

FLORA OF NEW ZEALAND

FERNS AND LYCOPHYTES

ANEMIACEAE



P.J. BROWNSEY & L.R. PERRIE

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Cover image: *Anemia phyllitidis*. Mature, fertile plant self-sown on a bank.



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Introduction

Anemiaceae is a small family previously included in Schizaeaceae but now shown to be sister to it. Anemiaceae is distributed in the Neotropics, southern Africa, Madagascar and peninsular India, with the greatest diversity in the Americas. It is represented in New Zealand by a single naturalised species, *Anemia phyllitidis*, which has been collected once from Kerikeri.

The species is recognised by its erect rhizome bearing orange-brown hairs, and hemidimorphic fronds. The laminae have two to five pairs of ovate sterile pinnae, and one highly modified basal pair of more divided fertile pinnae, which are skeletonised, held upright on long stalks, and bear sporangia in two rows on either side of the costae.

Anemiaceae Link, *Fil. Spec.* 23 (1841)

Terrestrial or rupestral ferns. Rhizomes erect (NZ) or creeping (not NZ), bearing hairs (NZ) and sometimes non-clathrate scales (not NZ). Fronds hemidimorphic, with fertile and sterile pinnae markedly dimorphic (NZ) or occasionally monomorphic (not NZ), not articulated to rhizome. Stipes hairy (NZ) and occasionally scaly (not NZ). Laminae 1-pinnate to 4-pinnate, anadromous proximally and catadromous distally, herbaceous or coriaceous, hairy (NZ) and occasionally scaly (not NZ). Veins reticulate without free included veinlets (NZ), or free (not NZ). Sporangia limited to the basal pair of skeletonised pinnae, which are held erect on long stalks (NZ), or occasionally borne abaxially on unmodified laminae (not NZ); sporangia in two rows either side of a vein, not in sori, sessile, slightly asymmetrically ovoid or pear-shaped, with the annulus horizontal around the outward-pointing apex, dehiscing by a vertical longitudinal slit; spores maturing \pm simultaneously; 32–256 spores per sporangium. Homosporous; spores trilete, with coarse echinate or bacculate ridges, or rarely reticulate, lacking chlorophyll.

Taxonomy: A family of one genus and about 115 species (PPG 1 2016).

Earlier classifications have varied in their treatment of the Schizaeales. Allan (1961) and Kramer (1990) included the Lygodiaceae and Anemiaceae in the Schizaeaceae, whereas Pichi Sermolli (1977) maintained all three as separate families. Three families are now recognised within the Schizaeales (PPG 1 2016), with Anemiaceae sister to Schizaeaceae (Schuettpehl & Pryer 2007; Labiak et al. 2015).

From one to five genera have previously been circumscribed in Anemiaceae, but *Anemia* (including *Mohria*) is now generally accepted as the sole genus (Smith et al. 2006; Labiak et al. 2015; PPG 1 2016; Mickel 2016).

Distribution: A family distributed in America from Texas to Argentina, southern Africa, Madagascar and peninsular India (Kramer 1990), with the great majority of species in the Americas. One genus and species casual in New Zealand.

Biostatus: Exotic; casual.

Table 1: Number of species in New Zealand within *Anemiaceae* Link

Category	Number
Exotic: Casual	1
Total	1

Recognition: Anemiaceae is a family of terrestrial ferns with erect or creeping rhizomes, hemidimorphic or rarely monomorphic fronds bearing hairs and occasionally scales. The sporangia are usually borne on a basal pair of highly modified pinnae, or occasionally abaxially on unmodified laminae; they are not aggregated in sori, and each has a horizontally arranged subapical annulus. The spores are trilete and coarsely ridged.

***Anemia* Sw., *Syn. Fil.* 6, 155 (1806), nom. cons.**

Type taxon: *Anemia phyllitidis* (L.) Sw.

Etymology: From the Greek *aneimon* (naked), a reference to the absence of indusia.

Taxonomy: *Anemia* has been monographed by Mickel (2016), and the relationships of 81 species have been analysed on the basis of four chloroplast loci (Labiak et al. 2015), supporting the recognition of a single genus with three subgenera. Only subg. *Anemia* occurs in New Zealand.

Distribution: A genus of about 115 species distributed in America from Texas to Argentina, southern Africa, Madagascar and peninsular India (Kramer 1990); almost 100 species in the Neotropics, 16 in Africa and Madagascar, and one in India (Labiak et al. 2015; Mickel 2016). One casual species in New Zealand.

Biostatus: Exotic; casual.

Table 2: Number of species in New Zealand within *Anemia* Sw.

Category	Number
Exotic: Casual	1
Total	1

Recognition: Species of *Anemia* subg. *Anemia* are easily recognised by their hemidimorphic fronds. Sporangia are borne only on the basal pair of pinnae, which are highly modified, borne on long stalks

and usually held erect. The fertile pinnae are skeletonised, more highly divided than the sterile pinnae, and bear the sessile sporangia in two rows either side of a vein, not in discrete sori.

Cytology: The base chromosome number in *Anemia* is given as $x = 38$ by (Smith et al. 2006) with numbers of $n = 38, 76$, and 114 , and $2n = c. 76, 114$, and 152 recorded by Kramer (1990).

***Anemia phyllitidis* (L.) Sw., Syn. Fil. 155 (1806)**

≡ *Osmunda phyllitidis* L., Sp. Pl. 1064 (1753)

Lectotype (selected by Proctor 1985): Plate "*Osmunda lanceolata et subtiliter serrata*" in Plumier, Traité Foug. Amér., 133, t. 156 (1705)!

Etymology: From the Greek *phyllitidis* (like *Phyllitis*).

Distribution: North Island: Northland

Altitudinal range: 10 m.

Known as a cultivation escape from one locality in Kerikeri.

Occurs naturally in Mexico, Central and South America (Mickel & Smith 2004).

Biostatus: Exotic; casual.

Habitat: Reported as growing on a steep, south-facing bank near a site previously occupied by the now-dead parent plant.

First record: Ogle et al. (2021). Voucher AK 327905, 2008.

Recognition: New Zealand material, comprising one known collection, has the following characteristics. Rhizomes erect, bearing orange-brown hairs. Fronds c. 380 mm long, hemidimorphic. Stipes c. 210 mm long, bearing orange-brown hairs. Sterile portion of each lamina pinnate, ovate, c. 170 mm long, c. 130 mm wide. Primary pinnae in 2–5 pairs below a similar apical pinna, ovate, apices acuminate, the longest c. 80 mm long, 20 mm wide. Rachises bearing orange-brown hairs. Venation reticulate. Basal pair of pinnae fertile, held erect on stalks c. 100 mm long, arising very close to basal pair

of sterile pinnae; apical portion skeletonised, 3–4 pinnate, c. 70 mm long, c. 15 mm wide, bearing sporangia in two rows either side of each costa.

Notes: *Anemia phyllitidis* is distinguished from its congeners by its pinnate fronds, fertile pinnae that arise very close to the basal pair of sterile pinnae, acuminate pinnae, and reticulate venation involving every vein in each sterile pinna.

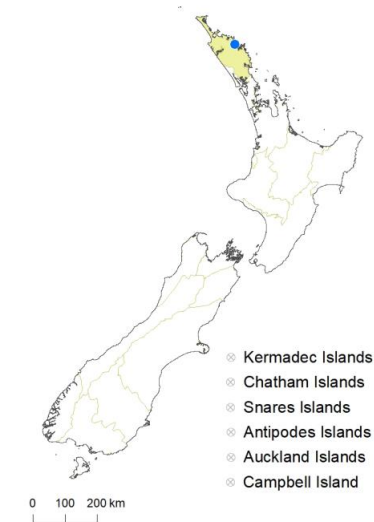


Fig. 1: *Anemia phyllitidis* distribution map based on databased records at AK, CHR & WELT.



Fig. 2: *Anemia phyllitidis*. Mature, fertile plant self-sown on a bank.



Fig. 3: *Anemia phyllitidis*. Mature, fertile plant with 1-pinnate laminae.



Fig. 4: *Anemia phyllitidis*. Close up showing the fertile pinnae on long stalks arising from the basal pair of pinnae.



Fig. 5: *Anemia phyllitidis*. Herbarium specimen of a plant from Kerikeri, AK 327905, showing a fertile frond with one of a basal pair of fertile pinnae on a long stalk.

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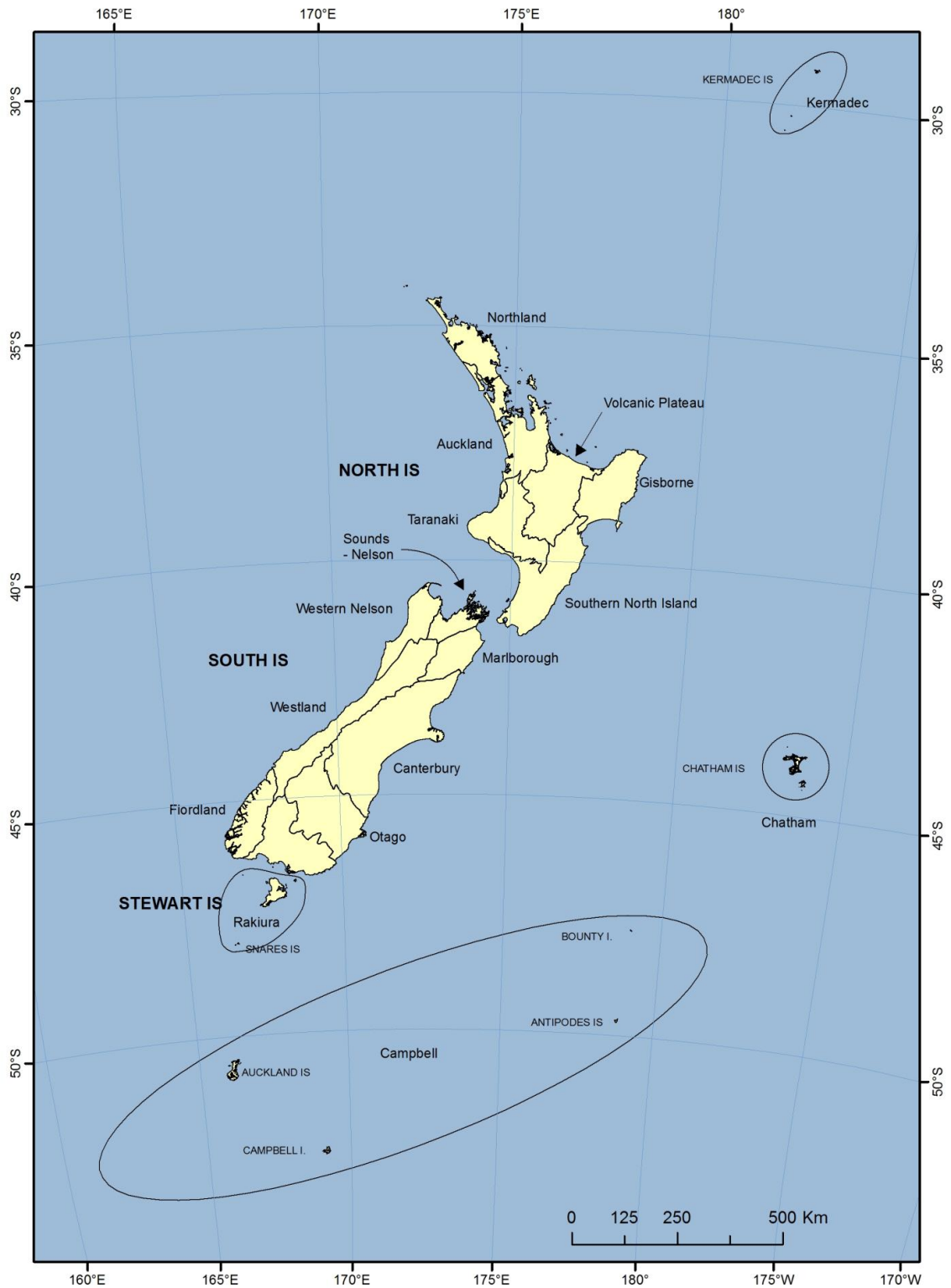
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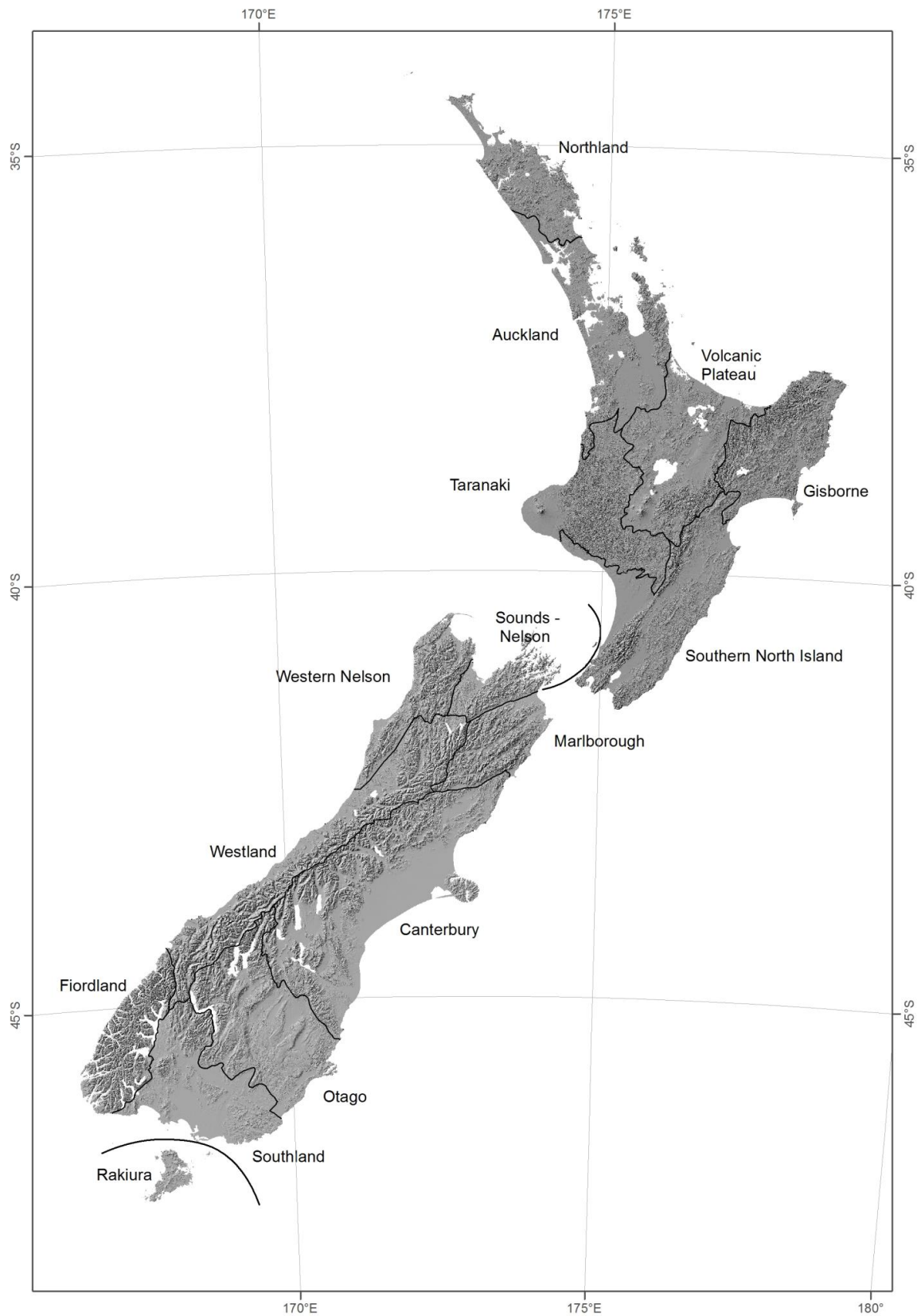
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Map 1: Map of New Zealand and offshore islands showing Ecological Provinces



Map 2: Map of New Zealand showing Ecological Provinces

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Page numbers are in **bold** for the main entry,
and *italic* for synonyms.

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Anemiaceae Link 1, **2**

Osmunda phyllitidis L. 3

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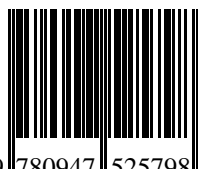
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