

A self-guided walk

September 2024

ABG



Over half the species in this month's list form symbiotic associations with nitrogen-fixing bacteria, a particularly useful alliance in Australia, which is noted for its ancient, nutrient-poor soils. Many species of *Acacia*, our largest genus, sennas and other natives from the family Fabaceae, along with our important legume crops, have root nodules containing bacteria from the genus *Rhizobium*.

See over page for map

*An Australian native

- *1 *Crotalaria cunninghamii*** Rattlepod, green or regal bird flower Semi-arid to arid inland Australia
Planted on an exposed mound of well-drained soil, mimicking its arid habitat, *Crotalaria cunninghamii* is a short-lived perennial which colonises unstable sand dunes. The lime-green flowers, looking much like birds attached to the stem by their beaks, are followed by large hairy pods (legumes) in which the seeds rattle when ripe. Nectarivorous birds and bees are the main pollinators. Rattlepod is one of the native species with root nodules containing rhizobia, though the extent of the benefit is not well-known.
- *2 *Hakea francisiana*** Grass-leaf or bottlebrush hakea WA, SA
On the path between the settling and macrophyte ponds, *Hakea francisiana* is a tall woody shrub, named for our first Director, George Francis, and for its tough narrow leaves with grass-like parallel veins. Racemes of pinkish-red flowers open sequentially from the base forming a 'bottlebrush' up to 10cm long. Fruits which develop following pollination are robust woody follicles holding two winged seeds that are shed on death of the branch, often after a bushfire. This site is probably wetter than its normal habitat, so look for the pair of specimens in the drier mallee beds at [2a](#), which also has a plaque dedicated to George Francis.
- 3 *Kalanchoe beharensis* (unlabelled)** Felt bush Madagascar
Just left of the stairs leading up from the Sunken Garden is a succulent bearing large, triangular, leathery leaves with undulate margins and a dense tomentum of felt-like hairs. Like many arid-adapted members of the family Crassulaceae it takes up CO₂ at night when water loss is minimal, storing it temporarily in organic acids before fixing it into sugars the following day when stomates are closed. Research has shown that photosynthesis continues even after 5 months without rain, so felt bush is an excellent container plant, surviving on very little water. The type specimen was collected in the Behara region of SE Madagascar.
- 4 *Ceanothus* spp.** (most labels 'buried') California lilacs North America
The blue-flowered shrubs in the beds overlooking the Sunken Garden include a number of *Ceanothus* species and cultivars. These N-fixing species from the family Rhamnaceae, have their centre of distribution in the Californian chaparral, a drought-tolerant vegetation shaped by a Mediterranean climate (mild, wet winters, long dry summers), low nutrients and wildfire. Unlike the legumes (eg rattlepod, acacias, sennas) the nodules on *Ceanothus* roots contain nitrogen-fixing actinomycete bacteria from the genus *Frankia*.
- *5 *Auranticarpa rhombifolia*** Queensland or diamond-leaf pittosporum Coastal; NE NSW to NE Qld
Once classified as a *Pittosporum*, this tree now belongs to a new genus *Auranticarpa* (golden fruit) which includes 6 tropical species, found only in Australia, all with gold or orange fruit. Corymbs of white, scented flowers appear in summer, followed by long-lasting orange capsules, containing 2-3 oval seeds.
- *6 *Olearia pannosa* ssp. *pannosa*** Silver daisy-bush Endemic to South Australia
Growing under the canopy of *Eucalyptus youngiana* (Ooldea mallee) next to the East Gate, silver daisy bush is a spreading shrub which attracts nectar-eating birds and insects in spring. The flowerheads are made up of 12-24 white ray florets surrounding 25-50 yellow disc florets. In the wild its tuberous, suckering roots can spread for 10-20 m. The species has been listed as vulnerable to a number of threats, including weed invasion, *Phytophthora*, grazing by domestic stock, land-clearing and lack of fire, among others.
- *7 Colour in the mallee beds**
At this time of year, the main colour in the mallee beds is the yellow of flowering acacias and sennas, from the family Leguminosae (syn. Fabaceae). The familiar pompoms of acacia flowerheads are dominated by the golden-yellow anthers of their many tiny flowers, but all parts of the buttercup-like flowers of *Senna artemisioides* can be clearly seen, even the green, bean-shaped ovary which will eventually enlarge and ripen into a fruit typical of the family, a legume splitting down both sides at maturity. The beans and peas in our diet, of course, are harvested well before they split and release their seeds.
- *8 *Casuarina glauca*** Swamp oak East coast from Central Qld to southern NSW
On the bank of Botanic Creek near the Nelumbo (sacred lotus) pond is a large stand of swamp oak, a long-lived species spreading by means of root suckers to form uneven-aged clones which, in the wild, may be entirely male, or entirely female depending on the initial seed. The female trees bear cone-like structures which contain many winged fruits (samaras) dispersed by the wind. Like the California lilacs, root nodules contain bacteria from the genus *Frankia*, which contribute to the nitrogen economy of the stand.
- *9 *Acacia glaucoptera*** Flat wattle Western Australia
The foliage of most Australian acacias is made up of flattened or otherwise modified leaf stalks (phyllodes), said to reduce water loss in a dry climate, only a few species retaining the pinnate leaves of the seedling stage into maturity. The foliage of this unusual acacia is variously interpreted as cladodes (flattened stems), or as 'phyllodes continuous with the branches'. Whatever the case, the 'blue-green (*glauco*-) wings (*ptera*)' are an attractive feature, particularly the red tinge of the new growth. Heads of flowers appear on short stalks along the central axis, and topping the stalk later on perhaps - dark-brown tightly coiled legumes.