

**Conifers**

*Dacrycarpus dacrydioides*  
*Dacrydium cupressinum*  
*Libocedrus plumosa*  
*Podocarpus totara*  
*Prumnopitys ferruginea*  
*Prumnopitys taxifolia*

**Dicots**

\**Acmena smithii*  
*Alectryon excelsus*  
*Beilschmiedia tarairi*  
*Beilschmiedia tawa*  
\**Berberis glaucocarpa*  
*Carpodetus serratus*  
*Centella uniflora*  
*Coprosma arborea*  
*Coprosma areolata*  
*Coprosma repens* (planted)  
*Coprosma rhamnoides*  
*Coprosma robusta*  
*Coprosma spathulata*  
*Corynocarpus laevigatus*  
*Dysoxylum spectabile*  
\**Euonymus japonicus*  
*Geniostoma ligustrifolium*  
*Griselinia littoralis* (planted)  
*Haloragis erecta*  
*Hedycarya arborea*  
*Hoheria populnea* (planted)  
*Knightia excelsa*  
*Kunzea ericoides*

*Laurelia novae-zelandiae*  
*Leucopogon fasciculatus*  
\**Ligustrum lucidum*  
\**Ligustrum sinense*  
*Macropiper excelsum*  
*Melicope simplex*  
*Melicytus micranthus*  
*Melicytus ramiflorus*  
*Metrosideros diffusa*  
*Metrosideros fulgens*  
*Metrosideros perforata*  
*Mida salicifolia*  
*Muehlenbeckia australis*  
*Myrsine australis*  
*Nestegis lanceolata*  
*Olearia rani*  
*Parsonsia heterophylla*  
*Passiflora tetrandra*  
*Pennantia corymbosa*  
*Pittosporum tenuifolium*  
*Polygonum salicifolium*  
*Pseudopanax crassifolius*  
*Pseudopanax lessonii*  
\**Prunella vulgaris*  
*Rubus cissoides*  
\**Solanum mauritianum*  
*Streblus heterophyllus*  
\**Ulex europaeus*  
*Vitex lucens*

**Monocots**

*Astelia solandri*

\**Axonopus fissifolius*  
*Carex dissita*  
\**Carex divulsa*  
*Carex lambertiana*  
*Carex lessoniana*  
*Carex secta*  
*Collospermum hastatum*  
*Cordyline australis*  
*Cyperus ustulatus*  
*Earina mucronata*  
*Eleocharis gracilis*  
*Freycinetia banksii*  
*Gahnia lacera*  
*Gahnia setifolia*  
*Gahnia xanthocarpa*  
\**Juncus effusus*  
\**Iris foetidissima*  
*Isolepis reticularis*  
\**Isolepis sepulcralis*  
*Microlaena avenacea*  
*Microlaena stipoides*  
*Oplismenus hirtellus* subsp.  
*imbecillis*  
*Rhopalostylis sapida*  
*Ripogonum scandens*  
*Schoenus maschalinus*  
*Uncinia banksii*  
*Uncinia distans*  
*Uncinia uncinata*

## An annotated Bryophyte species list for Murphy's Bush, Manukau

Matt A. M. Renner

### Introduction

Murphy's Bush is a small bush remnant growing on moderately drained alluvial soil in flat to gently rolling country within the Otara Creek catchment, Manukau. The forest canopy is dominated by kahikatea and taraire, with a thick sub-canopy component of nikau. The forest structure and composition suggest that the soils are of reasonable fertility, because, like other floodplain forests growing on fertile, reasonably drained alluvial soils in the northern North Island, this forest is reasonably tall, has a preponderance of nikau, and lacks well developed shrub and ground layers, giving a very open character. This is in stark contrast to kahikatea-dominated forests on the West Coast of the South Island that grow on very poorly drained soils developed over glacial moraine deposits, where kiekie typically dominates the shrub layer. It is generally accepted that this open character is simply a hangover from days prior to stock exclusion (Cameron *et al.* 1997).

The present study records the mosses and liverworts collected in the northern half of Murphy's Bush during an Auckland Botanical Society field trip in May 2004. To the best of my knowledge, no prior collecting of bryophytes has occurred in this reserve. Voucher specimens of all species collected have been lodged with the Herbarium of the Auckland War Memorial Museum (AK).

Species are arranged alphabetically under major groups (classification follows Schuster 1984). Nomenclature follows that presented in Beever *et al.* (1992) for mosses and Glennly (1998) for liverworts.

### Methods

Three hours were spent noting habitats and collecting material within Murphy's Bush. Subjective assessments of habitat types and microsites were made, and efforts made to sample from each. The author is indebted to Josh Salter for her assistance in the field. In case anyone is wondering, bryophytes are best collected with a knife, so that part of the

substrate they adhere to is removed with the specimen. This helps to keep the specimen in one piece, particularly if the substrate is bark. For twigs, twiglets, leaves, and even bark, the best strategy is to collect *the habitat* rather than the plants themselves, and to survey the resulting material under magnification back in the lab. This method proves effective for the collection of occasional species, especially tiny species, that would otherwise be passed over in the field if individual plants were being searched for (has anyone seen *Nephelolejeunea conchophylla* in the field?). This approach also ensures that sufficient quantities of even rarer species can be collected quickly, and later aggregated into excellent voucher specimens.

Rather than collecting and bagging each taxon separately, all the taxa from a given microsite were placed into a plastic sealable bag, with each bag being assigned a collection number for which the locality and microhabitat details were recorded. As well as keeping them fresh, it retained the species assemblages until detailed examination could be done.

#### Species notes:

##### *Acrolejeunea mollis*

A single plant found epiphytic on *Coprosma robusta* on clearing edge. *Acrolejeunea* plants are readily recognisable by their pluriplicate perianths, their large entire underleaves and their strong brown colouration. Gradstein (1975) revised the genus, recognising three species for New Zealand. *Acrolejeunea mollis* is readily identified by its single multicellular lobular tooth, and perianth immersed within the female bracts at maturity. A beaut. I had not seen this species before this outing. It is not especially small, but is reputedly rare. However, it is turning up in more and more places.

##### *Cheilolejeunea comitans*

A few isolated (and thankfully fertile) stems collected from *Coprosma robusta* branches on the edge of the clearing. *Cheilolejeunea* is a relatively easy genus to identify. The underleaves are bifid, the lobular apical tooth points at right angles away from the direction of the stem, and the cells contain usually two large, coarsely botryoidal oil-bodies. *Cheilolejeunea comitans* is unique among the New Zealand species in having balloon-like perianths. In all other species the perianths are 5-plicate.

##### *Chiloscyphus*

*Chiloscyphus* is being worked on by John Engel, based at the Field Museum. Until Engel's work is published, the best I can do for now is list these taxa under tag names, simply to illustrate that they are there. Hodgson published the last comprehensive treatment of the genus in the 1960s (as it was then, split between *Chiloscyphus* and *Lophocolea*), but this work leaves a little to be desired in an operative sense.

##### *Lejeunea* sp. "minutoica"

This is a species that I do not recognise. Unusual in its paroicious state, and minute size, and possession of 4-7 minutely botryoidal oil-bodies in each cell. Similar in size to *L. primordialis*, but differs in its oil-bodies. *Lejeunea* is a difficult genus in both practical and nomenclatural contexts, so this plant may have a published name of some antiquity.

##### *Metzgeria*

*Metzgeria* has been the focus of a recent work by So (2002) who provides a key, and brief descriptions of Australasian species. Characters of the fertile gametophyte are required at several stages of the key, therefore identification of sterile material is problematic.

##### *Rectolejeunea* aff. *denudata*

This plant is now known to me from four localities, all in the northern North Island. Murphy's Bush is in fact the southern most locality. I first collected it in the Herekino Forest, where I obtained four stems, which though sterile were distinctive enough to suggest a new entity. It is a little more abundant in Murphy's Bush, growing on taraire twigs overhanging the stream, and on dead rimu leaves still hanging in the canopy on the edge of the clearing.

It sits well within *Rectolejeunea* in its flattened habit, such that the stems appear ironed onto the branches, with the result that the leaves spread away from and expose the dorsal surface of the stem. This is a useful field character. The oil-bodies agree well with reports from other species in the genus (Schuster, 1992), being roughly spherical, brown tinted, finely botryoidal, and three to four per cell.

The plant is readily separable from *R. denudata*, described by Schuster (2000) in that 1) Leaf lobes rarely fragment off, denuding the stems as in *R. denudata*; 2) The lobular apical tooth is an elaborated, multicellular, canine-like structure often hooked or inclined at 45° away from the stem; 3) The underleaves are smaller, fewer celled, and more angular than those of *R. denudata*.

From *R. ocellata* this species is separable by its lack of ocelli. In well developed lobules of *R. ocellata* the lobule tooth is single celled (fide Schuster, 2000).

Caducous leaves are very rarely produced in plants of *R. aff. denudata*, and if they occur at all are localised to lateral-intercalary branches. In other species these branches are often dedicated to the production of fragile leaves.

Schuster (2000) described *Rectolejeunea denudata* from northern New Zealand, and illustrated *R. ocellata* from material collected on Mt. Manaia. Both these species are apparently New Zealand endemics.

### ***Siphonolejeunea nudipes* "robust"**

A number of plants were noted growing on a seepage below a fork in a rimu trunk, close to the open western edge of the reserve. This is interesting because *S. nudipes*, in my experience, occurs primarily on small branches and twigs in the outer part of tree and shrub canopies, rarely on trunks, and, when on trunks, not as divergent morphologically as this entity. Unlike others within the reserve (growing in more typical habitat), this entity is about three times as large, produces discoidal gemmae in abundance from the ventral side of the leaf-lobe, and has 11-16(-21) small, spherical, finely granular oil-bodies per cell. The lobule is a little different, being ob-rhomboidal (widest toward the apex) and narrow, with at the most 2 teeth, usually one, which typically has two cells side-by-side with the papilla in the notch between.

### **Bryophyte communities and habitats**

In Murphy's Bush, several distinct associations, all linked to microhabitat types are readily identifiable in the field.

#### Streamside

On the clay banks of the stream a loose bryophyte mat, dominated by *Thamnobryum pandum*, occurs. Species found only in this habitat include *Fissidens leptocladus*, which is not uncommon on these streambanks, *Lunularia cruciata*, and *Anthoceros* species.

#### Tree roots

Exposed tree roots on the forest floor, particularly those raised above local micro-relief, shed leaf litter and provide an excellent substratum upon which bryophytes establish. Roots of puriri, taraire and totara all bear the same species, primarily *Camptochaete arbuscula*, *Papillaria crocea*, *Pendulothecium pendulum*, *Pendulothecium oblongifolium*, *Racopilum convalutaceum* and *Thuidium sparsum*. The liverworts are rarely present in this community in Murphy's Bush, with two species of *Chiloscyphus*, *Lepidolaena taylorae*, and *Radula silvosa* occurring.

#### Forest floor

The forest floor in Murphy's Bush is largely devoid of bryophytes, with only two of the larger more robust bryophytes observed, *Hypnodendron colensoi* and *Acrophyllum dentatum*.

#### Nikau trunks

On damper sides of nikau trunks can be found a rich community dominated by *Racopilum convalutaceum* and *Metzgeria* aff. *crassipilus*, and *Archilejeunea olivacea*. The *Archilejeunea* looks superficially like *Porella* but can be recognised by its habit of growing sideways around the trunk, rather than downwards and pendulously away from it. This species has this growth habit on other tree species too, and is a useful field character, facilitating recognition from some distance (impress your mates). *Metzgeria* aff.

*crassipilus* is particularly abundant around the stream. Two smaller Lejeuneoids grow on nikau, the most conspicuous of these being *Lejeunea* (*Microlejeunea*) *cucullata*.

#### Canopy Branches

Species of *Lejeunea* are common on canopy branches, as are species of *Macrocoma*, *Macromitrium*, *Papillaria*, *Porella* and *Zygodon*.

#### Clearing

Several more robust bryophytes are found in the clearing, but nowhere else in the reserve. Among these are several that are common forest interior inhabitants in forests elsewhere in the country, including *Dicranoloma billiardierei*, *Thuidium furfuraceum*, *Heteroscyphus coalitus*, and *Leucobryum candidum*. These species may be restricted to the clearing due to heavy litter loadings received by the forest floor, or restricted by lack of light within the forest interior, or both. Also found within the clearing but nowhere else in the reserve are *Leptodontium interruptum*, *Kurzia hippuroides*, *Telaranea*, and *Bryum billiardierei*.

#### Forest Edge

Forest edges are excellent places to collect a wealth of smaller epiphytic species of a number of different liverwort families, including Jubulaceae, Lejeuneaceae, Porellaceae and Radulaceae. Murphy's Bush has its fair share of 'Minutiae', even a respectable epiphyllous flora, including *Cololejeunea minutissima*, *Harpalejeunea latitans*, *Siphonolejeunea nudipes*, and *Lejeunea* (*Microlejeunea*) *cucullata*. On twigs you will also find *Rectolejeunea* aff. *denudata* and up to five species of *Frullania*. *Acrolejeunea mollis* and some of the other more common and larger epiphytes grow on tree branches around the clearing. Unfortunately some of the lushest looking communities, on a puriri on the forest edge, were inaccessible. Remind me to bring a ladder.

### **Discussion**

Though not inconsiderable, Murphy's Bush has a depauperate bryophyte flora in comparison with forests from around the country (pers. obs), particularly those of higher rainfall regions where upwards of 100 species can be anticipated to be encountered within a forest. Illustrative of this is the absence of a range of microhabitats frequently encountered in forests, such as large coarse woody debris, canopy gaps, and subcanopy and shrub layers. Indeed, whole suites of species, that can readily be found in association with coarse woody debris in the Waitakere and Hunua forests, are absent, including *Aneura* spp., *Bazzania* spp., *Riccardia eriocaula*, *Rhizogonium* spp., *Schistochila replete*, *S. glaucescens*, and *Zoopsis* spp. In short, microhabitat diversity within Murphy's Bush is low, and the species numbers present are reflective of this.

Also unusual is the absence of a well developed ground layer of bryophytes. Possibly, ground dwelling bryophyte communities may be particularly slow to respond to the removal of stock from the reserve. Alternatively, the absence may be intrinsic: (a) from the depth of the leaf litter, in combination with periodic drying over the summer period, hampering establishment; or (b) the litter loadings smothering bryophytes that do establish; or (c) the two factors acting together to prevent establishment. At any rate there are, again, a raft of bryophyte species that grow in these microsites that are missing, for whatever reason, including some of the largest and most conspicuous of the flora.

Absence of species found in these two microhabitat types are, in my opinion, the main reason for the generally lowered species numbers. In other habitats for instance, notably my particular favourites, the epiphylls and microepiphytes of canopy branchlets, Murphy's Bush possesses a respectable array of

species, including one undescribed species at its known southern limit in the reserve.

Habitat diversity will probably increase in Murphy's Bush with time. Trees die, fall over, and decay, so structural diversity of the ground layer can be expected to increase as dead wood accumulates. Colonisation of this dead wood by the lignicolous specialists outlined earlier can be anticipated.

As the forest ages, colonisation of *in situ* newly created microhabitats would make an interesting observational study, answering questions such as: (1) which species turn up; and (2) what characterises the local source pools from whence the species come; (3) the specific composition of those source pools; and most significantly, (4) whether there is concordance between the two. However, little is known of dispersal ability in bryophytes, let alone the dynamics of metapopulations, so perhaps it is best to speculate no further.

### Species list

In the following species list, habitats have been assigned numbers (0 = Clearing; 1 = Forest edge; 2 = Forest canopy; 3 = Forest interior; 4 = Stream side) and the ten microsites are indicated by letters (lv = leaves; tw = twigs; br = branches; tr = tree trunks; ntr = nikau trunks; tf = tree fern trunks; ro = tree roots; w = decaying wood; h = humic soil; c = clay soil)

#### Anthocerotopsida

<i>Anthoceros</i> sp.	4	c
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#### Bryopsida

<i>Acrophyllum dentatum</i>	3	h
<i>Bryum billiardieri</i>	0	h
<i>Campochaete arbuscula</i>	3	tr, ro, h
<i>Campylopus introflexus</i>	0	h
<i>Crateoneurosis reflexa</i>	3, 4	c
<i>Dicranoloma billiardieri</i>	0	h
<i>Fissidens leptocladus</i>	4	c
<i>Fissidens taxifolius</i>	1, 3, 4	c
<i>Hypnodendron colensoi</i>	3	h
<i>Hypnum cupressiforme</i>	0, 1, 3	br, tr, ro, h
<i>Leptodontium interruptum</i>	0	h
<i>Leucobryum candidum</i>	0	h
<i>Macrocoma tenue</i>	1, 2	br
<i>Macromitrium gracile</i>	1, 2	br
<i>Macromitrium longipes</i>	2	br
<i>Neckera laevigata</i>	3, 4	ntr
<i>Papillaria crocea</i>	1, 2, 3, 4	tw, br, tr, ro
<i>Pendulothecium oblongifolium</i>	3	tr, h
<i>Pendulothecium punctatum</i>	3	tr, h
<i>Rhacopilum convalutaceum</i>	3, 4	tr, ntr, tf, ro, w, h
<i>Rhynchostegium tenuifolium</i>	3, 4	
<i>Stokesiella praelonga</i>	0	h
<i>Thamnobryum pandanum</i>	4	c
<i>Thamnobryum pumilum</i>	4	c

<i>Thuidium furfuraceum</i>	0, 4	h, c
<i>Thuidium sparsum</i>	1, 3, 4	tr, ntr, ro, h
<i>Wijkia extenuata</i>	3	h
<i>Zygodon intermedius</i>	1, 2, 4	br

#### Hepaticopsida

<i>Acrolejeunea mollis</i>	1	br
<i>Archilejeunea olivacea</i>	1, 2, 3, 4	br, tr, ntr
<i>Bazzania tayloriana</i>	3	tf
<i>Cheilolejeunea comitans</i>	1	tw, br
<i>Chiloscyphus</i> sp. "bident"	3	ro, h
<i>Chiloscyphus</i> sp. "cusp"	3	ro, h
<i>Chiloscyphus muricatus</i>	3	w
<i>Chiloscyphus semiteres</i>	4	c
<i>Cololejeunea minutissima</i>	1	lv, tw
<i>Frullania incumbens</i>	1, 2, 4	tw, br, tr
<i>Frullania rostellata</i>	1, 2, 4	tw, br, tr
<i>Frullania solanderiana</i>	1, 2, 4	tw, br, tr
<i>Frullania squarrosula</i>	1, 2	tw, br
<i>Harpalejeunea latitans</i>	1	lv, tw
<i>Heteroscyphus coalitus</i>	0	h
<i>Kurzia hippuroides</i>	0	c
<i>Lunularia cruciata</i>	4	c
<i>Lejeunea cucullata</i>	1, 2, 3, 4	lv, tw, br, tr, ntr
<i>Lejeunea flava</i>	1, 2, 3, 4	lv, tw, br, tr, ntr
<i>Lejeunea primordialis</i>	3	tr
<i>Lejeunea tumida</i>	1, 4	br

<i>Lejeunea</i> sp. "minutoica"	3	tr	<i>Rectolejeunea</i> aff. <i>denudata</i>	1, 4	tw
<i>Lepidolaena tayloriana</i>	2, 3	br, tr, ro	<i>Siphonolejeunea nudipes</i>	1, 2	lv, tw
<i>Metzgeria</i> aff. <i>crassipilus</i>	3, 4	ntr	<i>Siphonolejeunea nudipes</i> "robust"	1	tr
<i>Metzgeria</i> sp.	1	lv, tw	<i>Telaranea</i> sp.	0	h
<i>Metzgeria</i> sp.	2, 3	tw, br, tr, ro			
<i>Porella elegantula</i>	1, 2, 3	br, tr			
<i>Radula silvosa</i>	3	ro			

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## Lichens of Murphy's Bush

Dan Blanchon, Carol Lockett, Rick Kooperberg

The following lichens were collected by Rick Kooperberg and Carol Lockett during the Auckland Botanical Society field trip to Murphy's Bush, Manurewa on 15<sup>th</sup> May 2004. Identifications were made by Dan Blanchon.

#### Cladoniaceae

- Cladonia* sp. 1  
*Cladonia* sp. 2

#### Collembataceae

- Leptogium azureum* (Sw.) Mont.

#### Lobariaceae

- Pseudocyphellaria aurata* (Ach.) Vain.  
*P. carpoloma* (Delise) Vain.  
*P. coronata* (Mull. Arg.) Malme  
*P. dissimilis* (Nyl.) D.J. Galloway & P. James  
*P. episticta* (Nyl.) Vain.  
*P. poculifera* (Mull. Arg.) D.J. Galloway & P. James

#### Parmeliaceae

- Parmotrema* sp.  
*Rimelia* sp.  
*Usnea* spp.

#### Pertusariaceae

- Pertusaria* sp.

#### Physciaceae

- Heterodermia leucomelos* ssp. *boryi* (Fee) Swinscow & Krog  
*H. speciosa* (Wulfen) Trevis.

#### Ramalinaceae

- Ramalina celastri* (Sprengel) Krog et Swinscow  
*R. peruviana* Ach.

#### Stictaceae

- Sticta filix* (Sw.) Nyl.  
*S. fuliginosa* (Hoffm.) Ach.  
*S. martinii* D.J. Galloway

#### Teloschistaceae

- Teloschistes chrysophthalmus* (L.) Th.

#### Trichotheliaceae

- Clathroporina exocha* (Nyl.) Mull. Arg.