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SGAP Cairns

Society for Growing Australian Plants, Cairns Branch

C3 – C4 – CAM PHOTOSYNTHESIS

Most people are familiar with the concept of photosynthesis – the complex biochemical mechanism by which plants capture sunlight energy, and use it to create sugars from carbon dioxide and water. However, the different modes of photosynthesis are less familiar – they are known as C3, C4 and CAM.

C3 photosynthesis is by far the most common type where temperatures are moderate and water supplies are adequate. In the first step of this process, carbon dioxide is used to create a sugar molecule with three carbon atoms, hence "C3".

In warmer, drier environments, C4 photosynthesis is a more efficient way of capturing sunlight energy. In these plants (*e.g.* maize), the captured carbon dioxide is used to create an organic acid molecule with four carbon atoms (C4), which is transported to distinctive cells surrounding the leaf veins where the photosynthesis reactions are completed. However, it icosts the plant a lot in terms of energy, and therefore is less common in temperate plants.

Crassulacean Acid Metabolism (CAM) is a variant of C4 found mostly in arid zone plants such as pineapples and members of the Crassulaceae family. To avoid drying, leaf stomata are only open at night. Carbon dioxide is used to create the four carbon organic acids, which are stored in fleshy leaves. During the day, stomata are closed, but the stored organic acids can be used to complete the photosynthesis cycle.

this issue

FEBRUARY EXCURSION REPORT THE STREETS OF CAIRNS

by Don Lawie

Our February 2014 outing commenced very pleasantly around the barbeque area east of The Lagoon, with Chef Stuart turning out sausage and onion treats better than Bunnings ever offered. We discussed future outings and activities during lunch and Boyd outlined the detailed work he has done so far on the Banks and Solander project at Cairns Flecker Botanic Gardens.

Our plan, devised by Stuart, was to stroll through the inner city and discuss the street tree plantings, their suitability and state of health. We had Rob and Stuart to guide us on our journey of discovery, and we set off in 33 degree heat and burning sunshine, moving from shade to shade.

The Lagoon area is sensibly planted with numerous shade trees but the open sunny areas were Melanoma Central with hordes of scantily-clothed tourists making objective botanical observations quite difficult. Trees noted were several *Ficus* and *Cassia* species both native and exotic, including a beautifully flowering Rainbow Cassia – hybrid of *C. fistula* and *C. javanica*, Tuckeroo (*Cupaniopsis anacardioides)*, a *Syzygium hemilamprum* which Rob pointed out was recovering from an attack of Myrtle Rust, Bumpy Satinash *Syzygium cormiflorum* ,and Beach Calophyllum *Calophyllum inophyllum*.

Moving on, we approached the Casino where the erstwhile Anzac Park still preserves an array of mature trees, notable among which is an *Elaeodendron angulatum* [Editor's Note – this name is not recorded in the standard

The Streets of Cairns (cont…)

references] planted long ago by noted botanist Walter Hill. These trees supported a number of epiphytic orchids and ferns. The Golden Orchid *Dendrobium discolor* and the Pencil Orchid *Dockrillia calamiformis* are found all over the Cairns area as is the orchid-like fern *Pyrrosia longifolia*. A young Umbrella Tree *Schefflera actinophylla* was growing well in a tree fork – doubtless planted by a bird. Umbrella trees are in brilliant scarlet flower throughout the area at present, attracting clouds of butterflies and birds.

Street plants approaching the Casino are Beach Barringtonia *Barrringtonia asiatica* showing immature fruit and long-stamened flowers in profusion. The gardens of the five star area show signs of having been professionally planted some years ago using mostly exotic palms and shrubs. These gardens are now mature; the palms are leggy, bare patches show where odd plants may have died, and the once lush tropical gardens are in need of more care than can be given them by an occasional weed and water regime. An example is the once highly popular Redneck Palm *Dypsis lastelliana* – all the rage in the eighties when it was *Neodypsis lastelliana* with its compact growth and striking fuzzy-red crownshaft. They are now tall skinny trees with not much going for them.

Recent exceptionally high king tides had encroached on waterside gardens with resulting salt-burn on low plants. Two noted survivors were a rampant patch of *Ipomea pes-caprae* with hand-sized dark green leaves and a native grass *Zoysia matrella*. Rob says that this grass occurs along the foreshores of Cairns' northern beaches. Like *Ipomoea* it is accustomed to sea water and these two plant species were outstanding in their resilience to harsh conditions.

An exotic shrub I had not seen before was Sea Grape *Coccoloba uvifera* which has lime green, red-veined leaves and attractive bunches of round fruit. Unless it has some property such as weed potential or poisonous fruit, *Coccoloba* deserves wider planting.

Cairns Regional Council has in recent years brought the waterfront area into a tropical showpiece, using existing trees and making extensive use of recycled large baulks of old timbers. A childrens' playground has been cleverly established among the roots and branches of a giant Benjamin Fig and various so-called Artworks litter the area. Of interest is a sign pronouncing that Cairns was once known to the original people as "Gimuy" which was their name for the Blue Fig *Ficus benjamina*.

Near the Port offices street plantings comprised an array of natives. Of interest were *Barringtonia acutangula* showing small three sided fruit and the remains of their long tresses of scarlet flowers, and Dogbane *Cerbera manghas* already in fruit despite their small size. The walk went on but the heat was oppressive and in spite of Stuart's promise that an ice creamery was near I left the group after an instructive and interesting walk. I feel that we should do something similar in the cooler time of year, in parts of the inner city CBD where there are flowering trees to be discovered.

ATH
Australian Tropical Herbarium

NEWS FROM THE ATH

The extremely rare and immensely cute little kangaroo, the Northern Bettong, has benefitted from studies by ATH associates. This small, exceedingly shy marsupial feeds mostly on hypogeous fungi, more popularly known as truffles. Truffles are the fruiting bodies of mycorrhizal fungi – fungi that are intimately and obligately associated with the roots of plants, for whom they gather soil nutrients and exchange for plant sugars.

The bettong survives during seasons of low truffle abundance by digging up the underground shoots of *Alloteropsis semialata* (cockatoo grass). The Northern Bettong is difficult to survey, as it is shy and does not often enter traps. However, each time a bettong digs down to reach the shoots of cockatoo grass, it leaves a little hole and, uniquely, a little spit of grass fibres – physical evidence of its presence that can be used to survey activity. Another project is looking at the role of native marsupials in spreading hypogeous fungi.

Once again, it appears an improved scientific understanding of plant evolution will lead to name changes. This time, Annonaceae has been the target of researchers. Annonaceae is a large, tropical and widespread family, factors which have historically inhibited large-scale reviews. However, recent DNA studies may overturn many familiar genera. More to come.

But is it art? Dennis Nona's sculptures on the boardwalk.

Pandanus *bordering Wharf Street*

Cerbera manghas – *who needs frangipanis*

Cerbera manghas *fruits.*

Coccoba uvifera *(sea grape) – a native of the Caribbean.*

Cassia fistula x javanica, *another colourful exotic.*

Suggested Garden plants for "Botanic Explorers" display

Boyd Lenne

At our last meeting, we discussed at length the plants which might best suit the planned botanist commemorative beds at the Centenary Lakes Section of the Cairns Botanic Gardens. The compiled list follows (some with notes):

Banks and Solander:

Clerodendrum floribundum var. floribundum

- Family Lamiaceae, A small tree not exceeding 30 cmLarge terminal clusters of long tubular flowers are followed by black fruits in the red calyx. This plant used medicinally by Aborigines, wood decoction drunk for aches and pains.

Ficus opposita

- Family Moraceae. Usually grows into a small tree but can flower and fruit as a shrub 1-3 m tall

Hibiscus meraukensis

- Family Malvaceae. Flowers and fruits as a herb or shrub to about 2 m tall.

Melastoma malabathricum subsp. malabathricum

- Family Melastomataceae. Usually flowers and fruits as a shrub about 1-3 m tall.

Thryptomene oligandra

- Family Myrtaceae. Usually flowers and fruits as a shrub about 1-5 m tall but sometimes flowers when smaller. Occasionally grows into of a poorly formed tree.

Davallia denticulata

- Davalliaceae. This is a large epiphytic fern with a long, fleshy, creeping rhizome that is slightly flattened and covered in scales. The roots are found on the ventral surface of the rhizome. The fronds are bipinnate

Pyrrosia longifolia

- Polypodiaceae. Under 0.5 metres high, under 0.5 metres wide

Lomandra banksii

- Family Asparagaceae. Clumping Mat-rush

Dendrobium discolor

Dendrobium canaliculatum

Leptaspis banksii

- Family Poaceae

Pittosporum ferrugineum

- Family Pittosporaceae. A small tree not exceeding 30 cm dbh.

Grevillea parallela

Grevillea pteridifolia

- Family Proteaceae

Dodonaea polyandra

- Family Sapindaceae

Hybanthus enneaspermus

- Family Violaceae. Perennial herbs up to 60 cm tall with erect stems; stems longitudinally ribbed and clothed in scabrid hairs.

Cunningham:

Dodonaea viscosa subsp. angustifolia

Acacia leptocarpa

Coronidium rupicola

Pittosporum ferrugineum

- Family Pittosporaceae. A small tree not exceeding 30 cm dbh.

Neoroepera banksii

- Family Picrodendraceae Usually flowers and fruits as a shrub about 1-2 m tall.

Cyperus cristulatus

Dillenia alata

- Family Dilleniaceae. Red Beech

Leea indica

- Family Vitaceae

Fitzalan

Syzygium cryptophlebium

- Myrtaceae

Jasminum simplicifolium subsp. australiense

- Jasmine, Family Oleaceae

Deplanchea tetraphylla -

- Bignonia, Family Bignoniaceae

Polyscias elegans

- Black Pencil Cedar, Araliaceae

Orthosiphon aristatus

- Cats' Whiskers, Java Tea, Family Lamiaceae

Micromelum minutum

- Micromelum, Family Rutaceae

Delarbrea michieana

- Family Myodocarpaceae

Psilotum complanatum

- Flat Fork Fern. Psilotaceae

Vandasina retusa

- Family Fabaceae

Melastoma malabathricum subsp. Malabathricum

- Family Melastomataceae

Coronidium rupicola

- Family Asteraceae

Cordyline cannifolia

- Family Asparagaceae

Callitris macleayana

- Brush Cypress, Family Cupressaceae

Phyllanthus lamprophyllus

- Family Phyllanthaceae

Sterculia quadrifida

- Kuman, Family Malvaceae

Vitex trifolia var. trifolia

- Family Lamiaceae

Pothos longipes

- Family Araceae

Phylanthus lamprophyllus

- Family Phyllanthaceae

Cowley

Syzygium hemilamprum subsp. hemilamprum

- Family Myrtaceae

Pittosporum rubiginosum

- Family Pittosporaceae

Eustrephus latifolius

- Wombat Berry, Family Asparagaceae

Eupomatia laurina

- Bolwarra, Family Eupomatiaceae

Breynia cernua

- Family Phyllanthaceae

Archidendron lucyi

- Family Fabaceae

Clerodendrum inerme

Scambling Clerodendrum

- Family Lamiaceae

Harpullia rhyticarpa

- Family Sapindaceae

Sayer:

Tarenna dallachiana subsp. dallachiana

- Family Rubiaceae

Bridelia insulana

- Family Euphorbiaceae

Pavetta australiensis var. australiensis

- Family Rubiaceae

Hollandaea sayeriana

- Sayer's Silky Oak, Family Proteaceae

Flecker

Pandanus monticola
Codiaeum variegatum
Dianella ensifolia
Alpinia caerulea
Cyperus javanicus
Cordia subcordata
Cerbera manghas
Carallia brachiata
Lasianthus strigosus
Clerodendrum longiflorum
Gymnostachys anceps
Cleistanthus semiopacus
Myrsine subsessilis
Mackinlaya confusa
Persoonia falcate
Linospadix minor
Freycinetia excelsa

SEEKING *MITREPHORA DIVERSIFOLIA*

An email has been received from Dr Rojrawee Rawirash, seeking seeds of *Mitrephora zippeliana* (also called *Mitrephora diversifolia*), a shrub in the family Annonaceae that's native to northern Cape York. Photos of this plant can be seen at:

keys.trin.org.au/key-server/data/0e0f0504-0103-430d-8004-

Rojrawee is keen to obtain/purchase plants or seeds. He can be contacted at Rojrawee@gmail.com.

Upcoming Events

CAIRNS SGAP

Saturday 15th March

12 noon. Annual General Meeting, Cairns Botanic Gardens Visitor Centre, Collins Avenue, Edge Hill.

Bring lunch, and suggestions for excursions.

TABLELANDS SGAP

Meetings on the **4th Wednesday of the month**.

Excursion the following Sunday.

Any queries, please contact Chris Jaminon on 4091 4565 or email hjaminon@bigpond.com

TOWNSVILLE SGAP

Meets on the **2nd Wednesday of the month**, February to November, in Annandale Community Centre at 8pm, and holds excursions the following Sunday.

See www.sgaptownsville.org.au/ for more information.

OTHER EVENTS OF INTEREST

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