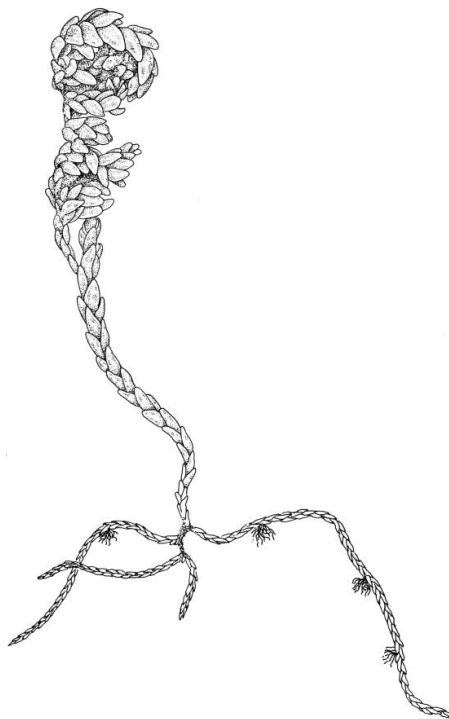




FLORA OF NEW ZEALAND
MOSSES

LEPTODONTACEAE



A.J. FIFE

Fascicle 22 – AUGUST 2015

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Cover image: *Leptodon smithii*, habit, dry. Drawn by Rebecca Wagstaff from A.J. Fife 8699, CHR 460815, and K.W. Allison 1438, CHR 611386.

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Introduction

The Leptodontaceae are represented in New Zealand by a single genus and only one species, although a second genus occurs in eastern Australia. Our one species, *Leptodon smithii*, has an English type and is named after the British botanist J.E. Smith, the founder of the Linnean Society. It is a very distinctive plant, with erect and pinnately branched secondary stems that are strongly inwardly curled when dry; this feature allows its ready recognition in the field. It grows on trunks of many tree species but is absent from species of southern beech; it also occurs on drier rock outcrops. The N.Z. distribution of *L. smithii* is strongly biased toward drier parts of the country but it does occur on limestone outcrops on the West Coast. This arguably provides an example of a predominantly epiphytic taxon occurring on rock when it is near its ecological and environmental limit.

Typification

The following lectotypification is made in accordance with the International Code of Nomenclature for Plants, Algae and Fungi.

***Leptodon novae-seelandiae* Müll.Hal., Hedwigia 41: 131 (1902)**

Lectotype (designated here): N.Z., Canterbury, Waimakariri Gorge, *T.W.N. Beckett 384*, CHR 267909!
Isolectotype (designated here): CHR 267910!

Leptodontaceae

Elements in the following description are taken from Buck (1998).

Plants medium-sized, dark or golden-green, epiphytic or rarely on rock, with secondary stems erect and arising from a stoloniferous primary stem. **Primary stems** creeping and inconspicuous, with reduced and scale-like leaves. **Secondary stems** erect, often curved when dry, irregularly, pinnately, or bipinnately branched, in cross-section with small and thick-walled cortical cells and no central strand. **Leaves of secondary stems and branches** similar, appressed when dry, spreading when moist, broadly ovate to lanceolate, rounded to short-acuminate at apex, sometimes asymmetric, concave, not or loosely complanate, often weakly plicate, decurrent, entire throughout or crenulate to serrulate above; **upper laminal cells** oval, rhombic-elliptic, or rhombic, firm-walled, smooth or unipapillose, similar or sometimes more elongate and \pm porose in lower leaf; **alar cells** numerous, mostly oblate or quadrate, forming a large and opaque group. **Costa** single, strong or weak, not extending to leaf apex. **Paraphyllia** lacking or foliose. **Pseudoparaphyllia** foliose.

Mostly dioicous. **Perichaetia** large and conspicuous. **Setae** short, yellow- or red-brown; vaginula densely covered with golden filaments; **capsules** exserted or immersed, erect, symmetric, ellipsoid to cylindrical; **annulus** none; **exothecial cells** thin- or firm-walled, mostly oblong or short-rectangular, not collenchymatous; **stomata** few; **operculum** conic-rostrate. **Peristome** double; **exostome teeth** linear-lanceolate to linear-triangular, usually pale, variably ornamented, with a straight median line on the outer surface, not or scarcely trabeculate on inner surface; **endostome** reduced or apparently absent. **Calyptra** cucullate, hairy. **Spores** ellipsoid or spherical, finely papillose, sometimes variable in size.

Taxonomy: Goffinet et al. (2009) included four genera in this family. Of these, only the genus *Leptodon* occurs in N.Z. A second genus, *Forsstroemia*, occurs as a rarity in eastern Australia. *Forsstroemia* differs from *Leptodon* by having secondary stems that are not curved when dry, acuminate leaf apices, and by its lack of paraphyllia. *Leptodon* was placed by Brotherus (1925) in a subfamily Leptodontoideae within the family Neckeraceae.

Alsia, of western North America, and *Taiwanobryum*, of Asia, are also included in the Leptodontaceae by Goffinet et al. (2009). Some of these genera (notably *Forsstroemia* and *Alsia*) have been placed in the Leucondontaceae by other authors (Bowers & Crum 1994, p. 667).

According to Buck (1998, p. 155) “the Leptodontaceae derive meaning from more or less frondose secondary stems that are often curved when dry, unicostate leaves with firm- to thick-walled cells, and numerous alar cells, hairy vaginulae, shortly exserted capsules, obliquely rostrate opercula, pale exostome teeth, greatly reduced endostome, and hairy cucullate calyptrae.” The family is accepted in the systematic arrangement utilised by the Flora of Australia (2006) and in Smith’s (2004) British Flora.

Leptodon D.Mohr, *Observ. Bot.*, 27 (1803)

Type taxon: *Leptodon smithii* (Hedw.) F.Weber & D.Mohr

The description of the N.Z. species applies to the genus.

Taxonomy: A small genus of fewer than five species worldwide. *Leptodon smithii* accounts for all but a minor fraction of the world distribution. The presence of paraphyllia and the absence of endostome segments distinguish this species from members of the Neckeraceae in N.Z. (excluding *Alleniella hymenodonta*, which has paraphyllia) and are used by Brotherus (1925, p. 178) to characterise the subfamily Leptodontoideae within his concept of the Neckeraceae.

Etymology: The generic name means “narrow-toothed”, which probably refers to the linear-lanceolate exostome teeth.

Leptodon smithii (Hedw.) F.Weber & D.Mohr, *Index Mus. Pl. Crypt.*, 2 (1803)

\equiv *Hypnum smithii* Hedw., *Sp. Musc. Frond.*, 264 (1801)

Type: England. Not seen.

= *Leptodon novae-seelandiae* Müll.Hal., *Hedwigia* 41: 131 (1902)

Lectotype: N.Z., Canterbury, Waimakariri Gorge, *T.W.N. Beckett* 384, CHR 267909!

Isolectotype: CHR 267910!

Plants dark green, with secondary stems erect, strongly inrolled when dry, and arising from a stoloniferous primary stem. **Primary stems** pale brown, irregularly branched, with scale-like leaves and scattered fascicles of smooth brown rhizoids, in cross-section with 3–4 layers of thick-walled

cortical cells and no central strand. **Secondary stems** erect, once or twice irregularly to subpinnately branched, 10–25 mm (rarely to c. 40 mm in shaded forms), strongly curled upwards and inrolled when dry, curved when moist, with branches to c. 8 mm, simple or subpinnately branched, occasionally with few to many attenuate and microphyllous branches. **Leaves of secondary stems and branches** variable in size but otherwise similar, mostly $(0.42\text{--}0.48\text{--}0.70\text{--}0.90) \times (0.21\text{--}0.30\text{--}0.48\text{--}0.60)$ mm and c. 3:2 l:w (excluding those of attenuate branches), appressed when dry, spreading when moist, loosely complanate, broadly ovate or elliptic, mostly asymmetric, broadly rounded at apex, cordate or weakly decurrent, usually slightly auriculate on one side, concave and often with a single plica on each side of costa, with margins entire or weakly crenulate near apex and inrolled in lower half; **upper laminal cells** rhombic-elliptic, mostly $9\text{--}15 \times 5\text{--}7$ μm , firm-walled, smooth, somewhat smaller and more quadrate near margins, scarcely altered in lower leaf; **alar cells** forming a large but weakly defined group of small, \pm opaque, and quadrate to \pm oblate cells, sometimes with c. 10–20 slightly enlarged and irregular cells in extreme angles. **Costa** single, stout, unbranched or with a small lateral spur, extending c. $\frac{3}{4}$ the leaf length. **Paraphyllia** linear or strap-shaped, mostly 2–4 cells wide, c. 100–200 μm long, some with lateral teeth or appendages. **Pseudoparaphyllia** not seen. **Brood bodies** and other **asexual propagules** absent.

Dioicous. **Perichaetia** scattered on secondary stems and branches, with leaves c. 1 mm long at archegonial maturity, weakly costate, lanceolate and tubular, after fertilisation becoming greatly elongate (to c. 3 mm) and sheathing the seta base. **Perigonia** scattered on secondary stems, c. 0.9 mm long, with inner bracts more elongate than outer, tubulose, ecostate, enclosing 2–3 antheridia and few filiform paraphyses. **Setae** short (c. 3 mm including vaginula), yellow-brown; **vaginula** densely covered with very long (c. 2.5 mm) golden filaments that extend to or slightly beyond the capsule base; **capsules** erect or inclined, short-exserted, ellipsoid, c. 2 mm, yellow-brown; **exothecial cells** rather thin-walled, mostly oblong, several rows smaller and rounded at rim; **stomata** few and difficult to observe, restricted to extreme capsule base; **operculum** obliquely rostrate from a conic base, 0.8 mm. **Exostome teeth** linear-lanceolate, papillose throughout, c. 300 μm ; **endostome** rudimentary. **Calyptra** cucullate, c. 2 mm, with numerous golden hairs at base and usually extending beyond apex. **Spores** ellipsoid or spherical, variable in size in a single capsule, mostly 12–30 μm , coarsely but lowly insulate, thick-walled.

Illustrations: Plate 1. Brotherus 1925, fig. 566; Magill & van Rooy 1998, fig 163, 12–24; Smith 2004, fig. 237, 1–3.

Distribution: NI: N Auckland (Whangārei, Woodhill), including offshore islands (GB), S Auckland, Gisborne, Hawke's Bay, Wellington; SI: Nelson, Marlborough, Canterbury, Otago, Southland; Ch (Tennant's Lake, Pitt I.). There are no confirmed records from Taranaki L.D. and the only collections from the West Coast are from limestone outcrops in/near Punakaikī and from coastal divaricating shrubs at Karamea (both localities in Nelson L.D.). In the Mt Arthur-Cobb Valley area (Nelson L.D.) this species is restricted to marble outcrops. It is more frequent in the drier portions of both main islands.

Anomalous. Australia*, Africa*. Recorded from southern and western Europe including Britain by Smith (2004, p. 719). Recorded also from south-west Asia, several regions of Africa, southern South America, and Juan Fernández Is by Magill & van Rooy (1998) and North America by Anderson et al. (1990).

Habitat: Occurring on a wide range of tree species, excluding species of southern beech (although it sometimes occurs in southern beech-dominated forests). Also on dry or mesic rock (limestone, marble, schist, or basalt). Recorded host species include *Carpodetus serratus*, *Coprosma areolata*, *Corynocarpus laevigatus*, *Dysoxylum spectabile*, *Elaeocarpus hookerianus*, *Griselinia littoralis*, *Hoheria angustifolia*, *Leptospermum scoparium*, *Lophomyrtus obcordata*, *Melicytus ramiflorus*, *Nestegis cunninghamii*, *Pennantia corymbosa*, *Pittosporum eugenioides*, *Pseudopanax arboreus*, *Sophora* sp., *Veronica elliptica*, *Vitex lucens*, and *Weinmannia racemosa* as well as the gymnosperms *Dacrycarpus dacrydioides*, *Podocarpus totara*, and *Prumnopitys ferruginea*. Epiphytic associates include the mosses *Fabronia australis*, *Macromitrium retusum*, *Neckera laevigata*, *Orthorrhynchium elegans*, *Syntrichia papillosa*, and *Weymouthia cochlearifolia*, the hepatics *Porella elegantula* and *Frullania* spp., and gelatinous lichens. Epilithic associates include *Austrohondaella limata*, *Fallaciella gracilis*, *Lembophyllum divulsum*, *Palamocladium sericeum*, *Schistidium apocarpum* s.l., *Macromitrium retusum*, and *Syntrichia serrata*, as well as *Frullania* spp. and gelatinous lichens. On North I. ranging from near sea level to c. 520 m elevation (Sentry Box Scenic Reserve, Hawke's Bay L.D.) and on South I. from near sea level (Punakaikī, Nelson L.D.) to 1360 m elevation (Black Birch Range, Marlborough L.D.).

Notes: Material of *L. smithii* from N.Z. is generally more compact than both European and east African collections, but compares well to them in other respects.

The strongly inrolled dry branches of this species are highly distinctive. Stout but short costae, broadly ovate and apically rounded leaves, and epiphytic or epilithic habitat also facilitate the recognition of *L. smithii* in the field. Under the microscope, the presence of a rudimentary endostome readily distinguishes it from members of the Neckeraceae, the family where it was placed by Sainsbury (1955). Among the N.Z. representatives of the Neckeraceae, only *Alleniella hymenodonta* (Müll.Hal.) S.Olsson, Enroth & D.Quandt (*Neckera hymenodonta* Müll.Hal.) has paraphyllia.

The type of *L. novae-seelandiae* bears a large number of microphyllous and attenuate branches (with leaves mostly c. 0.30 mm or shorter and c. 3:2 l:w and with reduced paraphyllia), but otherwise is not distinctive. It is not deserving of taxonomic separation. The microphyllous state of this collection is perhaps related to the deposition of wind-blown sand on the colony, which Beckett (*in herb.*) described as "1 to 1½ inch" deep. However, other specimens, (e.g., *D. Glenni* s.n. from Port Levy, Canterbury L.D., CHR 438699 and *W. Martin* 251.15 from Waihopai River, Marlborough L.D., CHR 536755), exhibit a similar tendency to produce microphyllous branches. In addition to depositional habitats, microphyllous branches appear to be associated with strongly shaded conditions.

Populations of *L. smithii* producing microphyllous branches resemble the rare epiphyte *Scorpiurium cucullatum*. The branch leaves of well-developed *L. smithii* are broader in relation to their length (c. 3:2 l:w, excluding those of attenuate branches) than the secondary stem and branch leaves of *S. cucullatum* (c. 2:1 l:w). Even in the microphyllous branched forms of *Leptodon*, the leaves are more rounded apically than the broadly acute or obtuse apices of *S. cucullatum* and mid laminal cells are less rhombic and shorter in the *Leptodon* (<15 µm vs c. 24–30 µm). The strap-shaped paraphyllia of *L. smithii* are present even on microphyllous branches while they are lacking in *Scorpiurium*.

Etymology: The species epithet commemorates the British botanist James Edward Smith (1759–1828), who purchased the Linnean herbarium and founded the Linnean Society.

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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

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
×	times; dimensions connected by × refer to length times width
>	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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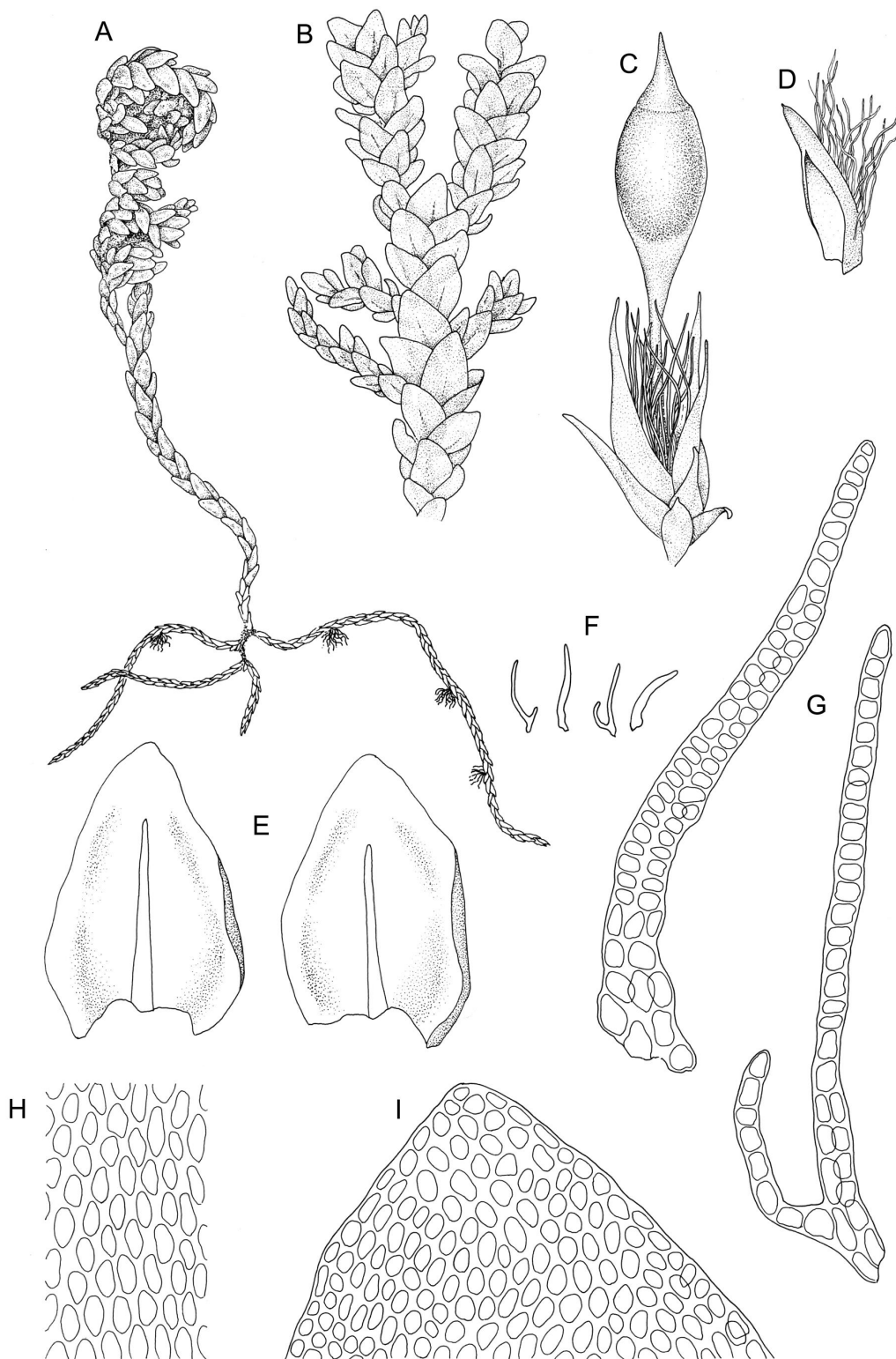
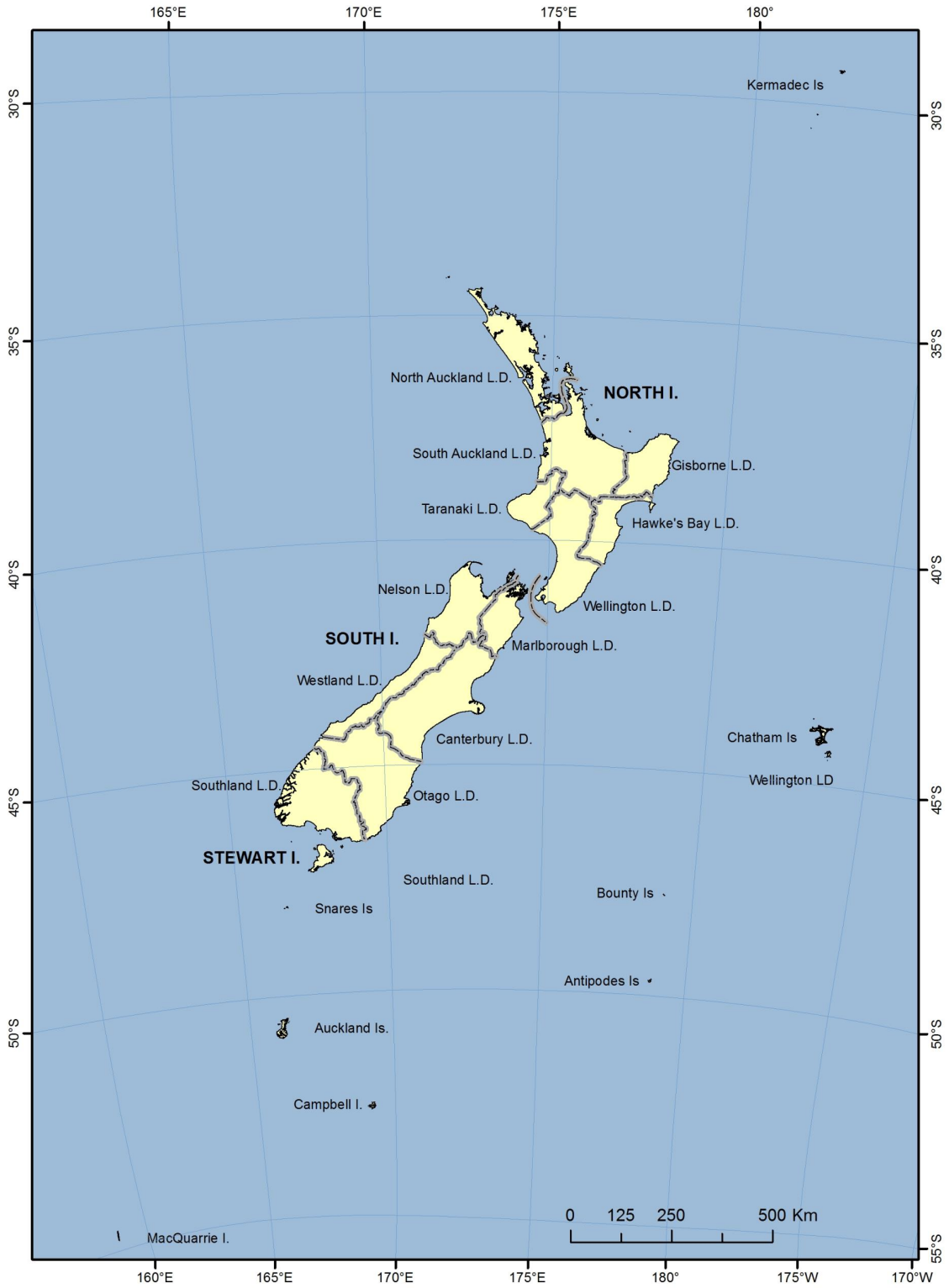
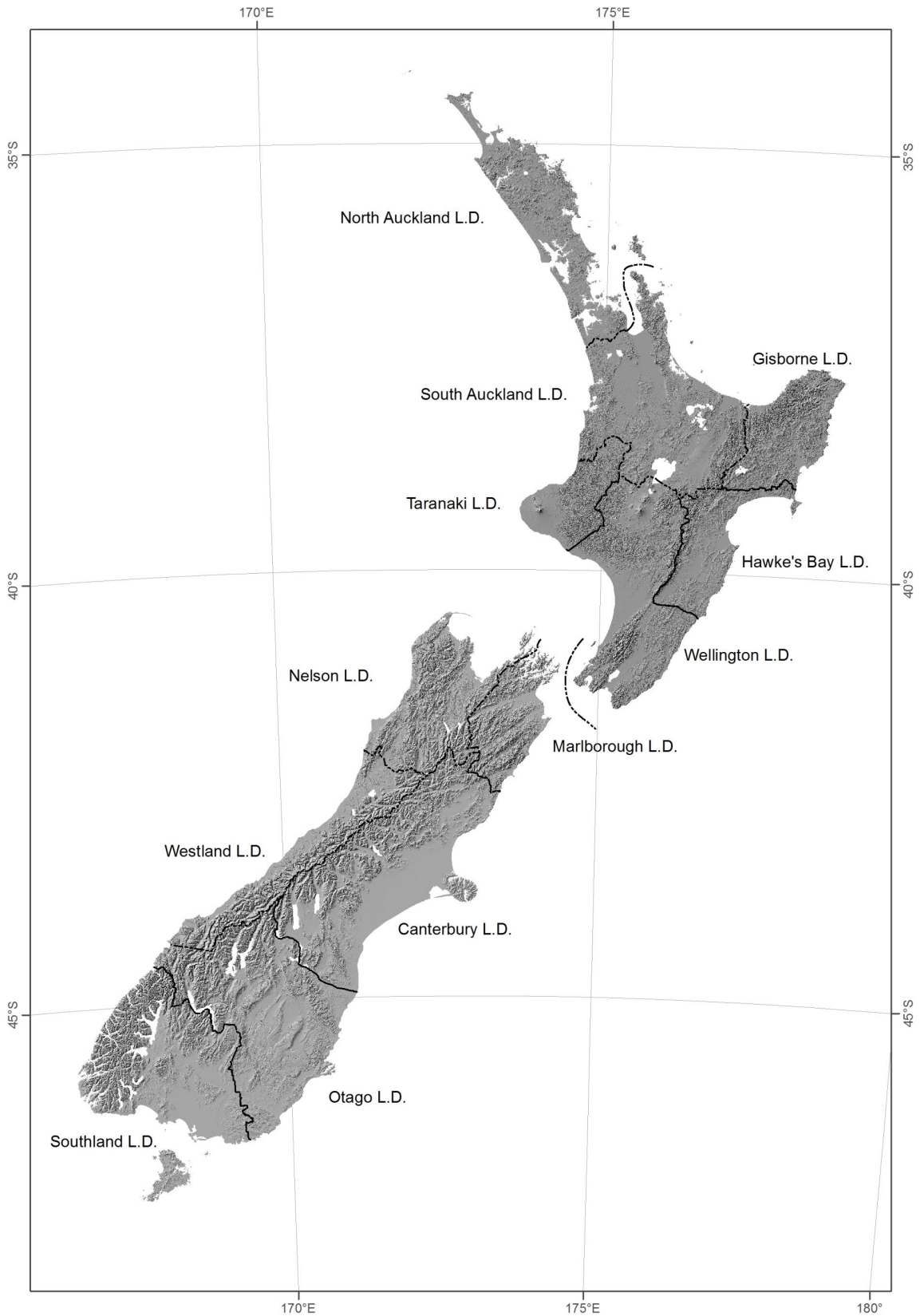


Plate 1: *Leptodon*. A–I: *L. smithii*. A, habit, dry. B, branch detail. C, perichaetium with capsule. D, calyptra. E, branch leaves. F, paraphyllia. G, paraphyllia detail. H, mid laminal cells. I, leaf apex. Drawn from A.J. Fife 8699, CHR 460815, and K.W. Allison 1438, CHR 611386.



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

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2

Leptodontaceae **2**

Image Information

Image
Plate 1
Map 1
Map 2

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