



# **Guide to the Lycopodiaceae of New Zealand**

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Contains a photographic overview of the family in New Zealand and a diagnostic page for each species. Only the more common taxonomic synonyms and colloquial names are given.

For more information, see:

Brownsey PJ, Perrie LR. 2020.

Lycopodiaceae. In: Breitwieser I, Wilton AD.

Flora of New Zealand - Ferns and Lycophytes. Fascicle 27.

Manaaki Whenua Press, Lincoln. <http://dx.doi.org/10.7931/kyrt-4p89>

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## Lycopodiaceae and the lycophytes

Lycopodiaceae is a family of lycophytes. The lycophytes are one of the principal groups of green land plants, alongside the mosses, liverworts, hornworts, ferns, and seed plants (including conifers and flowering plants). Like ferns and seed plants, lycophytes have specialised vascular systems for fluid transport. Also like ferns, lycophytes do not produce seeds, with their principal means of dispersal being via spores; however, ferns are more closely-related to seed plants.

Lycophytes are distinguished from the other vascular plants by having only a single vein in each leaf; their leaves are usually small. The c. 1300 living species are all small plants, although they may creep or climb extensively. However, some of their ancestors grew as trees, dominating forests and were major contributors to coal deposits.

The other lycophyte families are the Isoetaceae and Sellaginellaceae. These occur in New Zealand as the aquatic *Isoetes* quillworts and the introduced *Selaginella*, whose herbaceous stems distinguish them from the native Lycopodiaceae.

Twelve species of Lycopodiaceae are indigenous to New Zealand. We recognise five genera in the Lycopodiaceae, but others accept many more; see the Flora of New Zealand for more details. They are often colloquially referred to as “clubmosses” even though they are not mosses.

## Glossary

Lycopodiaceae species reproduce by spores. The spores are produced in capsules called sporangia, which are borne on leaves called sporophylls. Sometimes the sporophylls are grouped into distinctive cones.



Sporophylls differing only by their sporangia (the pale capsules) from the sterile leaves; the sporophylls not grouped into distinct cones. *Huperzia australiana*.



Sporophylls grouped into distinct cones, differing markedly from the sterile leaves below. *Lycopodium fastigiatum*.

*Huperzia australiana*



*Lycopodiella cernua*



*Lycopodiella diffusa*



*Lycopodiella lateralis*



*Lycopodiella serpentina*



*Lycopodium deuterodensum*



*Lycopodium fastigiatum*



*Lycopodium scariosum*



*Lycopodium volubile*



*Phlegmariurus billardierei*



*Phlegmariurus varius*



*Phylloglossum drummondii*





Habit in open



Sporophylls, shaded plant



Bulbils and sporophylls

## ***Huperzia australiana***

*Lycopodium australianum*  
fir clubmoss

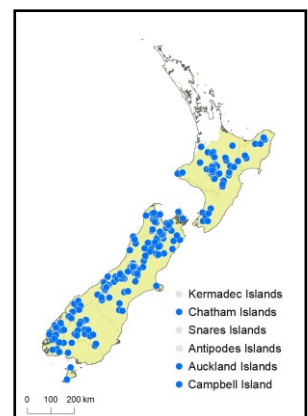
Indigenous to New Zealand, Australia, New Guinea, and Indonesia.

Distinguished by its upright stems and the sporophylls not grouped into distinct cones.

It is also the only lycophyte in New Zealand to have bulbils for vegetative propagation.

Grows in colder, open habitats; usually in the uplands.

Lycopodiaceae



Map CC BY Landcare Research



Upright stem with downward curling branch tips



Cones pendulous from ends of branches



Horizontal stems looping above ground

## ***Lycopodiella cernua***

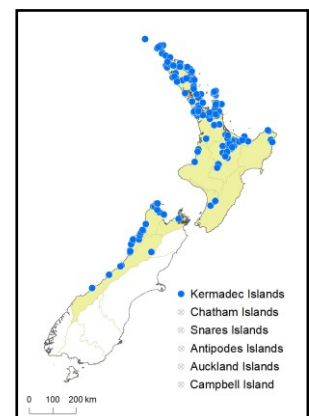
*Lycopodium cernua*, *Palhinhaea cernua*

Lycopodiaceae

Indigenous to New Zealand and many parts of the tropics and subtropics.

Distinguished by its above-ground, looping horizontal stems, and the downward curling branch-endings on the upright stems. Its unstalked cones are pendulous.

Grows in open areas, often on banks. Especially common around thermal areas and in the north.



Map CC BY Landcare Research



Prostrate habit, with mature cones



Prostrate *Lycopodiella diffusa* at left, with upright *L. lateralis* at right

## ***Lycopodiella diffusa***

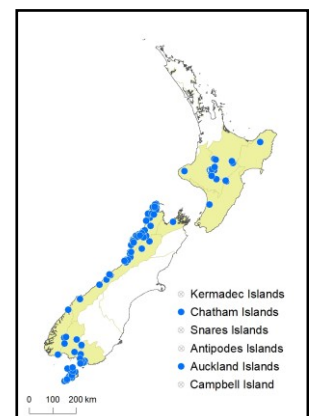
*Lycopodium diffusum*, *L. ramulosum*,  
*Lateristachys diffusa*  
carpet clubmoss

Indigenous to New Zealand and Australia.

Distinguished by its lateral (rather than terminal) cones on the aerial stems, and by its principally prostrate growth habit.

Grows in wet, often open habitats. It is often in colder places than the related *L. lateralis*.

Lycopodiaceae



Map CC BY Landcare Research



Lateral cones



Semi-shaded stem, with mature cone



Upright habit

## ***Lycopodiella lateralis***

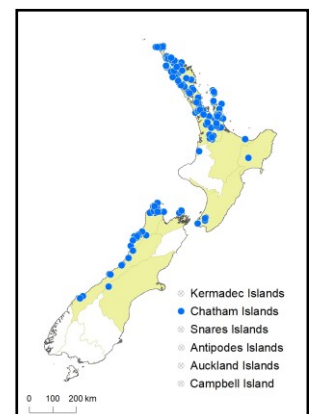
*Lycopodium laterale*, *Lateristachys lateralis*

Lycopodiaceae

Indigenous to New Zealand, Australia, and New Caledonia.

Distinguished by its lateral (rather than terminal) cones on the aerial stems, and by its principally upright growth habit.

Grows in damp, often open habitats. It generally occurs in warmer places than the related *L. diffusa*.



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Prostrate horizontal stems with erect stalked cones



Maturing cone at centre

## ***Lycopodiella serpentina***

*Lycopodium serpentinum*, *Pseudolycopodiella serpentina*

bog clubmoss

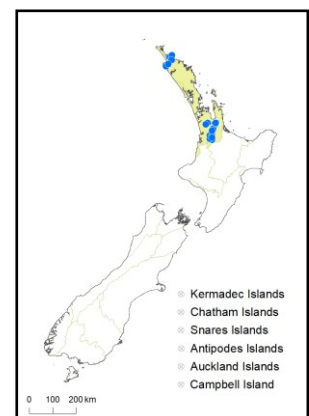
Indigenous to New Zealand, Australia, and New Caledonia.

Distinguished by its erect cones that have unbranched stalks arising from prostrate horizontal stems.

Grows in wetlands within limited areas of Northland and Waikato.

Has a **Threatened** conservation ranking.

Lycopodiaceae



Map CC BY Landcare Research





Erect cones at the ends of upward-pointing branches



Growing as a colony



Juvenile with spreading leaves

# ***Lycopodium deuterodensum***

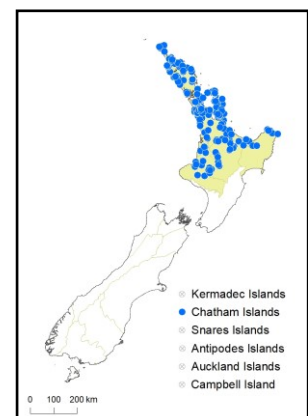
*Pseudolycopodium densum*  
puakarimu

Indigenous to New Zealand, Australia, and New Caledonia.

Distinguished by the appressed leaves of adults, its erect, unstalked cones at the ends of upward-pointing branches, and underground horizontal stems. Juveniles have spreading leaves.

Grows in colonies under various types of forest and scrub, often on poor soils.

Lycopodiaceae



Map CC BY Landcare Research



Spirally arranged leaves and erect stalked cones



Tall green plant



Small orange, prostrate plant



Among rocks in alpine zone

# ***Lycopodium fastigiatum***

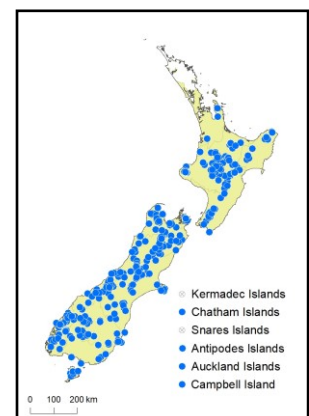
*Austrolycopodium fastigiatum*  
alpine clubmoss

Indigenous to New Zealand and Australia.

Distinguished by its spirally-arranged, spreading leaves, and erect, stalked cones; the stalks of the cones can be branched. Plants in exposed habitats can be short and orange; those under shelter can be taller and greener.

Grows usually in colder habitats, including the alpine zone, but also at the margins of forest and scrub.

Lycopodiaceae



Map CC BY Landcare Research



Scrambling plant with upright cones



Upper surface, with flattened lateral leaves



Lower surface, with central row of smaller leaves

## ***Lycopodium scariosum***

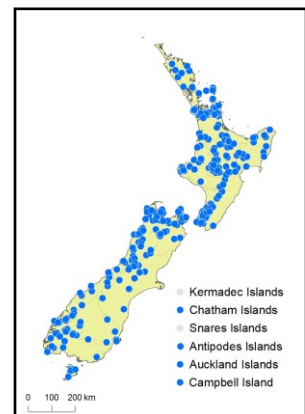
*Diphasium scariosum*  
creeping clubmoss

Indigenous to New Zealand, Australia, Indonesia,  
and Philippines.

Distinguished by its scrambling stems that have their  
larger leaves flattened into one plane, with a row of  
smaller leaves on the lower surface. Also by its stalked  
but solitary cones.

Grows in open habitats, usually near forest or scrub,  
and in colder areas.

Lycopodiaceae



Map CC BY Landcare Research



Flattened sterile leaves and pendulous cones on a scrambling plant



Upper surface



Lower surface

# ***Lycopodium volubile***

*Pseudodiphasium volubile*

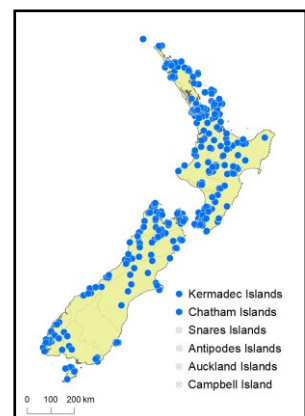
waewaekoukou, climbing clubmoss

Lycopodiaceae

Indigenous to New Zealand, New Caledonia, Solomon Islands, Vanuatu, and Malesiana.

Distinguished by its scrambling and climbing stems that have their larger leaves flattened into one plane, and smaller leaves on both the upper and lower surfaces. Also by its fertile branches with pendulous cones.

Grows usually at the margins of forest and scrub, or under a light canopy. Grows usually at the margins of forest and scrub, or under a light canopy.



Map CC BY Landcare Research



Pendulous epiphyte



Cones below and sterile stem above

## ***Phlegmariurus billardierei***

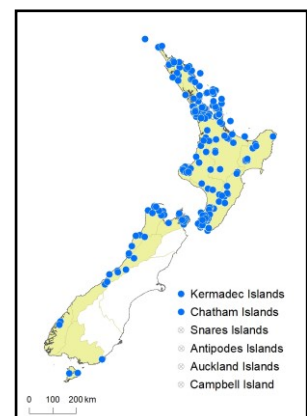
Endemic to New Zealand.

Distinguished by its pendulous habit and its cones, which have appressed sporophylls. The cones are connected to sterile stems with appressed leaves, which in turn lead into sterile stems with spreading leaves.

Grows epiphytically or terrestrially on banks, usually in forest.

It is more in warmer, lowland habitats than *P. varius* but they often co-occur.

Lycopodiaceae



Map CC BY Landcare Research



Robust pendulous epiphyte



Flaccid pendulous epiphyte



Spreading sporophylls grading into spreading sterile leaves



Terrestrial plant with upright habit

## ***Phlegmariurus varius***

*Lycopodium varium*, *Huperzia varia*

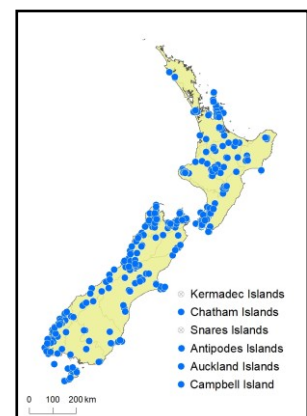
Indigenous to New Zealand and Australia.

Distinguished by at least some spreading sporophylls, which are subtended by sterile stems with spreading leaves. There are no appressed sterile leaves near the cones. Can be pendulous or upright.

Grows epiphytically or terrestrially. Extends into colder habitats than *P. billardierei* but they often co-occur.

*P. varius* is more variable than *P. billardierei*.

## Lycopodiaceae



Map CC BY Landcare Research



With mature cone



With developing cone

## *Phylloglossum drummondii*

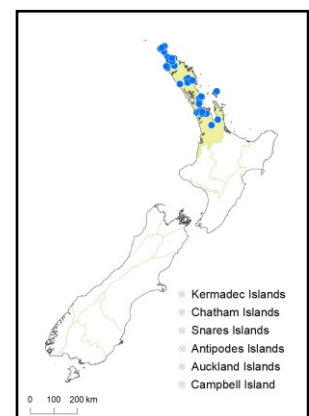
Lycopodiaceae

Indigenous to New Zealand and Australia.

Distinguished by its small size (less than 5 cm tall), with a rosette of leaves surrounding a stalked cone.

Grows on poor soils in gumland wetlands of Northland. Formerly extended to at least the Waikato. It appears above ground only in winter and spring, surviving summer as an underground tuber.

Has a **Threatened** conservation ranking.



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