

Seed dispersal by lizards in Aotearoa New Zealand

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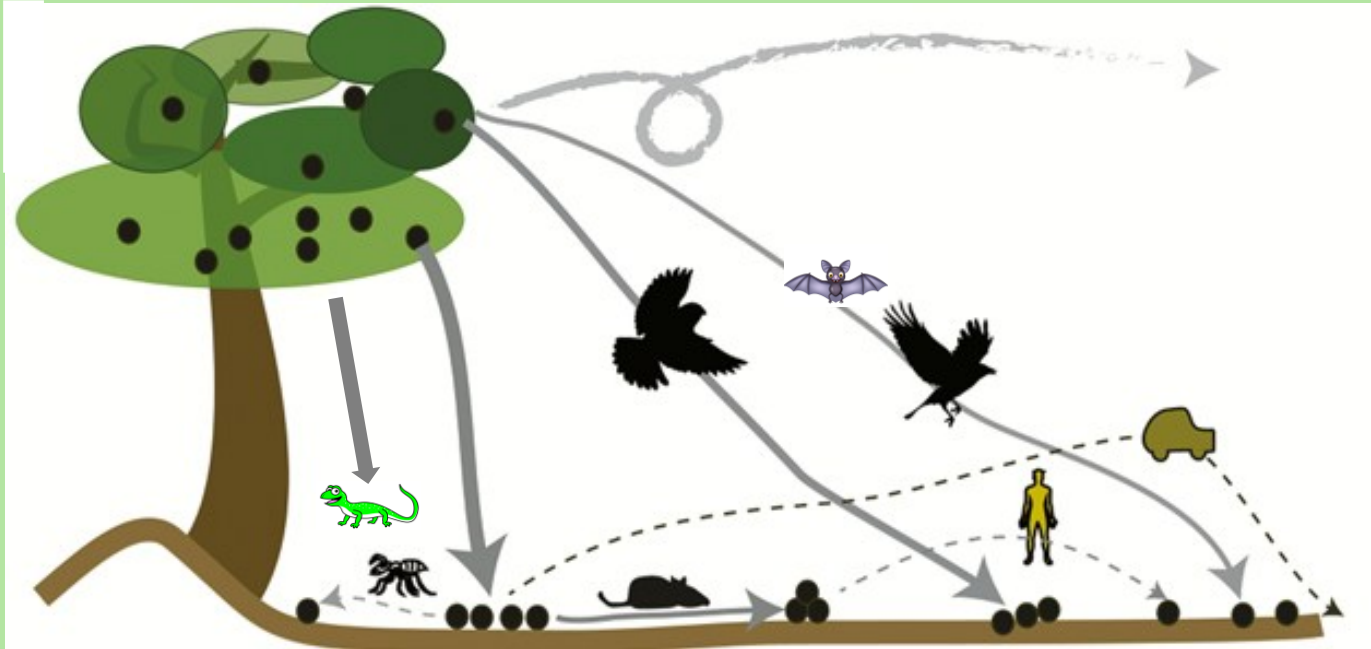


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Te Whare Wānanga o Tāmaki Makaurau
NEW ZEALAND



Manaaki Whenua
Landcare Research

The Importance of Seed Dispersal



Vectors of seed dispersal (Rogers et al. 2019).

Mechanisms:

- Falling to the ground
- Explosive action
- Wind, water or animals

= Movement of seeds away from the parent plant

Provides 3 main benefits:

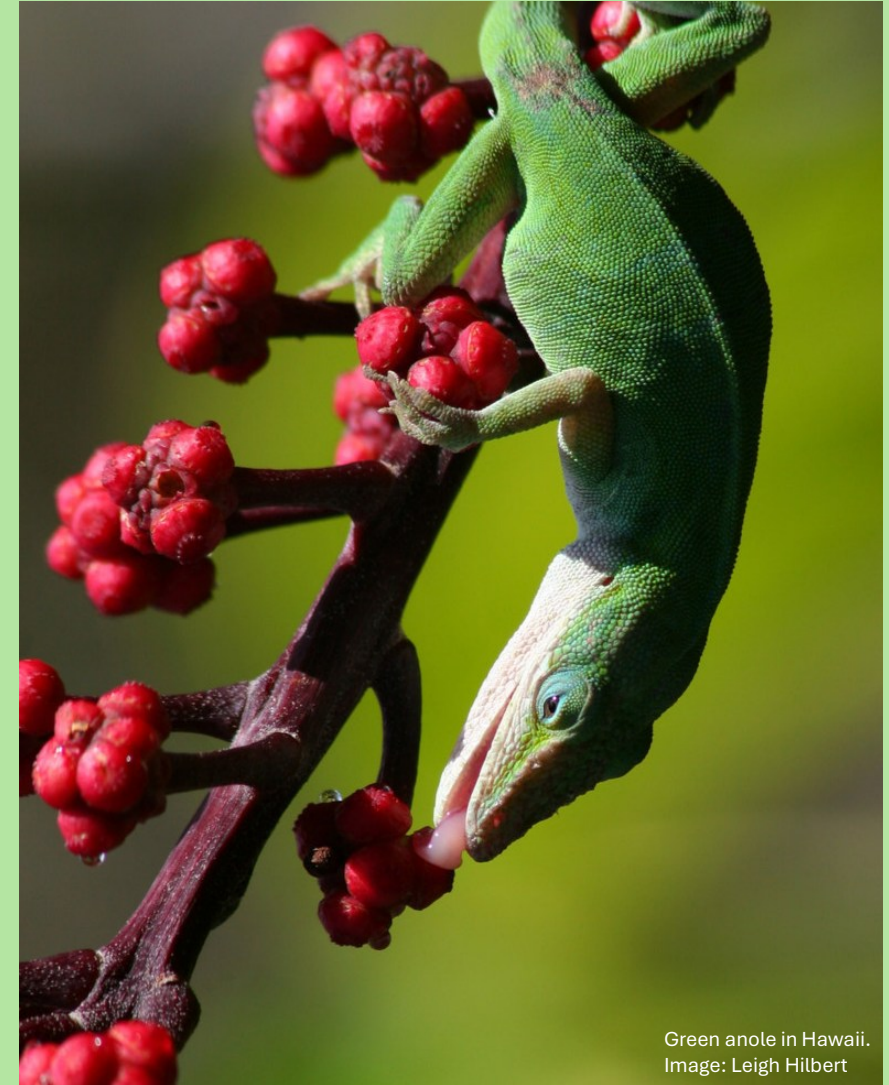
- Escape parents
- Colonisation of new sites
- Reaching safe microsites

For animal dispersal:

- Enhanced germination

Seed Dispersal by Lizards

- Often thought to be 'rare and unimportant'
- Fleshy fruits consumed by at least 470 lizard species worldwide
- More common on islands, including NZ
- Reductions in lizards can disrupt seed dispersal



Green anole in Hawaii.
Image: Leigh Hilbert

New Zealand Lizards

- 147 endemic species

Most diverse squamate fauna of any cool temperate region

- Diverse ecology

Coast to alpine, bare rocks to canopy

- Many at risk of extinction

46% threatened, 53% at risk, 1 extinction, 1 introduced

- Little known about natural history

Most are omnivores

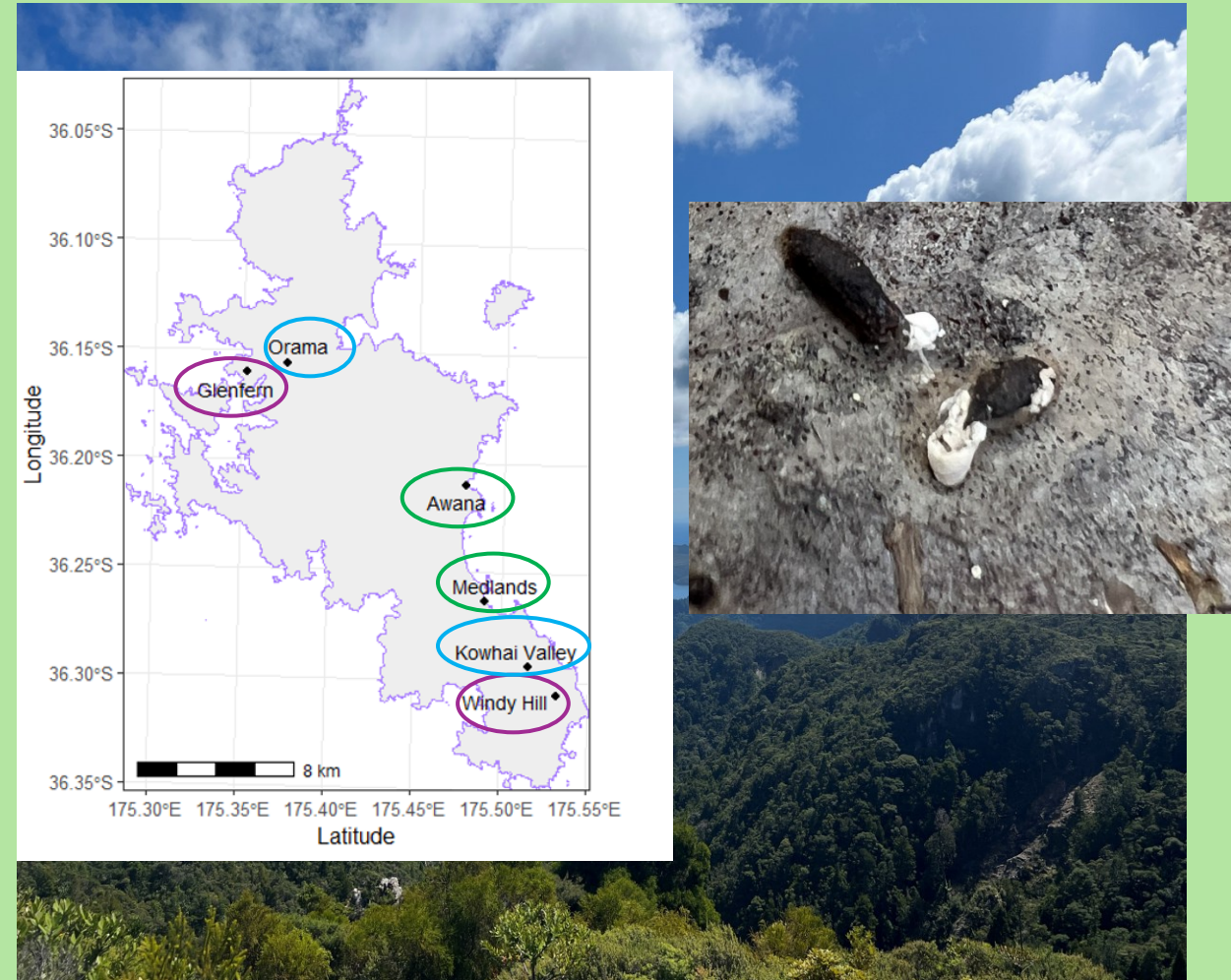
- Very few studies on seed dispersal



Raukawa gecko consuming kākāwaka in NZ.
Image: Debra Wotton

Seed Dispersal on Aotea Great Barrier Island

- 285 km² island with 13 native lizard species
- Pest control varies across the island – 2 sanctuaries + community trapping groups
- Collected 300 lizard scats from ARs over 2 years (2021 – 2023) from 6 sites



- 10 species consumed by lizards, 9 new species recorded
- Frugivore exclusion experiments in forested sites
- Lizard removal higher than birds for 3 species
- Compared *C. rhamnoides* at sites with high vs low rodents

Fruit removal by lizards 2 x higher with low rodents.
No change in birds

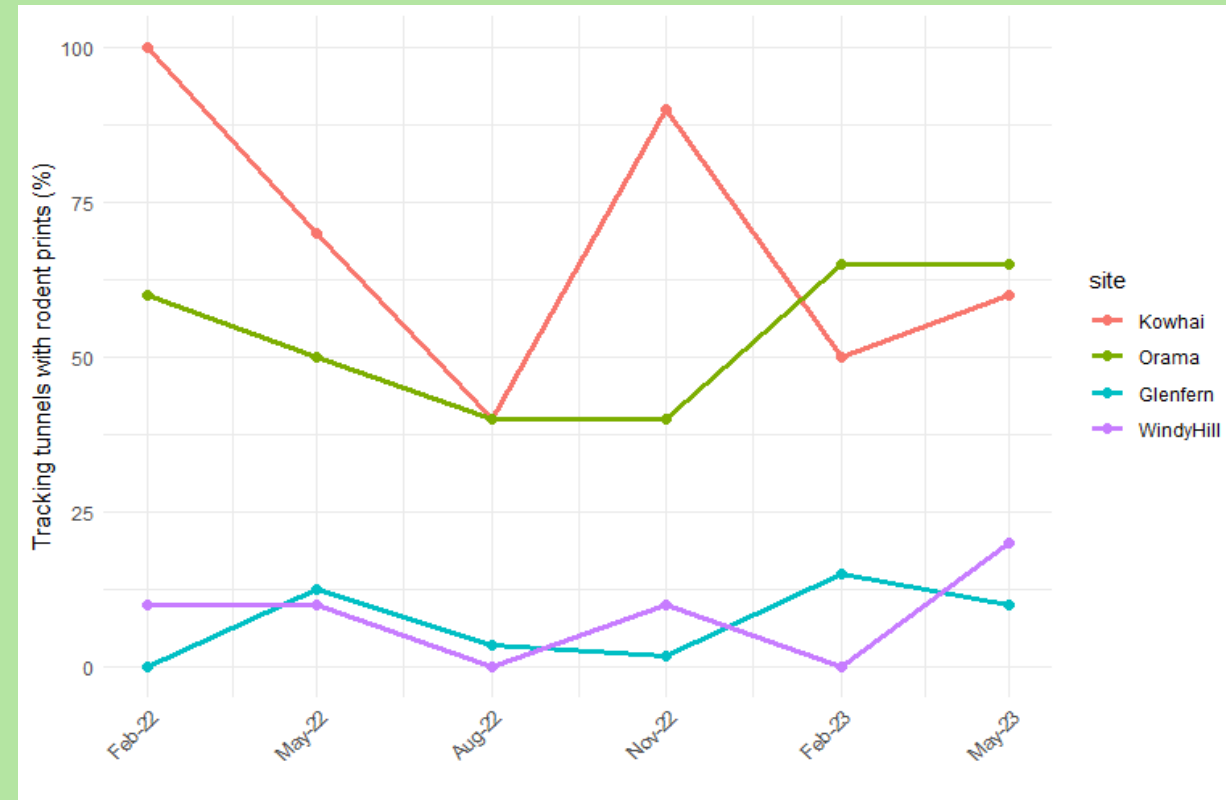


Image credits

Coprosma rhamnoides: cbeem @ iNaturalist

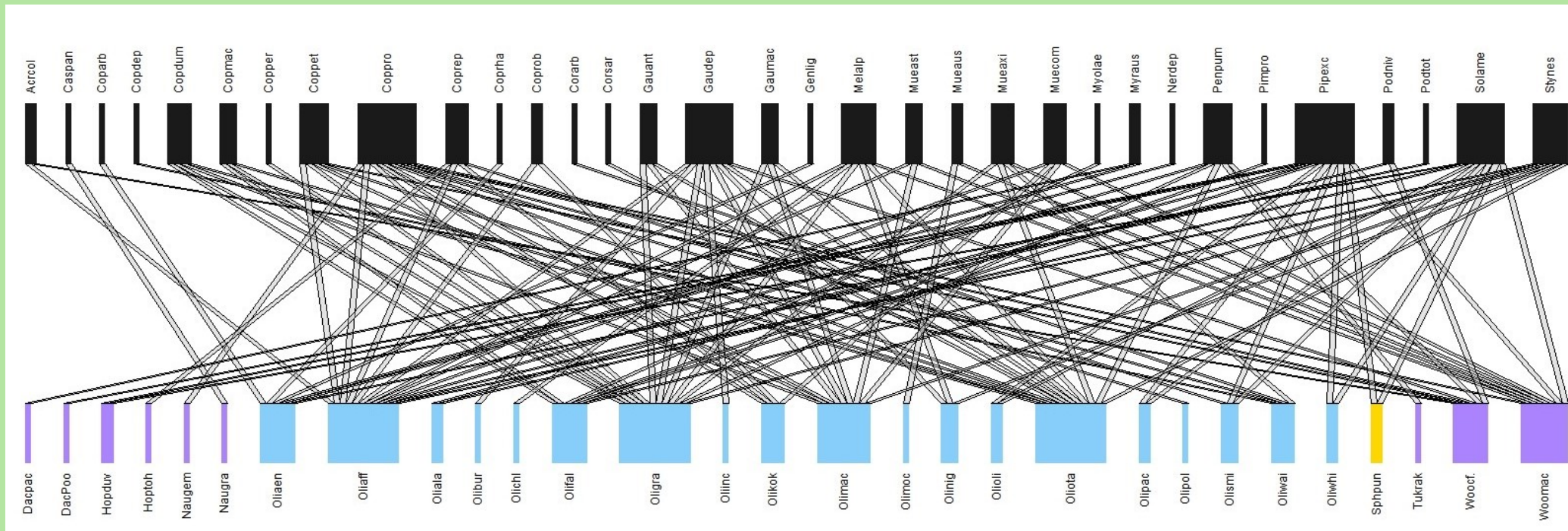
Coprosma spathulata: Jeremy Rolfe

Dianella nigra: Jeremy Rolfe

Prickly mingimingi: John Barkla

What plant species do lizards consume?

- Compiled all known observations of lizard frugivory, excluded captive obs.
- 108 records of frugivory between 29 reptile and 33 plant species.



- Probably many more species than we realise due to cryptic nature

- Some plants may rely on lizards for dispersal:



Image: Lek Khauv

Cassytha paniculata
(māwhai)



Image: Christopher Stephens

Coprosma dumosa



Image: Marley Ford

Pimelea prostrata
(pinātoro)



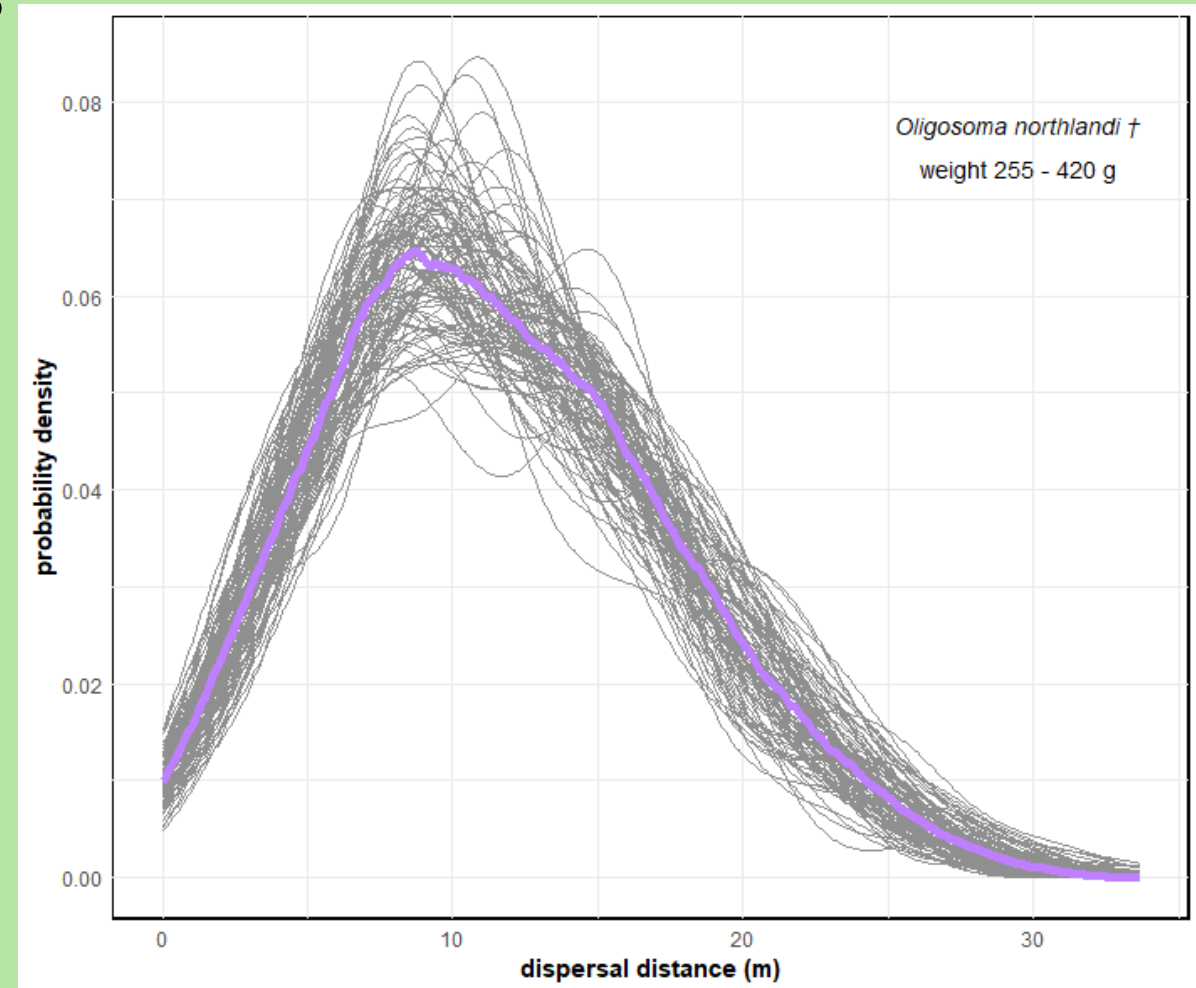
Image: Jacqui Guex

Nertera depressa
(fruiting duckweed)

- Some plants may be primarily dispersed by lizards:
 - *Muehlenbeckia* spp. (pōhuehue)
 - *Gaultheria* spp. (snowberry)
 - *Styphelia nesophila* (dwarf mingimingi)
 - *Melicytus alpinus* (porcupine shrub)
 - *Coprosma petriei* (Turfy coprosma)
- Most are alpine species

How far can lizards move seeds?

- Longer SRT than birds & mammals
- Estimated dispersal distances
- Small species up to 4 m
Even dispersal a few meters away can benefit plants
- Medium species up to 14 m
- Large species up to 19 m
- Northland skink up to 33 m



The Role of Sanctuaries

- Lizards can help with natural regeneration, particularly larger species
- Protecting lizards → protecting seed dispersal
- Translocations = two for the price of one!
- Suggestions for species to plant



Planting Suggestions

- *Coprosma propinqua*
- *Piper excelsum*
- *Gaultheria depressa*
- *Melicytus alpinus*
- *Muehlenbeckia complexa*
- *Styphelia nesophila*
- *Coprosma dumosa*
- *Muehlenbeckia axillaris*
- *Pentachondra pumila*
- *Gaultheria antipoda*
- *Coprosma petriei*



Green skink eating *Melicytus alpinus*.
Image: Rod Morris

Acknowledgements

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Thank You

A close-up photograph of a vibrant green tree frog with yellow and white stripes along its back and sides. The frog is perched on a branch, surrounded by several round, pinkish-purple fruits and some green ones. The background is a soft-focus green.

I have a
question!!
What are
these fruits?!
Yum!

- Plants consumed by lizards on Aotea:

- *Geniostoma ligustrifolium*
- *Coprosma rhamnoides*
- *Coprosma spathulata*
- *Coprosma arborea*
- *Dianella nigra*
- *Myrsine australis*
- *Nertera depressa*
- *Muehlenbeckia australis*
- *Podocarpus totara*
- *Portulaca oleracea*

Which fruit colours do lizards prefer?

