Comparative autecology of NZ's endemic *Pittosporum* shrub epiphytes

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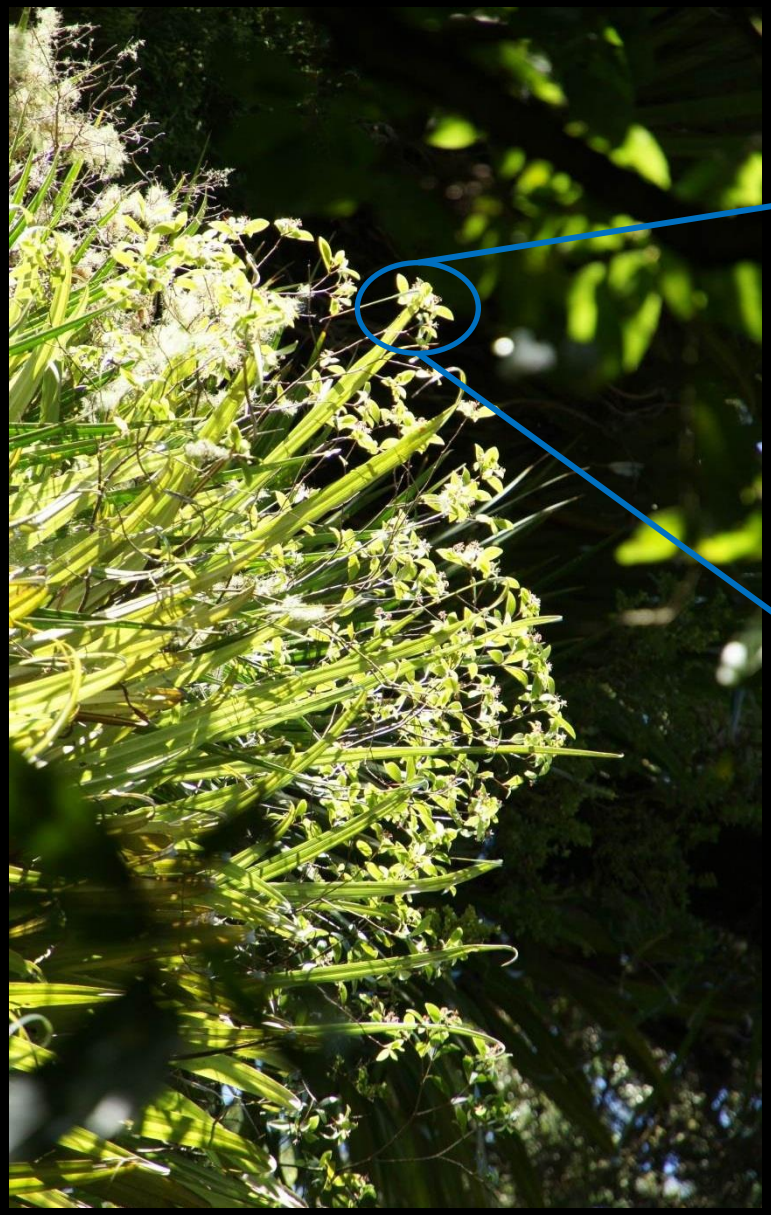
Pittosporum cornifolium



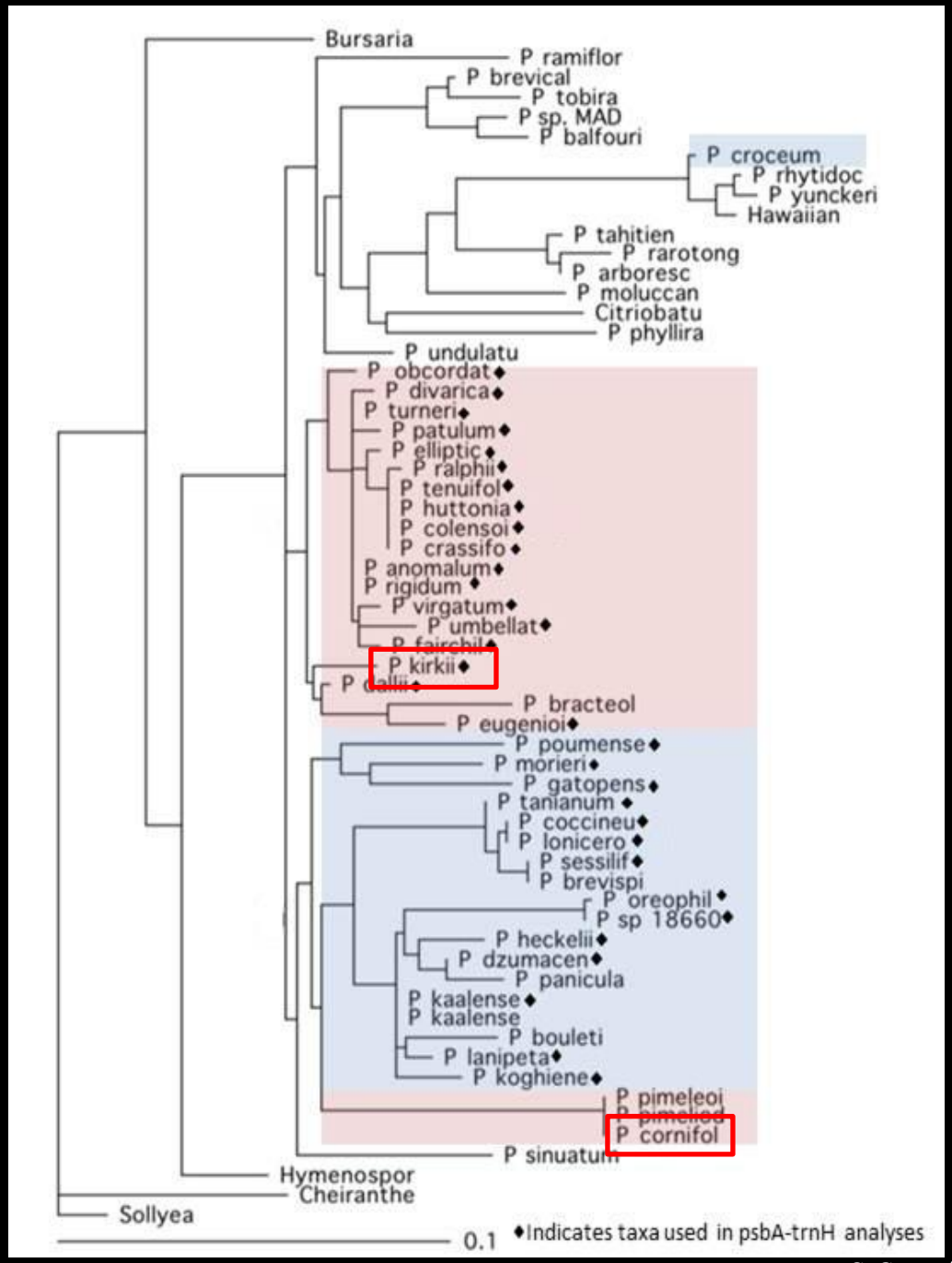
C. Bryan, J. Barkla

Pittosporum kirkii

A. Hawcroft, C. Bryan

Pittosporum phylogenetic relationships

New Zealand
New Caledonia



C. Gemmill

Reproductive biology

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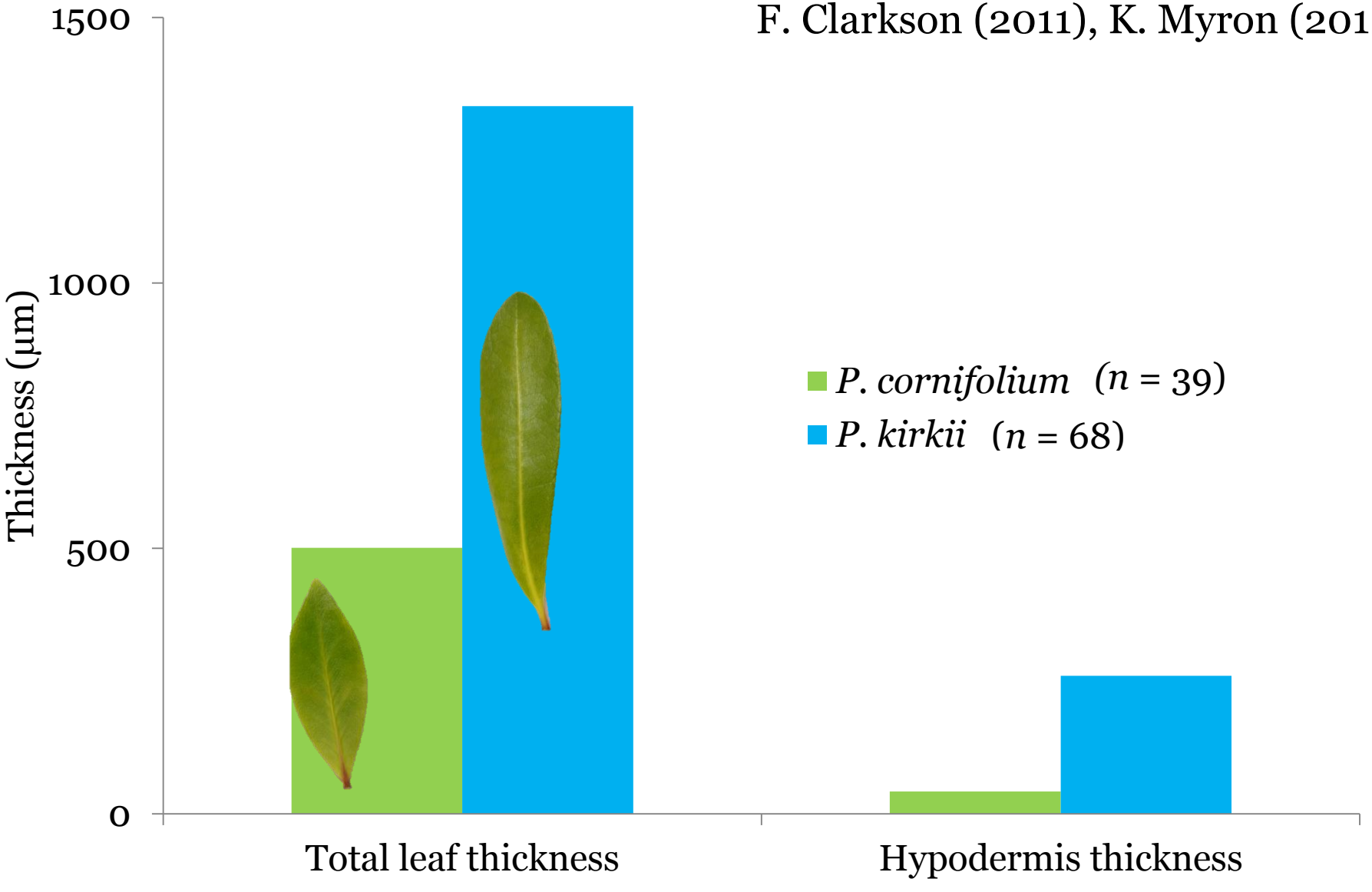
Leaf morphology

C. Bryan

Leaf morphology

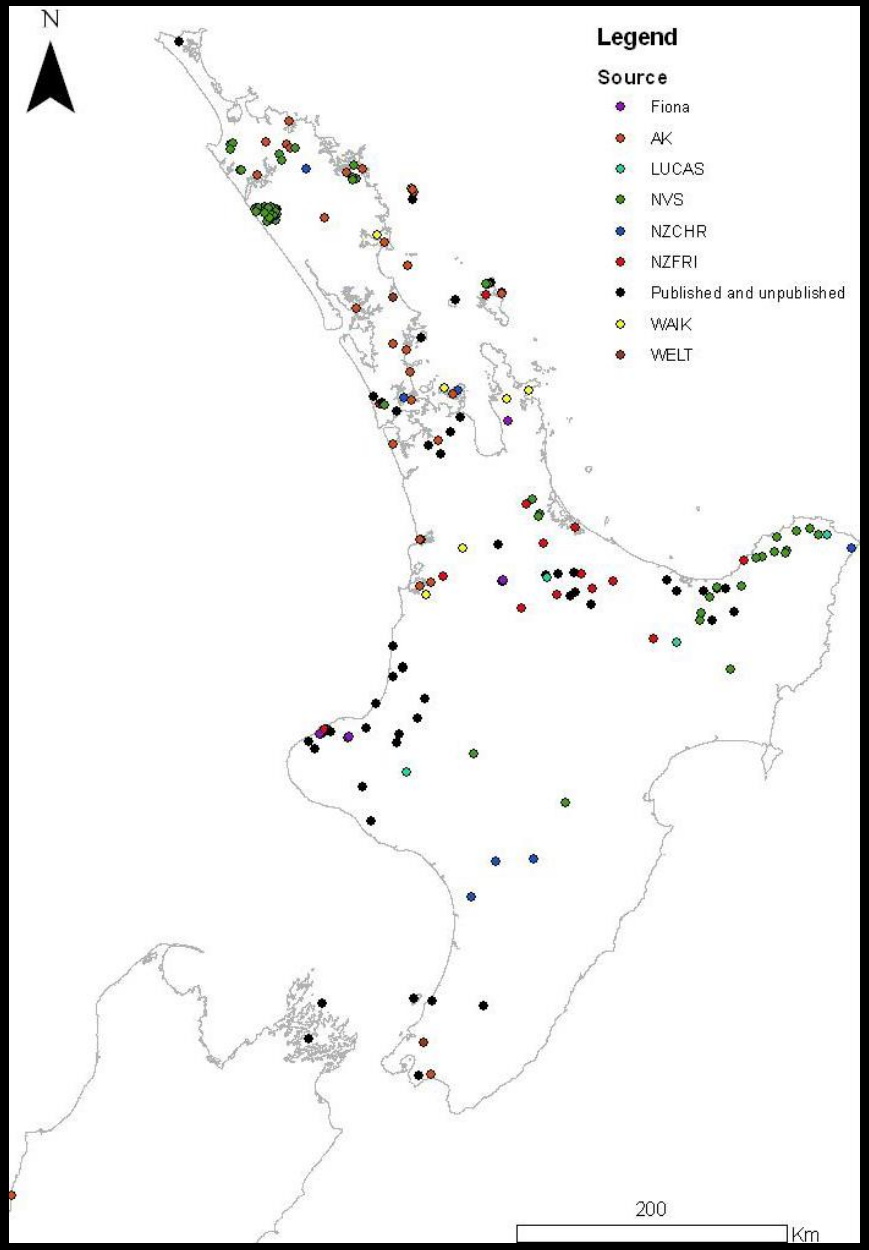
F. Clarkson (2011), K. Myron (2012)



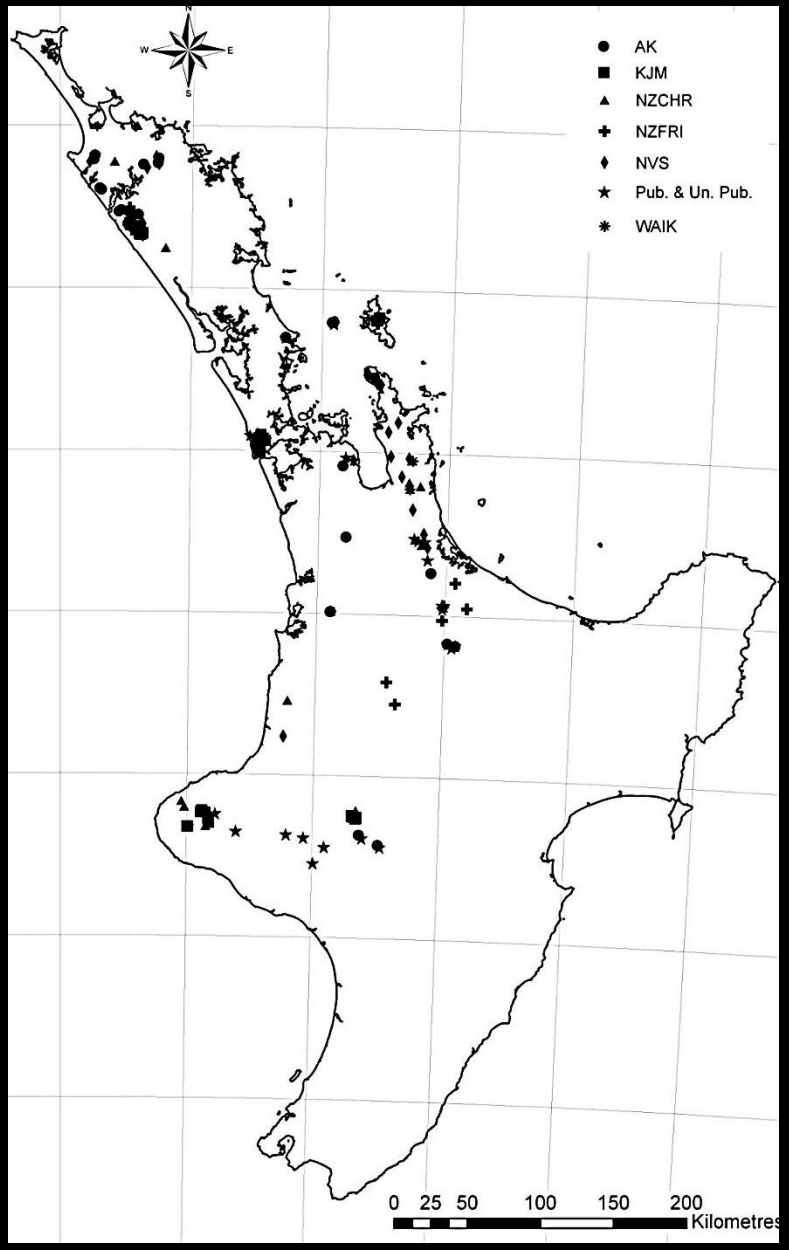
Outline

- Distribution and environmental model
- Hosts and host size
- Associates and competitive interactions
- Phenology
- Population/life stage structures
- Sex ratios
- Population genetics
- Conservation and restoration

Distribution records



P. cornifolium (Clarkson, 2011)



P. kirkii (Myron, 2012)

Key environmental predictors (mean values)

	1	2	3	4	5	6	7
P. cornifolium	1841.7	0.32	13.2	5.0	247.8	14.8	5.9
P. kirkii	2104.8	0.29	12.0	4.4	471.5	1.5	5.9

1 = Total annual rainfall (mm)

2 = Mean October vapour pressure deficits at 0900 hours (kPa)

3 = Mean annual temperature (˚C)

4 = Mean minimum daily temperature of the coldest month (˚C)

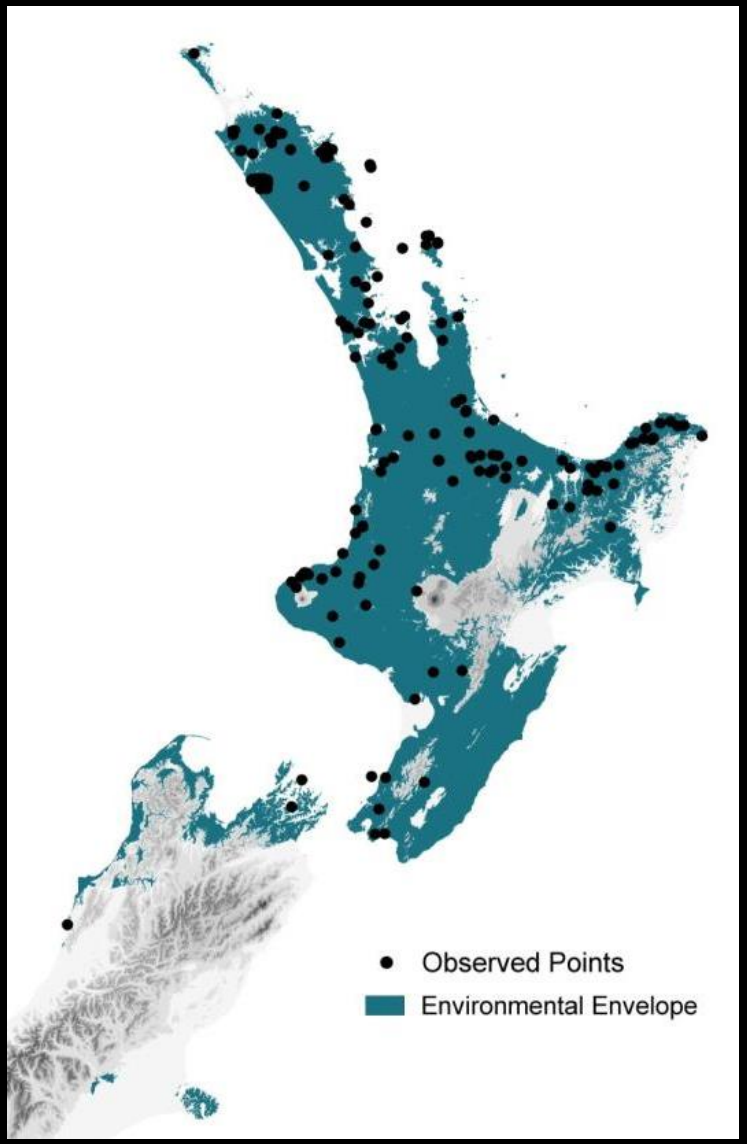
5 = Elevation (m)

6 = Mean annual solar radiation per day (kJ/m²/day)

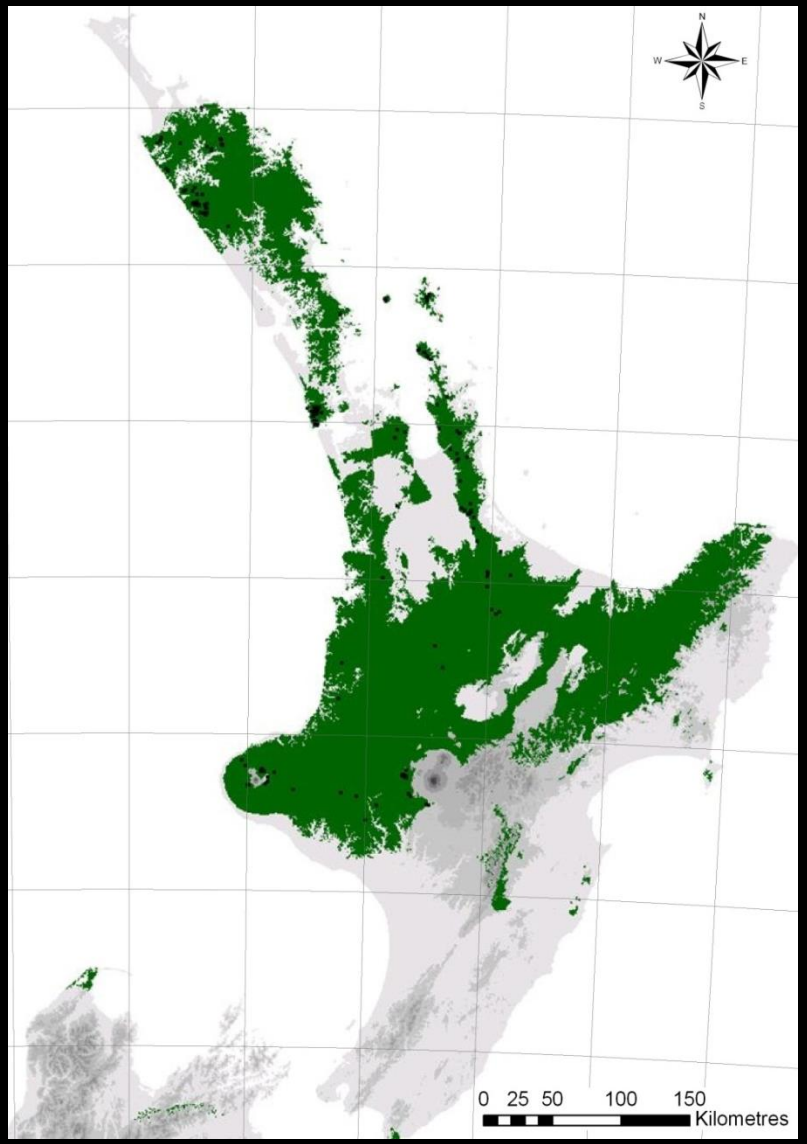
7 = Mean minimum daily solar radiation in June (MJ/m²/day)

Clarkson (2011), Myron (2012)

Environmental model

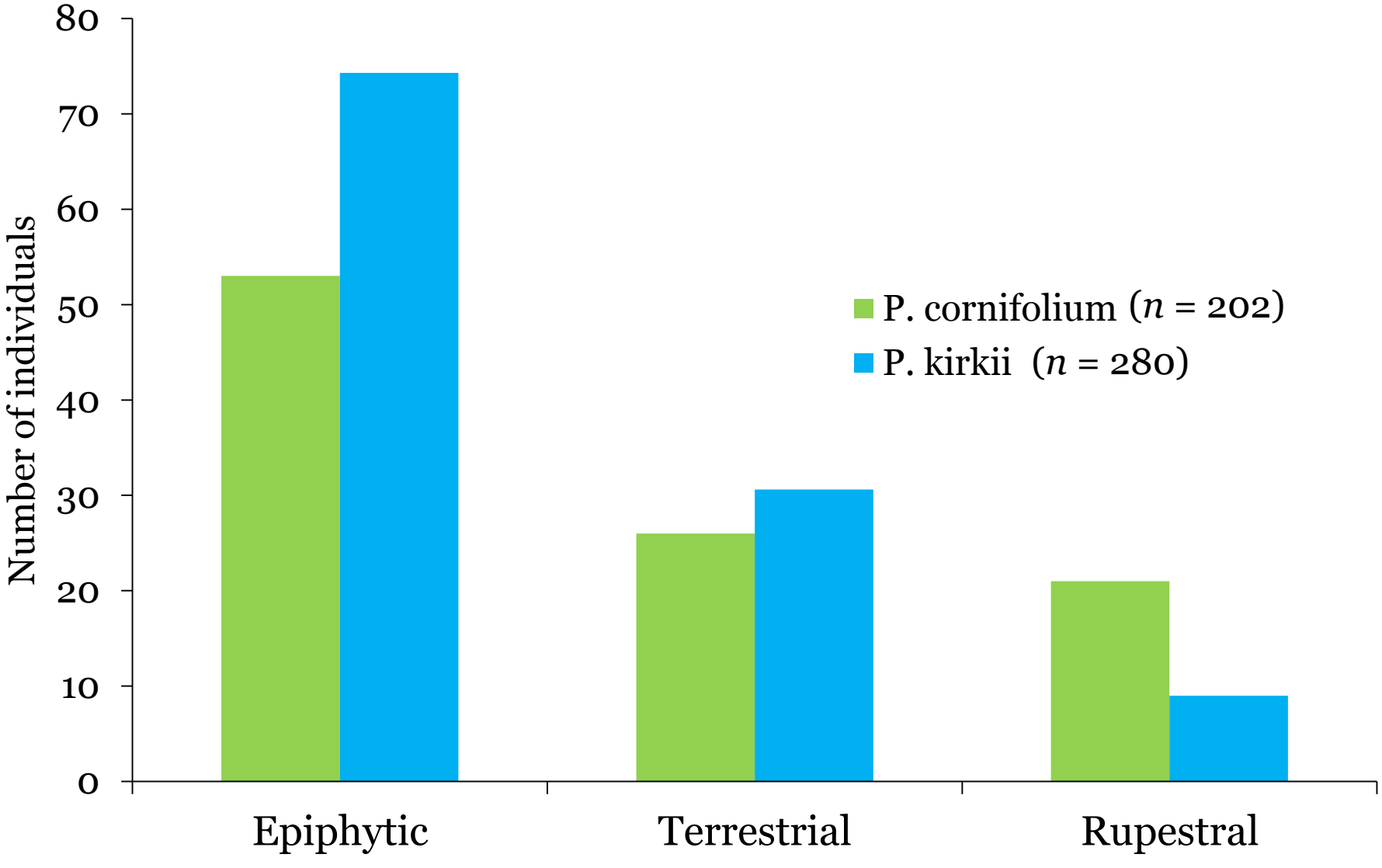


*P. cornifolium (*Clarkson, 2011)



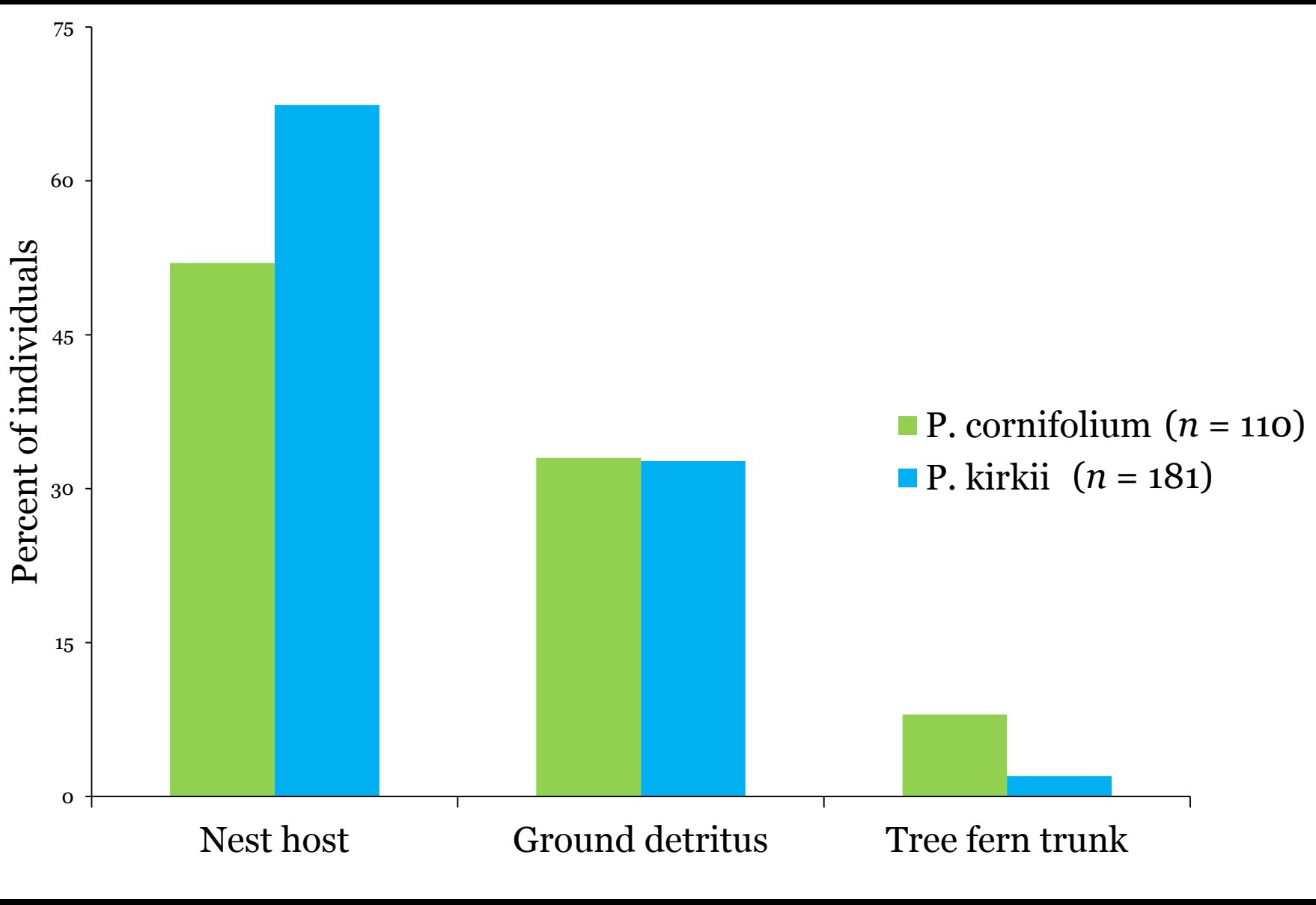
P. kirkii (Myron, 2012)

Overall life style



Clarkson (2011), Myron (2012)

Overall growing substrate



Nest hosts

Astelia solandri
Astelia banksii
Collospermum hastatum
Collospermum microspermum

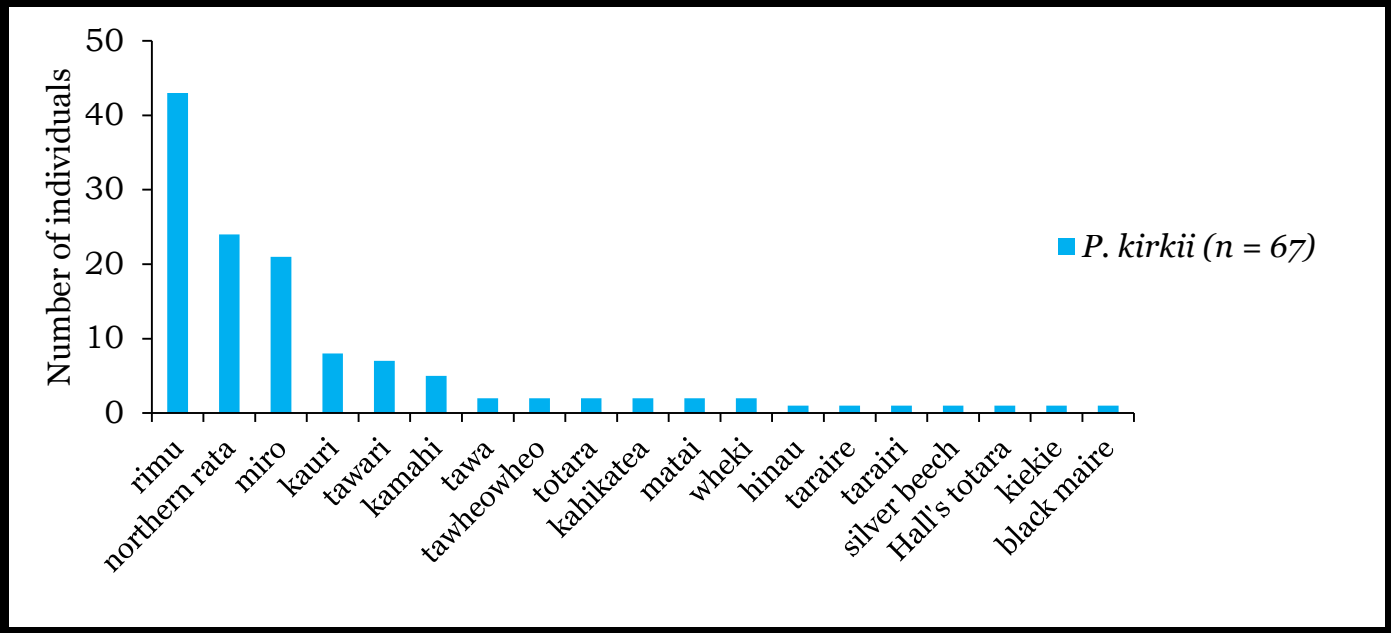
Collospermum hastatum

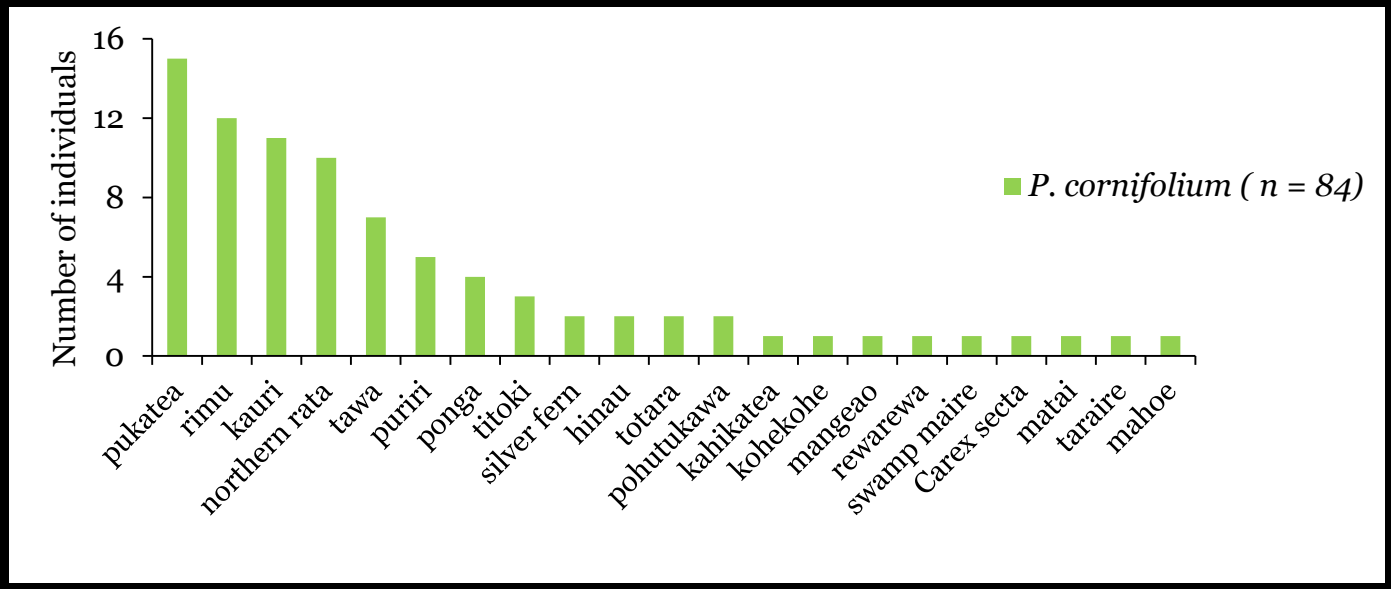
Images: C. Bryan

Raglan rupestral

Tree fern host

Host tree species





Clarkson (2012), Myron (2011)

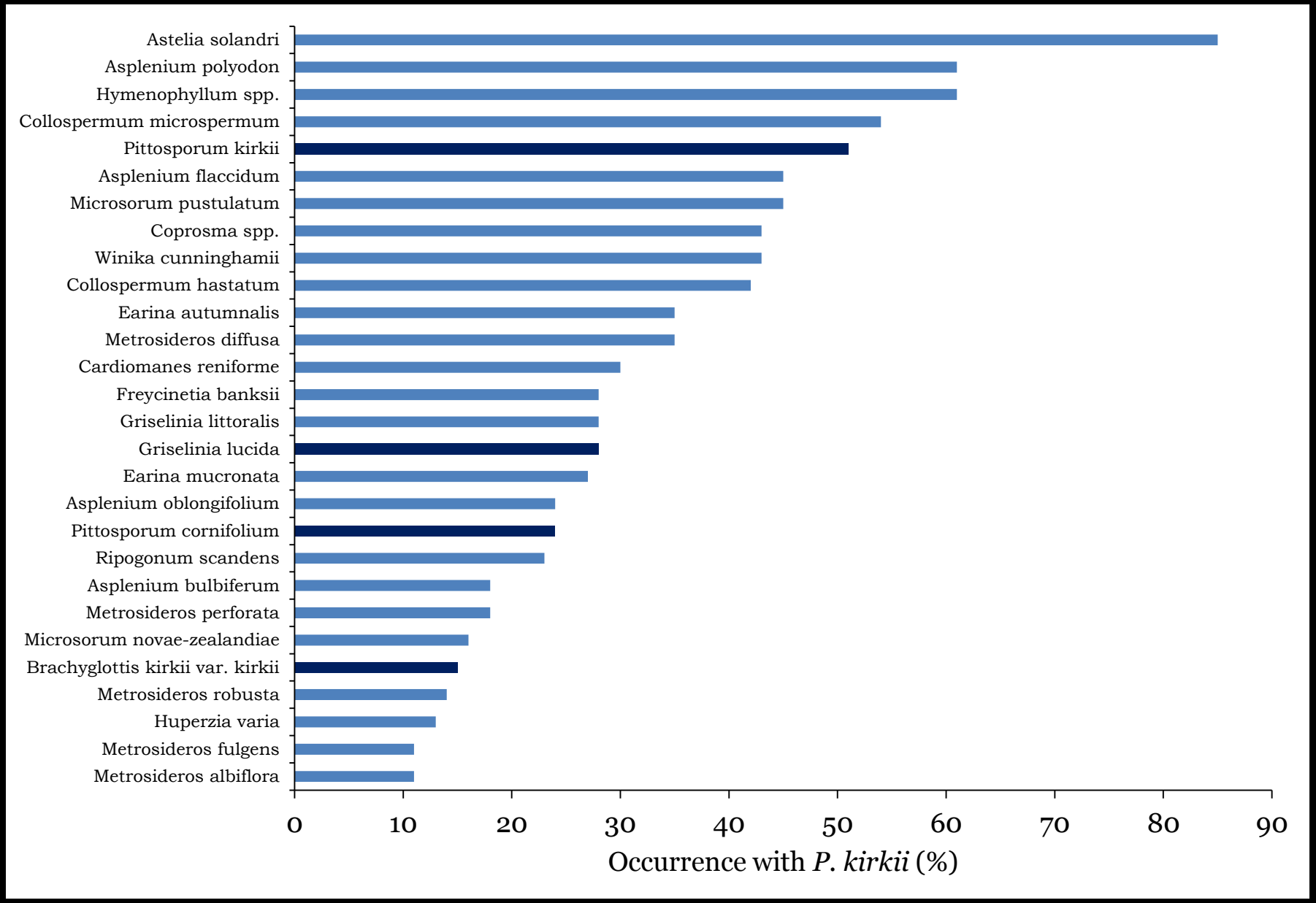
C. Bryan

Host tree diameter cm

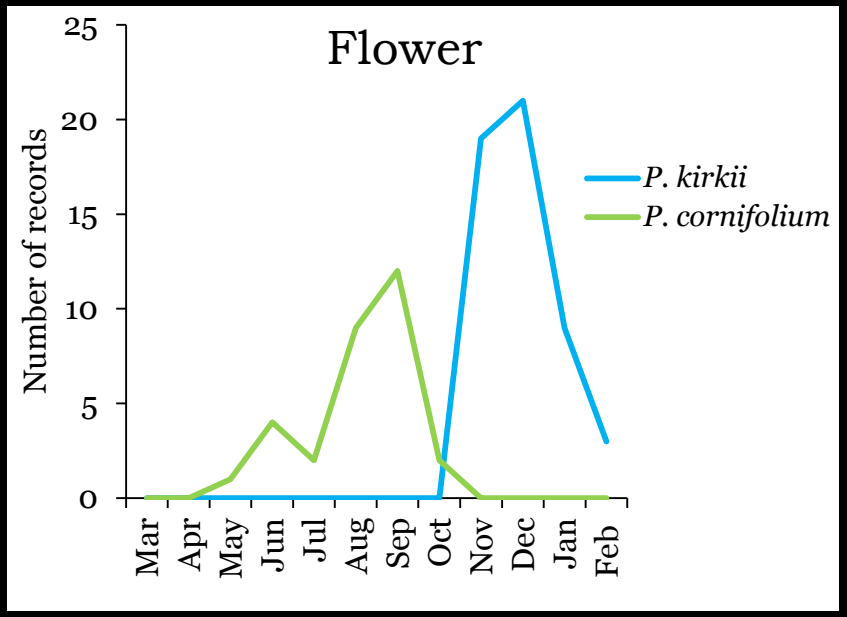
	P. kirkii	*P. cornifolium*
Mean	151	152
Min.	9	7
Max.	522	290

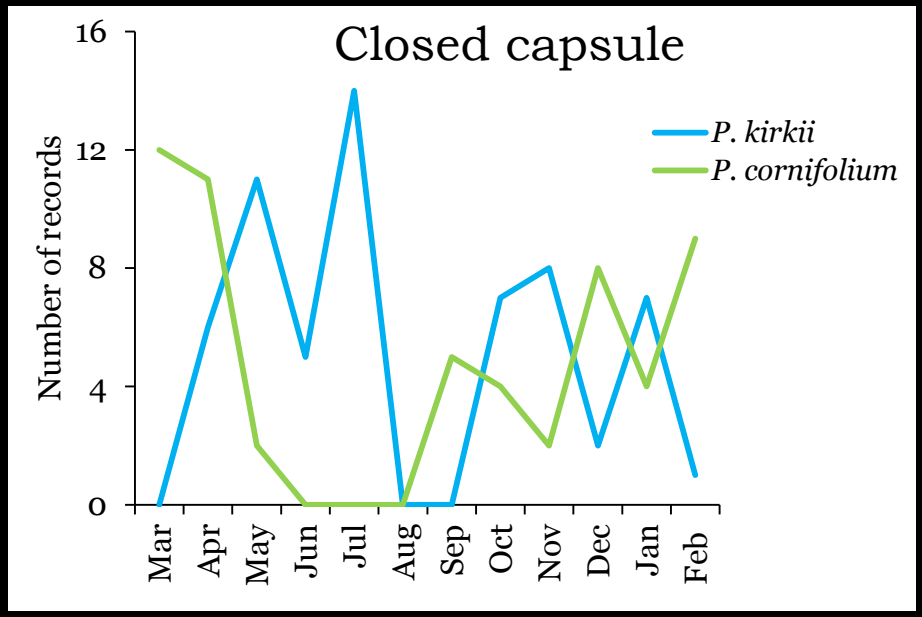
Clarkson (2011), Myron (2012)

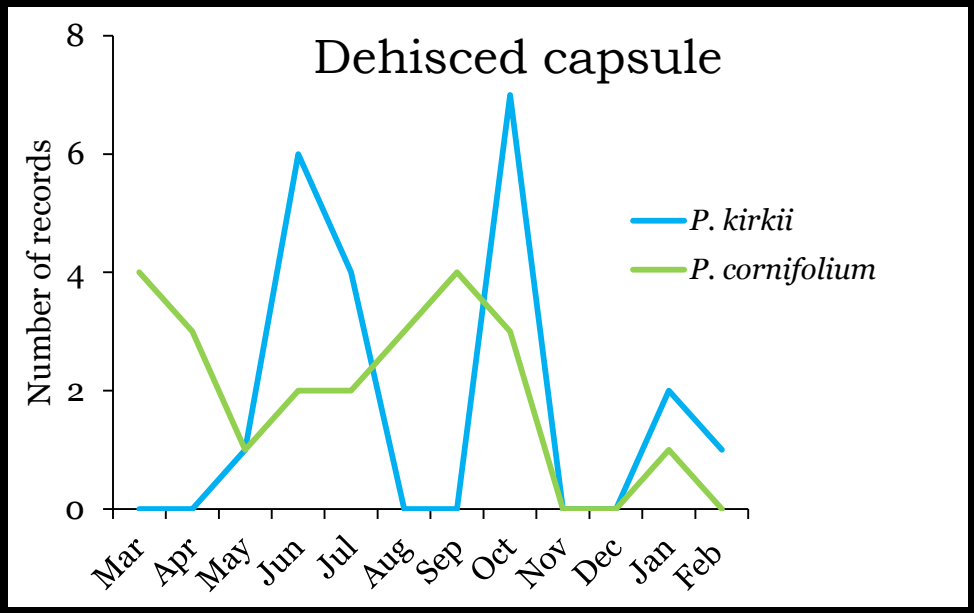
Associated species: *P. kirkii*



Phenology



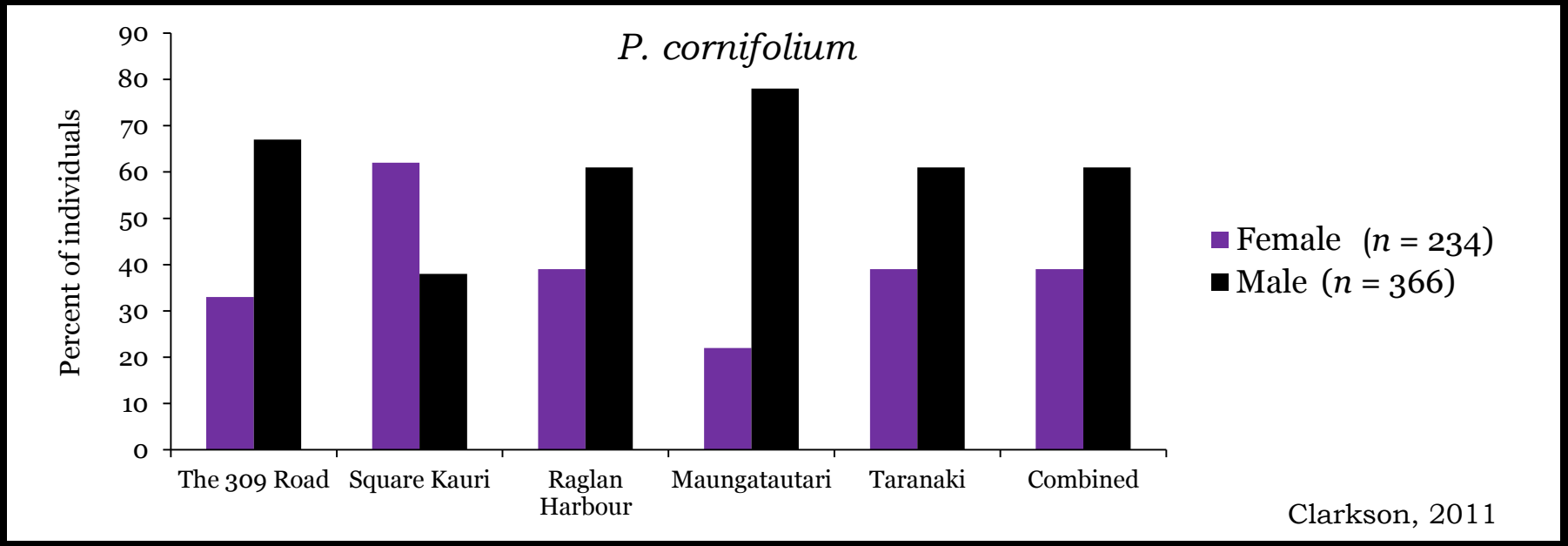


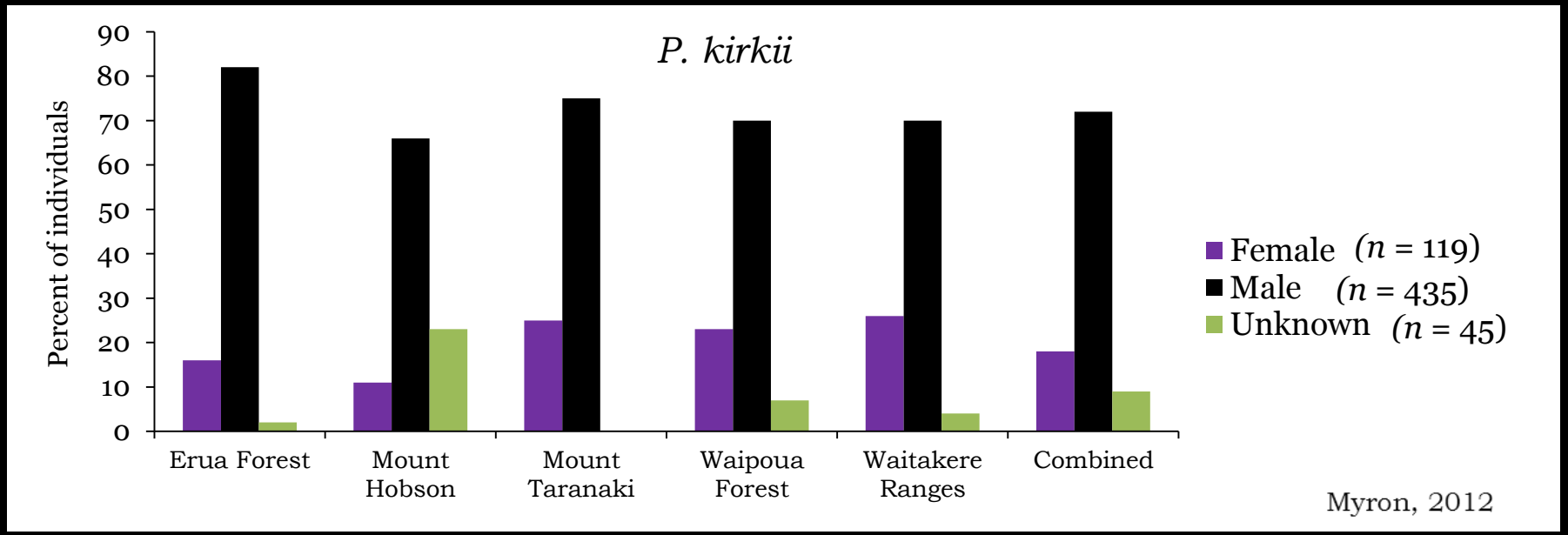


P. kirkii (n = 145)
P. cornifolium (n = 105)

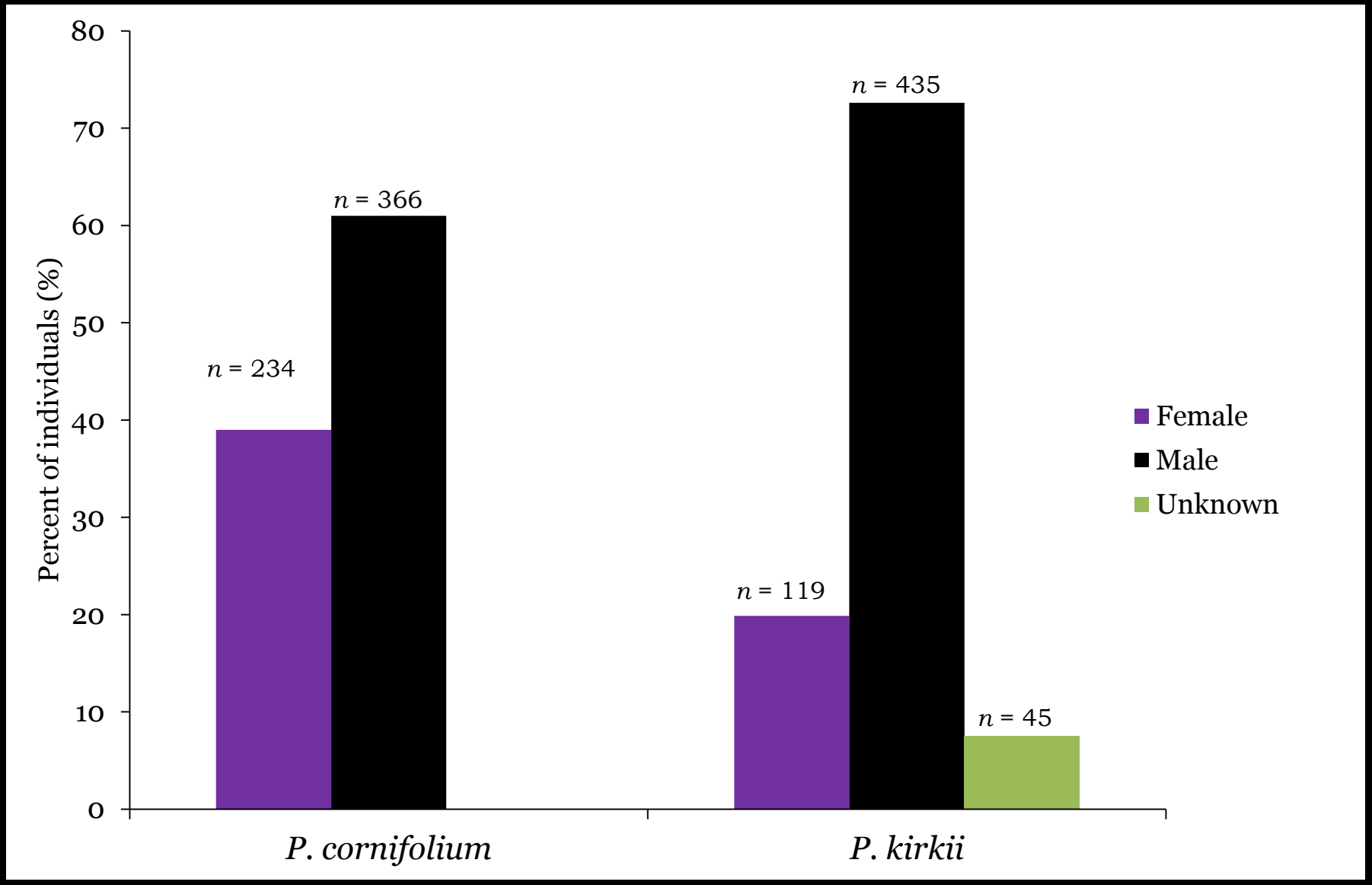
Clarkson (2011), Myron (2012)

Sex Ratios

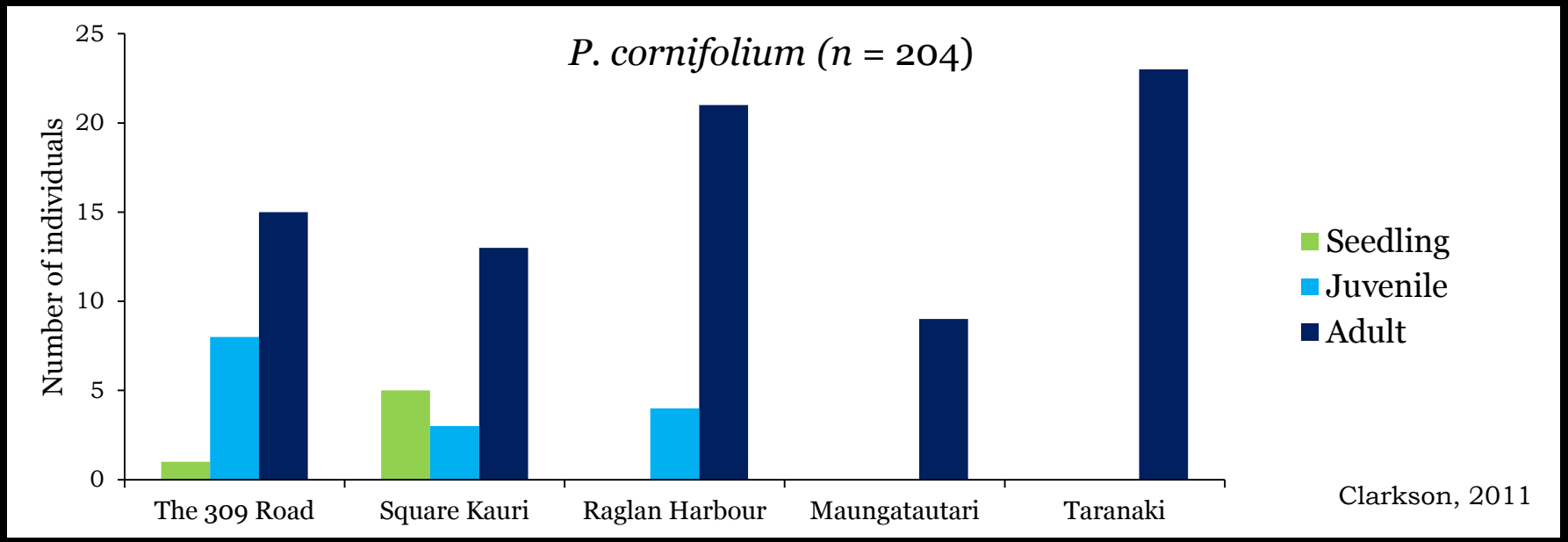

P. cornifolium
Percent of individuals
90
80
70
60
50
40
30
20
10
0
The 309 Road
Square Kauri
Raglan Harbour
Maungatautari
Taranaki
Combined
Female (n = 234)
Male (n = 366)
Clarkson, 2011

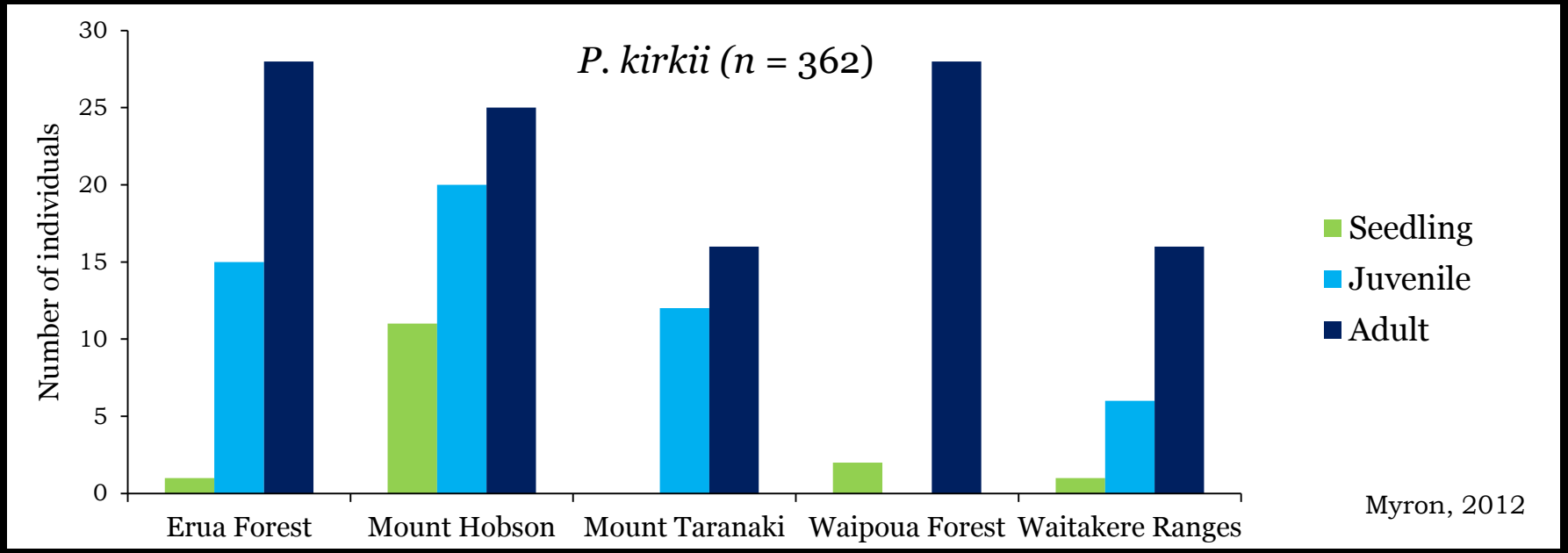

P. kirkii
Percent of individuals
90
80
70
60
50
40
30
20
10
0
Erua Forest
Mount Hobson
Mount Taranaki
Waipoua Forest
Waitakere Ranges
Combined
Female (n = 119)
Male (n = 435)
Unknown (n = 45)
Myron, 2012

Overall sex ratios

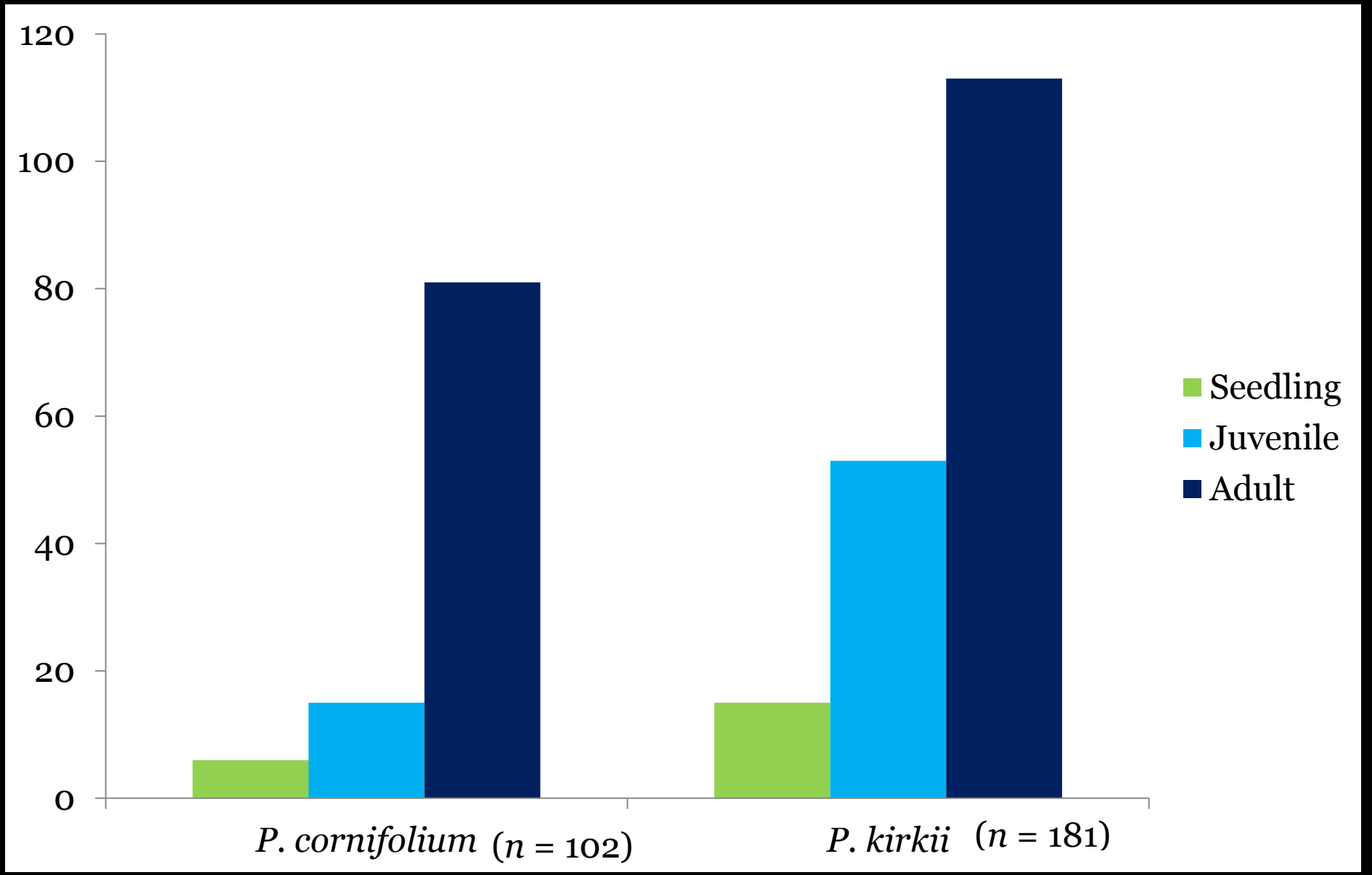


Population structures

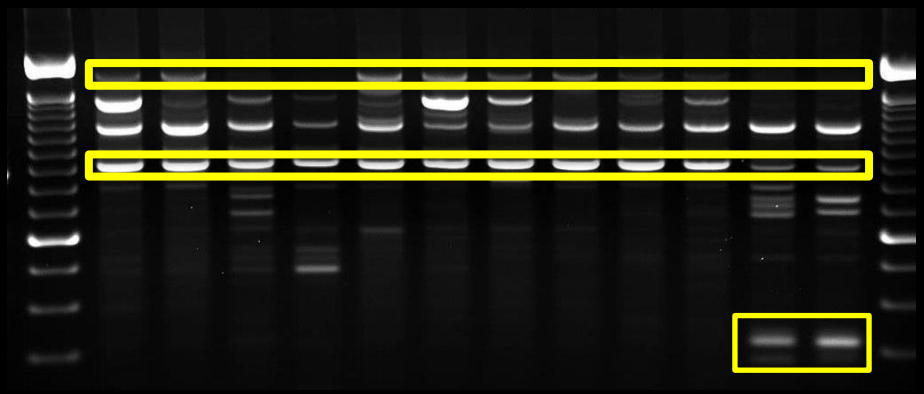


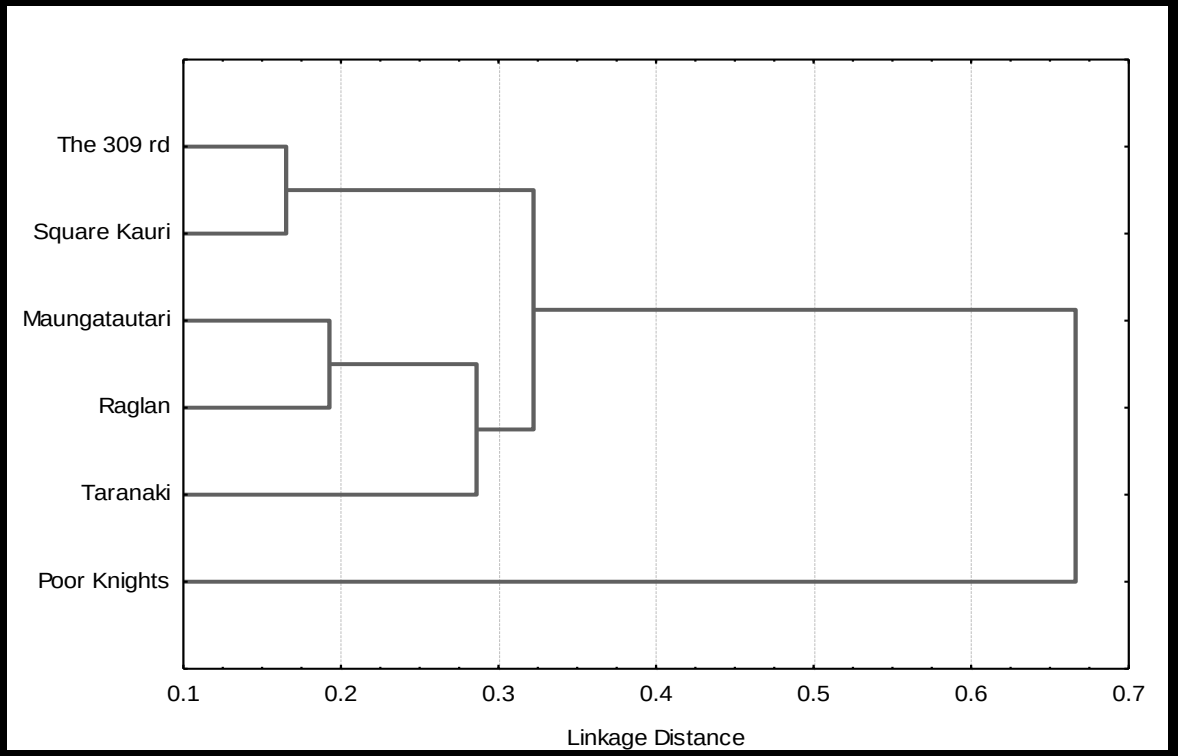


Overall population structure



Population Genetics





Clarkson, 2011

Mantel test:

$r = 0.65$

$p = 0.004$

Genetic distance is strongly correlated to geographic distance

Single difference (mutation?) at one point in the sequence

Conservation and restoration

P. cornifolium not threatened?
P. kirkii at risk, declining, data poor

- Buffering and connectivity of fragments
- Protection of old growth forests/old trees
- Pest control
- Reintroduction of epiphytes
- Ecosourcing

Acknowledgements

- George Mason Scholarships
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