

<i>Trachyloma planifolium</i>		x
<i>Weymouthia cochlearifolia</i>		x
<i>Wijikia extenuata</i>		x
<i>Zygodon intermedius</i>		x
<b>Fungi</b>		
<i>Amanita nothofagi</i>	x	
<i>Auricularia polytricha</i> , ear fungus/wood ears	x	
<i>Biscogniauxia capnodes</i> var. <i>rumpens</i> , a charcoal black crust or sheet on wood		x
<i>Calocera</i> sp., creamy or pale pointed horns on wood		x
<i>Chlorociboria aeruginascens</i> , verdigris stud fungus	x	
<i>Clavaria sulcata</i> , fairy clubs, flame fungus		x
<i>Conchomyces bursaeformis</i>		x
<i>Crinipellis procera</i> , horsehair		x
<i>Crucibulum laeve</i> , birdsnest fungus	x	x
<i>Entelloma</i> sp. (unidentified)	x	x
<i>Favolaschia calocera</i> , orange pore fungus *	x	
<i>Galerina patagonica</i>	x	
<i>Ganoderma</i> aff. <i>applanatum</i>	x	
<i>G. australe</i> , perennial bracket fungus, artist's conk		x
<i>Gliophorus lilacipes</i> , wax gill		x.

<i>G. luteoglutinosus</i> , wax gill		x
<i>G. subheteromorphus</i> , wax gill		x
<i>G. viridis</i> , wax gill		x
<i>Glomus</i> sp.		x
<i>Humidicutis conspicua</i> , wax gill		x
<i>Hydnum crocidens</i> var. <i>?crocidens</i>	x	
<i>Hygrocybe blanda</i> , wax gill	x	
<i>H. firma</i> , wax gill	x	x
<i>H. julietae</i> , orange wax gill	x	x
<i>H. rubrocarnosa</i> , red wax gill		x
<i>Hypocrea</i> sp.		x
<i>Hypholoma fasciculare</i> , sulphur tuft		x
<i>Laccaria ohienis</i> var. <i>paraphysata</i>	x	
<i>Nidula niveotomentosa</i> , woolly birdnest		x
<i>Ramariopsis</i> sp., a white club fungus	x	x
<i>Ramariopsis ?antiitarum</i> , a yellow club fungus	x	x
<i>Russula acrolamellata</i> , a yellow-brown russula	x	x
<i>Scutellinia ?colensoi</i> , eyelash elf cup		x
<i>Stereopsis hiscens</i>		x
<i>Tramella ?fuciformis</i>		x
<i>Weraroa novaezealandiae</i> , a white pouch fungus on wood		x
<i>Weraroa virescens</i> , pale blue pouch fungus		x



## The puzzle of wild London plane trees (*Platanus X acerifolia*) in downtown Auckland

Jon Sullivan, Ewen Cameron, Tristan Armstrong & Brian Murray

London plane trees (*Platanus X acerifolia* (Aiton) Willd., Platanaceae, synonyms *P. hybrida*, *P. hispanica*, and *P. orientalis* var. *acerifolia*) are popular ornamental trees conspicuous along the street sides of many temperate cities, including Auckland. Their popularity in cities is due in part to their ability to grow well in paved streets, and their observed high tolerance of atmospheric impurities and diseases (Hora 1981, Huxley et al. 1992). Many different cultivars are available in New Zealand, which are readily propagated from cuttings (Sheat 1991).

The first wild plane seedling in New Zealand was collected by Alan Esler on Auckland City's waterfront, on 27 Jan 1981 (specimens AK 153932 & CHR 371206)(Webb et. al 1988, 1989). Since then, plane tree seedlings have occasionally been found around the Auckland central district area. There is also one record of plane tree seedlings appearing on Motutapu Island, near an adult London plane tree (specimen AK 245956, collected by S. Wotherspoon). These seedlings were puzzling, as our understanding was that the London plane tree is an infertile hybrid garden

product with no wild populations. Are these Auckland seedlings offspring of just London plane trees, or are they the result of crosses with a true species in the Platanaceae planted more recently in the area?

Before we address this puzzle, we should first summarise what is known of the origins and fertility of the London plane tree. It is widely accepted that the London plane tree is a hybrid between the previously isolated American sycamore (*Platanus occidentalis* L.) and the Oriental plane tree (*Platanus orientalis* L.)(Huxley et al. 1992). These two species were first brought together in Western Europe ornamental plantings, evidence suggesting an origin in Spain or Southern France early in the 17th century 1650, with a later transfer to England (Everett 1981). The London plane tree is intermediate in characteristics between the American sycamore and the Oriental plane tree (Everett 1981), and hybrids have also been artificially created between these species (Bean et al. 1980). The London plane tree is observed to be more disease resistant than *P. occidentalis* and faster growing than

*P. occidentalis* (Huxley et al. 1992), and has been a popular ornamental tree for centuries.

London plane trees are not as infertile as we initially believed. While its seeds have often been found to be infertile (e.g., Harrison 1963, Huxley et al. 1992), there is evidence that the species has successfully backcrossed with its two parents (Hsiao and Li 1975). Also, in some cases, fertile seed not derived from parental backcrossing has been reported, but with a low germination rate and producing seedlings that are variable in form, performance, and disease susceptibility (Hora 1981, López González 1998).

As is usually the case in science, there are some who question the consensus view. Ginés López González (1998) suggests that London plane trees in Europe are not hybrids at all, but instead an unusual variety of the Oriental plane tree, as this species is known for its variability in its native range, notably in leaf shape. González (1998) explains the low fertility by suggesting some form of autoincompatibility, although the appropriate pollination studies appear not to have been done. Until there is evidence for autoincompatibility or a documented wild population of London plane trees, we will accept the consensus view of the hybrid origins of the London plane tree.

To return to the puzzle of London plane tree seedlings in Auckland, in March 2001 we searched for seedlings in Auckland City, especially around the Auckland University city campus on Symonds Street, and inspected the nearest adult trees. One of us (BM) prepared and counted the chromosomes from a wild seedling. If the seedlings are allopolyploid hybrids between London plane trees and another locally planted plantanaceous species, the offspring would have an increased chromosome number, reflecting the chromosome complement of each parental species.

Plane tree seedlings, although not abundant, were not hard to find with searching. In all cases, there was an adult London plane tree within a few hundred meters, and no other *Platanus* species was identified. Numerous seedlings were found in along the University campus stretch of Symonds Street, which is framed by row of large London plane trees. Seedlings typically occurred growing in cracks in the footpath and guttering, and on rock walls. Several times, groups of plane tree seedlings were found growing in asphalt cracks, while none at all were found in the soil of adjacent neglected gardens. This is perhaps not surprising, given that the natural habitats of both the American sycamore and the Oriental plane tree are river gravels and silt, and both species are able to tolerate drought well (Huxley et al. 1992).

While we were able to find numerous seedlings in areas with planted adult London plane trees, one of us (EC) had previously collected two lone juvenile plane trees that were not adjacent to cultivated London plane trees. One was a c. 1 m tall sapling in a crack between the footpath and a building down Leek

Street, Newmarket (specimen AK 252742), and the other, a seedling in crack between the tarseal carpark and a crib wall at the back of the Auckland Museum (specimen AK 252741). Both of these plants could feasibly have resulted from seed dispersed on cars parked previously under seeding London plane trees.

We revisited one juvenile plane tree that had been first collected in 1986 by one of us (EC) when it was a wild sapling about 2 m tall, growing on the top of a crib wall on Eden Crescent, just east of the Law School (herbarium specimen AKU 19770). By March 2001 (specimen AK 252621), it had become a 10 m tall and wide tree, fruiting abundantly, and indistinguishable in morphology from an original nearby London plane tree. Wild seedlings were also found on the opposite side of street growing in cracks in the footpath, and two saplings, 2 m and 4 m tall, were found wild in a nearby thin strip of neglected garden between a concrete wall and a driveway.

Ample seed was collected from both this wild adult tree, and from planted adult trees along Symonds Street, and laid out on moist filter paper to germinate. No seeds from either source germinated in six months.

A wild plane tree seedling was found to have 42 chromosomes ( $n = 21$ ). This is the same number as the London plane tree (Morawetz and Samuel 1989, Oginuma and Tobe 1991, sourced using the Missouri Botanical Gardens online Index to Plant Chromosome Numbers, <http://mobot.mobot.org/W3T/Search/ipcn.html>), and also the same number as both parents, the American sycamore and the Oriental plane tree (Darlington and Wylie 1955.). This result is consistent with the wild seedlings in Auckland being London plane trees, the result of the occasional fertile seed.

One British website, maintained by Mr. I. M. Chengappa, reports wild plane tree seedlings in London, (<http://www.chengappa.demon.co.uk/planes/text/mainplanes.html>, page last updated 5 October 1999, cited 13 November 2002). He states that a "very low proportion" of London plane tree seed is viable, and notes that there have been several reports of seedling plane trees in the London area, mostly on the river walls of the river Thames. While Chengappa suggested that the concentration of seedlings along the Thames is because they are quickly and easily eliminated elsewhere, it seems more likely to us that the habitat requirements of viable London plane tree seedlings are narrow, and restricted to competition-free rocky cracks.

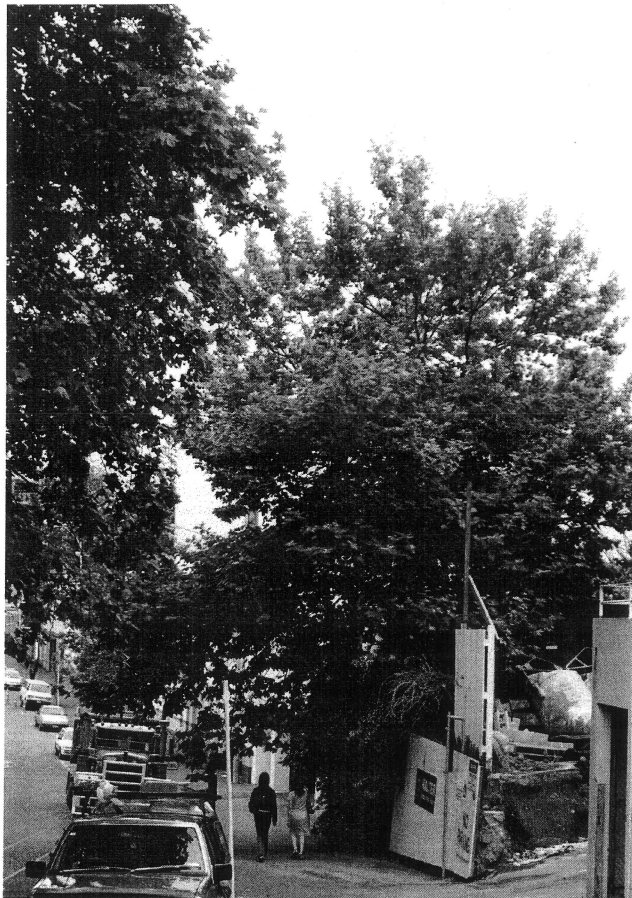
In conclusion, our puzzle was not that perplexing. London plane trees are not fully infertile, and the wild plane tree seedlings of downtown Auckland show all the signs of being occasional offspring of the planted London plane trees. Such seedlings have occasionally been reported elsewhere in the world. Established seedlings appear to require cracks in asphalt, rock walls, and similar rocky, competition-free sites. It will

London plane tree seedlings are found in Auckland, despite the abundance of adult trees, and perhaps why all records are from the past two decades, when seed output from the mature planted trees is likely to

have been at its highest. We can sleep easy knowing that the Auckland Region is unlikely to be overrun with a plague of wild plane trees any time soon.

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Fig. 1. Perhaps the oldest and largest (c.10m tall) naturalised plane tree in New Zealand (right side)? Potential parent on left. About 20 years old, growing on top of crib wall, Eden Crescent, central Auckland. Nov 2002.