Fruit and seedling

In most flowering-plants the fruit is formed just by the ripened ovary, but in the Nyctaginaceae its most substantial part is made by the basal part of the calyx. At first fleshy and bowl-like, this enlarges after fertilisation, toughens, and closes over the ovary to firmly envelop it and its single seed. The whole fruit-like structure is technically described as an 'anthocarp', i.e., a "flower-fruit"—see for example our Flora's descriptions of the bird-catcher plant, *Pisonia*. No protection to the seed is given by its coat or by the wall of the ripened ovary—these are very thin and lie so close to one another as to be indistinguishable to the naked eye. Clearly the calyx has taken over this role, providing us with an example of what morphologists call 'transference of function'.

When the anthocarp of *M. jalapa* is cut longitudinally and examined with a hand-lens two structures can be seen between the ovary and the outer, calyx-derived wall (Fig. 3). One is expected and the other is not. The first is the fused base of the ring of stamens, shrunken and contorted around the base of the ovary. The second lies outside this, as a ring around the low pedestal on which the ovary stands: a glistening white cluster of 'raphides', crystals of calcium oxalate; these are more usually seen as intracellular objects.

The anthocarp wall is not quite 1 mm deep and is largely composed of a thick inner layer of longitudinally orientated stone cells and a variably thinner transversely-oriented outer layer (heaviest under the little bumps spattered over the fruit surface (Fig. 4). Such is the 'proximate explanation' for the anthocarp's external appearance. The 'ultimate explanation', i.e., the evolutionary one, is a mystery. In the flowering plants knobbly rather than smooth fruit-stones are quite frequent. It might help them get picked up by the dispersal agent, or govern their rate of passage through the gut. What the agent for dispersing *Mirabilis* in Peru might be I do not know—given the texture of the fruit it would have to be some very unfussy animal.

If a *Mirabilis* fruit is soaked in water for a few days then given a firm squeeze it splits in several places longitudinally around its cogwheel-like base. The radicle of the embryo can then emerge. Sometimes though, when the splitting is not great enough, the "stuck" radicle sends out numerous adventitious roots. Either way, the embryonic shoot apex and the two large green cotyledons soon swell enough to push off their cap of anthocarp (Fig. 5).

It seems to me that the fruit in my garden's seed bank has no significant enemies (not even the motor mower). So, as with the flower, there appears to be no feature of this part of the plant's life-cycle that is clearly responsible for its inability to become more than just a seasonally welcomed 'wildflower weed'.

Note 1 The term 'salverform' derives from the near-obsolete English word salver, meaning a very superior kind of tray used when presenting food or drink to royalty, etc. The Oxford English Dictionary relates salver not (as one might guess) to the metal silver but to French and Spanish words used in the 17th C. and earlier. These had the particular meaning of a presentation that had been tested and found free of poison, the ultimate origin here lying with the medieval Latin *salvar*, to make safe (see also https://www.acsilver.co.uk). The term, as 'salver-shaped' was used by both John Lindley and Asa Gray in the first part of the 19th C. in their texts; I have not traced earlier occurrences. A competing Greek term is 'hypocrateriform', which means, rather obscurely, less than bowl-shaped. This, the OED says, appeared in English in 1760. (Gray observed that "hypocraterimorphous" was preferable, since it did not mix Greek with Latin.)

Knee-deep botany in the time of Covid-19 – Titch Place Stormwater Pond, Sunnyvale

Yumiko Baba and Cameron Kilgour

Our bubble of two was tucked in, in the quiet suburb and cultural oasis of Sunnyvale (NOT Sunnynook!), West Auckland. During lockdown we took the opportunity to explore some of the planted and weedy suburban streamside vegetation and reserves in our area. These areas fall within the catchment and floodplains of both Oratia and Waikumete streams. One stormwater pond in particular grabbed our attention due to it being almost completely dry and having an interesting array of wetland species growing in the mud, despite the usual human detritus and modern artifacts of the urban environment.

Titch Place storm water pond is one of four artificial storm water ponds located near to Waikumete Stream and both Sherrybrooke Esplanade and Albionvale Esplanade Reserve, which are

Fig. 1. Titch Place Stormwater Pond overview. All photos by C.D. Kilgour, 27 March 2020.

Fig. 2. *Glossostigma elatinoides* waterlogged population.

adjoining the eastern side of Parrs Park. The pond is located at S174° 54′ 13.9″, E174° 38′ 05.5″, c. 13 m asl, and covers an area of c. 662.9 m^2 (calculated using Auckland Council GEOMAPS version 3.2.1.1, 'draw and measure' function, https://geomapspublic.aucklandcouncil.govt.nz/viewer/index.html, accessed on 11 May 2020). The level of the water fluctuates depending on the amount of overflow, presumably from the adjacent pond. At the time of our first visit on 27 March 2020, during the driest summer on record, the water level was low, exposing the edge of the pond by 1.5 m all around (Fig. 1). The immediate higher areas surrounding the pond are mainly planted. The species checklist (see Appendix) was made within c. 5 m of the pond only.

The overall number of vasculer plant species counted was 44, seven of which are native, (six of these planted) and the rest are adventive (see Appendix). Amongst the mostly weedy species such as *Ludwigia palustris*, *Isolepis sepulcralis*, *Cyperus* spp., *Aristea ecklonii*, *Juncus articulatus* and *J. prismatocarpus*, was one large plant of the (once rare) now rather common *Epilobium hirtigerum* and a large colony of the uncommon herb *Glossostigma elatinoides* (Fig. 2 & 3).

While *Glossostigma elatinoides* is not nationally threatened it is listed as regionally At Risk (Stanley et. al 2005), and naturally its records or observations are rather limited in Tamaki Ecological District (e.g. two collections held at Auckland War Memorial Museum Herbarium, one from Meola Creek, Mt Albert and a historical 1930 record from St John's Lake, Remuera, https://www.aucklandmuseum.com/discover/collections; and an iNaturalist observation from Western Springs, https://inaturalist.nz/observations?place_id=6803&taxon_id=402125; both accessed on 27 March 2020).

This population was large (5 m x 1 m), mostly exposed and in full flower, and quite the spectacle for us, despite the bewildered looks of passing walkers. This welcome addition to the urban flora highlights the importance of urban parks and attests to the adaptability of our native flora, often overlooked in the urban environment. Even though this population is currently submerged thanks to long-awaited rain, no doubt we will be able to observe it again at the end of next summer.

There was a flock of the ubiquitous urban mallard ducks spotted in the other deeper stormwater ponds, which led us to casually speculate that *Glossostigma* propagules could have been dispersed here by these dabbling beasties.

Fig. 3. *Glossostigma elatinoides* flowering profusely.

Reference

Stanley, R., de Lange, P.J., Cameron, E. 2005. Auckland Regional Threatened and Uncommon Plant List. *Auckland Botanical Society Journal* 60: 152-157.

Appendix. A species checklist of vascular plants at Titch Place Stormwater pond (27 March–27 April 2020). * = adventive P = planted

Dicotyledons	
Bellardia viscosa *	
Bidens frondosa *	
Epilobium ciliatum *	
Epilobium hirtigerum	
Glossostigma elatinoides	
Helminthotheca echioides *	
Kunzea ? robusta	P
Leptospermum sp.	P
Lotus pedunculatus *	
Lotus suaveolens *	
Ludwigia palustris *	
Lythrum hyssopifolia *	
Myosotis laxa subsp. *caespitosa* *	
Paspalum urvillei *	
Persicaria hydropiper *	
Persicaria maculosa (long spike red/white) *	
Plantago major *	
Quercus sp. (seedling) *	
Salix sp.(seedling) *	
Senecio esleri	
Senecio skirrhodon *	
Solanum nigrum *	
Symphyotrichum lanceolatum *	
Trifolium pratense *	
Trifolium repens *	
Vellereophyton dealbatum *	
Monocotyledons	
Apodasmia similis	P
Aristea ecklonii *	
Austroderia fulvida	P
Carex virgata	P
Cordyline australis	P
Cyperus brevifolius *	
Cyperus congestus *	
Cyperus eragrostis *	
Digitaria sanguinalis *	
Echinochloa crus-galli *	
Isolepis prolifera	
Isolepis sepulcralis *	
Juncus articulatus *	
Juncus prismatocarpus	
Juncus tenuis subsp. *dichotomus* *	
Machaerina articulata	
Panicum dichotomiflorum *	
Paspalum dilatatum *	

Titoki (*Alectryon excelsus*) – Auckland's most successful street tree

Ewen K. Cameron

Earlier in the year, when Cheryl and I did our daily Covid-19 lockdown neighbourhood walks in the wider Mt Eden area, the weather was beautiful and sunny, but it was also during the worst Auckland drought in living memory. Trees, including fully grown species, were dying all around us in streets, parks, private gardens and wild in natural forests. Native planted species such as rewarewa (*Knightia excelsa*), kāpuka (*Griselina littoralis*) and kauri (*Agathis australis*, Fig. 1) fared badly. Kāpuka (Fig. 2 & 3) is only native to the wetter, higher altitudinal areas of the Auckland region – now we know why. A Poor Knights Islands *Myrsine aquilonia* in the home garden had a different drought strategy; it dropped c. 80% of its leaves (Fig. 4), and when the rain finally came it leafed out quickly – a great strategy when you grow on a drought-prone island, and perhaps a good choice for future city plantings.

One of the commonest street tree species in our urban area, in fact the commonest in Auckland City is titoki (*Alectryon excelsus,* Fig. 5) (Wilcox 2012: table 9), and unlike many other species, it flourished during the drought – none were seen suffering or dying. Titoki are also prominent trees of Auckland's

Fig. 1. A drought-killed 6 m-tall well-established kauri – the most uphill of several planted kauri. Dove Myer Robinson Park, Parnell, 29 Apr 2020. All photos by the author except Fig. 2.