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***Phoenix* and *Washingtonia* palms as epiphytes on suburban street trees, Albury, NSW, Australia—five years on**

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Abstract

A survey of suburban street trees in central Albury in southwestern NSW in July–August 2019 recorded 15 *Phoenix canariensis* and *Washingtonia robusta* palms growing as epiphytes in *Platanus x acerifolia* and *Ulmus glabra* trees. The survey was repeated in September 2024. All but two epiphytes encountered in 2019 were still alive in 2024 with no significant increase in size or number of live leaves. One additional specimen has appeared since then. The death of two individuals is attributed to adverse human intervention.

Keywords: *Phoenix canariensis*, *Washingtonia robusta*, dispersal, marginal environments, frugivory

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Introduction

Frugivore dispersed specimens of ornamental palms, primarily the Canary Islands date palm *Phoenix canariensis* (Spennemann, 2019b) and fan palms *Washingtonia filifera* and *Washingtonia robusta* (Spennemann, 2020d) have been documented as surviving in highly marginal environments, such as shallow water bodies (Spennemann, 2018b) and as epiphytes in crooks and branch scars of trees (Spennemann, 2019d).

Albury, a rural service town in the Southern Riverina, NSW, experiences an average annual rainfall of 700 mm, with average seasonal temperatures of 2.7°C in winter and 31.2°C in summer. The central area, a 19th century development, is characterized by streets lined with mature trees and well-established residential gardens, many featuring exotic palms like *Phoenix canariensis* and *Washingtonia robusta*. The street trees are mostly deciduous, dominated by species such as *Platanus x acerifolia* London plane; *Ulmus glabra* Elm, *Acer rubrum* Red Canadian Maple, *Fraxinus pennsylvanica* Green Ash and *Liquidambar styraciflua* Liquidambar. Residual native Eucalypts, mainly *Eucalyptus melliodora* Yellow Box only exist in settings peripheral to the urban core.

In July and August 2019 the author undertook a survey of palms growing as epiphytes in suburban street trees in Albury (Spennemann, 2019d). At the time, 15 occurrences were documented (Table 1), nine *Phoenix canariensis* and six *Washingtonia robusta* plants. Perusal of Google Streetview images going back to 2007 indicated putative ages for most of these, with many specimens older than ten years. The paper also provided some speculative comments on the longer-term future of these plants. The present paper reports on a resurvey of the area, five years later, and discusses new recruitment and persistence of previously encountered epiphytic specimens.

Method

The survey of 2019 was repeated in September 2024 in the same spatial area (Albury's historic urban core). As the survey was carried out during the southern winter, the street trees had lost their foliage and were observable in their entirety. All specimens identified in the 2019 survey were reassessed, counting the number of leaves and estimating their height.

Results and Discussion

All specimens of *Phoenix canariensis* that were growing during the 2019 survey were still thriving in 2024 (Table 1). They maintained their living leaf numbers and maintained, or marginally increased their plant height, but not significantly. Compared to 2019 most specimens exhibited more dried leaves. Of the six specimens of *Washingtonia robusta* observed in 2019 one had disappeared (n° 14) and another in the same street had died (n° 15). On the latter tree a new *Washingtonia robusta* had seeded in a branch scar to the south (n° 16). That plant is observable on the Google Streetview image of May 2023 but not on the image of May 2021. Imagery of plant n° 15, taken in February 2022 shows four erect leaves as well as approximately twenty old and dried, drooped leaves. Two of the erect leaves were fully unfolded but had yellowed, with parts of the petiole still green. The two folded leaves were a full-length leaf which in part was still green and an emerging leaf (ca 30% of future length) that was fully green. An examination of a May 2021 Google Streetview image shows the plant to be healthy at the time, with three unfolded leaves and one emerging

one. An examination of Google Streetview imagery shows plant n° 14 to be present in May 2021 but missing in May 2023. Prior to the February 2022 observation some arborist work had been undertaken in the street as part of the maintenance of overhead powerlines. It is likely that n° 14 was removed at this time.

New recruitment

The main dispersers of these palm species in Albury are Pied Currawongs (*Strepera graculina*), European Blackbirds (*Turdus merula*) and Grey-headed Flying Foxes (*Pteropus poliocephalus*) as well as Red Foxes (*Vulpes vulpes*) (Spennemann, 2018a, 2019c, 2020b, 2020e). Of these, only Pied Currawongs access the crowns of the street trees under discussion. Seeds of *Phoenix canariensis* regurgitated by Pied Currawongs have a significantly higher chance of germination than seeds from unconsumed drupes (Spennemann, Pike, & Robinson, 2021). *Phoenix canariensis* rapidly establishes in watered domestic gardens. In generally dry bushland the species will germinate following moisture pulses (Spennemann, 2020a). Once established, the water demands of *Phoenix canariensis* are low compared to other ornamentals and the plants are relatively drought tolerant (Cubino, Subirós, & Lozano, 2014; Hernández, Morales, & Saurí, 2014; May, Livesley, & Shears, 2013; Pittenger, Downer, Hodel, & Mochizuki, 2009). *Washingtonia*, on the other hand, require well-watered settings, such as urban gardens or wetlands (Spennemann, 2018b) but will not establish in dry environments even with a moisture pulse (Spennemann, 2019a)

Vector-dispersed *Washingtonia robusta* and *Phoenix canariensis* occur in garden settings and as road-side vegetation throughout Albury (see data in iNaturalist). It is not possible to quantify the total number of self-seeded palms as access to private backyards is not feasible; small specimens do not show on aerial imagery until they have developed a full canopy. Judging from front yards, recruitment of both species in the urban core is ongoing as many juvenile plants escape detection or are tolerated. The only recruitment of palms in epiphytic settings comprised a single *Washingtonia robusta* growing on a *Platanus x acerifolia* (n° 16) that had previously hosted another *Washingtonia robusta* (n° 15). Outside the urban core *Phoenix canariensis* have been colonising the Gum Grassy Woodlands of the surrounding hills (pers obs.)

Growth rates

Data on growth rates of *Phoenix canariensis* and *Washingtonia robusta* are extremely limited, with overseas data suggesting rates between 0.3–0.5 m per year for under 25 year-old plants (reviewed in Spennemann, 2020c). A comparison of the size difference of the epiphytic specimens between 2019 and 2024 shows that *Washingtonia robusta* maintained their 2019 height, while *Phoenix canariensis* plants grew on average 0.0163 m per year. This contrasts with an annual growth rate of 0.21 m observed at a well-irrigated set of 110 *Phoenix canariensis* growing 13 km southeast of the study area (Spennemann, 2020c). While Albury experienced below average rainfall in the summer of 2019 / 2020 as well as in the winter of 2024 (Bureau of Meteorology, 2024), this did not materially affect the number of dead (brown) leaves that were observable in 2024. Rather, among epiphytic palms leaves brown and die as new leaves emerge. A good example is n° 13, for which, by virtue of its placement at chest height, more observations exist. While the plant continually produces new leaves, at any given time there are never more than three unfolded leaves.

Implications

Setting aside the two lost *Washingtonia robusta* plants, the resurvey of 2024 has demonstrated that epiphytes can persist without detrimental human intervention. The prediction that specimens would outcompete the other in cases where multiple specimens were growing in the same branch scar has not eventuated to date. Several epiphytic *Phoenix canariensis* and *Washingtonia robusta* plants are well over 10 years old, one *Phoenix canariensis* (n° 1) at least 16 years old. All plants remained in their 2019 growth state, even palm n° 8 which had been a two-

leaf seedling, with their overall size not significantly increasing. None of them had developed flowers, not even the 16-year-old *Phoenix*, suspending the palms in an 'auto-bonzaied' state, similar to plants that are ultimately size-constrained when pot grown. Given that these epiphytic specimens do not mature and fruit, there is little risk that they will ever become seed sources in their own right. What this study does demonstrate, however, is the resilience and persistence of these two palm species, and in particular *Phoenix canariensis*, to persist in extremely marginal settings.

Table 1. Instances of epiphytic growth of ornamental palms in Albury, NSW P.a.—*Platanus x acerifolia*; U.g.—*Ulmus glabra*

N°	Location	Host tree		July-August 2019			September 2024			Age in 2024	
		Plant	Habit	Size (m)	Leaves green	Leaves brown	Size (m)	Leaves green	Leaves brown		
<i>Phoenix canariensis</i>											
1	684 Dean St (Wilcox)	P.a.		juv.	0.8–1.0	9	7	0.8–1.0	9	9	> 16
2	611 Stanley St	P.a.	South	juv.	0.5–0.6	5	—	0.7–0.9	8	3	> 10
3	611 Stanley St	P.a.	North	juv.	0.5–0.6	5	—	0.7–0.9	7	4	> 10
4	622 Stanley St	P.a.		juv.	0.7–0.9	7	—	0.7–0.9	7	2	> 7
5	370 Tribune St	P.a.	South	juv.	0.6–0.7	4	—	0.6–0.8	5	2	> 8
6	370 Tribune St	P.a.	North	juv.	0.6–0.7	5	1	0.6–0.8	6	4	> 8
7	Noreuil Park	P.a.		juv.	1.1–1.4	?6–8	?4–6	tree felled April 2019			
8	832 Mate St	U.g.		seedl.	0.3–0.4	2	1	0.4	2	1	>6
9	782 David St	U.g.		juv.	0.7–0.9	8	7	0.7–0.9	8	4	> 8
<i>Washingtonia robusta</i>											
10	459 Hovell St	P.a.	South	juv.	0.8–1.0	3	6	0.8–1.0	3	9	> 10
11	459 Hovell St	P.a.	North	juv.	0.3–0.5	2	6	0.3–0.5	2	8	> 10
12	573 Bonegilla St	P.a.		juv.	0.6–0.8	3	7	0.6–0.8	3	12	> 10
13	641 Macauley St	P.a.		juv.	0.3–0.4	3	5	0.3–0.4	3	9	> 7
14	568 Macauley St	P.a.		juv.	0.4–0.5	3	5	missing			≤ 8
15	577 Macauley St	P.a.	North	juv.	1.2–1.3	3	45+	dead			
16	577 Macauley St	P.a.	South	juv.	—	—	—	0.3–0.4	4	4	≤ 3

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