Breeding and Selection of *Brachychiton*©

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INTRODUCTION

Why *Brachychiton*?

- Beautiful trees naturally.
- Ornamental trunks and foliage.
- Free flowering.
- Colours, white, red, pink, orange, and greenish.
- Flowers up to 50 mm long and 40 mm wide in some species.
- Many are deciduous flowerers.
- Flowering period can be many months.
- Drought tolerant.
- Not likely to become weeds.
- These make ideal characteristics for breeding.

Some Drawbacks. Some species may have flowers that upon falling could be a slip hazard to pedestrians and motorcycles. *Brachychiton discolor* F. Muell is such a species that produces muscilaginous excretions from fallen flowers. This results in an extremely slippery surface when it falls onto hard-paved areas.

Substantial juvenility periods may hinder breeding and assessment programs.

GENERAL

This genus contains many familiar species that are important ornamental and agricultural trees. *Brachychiton populneus* (Schott & Endl.) R.Br., kurrajongs, is considered an important fodder species during droughts, providing valuable feed for livestock and has been extensively planted for this purpose.

The other more popular species are ornamental trees such as the illawarra flame tree *B. acerifolius* (Cunn. Ex Endl.) Macarthur, Queensland lace-bark *B. discolor* F. Muell, and the Queensland bottle tree *B. rupestris* (Mitchell ex Lindley) Schumann. The latter has a spectacular bottle-shaped trunk that can grow to several metres in diameter (Guymer, 1988)

ASSESSMENT OF HYBRIDS

- The hybrids will be assessed on their precociousness, flower colour, size, and inflorescence size, foliage colour and shape, and the colour of the new growth.
- Flowering period, annual flowering, and duration of flowering season.
- Tolerance to drought, frosts, and wet conditions.
- Mature size when compared to the three parameters for selection, specimen trees, trees under powerlines, and tub specimens.

BREEDING

- Flowers are functionally unisexual by abortion, Schott & Endlicher (1832).
- Flowers generally are open for 2 days falling on the 3rd.
- Flowers usually occur on the lower branches first closer to the trunk. Male flowers are much more numerous than female flowers that often open later in the flowering period.
- Native bees are extremely fond of the pollen. Flowering in the tropics starts in September and continues through to November for *B. bidwillii* Hook. (Boorman, pers. comm., 2003). This species is extremely useful as a parent as it is precocious and free flowering producing large quantities of pollen and also a proportional number of female flowers. The species is ideal as it has a low growth habit, freely branches and is tolerant of a range of climatic extremes from tropical summers to frosty inland areas where it naturally occurs.
- Many of the earlier trial pollinations were unsuccessful. The reason being that flowers are receptive to pollen on both days but abscission has already commenced on the second day, pollination is not successful and flowers are aborted.
- Pollination is also sensitive to the time of day with pollination activities after 8:30 AM on the first day not being successful. This is also exacerbated by hot dry winds or overly hot mornings.
- Fertilisation results in a rather swift swelling of the ovaries that is clearly visible after several days.
- Flower abortion can occur after a week or so and may be as a result of nutrient or moisture stress on the parent.
- Boring larvae can also cause abortion of nearly mature pods even if only 2 to 3 of the 20 or so seeds have been damaged.

PARENT SELECTION

Scion and rootstock interactions can also stunt growth and promote flowering such as between *B. acerifolius* rootstocks and *B. garrawayae* (Bailey) Guymer. scions. Scion growth is stunted causing it to produce relatively large numbers of flowers for the plant size. *Brachychiton garrawayae* (Bailey) Guymer is noted as growing to 12 m but I have not grown a grafted specimen over 0.75 m. They have on two occasions produced so many flowers and subsequently fruit when deciduous that the plants have died. I do not believe that it is incompatibility but rather a hypersensitivity to some latent pathogen in the rootstock (Boorman, pers. comm., 2003).

The five species that I have used to date for breeding are: *B. bidwill*, *B. garrawayae*, *B. grandiflorus* Guymer, *B. velutinosus* Kostermans, *B.* sp. 'Exmore Station', and the natural hybrid *B* . ×*carneus* Guymer (*B. garrawayae* ×*B. grandiflorus*).

Other species that I have and am waiting for first flowering are *B. albidus* Guymer, *B. chillagoensis* Guymer, *B. discolor* F. Muell., *B.* ×*vinicolor* Guymer (*B. acerifolius* ×*B. populneus* subsp. *populneus*), *B. acerifolius* ×B.*discolor.*

I will also include *B. acerifolius* and *B. rupestris* (Mitchell ex. Lindley) Schumann, both species appear to have extremely long juvenile phases that make breeding programs time consuming so precocious species are the first I have used while establishing the other stock plants.

Brachychiton ×*carneus* Guymer, (*B. garrawayae* ×*B. grandiflorus*) has produced some interesting responses to insect attack possibly fruit-piercing moth. This response was a particularly strong terminal panicle that flowered over 3 months from both tips affected. This may indicate the possibility of using growth regulators to promote flowering, for breeding, and display purposes.

The breeding has resulted in the production of 100 of *B. bidwillii* ×*B. grandiflorus* and 120 *B. bidwillii* × *B.* ×*carneus* which are 2 years old and planted out in test blocks at 3 m spacing for assessment.

The next batch consists of *B. garrawayae* ×*B. bidwillii*, *B. grandiflorus* ×*B. velutinosus, B. garrawayae* ×*B.* sp. 'Exmore Station', and *B. bidwillii* ×*B.* sp. 'Exmore Station' and consists of 300 plants that will be planted in the trial block in spring.

LITERATURE CITED

Elliot,W.R. and **D.L. Jones**. 1985. Encyclopaedia of Australian plants Vol. 2. Lothian Pub. Co. Pty. Ltd, Melbourne, Australia.

Guymer, G.P. 1988. A taxonomic revision of *Brachychiton* (Sterculiaceae). Australian Systematic Botany Society.

Unconventional Pesticides©

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The pesticides I want to talk about are being termed "bio-rational pesticides". The term did make me pause to consider if all the chemicals we have been using are by definition bio-irrational pesticides.

Our single biggest selling plant is *Amelanchier* or juneberry. It is a native American small tree that has four-season interest; white flowers in April, edible fruits in June, excellent red fall color, and attractive smooth gray bark in winter. The problem with *Amelanchier* is that it is very susceptible to powdery mildew. We can have a greenhouse filled with lilac, the plant we think of as a magnet and indicator for powdery mildew. The lilac will be perfectly clean while the *Amelanchier* get mildew seemingly overnight. We had been using a rotational spray of Cleary's 3336 and Milban and have been getting mixed results. We were also having trouble with occasional root rot in our summer-blooming azalea transplants. At that point we began to look at some alternative fungicides. You do need to be careful, as some of the treatments I'm going to talk about may not be registered for the use I'm suggesting in your situation.

DISEASE CONTROL

ZeroTol™. ZeroTol is a liquid chemical manufactured by BioSafe Systems in Glastonbury, Connecticut. The active ingredient is 27% hydrogen dioxide. ZeroTol is marketed as a broad-spectrum algaecide/fungicide for preventative treatment on ornamentals and turf. It can be used as a drench to control soil-borne plant diseases such as *Pythium*, *Phytophthora*, *Rhizoctonia,* and *Fusarium* at transplanting or seeding. We used it as a drench when we transplanted our summer-blooming azaleas. The label says that it can also be used as a foliar spray as an initial (curative) application to kill fungal spores on contact with any plant surface, then at a more dilute rate as a weekly preventative treatment.