

**ASGAP BRACHYCHITON & ALLIED GENERA STUDY GROUP**

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**Mea Culpa** : This time I have broken all previous records on late newsletters, partly due to slackness, partly due to leaving newsletters until flowering etc. information was all at hand, & finally due to a bout of illness which put me into hospital with a mystery bug which caused hallucinations, fever & heart irregularities. Before all this, the May & June newsletters were on my computer in draft form. Then my CPU died, so they were finished on a shining new computer that runs under Windows Professional XT, instead of the previous Windows 98.

I have edited items so that, for instance, all the weather bits are in the May newsletter, despite some June '04 dates, to make easier reading.

**Membership Matters** : Welcome to new (corresponding) member Perry Brampton, Civic Centre, Warooka Drive, Smithfield, SA 5114. Perry is with the council nursery of Playford. Subs are still \$5 in Australia & \$10 for overseas, & run from July in one year to June in the next. The 1-line table below shows your status as per my records, where a tick means paid up.

'98-'99	'99-'00	'00-'01	'01-'02	'02-'03	'03-'04	'04-'05
ASGAP, at its last (Launceston) meeting in January '04, ruled that only members of member societies of ASGAP could be full members of study groups. But study group leaders can have corresponding members who provide useful information, such as botanists & surveyors. We also have to be a bit more business-like re finances & so on, & have our books audited, although a member can do this, & I will call on someone in Brisbane to help out.						

**Weather & Plant Behavior** : The weather here at Greenbank (40 km S-W of Brisbane), & most of eastern Australia, has been more peculiar & variable than usual. My longest drought – 3 years of no creek flow – appeared to break in mid-January '04 with a useful fall then, & creek running from non-local water in early Feb. & early March. But not a drop since, & the grass is white again. The winter of '03 was fairly normal, with 12 or so frosts, while Sept. alternated every few days between maxima around 20 & in the high 30's (all temperatures in degrees Celsius). October was cooler, with maxima mostly between 22 & 27, until hot weather (31-36) & some dust storms from Oct. 21. November started cool, around 27, then in the 30's by the 11<sup>th</sup>, with Dec. 30 to 39. Early Jan. '04 was all hot, 35–42, with Qld. records falling daily. The rest of January was normal, in low to mid 30's; Early Feb. was around 35, then several hot days, 36–44, from Feb. 14 to 23. On the 15<sup>th</sup>, Brisbane had a night minimum record of 26. The 21<sup>st</sup> had the hottest day ever (by 5 degrees) on the Gold & Sunshine Coasts, & 44 here. All these records were slightly exceeded the next day, then the rest of February returned to normal, around 33 degrees. Early March, back to high 30's, with several record highs (for March) in western Qld. April was normal, & May cooler than usual, with frosts of -2 on the last 2 days of the month. Usually I get no frosts before July. June stayed cold.

This fine detail given above is given because so many plants behaved unusually in spring/summer of '03-'04. My hundred or so plants of *Dendrobium kingianum* & its hybrids failed to flower in 95% of cases, & my 60 or so *Sarcocylus* flowered poorly or not at all. Those that did flower did so at least a month earlier than usual, in late August. Many exotic orchids also performed poorly.

Most *Brachychiton* species flowered relatively poorly, with no flowers at all on *B. megaphyllum*, *B. sp. aff. megaphyllum*, *B. spectabilis* & *B. viscidulus* (& 1 late flower on *B. vitifolius*) plants which had flowered previously. For the first time, some *B. bidwillii* plants failed to flower, & the rest were less spectacular than usual. The *B. bidwillii* Leichhardt Form plants at Merv Hodge's property, some 30 km away & usually 3 or 4 degrees warmer than mine in the cool months, flowered normally. Flowering periods here for the *Brachychiton* hybrids Clarabelle, Griffith Pink, Rosalind & Belladonna were less than half as long as usual. How much of the floral shortfall was due to the drought, & how much to the on-off hot & cold spells, I cannot say. All the *Brachychitons* received a fair bit of supplementary watering due to small nearby plants being watered. For the orchids, which were watered artificially at normal rates, a drought

2

explanation would not be valid. A great many plants in scores of genera also flowered poorly, late, or not at all.

Two *B. megaphyllus* & 1 *B. viscidulus* did not start to put out leaves until 1-2-04. All were leafless again by 12-5-04, as was my sole *B. vitifolius* which did not grow leaves until December, so they did not have much time to gather food reserves from sunlight.

**Greater Malvaceae :** I have mentioned in earlier newsletters that some taxonomic botanists felt that the family Sterculiaceae, along with several others, should be merged into a much-enlarged Malvaceae. I have now looked at the DNA evidence for this, & somewhat reluctantly been convinced that they have quite a good case, as several different types of gene have been looked at. Morphological similarities were all taxonomists had to work with until fairly recently, & can be deceptive. All taxonomy is a human construct, aimed at reflecting the true evolutionary relations between species, while imposing an order that allows convenient pigeon-holing of taxa (a useful word which covers all taxonomic groupings). Similar evolutionary histories have led to very similar adaptations, such as echo-locating 'radar' in bats. Fruit bats & the small insect-eating bats are far apart genetically, & their radars must have evolved separately. Other examples of parallel evolution are legion.

In evolution, some genes have areas which are vital to their function, & almost never change, like vital haemoglobin & enzymatic action centres. Even these do alter, sometimes; octopuses (not octopi, as octopus comes from a Greek root, not a Latin one.) have blue blood because they use copper compounds to carry oxygen, not red iron-based haemoglobin. Chromosome duplication, vastly more common in plants than in animals, allows one gene pair to carry on with their original function, while the second can change to do something entirely different. DNA & RNA sampling across different gene systems gives one a chance to look at different types of gene, including the neutral or near-neutral genes most useful as biological clocks for recent millenia. Random mutations change the nucleotides in neutral genes in a predictable manner, summed over many genes, including some back-mutations to the earlier form before a mutational event. Some organs have different genetic histories; chlorophyll-producing chloroplasts were once independent algae aeons ago, & have their own genes which are not sited in the cell nuclei like 'mainstream' genes, & are inherited separately in the cytoplasm. Hence many variegations & so forth, involving plastids, can be lost if the plastid is lost. In mammals, mitochondria are non-nuclear entities, inherited via the mother's cell cytoplasm, with their own gene set, as they were once independent bacteria countless millions of years ago. So DNA studies on nuclear genes give a separate data set, inherited differently, from those on plastids or mitochondria. If all the sort of factors I have talked about are weighted appropriately, molecular (DNA etc.) evidence can be very compelling, & dating of evolutionary events can be fairly precise. If two plant species hybridise, the nuclear genes in the hybrid come from both parental species, but the chloroplasts may only derive from one parent, though that is probably rare. So plastid DNA evidence has to be looked at critically. It is currently believed that about 70% of all plant species have been involved in genome merging. In many cases, as in bread wheat, the precursor genomes (3 for wheat) can be seen & traced to existing wild species. Chromosome doubling is often involved in such cases, as gene pairing is then easy before gametes are produced. Otherwise new hybrids usually lose some chromosomes, often with fatal results. In many groups, including the family Sterculiaceae, botanists are unsure if the ancestral chromosome number was small or large.

**Flowering :** Some forms of *B. bidwillii* were in flower in early September, with the Maroochydore & Northern Coastal (Clayton) forms in flower by late September, & ceasing to flower in early December & late November respectively. My Leichhardt forms: 'Large Red' between 12-10-03 & 31-12-03, & 'Large Pink' (= 'Beau Belle') & 'White Star' from 12-11-03 to 31-12-03. Their flowering period started in September & finished in late January at Merv's place. Rosalind, Griffith Pink & ~~Belladonna~~ were briefly in flower here between late October & mid November. Clarabelle, normally with a 3-month flowering period, was in flower here from mid-November to late December, but the individual trees were only in flower for 3 weeks during that period.

Jean & Don Dennis called in on 1-10-03, back from Cape York, with flowers of *B. sp.* Exmoor Station. These were mid-pink, & 4 cm wide x 3 cm long on good forms, & 3 x 3 cm on others. Some flowers were green at the inside base of the floral tube, & some pink.

Flowers on several hybrids between *B. spectabilis* x *B. bidwillii* 'Beau Belle' were 4.5 cm x 4.5 cm, with a colour range from mid-pink with a tinge of apricot (from the *B. spectabilis*) to dark pink to red, on different F1 plants. All flowered well, & from mid-September to late January. I intend to call the best

3

selection B. 'Jasper Belle', since the female parent was collected from Jasper Gorge in Gregory National Park in the N.T.

Flowering in *Lysiosepalum involucreatum* was poorer & briefer than usual, & no *Thomasia* or *Lasiopetalum* flowered except *T. foliolosa*, whose flowers are tiny. *Commersonia bartramia* flowered profusely, as usual.

**New Plants at my place :** I replaced my dead B. sp. Exmoor Station by grafting some material from a tree at the Land Warfare Centre, Canungra, which was a grafted tree I had sold to member Don Lynch about 4 years ago. It was in flower, with dark pink flowers, on my visit, but they were almost spent. This coming spring I should have some good flowers & other material to give to the Qld Herbarium, whose director, Gordon Guymer, did the last revision of the genus in 1988. As far as I know, no botanist has yet seen any material of this species.

New grafted plants from flowering material; the first 6 entries came from material sent from North Qld. by Jean & Don Dennis. I got Merv Hodge to graft these as it was winter & he has heated post-graft facilities : *B. albidus*

*B. garrawayae*, from Musgrave Roadhouse (had 1 summer flower, orangy-red, 1.25 x 2.5 cm)

*B.-x allochrous*

*B. muellerianus*, from Development Road (between the Archer & Wenlock Rivers).

*B. velutinosus*, from Coen

*B. sp. Exmoor Station* (new collections)

*B. compactus*

*B. collinus*, from garden of late member Ian Waldron

*B. acerifolius*, a large-leaf & large-inflorescence form from Ian Waldron.

New seedling plants : *B. albidus*

*B. chillagoensis* (from 2 sources ; the younger ones leaved, & the older ones deciduous until early Feb. '04. ).

**Hybrid Swarms :** To underline the fact that species are just human constructs for our convenience, quite a few genera contain a range of genetically different but still inter-acting & intergrading populations. In *Senna*, there are several near-species clustering around *S. artemesioides*. In *Cycas* & *Grevillea* there are several swarms where species meet, & in palms a few years ago several genera (like *Chrysalidocarpus*, *Neodypsis* & *Vonitra*) were added into *Dypsis* when closer field studies found no criteria which validly defined the absorbed genera from each other. Another few thousand years, or a sizable loss of genetic diversity, & the genera may well have been nicely distinct. In some algae & microbes the situation is vastly more confusing, with many 'species' being made up of asexually reproducing strains, some of which may not have mixed genes with any other member of the 'species' in millions of years. Can just one mutation make a new species?