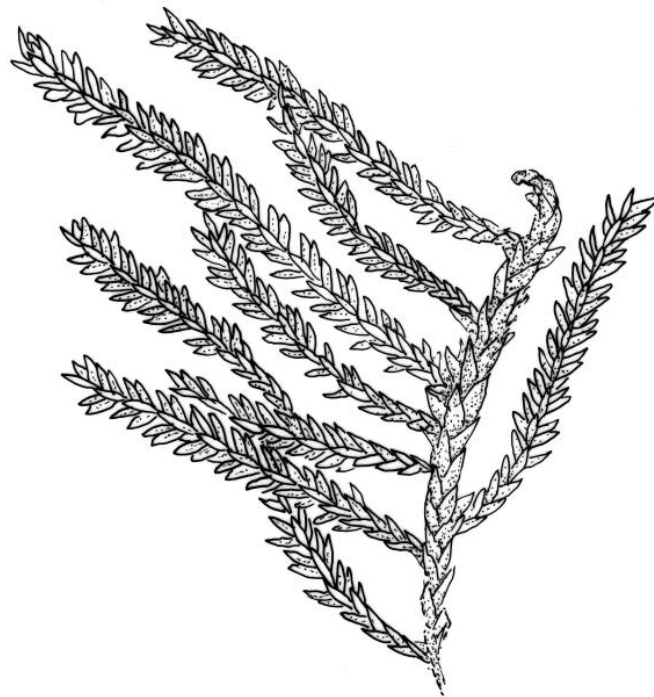




FLORA OF NEW ZEALAND
MOSSES

ANOMODONTACEAE



A.J. FIFE

Fascicle 9 – SEPTEMBER 2014

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Cover image: *Haplohymenium pseudotriste*, habit. Drawn by Rebecca Wagstaff from *J.E. Beaver 20-26*, CHR 104583.

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Introduction

The Anomodontaceae are historically confounded with the hypnaceous families Thuidiaceae and Leskeaceae, but differentiated from them in modern Floras by having, among other features, a non-hypnaceous peristome, stolons, and a lack of paraphyllia. The best known genus, *Anomodon*, is widely distributed in the northern hemisphere, and extends into tropical regions. The family is represented in New Zealand by a single genus and species, *Haplohymenium pseudotriste* which grows as an epiphyte on smooth-barked tree species, and is largely distributed on the North Island. Its delicacy and creeping, filiform habit differentiate this relatively rare species from all but a few N.Z. pleurocarps.

The genus *Anomodon* has been historically recorded from N.Z. because of occurrence here of the Tasmanian *A. tasmanicus*. That species has been shown convincingly to belong to the Pottiaceae; it is treated elsewhere in this Flora as a *Triquetrella*.

Anomodontaceae

Elements in the following description are taken from Noguchi (1987–1994) and Crum & Buck (1994).

Plants small to rather large, mostly yellow-, olive-, or glaucous-green, mostly forming interwoven mats on bark. **Primary stems**, when distinguishable, filiform and creeping, often stoloniferous, irregularly branched, with leaves reduced or none. **Secondary stems** spreading or ascendant, often curled when dry, lacking a central strand. **Leaves** erect or curved inwards when dry, often imbricate, spreading when moist, lingulate, ovate-lanceolate, or lanceolate, often from a broader and sometimes clasping base, rounded or less often acute at apex, occasionally fragile, entire or toothed; **mid laminal cells** mostly small, ± hexagonal or quadrate, usually pluripapillose, rarely unipapillose or smooth; **alar cells** not or poorly differentiated. **Costa** single and variable in length or rarely short and double. **Paraphyllia** lacking.

Dioicous. **Perichaetial leaves** moderately differentiated. **Setae** elongate, smooth; **capsules** erect, oblong, cylindric, rarely subglobose; **stomata** lacking or few; **operculum** rostrate or conic. **Peristome** double; **exostome teeth** pale, ± lanceolate, sometimes perforate along median line, coarsely papillose throughout or rarely cross-striolate; **endostome** usually reduced. **Calyptra** cucullate, smooth or sparsely hairy.

Taxonomy: In its modern sense (*sensu* Goffinet et al. 2009), the Anomodontaceae are distinguished from often confounded families (especially Thuidiaceae and Leskeaceae) partly by having erect capsules with a non-hypnaceous peristome and a usually reduced endostome. Members of the Anomodontaceae also lack paraphyllia. *Anomodon*, of the northern hemisphere, is the largest genus in the family, which is represented in N.Z. only by *Haplohymenium pseudotriste*.

By contrast to the Anomodontaceae, members of the Thuidiaceae typically have curved capsules with a hypnoid peristome (including a well-developed endostome) and generally numerous paraphyllia with papillose cells. Members of the Leskeaceae (*sensu* Goffinet et al. 2009) have curved or erect capsules, a variable exostome (with reduced teeth associated with epiphytic habitats), mostly reduced endostomes, and paraphyllia with smooth cells.

The Anomodontaceae were treated as a subfamily of a broadly defined Thuidiaceae by Brotherus (1925, p. 311). The Anomodontaceae, Leskeaceae, and Thuidiaceae (defined similarly to the concepts employed by Goffinet et al. 2009) were discussed and given meaning in treatments for the Mexican flora by Crum & Buck (1994). In their discussion of the Anomodontaceae they differentiated between stoloniferous (and nearly leafless) primary stems and secondary stems. Crum & Buck make this distinction mostly in respect to *Anomodon*, where the plants are more robust than in *Haplohymenium*.

An alternative view (not adopted here) of the affinities of *Haplohymenium* is provided by Noguchi (1987–1994) who placed it in a broadly-defined Leskeaceae, as did Crum & Anderson (1981).

Excluded Taxa: The genus *Anomodon* has arguably been recorded from N.Z., but the sequence of records is very confusing. Brotherus (1900) described *Anomodon tasmanicus* based on a Weymouth collection from Knocklofty in Tasmania. Subsequently, Dixon & Sainsbury (1933) described *Triquetrella curvifolia* from two sterile syntypes from Hawke's Bay L.D. Some years later, Sainsbury (1955, p. 474) stated his opinion that *A. tasmanicus* and *T. curvifolia* were conspecific and that the single species was "probably an *Anomodon*". Granzow-de la Cerda (1989) re-examined all the relevant type specimens and confirmed that *A. tasmanicus* Broth. and *T. curvifolia* Dixon & Sainsbury were heterotypic synonyms. He located terminal perichaetial buds in Tasmanian material (which preclude its retention in *Anomodon*) and made the required combination *Triquetrella tasmanica* (Broth.) Granzow-de la Cerda. J.E. Beever (pers. comm.) has confirmed this observation using more recently collected N.Z. material. Accordingly, the species in question is treated by us in *Triquetrella*, in Pottiaceae, as *T. tasmanica*.

***Haplohymenium* Dozy & Molk., *Musci Frond. Archip. Ind.*, 127 (1846) nom. cons.**

Type taxon: *Haplohymenium sieboldii* (Dozy & Molk.) Dozy & Molk.

Elements in the following description are taken from Noguchi (1987–1994).

Plants small, filiform, on tree trunks or occasionally on rock. **Primary stems** inconspicuous, creeping, and nearly leafless. **Secondary stems** irregularly or sub-pinnately branched, lacking a central strand. **Stem leaves** appressed and imbricate when dry, erect- or widely spreading when moist, ovate-lanceolate, rounded at apex, fragile or not, crenate at margins, costate. **Branch leaves** either lingulate or lanceolate from an ovate base or ovate-lanceolate, obtuse, acute, or rarely piliferous at apex; **margins** crenulate due to inflated cells, occasionally dentate above; **mid laminal cells** quadrate- or rounded-hexagonal, thin-walled, sometimes obscure in surface view, with several or rarely one papillae over the lumen; **juxtacostal cells** smooth, more elongate, and thicker-walled; **alar cells** not differentiated. **Costa** variable in length but mostly to mid leaf or beyond, often protruding weakly on abaxial surface, mostly smooth, pellucid. **Paraphyllia** lacking.

Dioicous. Perichaetia with numerous, filiform, and conspicuous paraphyses; **inner perichaetial leaves** oblong-ovate and narrowly attenuate. **Perigonia** gemmiform, scattered on stems and branches. **Setae** elongate and smooth; **capsules** erect, oblong to subglobose; **mouth** transverse and small; **stomata** lacking; **annulus** of large cells; **operculum** rostrate. **Peristome** double; **exostome teeth** linear-lanceolate, often split along median line, coarsely papillose above, pellucid; **endostome** reduced, lacking segments and cilia. **Calyptra** cucullate, lobed, and sparsely hairy.

Taxonomy: *Haplohymenium* is a modest-sized genus best developed in eastern Asia. A treatment of the five species occurring in Japan (Noguchi 1987–1994) is helpful, and draws on Noguchi's earlier generic revision (not accessed while writing this treatment). *Haplohymenium* has been variously placed in the Leskeaceae, Thuidiaceae, and the Anomodontaceae. Although *Haplohymenium* has sometimes been included within *Anomodon* (Granzow-de la Cerda 1997), I have utilised here a more traditional circumscription of the genera, in agreement with Noguchi (1987–1994) and Crum & Buck (1994). According to the latter *Haplohymenium* can be distinguished from *Anomodon* by its having "more slender gametophytes, oblong-ovoid capsules, exostome teeth with large papillae or irregular thickenings, endostome without segments or cilia, and hairy calyptrae". The genus is likewise retained by Goffinet et al. (2009).

Etymology: According to Crum & Anderson (1981, p. 863) the generic name probably refers to the fact that the endostome is reduced to a mere membrane.

***Haplohymenium pseudotriste* (Müll.Hal.) Broth., Nat. Pflanzenfam. [Engler & Prantl] 1 (3) 986 (1907)**

≡ *Hypnum pseudotriste* Müll.Hal., *Bot. Zeitung (Berlin)* 13: 786 (1855)

≡ *Anomodon pseudotristis* (Müll.Hal.) Kindb., *Enum. Bryin. Exot.*, 7 (1888)

Type: South Africa. Not seen.

= *Anomodon huttonii* Mitt., *J. Linn. Soc., Bot.* 13: 309 (1873)

≡ *Haplohymenium huttonii* (Mitt.) Broth., *Nat. Pflanzenfam.* [Engler & Prantl] 1 (3) 986 (1907)

Type: N.Z., Great Barrier Island, Nov. 1867, *Hutton & Kirk s.n.*, CHR 621732!

Plants yellow- or olive-green, creeping, very delicate and filiform. **Secondary stems** mostly c. 4–7(–15) mm, irregularly branched, in cross-section of incrassate cells nearly throughout, lacking a central strand, with scattered fascicles of smooth, red-brown rhizoids. **Stem leaves** ovate-lanceolate and acute, c. 0.5 mm, not fragile, crenate. **Branches** mostly 5–15 mm. **Branch leaves** lingulate from a ± broadened base or broadly elliptic, rounded, obtuse or broadly acute at apex, (0.40–)0.50–0.58 × 0.15–0.17 mm, crenulate throughout; **mid laminal cells** rounded-hexagonal, ± obscure in surface view, with several small and rather obscure papillae on each surface, mostly 6–8 µm across, in cross-section bulging and rounded both abaxially and adaxially; **juxtacostal cells** more elongate in a small area near leaf base. **Costa** extending c. 2/3 to apex but with the distal half obscure and consisting of non-elongate cells which are scarcely differentiated from adjacent laminal cells, in cross-section bistratose and protruding very weakly on abaxial surface. **Paraphyllia** lacking. **Propagula** lacking.

Presumably dioicous. Perichaetia and **perigonia** not seen. **Sporophytes** unknown in N.Z. material.

Illustrations: Plate 1. Noguchi 1987–1994, fig. 364, C; Streimann 2002, fig. 66.

Distribution: K; NI: N Auckland, including offshore islands (GB), S Auckland, Gisborne (Raukōkore River), Hawke's Bay (Wairoa, Māhia Peninsula); SI: Nelson (Kaihokai Lakes, near Tākaka), Westland (Waiho River); Ch.

Anomalous. Mainland Australia (N.S.W.)*, Norfolk I.*. Recorded from numerous Japanese and other East Asian localities, as well as Australia and South Africa, by Noguchi (1987–1994).

Habitat: Epiphytic on a range of mostly smooth-barked dicotyledonous tree species, including *Beilschmiedia tarairi*, *Coprosma arborea*, *Corynocarpus laevigatus*, *Kunzea ericoides*, *Litsea calicaris*, *Meliccytus ramiflorus*, *Metrosideros kermadecensis*, and *Myoporum laetum*, as well as *Cordyline australis* and *Rhopalostylis baueri*; in lowland and mostly coastal situations. The single confirmed record from the Chatham Is was collected from “the base of an *Olearia telmatica* tree”. Rarely occurring on shaded limestone (as at Waikawau Stream, S Auckland L.D. and at Tākaka, Nelson L.D.). From near sea level to c. 300 m elevation. Frequent associates include *Camptochaete pulvinata*, *Leptodon smithii*, *Orthorrhynchium elegans*, *Rhaphidorrhynchium amoenum*, and *Syrhophodon armatus*, as well as *Frullania* spp., *Metzgeria* spp., and various Lejeuneaceae.

Notes: The distinctions drawn by Noguchi (1987–1994) between this species and *H. triste* in Japan are mostly quantitative. The laminal cell dimensions of N.Z. material are intermediate between those given by Noguchi for the two species. The leaves of N.Z. plants are not fragile. Streimann (2002) presented a useful discussion of this species on Norfolk I.; his description of the sporophyte appears not to be based on Australian material.

Recognition: Its delicacy and creeping, filiform habit differentiate this relatively rare species from all but a few N.Z. pleurocarps. The leaves of *H. pseudotriste* are exceedingly small. The cell walls of the bulging and papillose laminal cells are obscure under the microscope. The primary stems are very inconspicuous in N.Z. material but can sometimes be seen adhering to the substrate (as in material from Raoul I., *P. de Lange* K580, AK 326909).

Haplohymenium pseudotriste could be mistaken for the exceedingly rare *Lindbergia maritima*, q.v. The present species has leaves of similar size, but differs from the *Lindbergia* by having a shorter and more obscure costa, several small and rather obscure papillae on each mid to upper laminal cell, broader, more rounded leaf apices, and an absence of axillary propagula.

Pseudoleskea imbricata is another superficially similar species, but it is largely epilithic rather than epiphytic. It is a neater, more julaceous, and somewhat more robust plant in which the costa is better defined and longer and the laminal cells are rounded-rhomboid (rather than rounded-hexagonal).

The very rare *Erpodium glaucum* is similar in size and overall habit to *H. pseudotriste*, but is pale green and glaucous in colouration, and has more distinctly ranked and acute to apiculate leaves with no costa. The two species have been collected growing together at the Raukōkore R. in Gisborne L.D.

Thuidium sparsum is generally a bright green plant differing from *H. pseudotriste* by its decidedly dimorphic leaves (those of stems are ± triangular-ovate), and paraphyllia that are clearly visible under a hand lens.

Etymology: The epithet *pseudotriste* makes comparison to the northern hemisphere *H. triste*. *Triste* (sad), is apparently an allusion to the dull coloration of both species.

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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
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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A.J. Fife

Landcare Research, PO Box 69040, Lincoln 7640, New Zealand

FifeA@landcareresearch.co.nz

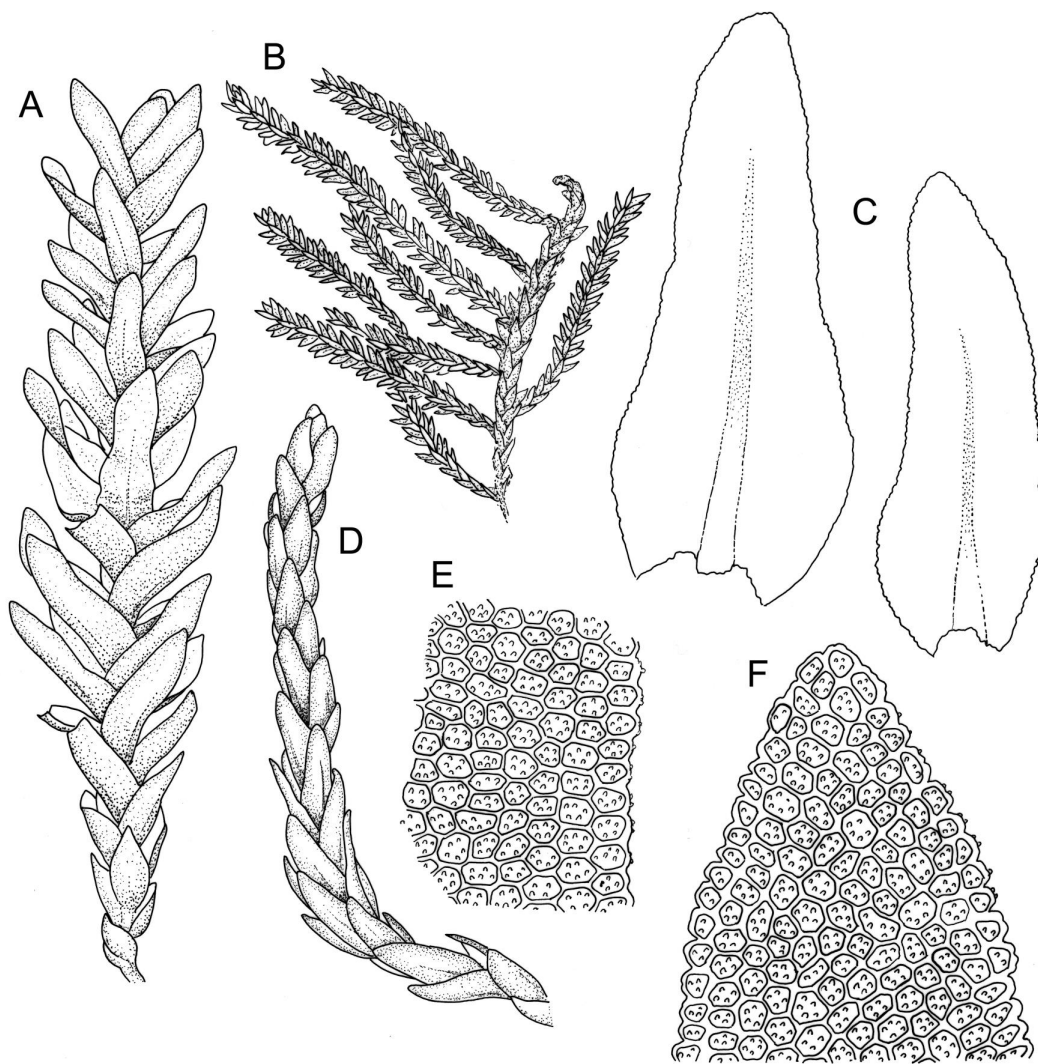
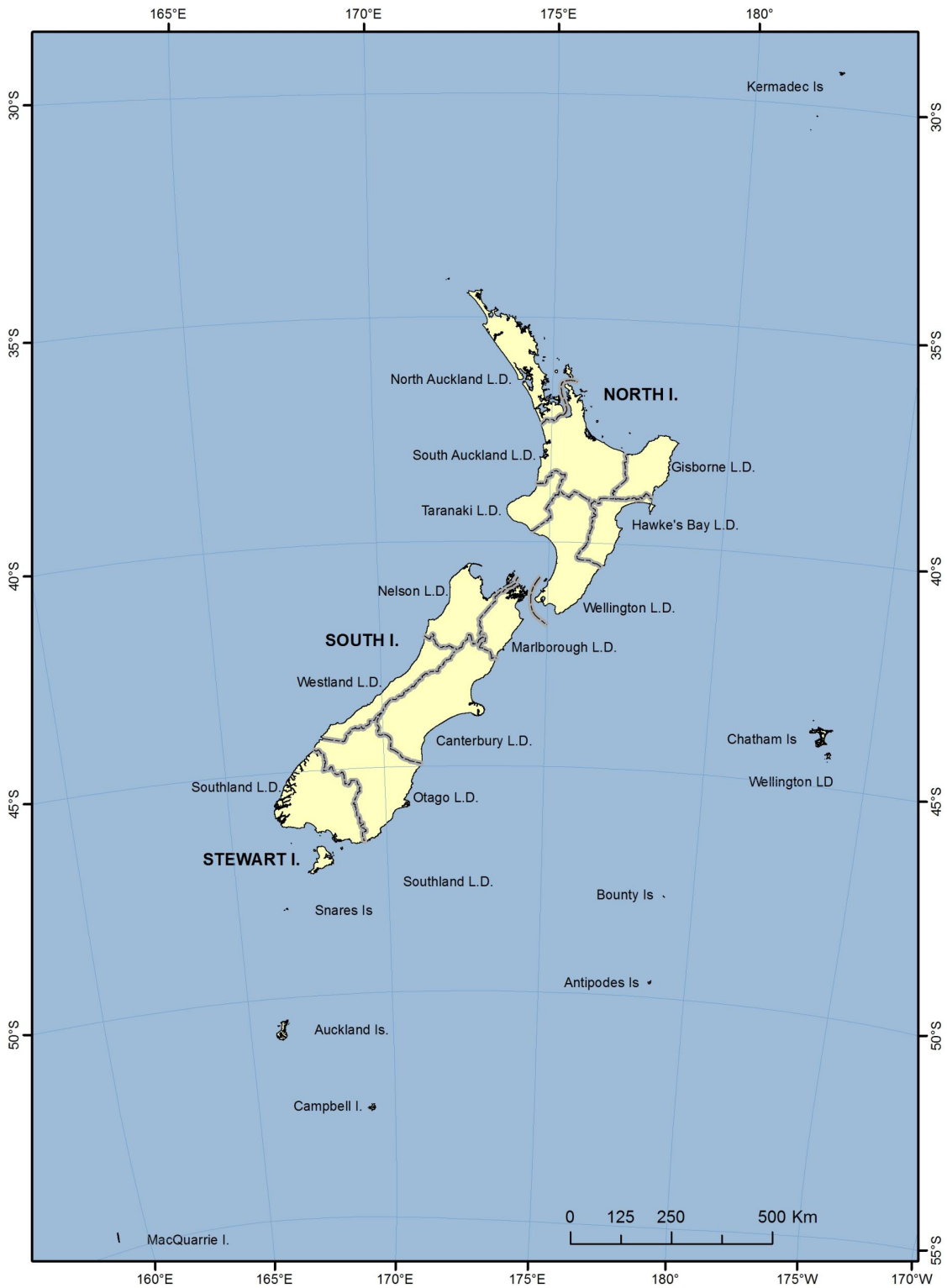
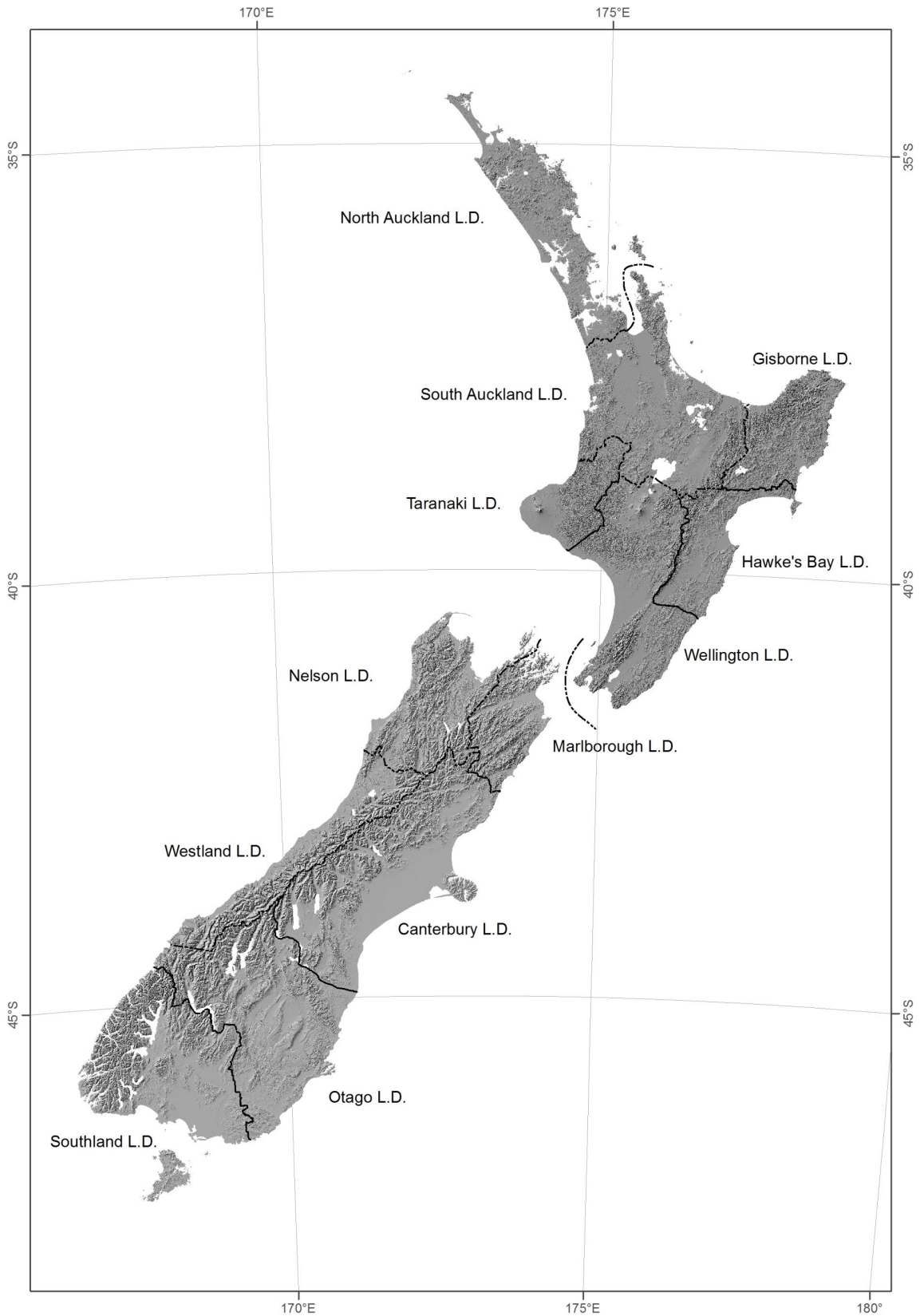


Plate 1: *Haplohydnum*. A–F: *H. pseudotriste*. A, shoot. B, habit. C, leaves. D, shoot, dry. E, mid laminal cells at margin. F, leaf apex. Drawn from J.E. Beaver 20-26, CHR 104583.



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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and *italic* for synonyms.

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Image Information

Image
Plate 1
Map 1
Map 2

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