



**FLORA OF NEW ZEALAND**  
**MOSSES**

**ARCHIDIACEAE**



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**A.J. FIFE**

Fascicle 10 – SEPTEMBER 2014

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Cover image: *Archidium elatum*, habit. Drawn by Rebecca Wagstaff from isotype, *H.B. Matthews s.n.*, Jan. 1931, CHR 500984.

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## Introduction

The Archidiaceae include a single genus of nearly cosmopolitan distribution. *Archidium* has about 26 species worldwide, while only one endemic species occurs in New Zealand. The family is considered to be strongly isolated among the true mosses because of certain morphological features of the developing capsule. Mature capsules are globose, thin-walled, lack both a columella and stomata, and enclose a few large and single-celled spores.

*Archidium elatum* is one of least known mosses in the N.Z. flora, occurring on coastal rocks, especially basalt. It has been documented only from a single North I. locality (where it is possibly extinct), one inshore island group, and Chatham I. Unfortunately it is known only from non-fruiting material; the highly inconspicuous *A. elatum* is best recognised by its coastal habitat, the presence of numerous innovative branches arising in clusters from old perichaetia, the zig-zag appearance of its stems, and its widely spreading and strongly costate leaves. Under the microscope, short-rectangular or quadrate cells that extend some distance up the lower leaf margins are among its more distinctive features.

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## Archidiaceae

**Taxonomy:** A monotypic family with the characteristics of the genus *Archidium*. The family is considered to be strongly isolated among the true mosses (Bryopsida) due to the lack of a quadrant stage in the developing capsule, and the failure of the endothecium to differentiate into a columella and archesporial layer. The mature capsules are globose, thin-walled, lack stomata, and enclose a few large and single-celled spores. Goffinet et al. (2009) placed the Archidiaceae in its own order within the subclass Dicranidae.

The development of the sporophyte in *Archidium* was described in detail by Snider (1975b).

### *Archidium* Brid., *Bryol. Univ.* 1, 747 (1827)

**Type taxon:** *Archidium phascoides* Brid.

Elements in the following description are taken from Snider (1975a).

**Plants** small, ephemeral or perennial, forming turves or tufts on moist soil in disturbed habitats. **Stems** erect, to 20 mm, simple or branched, often with sterile innovations in axils of the outer perichaetial or upper vegetative leaves; lower stems often becoming prostrate and stoloniferous and these giving rise to erect and fertile branches, which form rhizoids at base and often become detached; in cross-section with a central tissue of large, thin-walled cells, lacking a central strand, and the outer cells smaller and ± firmer-walled. **Vegetative leaves** triangular to linear-lanceolate, smaller but otherwise little differentiated from the perichaetial leaves.

**Monoicous. Perichaetial leaves** variable in shape but mostly ± lanceolate or triangular, entire or toothed; **mid laminal** and **basal cells** uniform throughout or becoming more quadrate at base and at lower margins; **costa** percurrent to strongly excurrent, in cross-section of uniformly thick-walled cells. **Capsules** globose, sessile, 1-several per plant, 200–750 µm diam., with 1 exothecial cell layer, releasing spores by irregular rupture or rotting of the capsule wall; **setae** not developed; **stomata** and **columellae** absent. **Calyptra** scarcely developed, consisting of an irregularly torn membrane attached to the remains of the vaginula. **Spores** usually few (4–176) per capsule, 1-celled, large (c. 50–300 µm) and thick-walled, maturing in spring or autumn.

**Taxonomy:** A genus of nearly cosmopolitan distribution. Snider (1975a) recognised 26 species in a worldwide monograph in which he proposed an infrageneric classification of two subgenera and several sections. One endemic species occurs in N.Z.

### *Archidium elatum* Dixon & Sainsbury in Sainsbury, *Trans. & Proc. Roy. Soc. New Zealand* 75: 169 (1945)

Isotype: N.Z., North Auckland L.D., Ahipara, on rocks at coastline, Jan. 1931, *H.B. Matthews s.n.*, CHR 500984!

**Plants** forming turves, dark green or dark brown below, apparently sometimes yellow-green above (living material not seen). **Stems** to 18 mm, much branched, often with a distinctly zig-zag appearance, the branches often arising from old perichaetia in clusters of 2–4. **Leaves** of lower stem triangular-lanceolate, appearing rigid, c. 1.0–1.2 × 0.25–0.3 mm, erect-spreading; **mid laminal cells** firm-walled and oblong-rectangular, smooth, c. 24–39 × 9–12 µm, those in the basal corners gradually becoming short-rectangular or quadrate, c. 10–15 × 12 µm and extending up the leaf margins in 2–4 rows; **costa** stout, occupying 1/3 or more of leaf base, percurrent or ± filling the upper 1/3 of leaf and short excurrent, in cross-section lacking stereids or other differentiated cells; **leaves of innovations** sometimes longer (c. 1.4–1.5 mm) and more wide-spreading.

**Perichaetial leaves** c. 1.2 × 0.25 mm, triangular-lanceolate or lanceolate from a ± ovate base, plane or weakly recurved, entire. **Perigonia** not seen. **Capsules** unknown.

**Illustrations:** Plate 1. Snider 1975a, figs 200–205, 347.

**Distribution:** NI: N Auckland (Ahipara, Moturoa I. and associated Black Rocks); Ch (Ōtauwae Covenant).

Endemic.

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**Habitat:** On coastal rocks, especially basalt. At Black Rocks the best documented collections came from damp or waterlogged depressions on an exposed basalt platform on the Northwest Crater Rim (one of the Black Rocks), where it was associated with *Campylopus introflexus* and *Ceratodon purpureus* and the flowering plants *Disphyma australe* and *Astelia banksii*. At the Ōtauwae Covenant site this species (*fide* P.J. de Lange) was a “dark brown wispy moss” growing “extremely exposed to southerly storms”. It grew “amongst basalt cobbles, saprolite, and on the margins of semi-permanent pools within [the] drip zone [of a] steep overhanging basalt bluff”.

**Notes:** *Archidium elatum* is one of least known mosses in the New Zealand flora. The type collection from Ahipara was made in 1931. At Ahipara “most of the likely habitat is now invaded by kikuyu grass [*Pennisetum clandestinum*] and it is possible [that *A. elatum*] is no longer present at the type locality” (J.E. Beever, pers. comm., Oct. 1994). The Moturoa Is and Northwest Crater Rim collections from the Bay of Islands were made in 1990 by J.E. Beever and R. Beever (four collections in total). A single, well-documented collection from the Ōtauwae Covenant (“toward Ōtauwae Point”) on Chatham I. was made by P.J. de Lange in 2006. While it is impossible to know whether *A. elatum* was more common in the past, reduction in its range and habitat since its original discovery is likely.

*Archidium elatum* is listed as a “nationally vulnerable” and “data poor” species in the 2010 edition of the N.Z. Department of Conservation’s bryophyte species threat classification ranking (Glenny et al. 2011).

**Recognition:** Unfortunately known only from non-fruiting material, this species is exceedingly inconspicuous and possibly overlooked at other coastal sites. It is best recognised by its formation of numerous innovative branches, the zig-zag appearance of its stems, its ± wide-spreading, strongly costate leaves, and its occurrence on coastal rocks. Under the microscope, the numerous short-rectangular or quadrate cells at the basal margins, extending some distance up the lower margins, are among its most distinctive features. Strips of stem cortical cells typically adhere to the costal base when leaves are removed. The large and thin-walled central cells of the stem cross-section also facilitate its recognition. In one of the Moturoa specimens (R. Beever, 23 Jan. 1990, CHR 462057) stem cross-sections appear to show a weak tendency to form a central strand, but this does not appear to be the case in other collections.

In the type collection the leaves of the innovations are longer (c. 1.4–1.5 mm) and more wide-spreading than those of the lower stems, while in the Moturoa, Crater Rim, and Ōtauwae collections the “innovations” are not associated with perichaetia and have leaves equal to or somewhat smaller than the lower stems.

**Etymology:** The epithet means tall and presumably refers to the tall stature of this species relative to its congeners.

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# Conventions

## Abbreviations and Latin terms

Abbreviations	Meaning
A	Auckland Islands
A.C.T.	Australian Capital Territory
<i>aff.</i>	allied to ( <i>affinis</i> )
agg.	aggregate
Ant	Antipodes Islands
a.s.l.	above sea level
<i>auct.</i>	of authors ( <i>auctorum</i> )
B	Bounty Islands
C	Campbell Island
c.	about ( <i>circa</i> )
cf.	compare with, possibly the species named ( <i>confer</i> )
<i>c.fr.</i>	with fruit ( <i>cum fructibus</i> )
Ch	Chatham Islands
<i>comb. nov.</i>	new combination ( <i>combinatio nova</i> )
D'U	D'Urville Island
et al.	and others ( <i>et alia</i> )
et seq.	and following pages ( <i>et sequentia</i> )
ex	from
fasc.	fascicle
<i>fide</i>	according to
GB	Great Barrier Island
HC	Hen and Chicken Islands
Herb.	Herbarium
hom. illeg.	illegitimate homonym
I.	Island
ibid.	in the same place ( <i>ibidem</i> )
incl.	including
<i>in herb.</i>	in herbarium ( <i>in herbario</i> )
<i>in litt.</i>	in a letter ( <i>in litteris</i> )
<i>inter alia</i>	among other things ( <i>inter alia</i> )
Is	Islands
K	Kermadec Islands
KA	Kapiti Island
LB	Little Barrier Island
L.D.	Land District or Districts
<i>leg.</i>	collected by ( <i>legit</i> )
loc. cit.	in the same place ( <i>loco citato</i> )
l:w	length:width ratio
M	Macquarie Island
Mt	Mount
<i>nec</i>	nor
NI	North Island
no.	number
nom. cons.	conserved name ( <i>nomen conservandum</i> )
nom. dub.	name of doubtful application ( <i>nomen dubium</i> )
nom. illeg.	name contrary to the rules of nomenclature ( <i>nomen illegitimum</i> )
nom. inval.	invalid name ( <i>nomen invalidum</i> )
nom. nud.	name published without a description ( <i>nomen nudum</i> )
<i>non</i>	not
N.P.	National Park
N.S.W.	New South Wales
N.T.	Northern Territory (Australia)
N.Z.	New Zealand
op. cit.	in the work cited ( <i>opere citato</i> )
pers. comm.	personal communication

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PK	Poor Knights Islands
P.N.G.	Papua New Guinea
<i>pro parte</i>	in part
Qld	Queensland
q.v.	which see ( <i>quod vide</i> )
RT	Rangitoto Island
S.A.	South Australia
<i>s.coll.</i>	without collector ( <i>sine collectore</i> )
<i>s.d.</i>	without date ( <i>sine die</i> )
sect.	section
SEM	scanning electron microscope/microscopy
<i>sensu</i>	in the taxonomic sense of
SI	South Island
<i>sic</i>	as written
<i>s.l.</i>	in a broad taxonomic sense ( <i>sensu lato</i> )
<i>s.loc.</i>	without location ( <i>sine locus</i> )
Sn	Snares Islands
<i>s.n.</i>	without a collection number ( <i>sine numero</i> )
Sol	Solander Island
sp.	species (singular)
spp.	species (plural)
<i>s.s.</i>	in a narrow taxonomic sense ( <i>sensu stricto</i> )
St	Stewart Island
<i>stat. nov.</i>	new status ( <i>status novus</i> )
subg.	subgenus
subsect.	subsection
subsp.	subspecies (singular)
subsp.	subspecies (plural)
Tas.	Tasmania
TK	Three Kings Islands
U.S.A.	United States of America
var.	variety
vars	varieties
Vic.	Victoria
viz.	that is to say ( <i>videlicet</i> )
vs	versus
W.A.	Western Australia

## Symbols

Symbol	Meaning
µm	micrometre
♂	male
♀	female
±	more or less, somewhat
x	times
>	greater than
<	less than
≥	greater than or equal to
≤	less than or equal to
=	heterotypic synonym of the preceding name
≡	homotypic synonym of the preceding name
!	confirmed by the author
*	in distribution statements, indicates non-N.Z. localities from which material has been confirmed by the author

Technical terms conform to Malcolm, B.; Malcolm, N. 2006: *Mosses and other Bryophytes: an Illustrated Glossary*. Edition 2. Micro-Optics Press, Nelson.

Abbreviations for Herbaria follow the standard abbreviations listed in *Index Herbariorum*.

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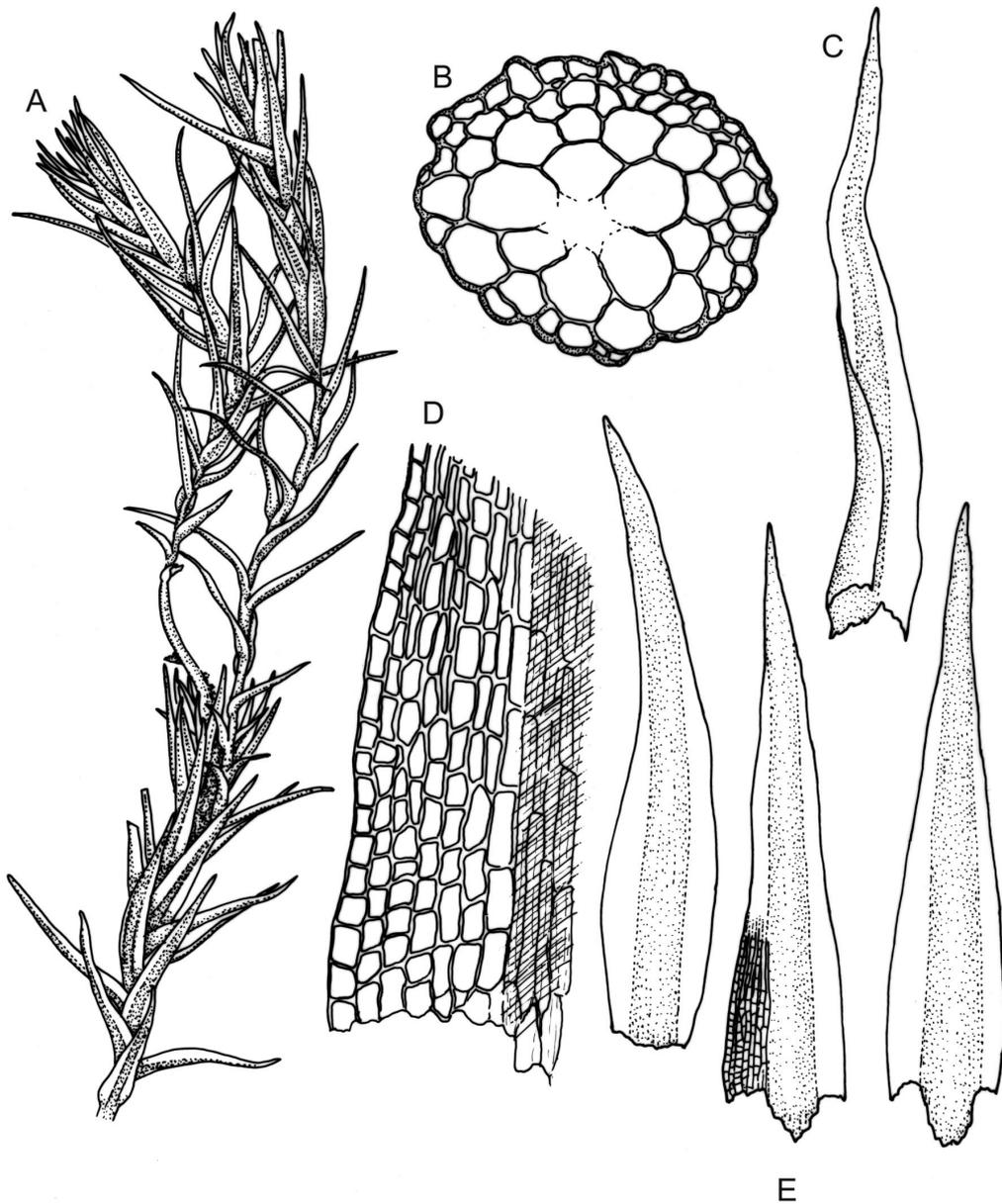
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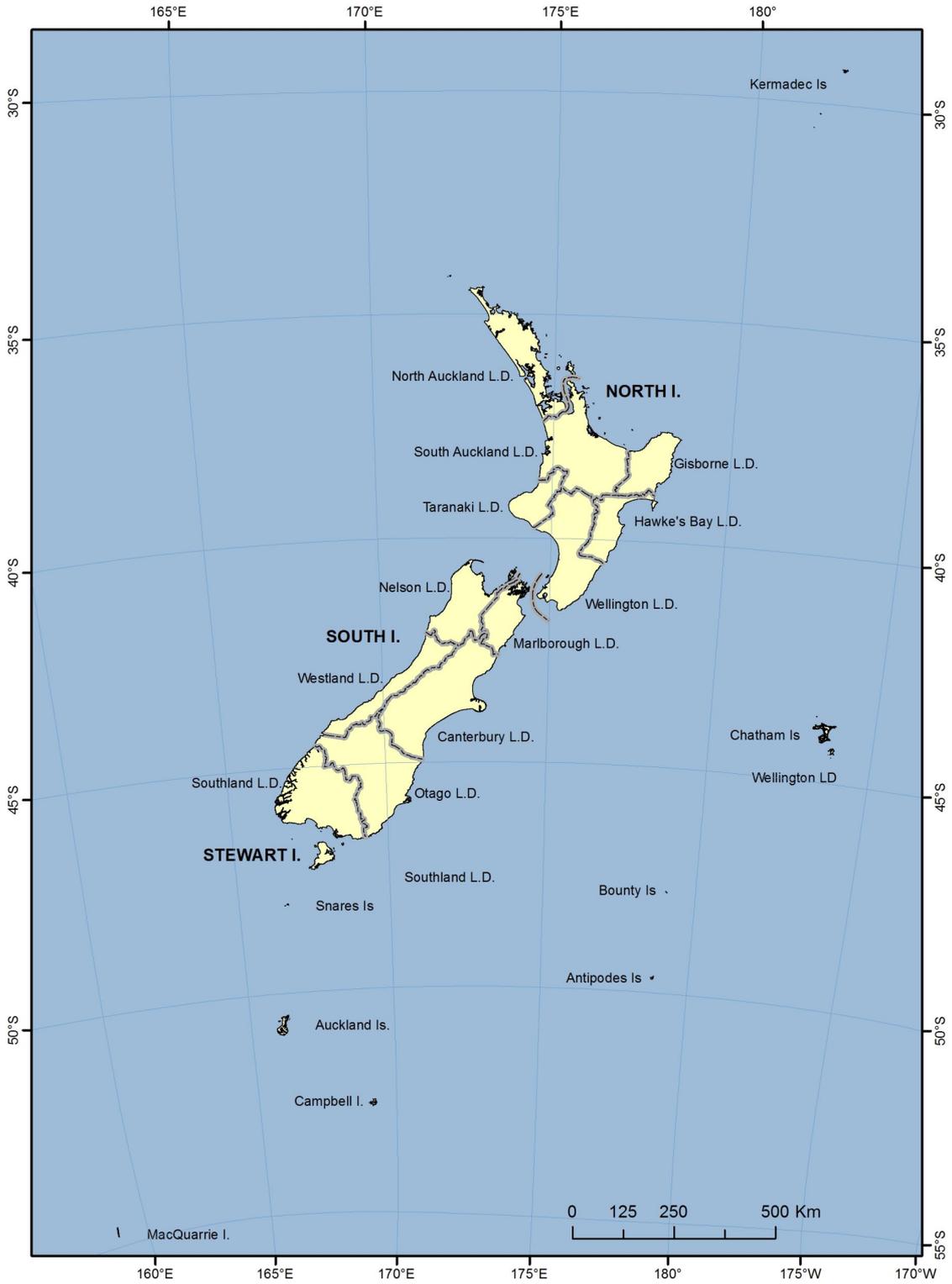
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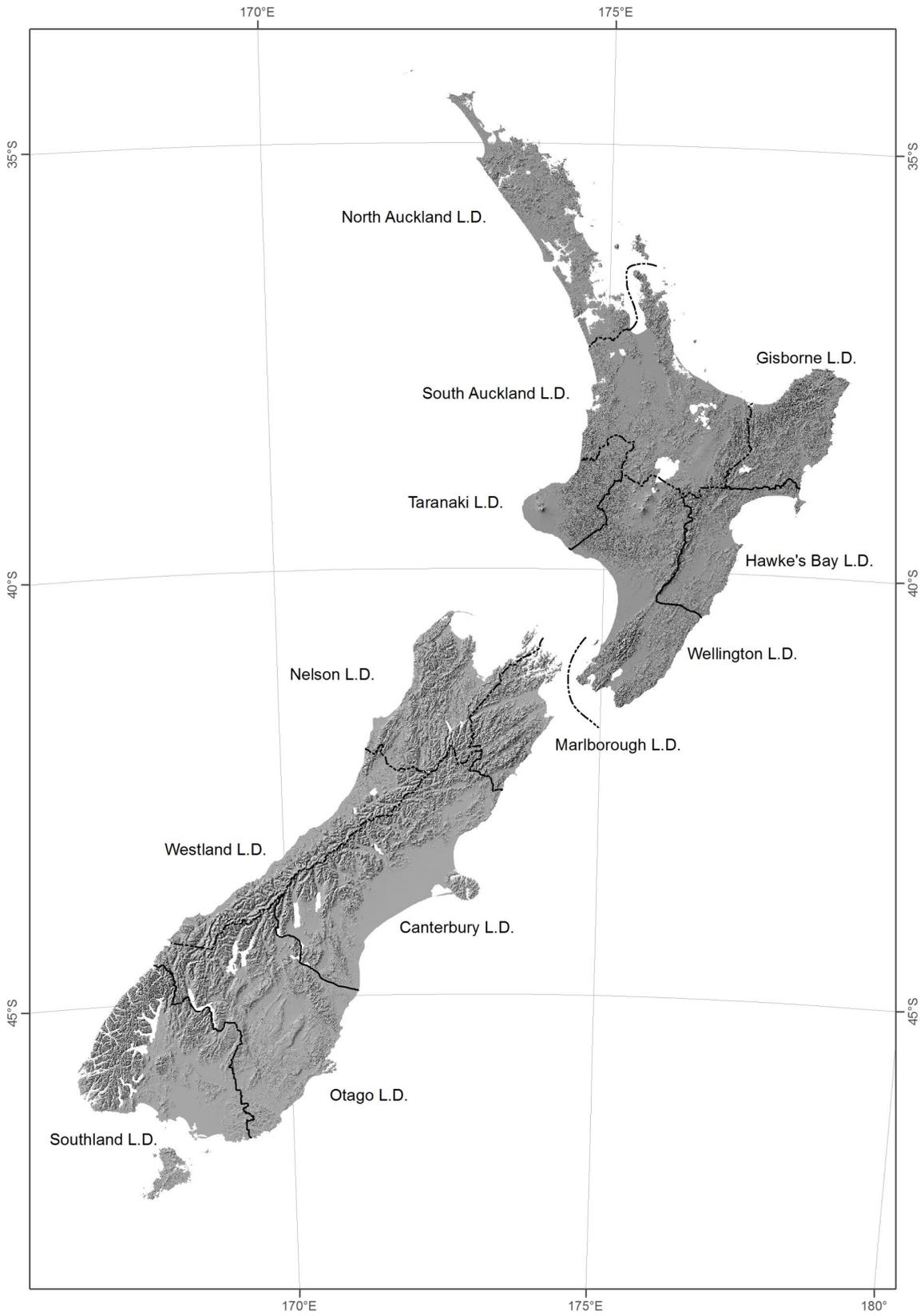
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**Plate 1: Archidium. A-E: *A. elatum*.** A, habit. B, stem cross-section. C, leaf. D, basal laminal cells from costa to margin. E, three perichaetial leaves. A, C-E drawn from isotype, *H.B. Matthews s.n.*, Jan. 1931, CHR 500984; B drawn from *R.E. Beever s.n.*, 28 Aug. 1990, CHR 620816.



**Map 1:** Map of New Zealand and offshore islands showing Land District boundaries



**Map 2:** Map of main islands of New Zealand showing Land District boundaries

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## Index

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

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## Image Information

**Image**  
Plate 1  
Map 1  
Map 2

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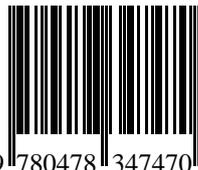
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