* 'Genie' × *M.* 'Margaret Helen,' one of which flowered in March.

Where to from here?

As with any breeding program, it helps to start with the best parents available. When my wife and I went to the UK and Europe in April 2006, one of the goals was to see what was out there, and what I should be hybridizing with. Up until this time, I was working with, and aiming at, what was doing well and sold well in NZ. In reality, the market is worldwide so the focus needed to be broadened.



A lot of the crossing has been done within the *M.* 'Sweet Simplicity' line to keep working on the smaller garden plants, but the charm of the *M. campbellii* types for classical form is still irresistible. The latest batch of seed includes crosses with *M. campbellii* var. *alba* 'Mt Pirongia,' (adjacent photo) a selection by Ian Baldick, probably raised at Hilliers and imported by Duncan and Davies as a seedling in the 1950s. This is the most formal shaped white *M. campbellii* I have seen, and

is very reminiscent of *M. campbellii* var. *mollicomata* in form. This addition of *M. campbellii* back into the gene pool will also help to increase the size of the flowers on the hybrids.

Magnolia 'Genie' has also been used in most of the last round of hybrids, including crosses with *M. cylindrica* and *M. sprengeri* var. *elongata*. The latter is a charming plant, which has been overlooked as a small garden tree in NZ. I feel it has much potential, both as a tree in its own right, as well

as for breeding. I am using *M. 'Genie'* extensively as it has the potential to impart more rounded tepals to any cross that was formerly done with *M. liliiflora 'Nigra.'*

I have sent material to Europe and the us for trialing both through a network of plant franchising companies and on individual basis. (Plant franchising is an interesting concept for mass marketing of patented material, but how successful this is going to be remains to be seen. Not everyone agrees with the concept of variety "ownership," but it is the only way to get big nurseries behind a plant that is then offered to a wide customer base.) Trials are in place to test the hardiness range before commercial release, and this will prove valuable for further breeding work both here (NZ) and abroad. When a free-flowering, easy-care variety is marketed, people who know nothing of magnolias are encouraged to plant one and actually enjoy it instantly. This is a good way to make the genus more widely known.

The breeding program is producing much more material than really fits the franchise model of rewarding easy-care plants. With a broad genetic base including several *M. campbellii* types, there will be many forms arising that will only be collectors' plants. It is not fair just sit and enjoy their flowers and shade for a few years, and then their firewood! These will be propagated and distributed selectively for magnolia enthusiasts to enjoy.

As fall sets in we are setting about extending the garden and nursery. The hybrid seed germination was the best I have had and we now have approximately 1,600 seedlings from 28 crosses to plant out. With the current planting system that is about 2,000 square meters or ½ an acre of land! We are exploring ways to merge them into a garden feature.

We also look forward to the next flowering season to see what surprises are in store. I sometimes wonder if I am a little crazy planting so many seedlings then having to set about sorting them out. In the end however, they sort themselves. Each seedling has a beauty all of its own, but the good ones keep leading the eye and turning the heads of visitors.

If you are coming to visit New Zealand, you are most welcome to visit our collection. Mid August to mid September is peak season for magnolia flowers in our garden. E-mail for details at budder@xtra.co.nz