‘Invasion of the banyans’
Article by Colin and Robyn Ogle, Wanganui

Moreton Bay fig (Ficus macrophyllus) is native to Australia, growing naturally in coastal NSW and southern Queensland. It has been grown in warmer parts of New Zealand since early European settlement, having been brought in as seed or young plants. In the Wanganui district they have flowered for many years, visible as small hard green “fruit” that dropped off without ripening. In 2007, in Moutoa Gardens and at Bason Botanic Reserve, there were lots of ripe fruit.
The two photos on this page are of ripe fruit on Moreton Bay fig, and fallen and partly eaten figs (by birds?) at Moutoa Gardens 27.4.07


Samples that we sent to the Auckland Museum contained tiny pollinating wasps, insects that were presumably blown from Australia and were first recorded in New Zealand in 1996, in Auckland. Since 1997, Moreton Bay fig plants have been found growing on phoenix palms and other trees around Auckland, all close to adult fig trees. On 25 April 2007, we found two fig seedlings, both less than 20 cm tall, on palms in Wanganui city, one on a Jubaea with a one-metre trunk in Moutoa Gardens and one on a 1.5 m trunk of Phoenix canariensis across Bates Street from the large Moreton Bay fig in Moutoa Gardens. These fig seedlings were 40 m and 20 m away from the presumed parent tree, respectively. Larger seedlings are on palms at the Bason. This means the pollinating wasps were in Wanganui at least two or three years earlier. One in the crown of a phoenix palm by the conservatory car park seems to be 1-2 m tall; judging by the age of similar figs in Auckland this could be four or five years old (E Cameron, Auckland Museum, pers. comm.), which pushes back the time of the arrival in Wanganui of the pollinating wasp to 2002 or 2003.

The Bason figs
On 17 June 2007 we did a quick survey of some of the Bason’s palm trees and found fig seedlings on Jubaea chilensis, Butia (capitata?) and Phoenix canariensis. The solitary Jubaea palm has a trunk about 1.5 m tall and is about 20 m from the nearest adult fig. It supported 21 fig seedlings. Four Butia palms, planted in a line parallel to the pergola into the conservatory are no more than 15 m from the nearest adult fig tree. One had 37 fig seedlings, the tallest about 50 cm tall. This same palm had seedlings of karo (Pittosporum crassifolium), lemonwood (P. eugenioides), puka (Meryta sinclairii), various hybrid five-fingers (Pseudopanax crassifolius X P. lessonii) and Euphorbia mellifera. All four Butia palms had fig seedlings.

The Bason’s phoenix palms were harder to assess, because most have crowns well out of reach. A few figs could be seen from ground level but a long ladder or, better still, a cherry picker would be needed for a thorough survey. Small fig seedlings were found on the lower trunk of several phoenix palms, along with seedling puka, karo, blackberry, thistles, Oxalis chnoodes and, on one, a Davallia fern. The greatest distance we found of a seedling fig from a potential parent fig tree was 50 m.

The future?
Many figs, including Moreton Bay fig, begin life from bird-dropped seed high in another tree, from where they send roots to the ground. The fig branches overtop the host and its woody roots surround the host’s trunk. Eventually the host tree dies. Overseas these are called strangler figs or banyans. Technically it has not been ‘strangled’ but died through being outcompeted by the fig for light, water, minerals, or any combination of these. This will probably happen to Wanganui trees in which figs establish, but the figs could be removed manually before the supporting tree succumbs. The spectacle of Moreton Bay figs spreading in our native forests is more worrying. Seedlings of figs have been found up to 100 metres from adult fig trees in Auckland, suggesting birds are digesting figs close to where they feed. Around NZ, however, are all Moreton Bay fig trees more than 100 metres from forest? And how far might a constipated, fig-eating bird fly?



Photos on this page: the 2 portrait photos are of Butia with epiphytic Moreton Bay figs and other seedlings (see text)
The landscape photo is of 2 small seedlings of Moreton Bay fig on Jubaea trunk. All 17.6.07

Some details on figs and their pollinators
The young fruit of a fig is a fleshy structure lined on the inside with hundreds of tiny male and female flowers. It is, in effect, an inside-out flower cluster, called a synconium. In Moreton Bay fig, the male and female flowers ripen at the same time, though they are ‘out of phase’ in some other figs. Essentially, pollination happens when a female wasp, already covered in pollen from the fig where she hatched, flies to a new young fig and enters the hole at the outer end of the fig. She crawls in among the female flowers, depositing pollen. She also selects several short-styled female flowers, lays an egg in the ovary of each and dies. The wasp eggs hatch and develop to produce adult wasps that mate inside the synconium (by now a ripening fig). The female wasps crawl over ripening male flowers, the male wasps enlarge the hole in the end of the fig (the hole their mother entered by) and female wasps exit, covered in pollen to find new young figs to enter. The male wasps die in the fig where they were hatched. The story is even more complex than this! Many figs are known to have non-pollinator wasps as well. Their egg-laying stimulates the expansion of the synconium wall, so if no pollinating wasps are present, the fruit develops but is seedless. The common edible fig (Ficus carica) has only female flowers and sets seeds without pollination (i.e., is parthenocarpic). More detailed accounts can be found in various websites, such as:
http://www.nbii.gov/portal/community/Communities/Ecological_Topics/Pollinators/Learn_About_Pollination/Associations_and_Syndromes/
In June 2007 we sent several lots of ripe figs from the Moutoa gardens fig tree to John Early, entomologist at the Auckland Museum. In them he found the pollinating wasp, Pleistodontes froggatti, elongated and black with long heads. He also reported finding a second fig wasp species, Sycoscapter australis, which is not a pollinator. He says “It is a beautiful metallic green and females have a long ovipositor but we don't really know what it does inside the figs. It requires a partly grown pollinated fig and lays its eggs through the fig from the outside. I suspect that its larvae feed on gall tissue that forms in response to the pollinator's presence.” On 29.6.97, John Early had picked and examined 36 figs from the same Moreton Bay fig tree in Moutoa Gardens but he could not find any Pleistodontes within them, adding to the evidence that the wasps are quite recent arrivals.
Until recently, most research suggested that each fig species is pollinated by a single wasp species. Now, however, it appears that at least some figs may be pollinated by more than one wasp species. Nevertheless, it is reported that Hawaii has some 60 species of introduced figs, but only four of the wasps that fertilize them have been introduced and only four species of figs, including Moreton Bay fig, produce viable seeds in Hawaii.
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