

***Brachychiton* Breeding: A Propagator's Journey®**

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BACKGROUND

I started collecting *Brachychiton* in the early to mid 1990s. I had seen flowering *Brachychiton bidwillii* Hook. while at university and had grown several from seed while working at nurseries in Cairns, Queensland. A mate, Anton Van der Schans, is a plant collector and landscape architect who collected several species off Cape York on various trips including *B. garrawayae* (Bailey) Guymer, *B. velutinosus* Kostermans, and *B. grandiflorus* Guymer. These flowered and grafted readily. Grafted *B. velutinosus* were planted into landscapes and flowered and performed well. The spectacular and regular flowering of the tropical species inspired me to start a breeding program. I knew *B. bidwillii* was a precocious, prolific, regular flowerer with a compact habit which would make it ideal as a parent to reduce the size of the tropical tree species. Prior to this I had only bred *Grevillea* spp. In the mid 1990s I started to develop the pollination protocols to reliably produce hybrid brachychitons.

Since that time I have added the following:

Species:

- *Brachychiton acerifolius* (Cunn ex G. Don) Macarthur
- *B. albidus* Guymer
- *B. australis* (Schott & Endl.) A. Terrace
- *B. chillagoensis* Guymer
- *B. discolor* F. Muell.
- *B. populneus* subsp. *populneus* (Schott & Endl.) R. Br.
- *B. rupestris* (Mitchell ex Lindley) Schumann (broad leaf form)
- *B. sp.* (Blackwall Range)

Hybrids:

- *B. ×roseus* Guymer nothosubsp. *roseus*, hybrida nova,
- *B. ×excellens* Guymer, hybrida nova of which there are four selections
- *B. ×vinicolor* Guymer, hybrida nova
- *B. ×carneus* Guymer hybrida nova

Two Unnamed Hybrids:

- *B. chillagoensis* × *B. australis* and *B. acerifolius* × *B. rupestris*.
Both of these hybrids contain "bottle tree" parents so are extremely useful in decreasing the time to produce multiple parent hybrids containing these traits.

GENUS BRACHYCHITON

There are five separate sections within *Brachychiton* (Guymer, 1988) and these groups show differing characteristics such as growth habit, flower colour, shape, and the presence or absence of trichomes on leaves and other organs.

These sections are: Oxystele, Poecilodermis, Delabechea, Trichosiphon, and *Brachychiton*. (Guymer, 1988)

Within the genus there are 31 described species and numerous collections that are likely new species as well as collections waiting to be named. It is likely that the genus may actually contain 40 or more species.

There is some contention whether the genus belongs to Sterculiaceae or Malvaceae I see many similarities with Malvaceae after dealing with the genus for as long as I have.

Opportunities. Generation time for *Brachychiton* breeding is 3–4 years and as such the program is always in lag as to what is available to commercialise and also what can be used to continue the breeding program.

The advantage is that most people see generation times for trees being too long to bother with, so there is ample opportunity to breed this and many other tree genera as not much work has been done to date.

General. This genus contains many familiar species that are important ornamental and agricultural trees. *Brachychiton populneus* (kurrajong) is used as an important fodder species during droughts, providing valuable feed for livestock and has been extensively planted for this purpose (Guymer, 1988).

Kurrajong is also used extensively for street tree plantings in more temperate climates and performs excellently in southern Australia. Specimens can be seen around Canberra in both planted and natural situations where during winter they stay green and lush while even *Eucalyptus* spp. and *Acacia* spp. appear to suffer from the cold.

The other more popular species are ornamental trees such as the illawarra flame tree, *B. acerifolius*; Queensland lace-bark, *B. Discolour*; and the Queensland bottle tree, *B. rupestris*. The latter has a spectacular bottle-shaped trunk that can grow to several metres in diameter (Guymer, 1988).

Breeding. Flowers are functionally unisexual by abortion [(Schott and Endlicher, 1832) in Guymer, 1988].

Flowers generally are open for 2 days falling on the 3rd day, though several species observed have flowers that only open for a day before abscising.

Masses of flowers of either sex occur in flushes but typically there are large numbers of male flowers and many fewer female flowers. *Brachychiton garawayae* (Bailey) Guymer is an exception in that the clone I have produces female flowers prolifically and it is possible to kill plants by setting too many flowers.

The number of hybrids to produce to express variability increases considerably once multiple parents are introduced where recombination of traits becomes unpredictable.

Parent Selection. *Brachychiton populneus* subsp. *populneus* and *B. australis*. A. Terrace were used in the 2009 season to produce about a 1,000 hybrids from a range of interspecific crosses *B. bidwillii* and *B. discolour* and the hybrid cross of *B. velutinoso* × *B. bidwillii*, and *B. ×carneus* and *B. ×carneus* × *B. bidwillii*. The resultant seedlings look interesting with some unusual leaf expression in the juvenile phase that will likely be totally different in adult foliage but may indicate re-combinations. *Brachychiton populneus* subsp. *populneus* also has an extremely useful trait in that trimmed branches will abscise back to a branch collar leaving a clean and tidy wound. This is useful as it will allow trees that are trimmed to drop stubs and leave uniform and tidy branches and trunks after pruning activities.

The species that I have used to date for breeding are *B. bidwillii*, *B. garrawayae*, *B. grandiflorus*, *B. velutinosus*, *B. discolor*, *B. australis*, *B. acerifolius*, *B. sp.* Black-wall Range, and the natural hybrids *B. ×carneus* (*B. garrawayae* × *B. grandiflorus*), and *B. ×roseus* (*B. acerifolius* × *B. populneus* subsp. *populneus*).

This season I have also incorporated *B. acerifolius* a species I have stayed away from so far as it tends to lack regular flowering and is a large tree. However now I have a number of other hybrid streams in production I can invest in breeding species that likely have a longer juvenile period. However the juvenility may be influenced by putting such seedlings onto smaller rootstocks or dwarf interstocks that may influence flowering time and reliability by reducing vegetative vigour.

Once complex hybrids are flowered and assessed these will be further bred on to introduce "bottle tree" traits into a range of hybrids.

Assessment of Hybrids. Hybrids are assessed according to unique traits and suitability for certain purposes and climates. The inter-specific hybrids between *B. bidwillii* and *B. velutinosus* demonstrate this in that the hybrids may look identical but vary in the degree of frost hardiness. Where one does not suffer another may frost back and lose 2–300 mm of the previous season's growth. Knowing what traits to assess for and where to do it is critical in developing and releasing new unique selections.

Development of multiple parent hybrids (complex hybrids) that have five parents in the previous two generations show massive variation in the traits expressed by the progeny. Some show recombination of a variety of parents' traits to express new visual effects while others surprisingly show traits similar to one of the original species parents.

The next step is induce ploidal mutation to produce tetraploids and triploids of a range of the better selections.

Once assessed and trialled, suitable hybrids will be protected using Plant Breeders Rights to guarantee the security of the investment in this long-term breeding program.

LITERATURE CITED

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