

The bryophyte flora of nature reserves in central Chile.

1. The moss flora of Los Ruiles Nature Reserve, near Talca

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Abstract: The moss flora of the Los Ruiles Nature Reserve, Maule region (VII), central Chile was investigated. Los Ruiles is a small forest reserve dominated by *Nothofagus* trees and surrounded by plantations of *Pinus radiata*. The moss species list contains 72 taxa, among which are 36 species newly reported for the Maule region. Several species reach their northernmost known limit in the reserve, including *Achrophyllum magellanicum* var. *magellanicum*, *Ancistrodes genuflexa*, *Cryphaea consimilis*, *Dendrocryphaea lechleri*, *Lembophyllum orbiculatum*, *Leptostomum menziesii*, *Symblepharis krausei*, and *Zygodon papillatus*. To ensure the survival of these rare or local bryophytes, an increase of the proportion of *Nothofagus* trees in the forests surrounding the reserve is desirable.

Introduction

During the past few years we have investigated the bryophyte flora of several nature reserves in the Maule (VII) region, which is situated in central Chile about 250 km south of the capital Santiago de Chile. This region is characterized by strong human influence, and large parts of the area, especially in the central Chilean valley, are now under cultivation. Arable land, vineyards, fruit plantations and settlements predominate. In the area of the coast range, the formerly dominant *Nothofagus* forests have been almost completely cleared and replaced by

cultivated land or plantations of *Eucalyptus globulus* and *Pinus radiata*. In the Andean range the situation is more favorable, and larger stands of the natural forest vegetation survive, at least in the more remote, deep valleys. However, *Nothofagus* forests are protected within the region only in few natural reserves, and the number of reserves in the region is low (only seven protected areas). A small area of native *Nothofagus* forest in the coast range is protected within the Los Ruiles Nature Reserve. During excursions by the authors in March 1999 and March 2000 the moss flora of this nature reserve were studied in detail.

The moss flora of the Maule region of Chile is still insufficiently known. In the checklist of the mosses of Chile (He 1998) only 65 moss species are listed from this region. In contrast, between 190 and 450 species are known from regions to the south of Maule.

Our investigations had two objectives:

- to increase the knowledge of the bryophyte flora of the up to now poorly investigated Maule region of Chile
- to find out the importance of the few remaining stands of natural forest vegetation for the bryophyte flora of the region and to make proposals for protection measures.

The area of investigation

The Reserva Nacional Los Ruiles is situated in the Maule (VII) region of Chile, in the coastal range in the province of Cauquenes (Fig. 1), and the following information is taken mostly from the reserve management plan (Cunazza et al. 1995). The reserve was created in 1982, and covers 45.4 ha. It consists of two parts: the Los Ruiles sector, 29 ha in size, situated in the Chanco municipality (72°30'30" W, 35°49'30" S), and the El Fin sector, 16.4 ha in size, situated in the Empedrado municipality (72°21'0"W, 35°37'30"S). The Los Ruiles sector lies in the valley of the Curanilahue River, and the El Fin sector in the valley of the Pino Talca River, two shallow notched valleys in the mountains of the coast range which drain to the Pacific. The Curanilahue River flows throughout the year, but the Pino Talca River is mostly dry during the summer.

Dominant in the reserve are flat to moderately steep slopes with S to SW aspect, which ascend to 810 m in the Cerro Name.

The soils, derived from the underlying granite and pre-Cambrian metamorphosed sedimentary rocks, are acidic throughout, and can be classified as transitional brown-earth to reddish-brown lateritic soils. They are immature, shallow-layered, well drained and highly vulnerable to erosion.

The macroclimate shows a mediterranean subhumid tendency (Cagri & Hajek 1976). It is characterized by hot dry summers and rainy mild winters. The annual rainfall is about 800 mm. The annual average temperature is 13.8°C with maximums of 18.7°C in the months of January and February. The coldest months are July and August with average temperatures of 5.9°C (Hajek & Di Castri 1975).

The whole reserve is covered by forest. The dominant forest type is the summer-green Chilean mountain forest of the coast range („Bosque Cudacifolio Maulino“), described as the *Nothofagus glauca*-*Azara petiolaris* association. The forest is very rich in woody species, with about 80 shrub and tree species reported. Notable is the occurrence of several plant species at their northernmost known limit, such as *Weinmannia trichosperma* and *Embothrium coccineum*. Dominant trees include *Nothofagus dombeyi*, *N. glauca*, *N. leonii*, *N. alessandrii*, *Luma apiculata*, *Podocarpus saligna*, *Lithraea caustica*, *Peumus boldus* and *Quillaja saponaria*. Some vascular plants of the area are on the red list of threatened plants of Chile (Benoit 1989): *Nothofagus alessandrii* and *Pitavia punctata* are threatened by extinction, *Nothofagus glauca* and *N. leonii* are endangered and *Citronella mucronata* is potentially endangered because of its rarity. The occurrence of these rare and endangered species was the main reason for the creation of the Los Ruiles Nature Reserve.

Annotated species list

The species found in the reserve are listed in alphabetical order in Table 1. The nomenclature mainly follows He (1998). For each species the following information is given: distribution in the reserve (occurrence in the Los Ruiles and El Fin sectors), habitat, collection number, distribution in Chile, worldwide range, new record for the Maule region, northernmost known occurrence in Chile. Information on species distribution in Chile is mainly taken from

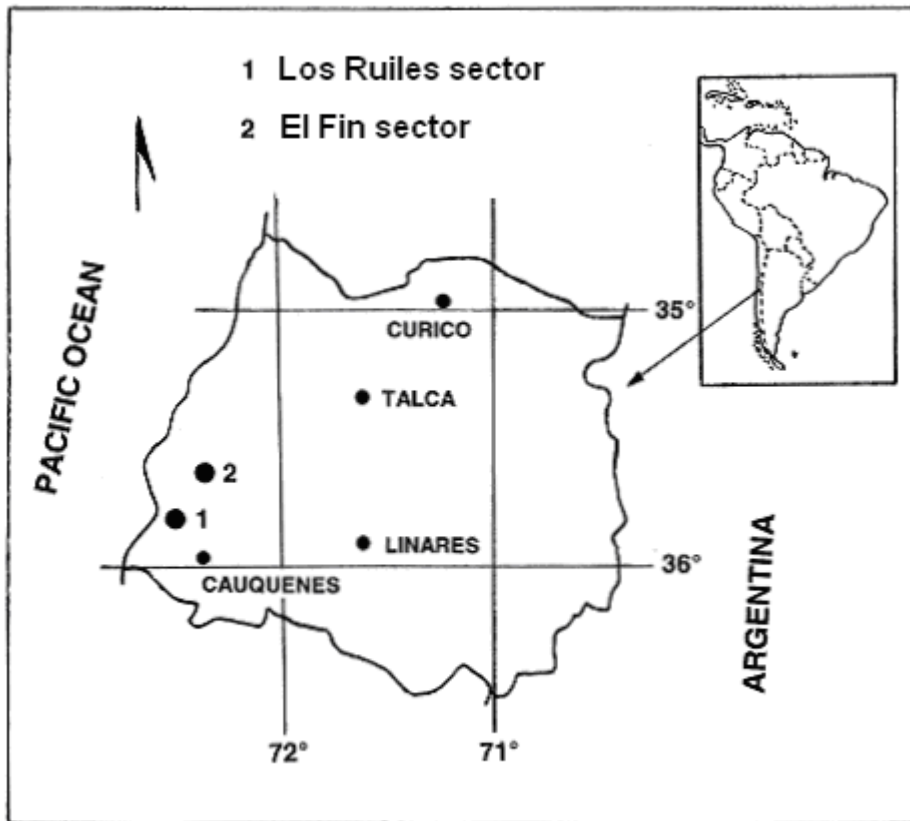


Fig. 1: Geographical position of the studied location

He (1998). (I ... XII = numbers of the administrative regions of Chile, M = Metropolitan region, JF = Juan Fernandez Is.). The herbarium specimens from our collections are deposited at the herbarium of the Institute of Botany of the University of Dresden (DR).

Taxonomically uncertain and therefore not treated in the list are one sterile sample of *Macromitrium* and all material of the genera *Tortula* and *Syntrichia*.

Besides the mosses, some liverworts were also collected. Among the collections there is material of the following species: *Aphanolejeunea asperrima* (Steph.) Steph., *Blepharolejeunea*

securifolia (Steph.) R.M.Schust., *Cephaloziella subpapillosa* Herzog, *Cololejeunea minutissima* subsp. *myriocarpa* (Nees & Mont.) R.M.Schust., *Jamesoniella colorata* (Lehm.) Schiffn., *Lejeunea hahnii* Solari, *Lepidozia chordulifera* Taylor, *Lophocolea muricata* (Lehm.) Nees, *Marchantia berteroana* Lehm. & Lindenb., *Noteroclada confluens* Taylor ex Hook. & Wilson, *Porella chilensis* (Lehm. & Lindenb.) Trevis., *Porella recurva* (Taylor) Kühnemann, *Radula striata* Mitt. ex Steph., *Radula tectiloba* Steph., *Symphyogyna circinata* Nees & Mont. and *S. rubritincta* A.Evans.

Discussion

In the reserve, the most important moss habitats are the bark of trees, and rocks and earthy slopes along paths. The forest ground itself is mostly free of mosses because of the dense shade, and mosses are characteristically rather more frequent only on damp forest ground along brooks, where such species as *Achrophyllum magellanicum* var. *magellanicum*, *Fissidens crispus* and *Hypnodendron microstictum* occur.

The moss diversity on decaying wood was rather low, and all species found on this substrate (e.g., *Catagioniopsis berteriana*, *Hypnum chrysogaster*, *Juratzkaea seminervis* subsp. *seminervis*, *Ptychomitrium fernandesianum*, *Rigodium toxarium* var. *toxarium*) also occurred in other habitats.

A total of 38 species were found on rocks. Typical mosses on rocks were *Amphidium tortuosum*, *Catagonium nitens*, *Fissidens oblongifolius*, *Grimmia trichophylla*, *Porothamnium panduraefolium*, *Ptychomitrium fernandesianum*, *Rigodium toxarium* var. *toxarium*. On walls, *Philonotis krausei* and the cosmopolitan species *Didymodon vinealis* and *Funaria hygrometrica* were found.

A few species occurred on boulders along brooks, submerged or subject to periodic inundation: *Dendrocryphaea lechleri*, *Racomitrium lamprocarpum*, *Schistidium falcatum*, *Symplepharis krausei*, *Vittia pachyloma*, *Distichophyllum krausei*, *Achrophyllum magellanicum* var. *magellanicum*, *Fissidens rigidulus*, and *Pohlia wahlenbergii*.

The epiphytic vegetation was not very rich in comparison with other areas of the coast range, e.g., the Los Queules nature reserve near Pelluhue. The reason for this is the form of the valleys of the Los Ruiles reserve, which are not narrow and deep, so that the humidity is not constantly high. For this reason, some hygrophilic epiphytes are missing from the reserve, e.g., the broad-leaved *Schimperobryum splendidissimum* var. *splendidissimum* which

occurs in the adjacent Los Queules reserve on shaded rocks and at the bases of tree trunks. Altogether 31 epiphytic species were found. The most dominant epiphytic mosses of the reserve were: *Lembophyllum orbiculatum*, *Chorisodontium aciphyllum*, *Glyphothecium gracile*, *Hypnum chrysogaster*, *Juratzkaea seminervis* subsp. *seminervis*, *Leptodon smithii*, *Lepyrodon hexastichus*, *L. parvulus*, *Neckera chilensis*, *N. scabridens*, *Pentastichella pentasticha*, *Rigodium toxarium* var. *toxarium* and *Zygodon intermedius*.

Several small brooks, which flow only periodically, drain from the slopes in direction of the main brook. Along these brooks, comparatively damp shady forests have developed, whose epiphytic moss flora is clearly different from the dry slopes outside the valleys. The epiphytic species *Dendrocryphaea gorveana* and *Weymouthia mollis* are confined to these areas.

The species diversity of earthy slopes, e.g. alongside paths, is relatively high. The most important species of this substrate type were: *Bartramia ambigua*, *B. ithyphylloides*, *Breutelia subplicata*, *Campylopus chilensis*, *Chrysoblastella chilensis*, *Ditrichum difficile*, *Eurhynchiella acanthophylla*, *Eustichia longirostris*, *Fissidens oblongifolius*, *Oligotrichum canaliculatum*, *Philonotis krausei*, *Polytrichum juniperinum* and *Pyrrhobryum mnioides*.

The moss flora of the reserve includes both tropical/warm-temperate species which reach their southernmost known distribution limit in the area, as well as Southern Hemisphere/southern Patagonian species, which reach in the area their northernmost known distribution limit.

The group of tropical / warm-temperate species is represented in the reserve by only a few species, e.g., *Fissidens asplenioides*, *F. crispus* and *Macrocoma sullivantii*. In contrast, the group of Southern Hemisphere/Patagonian elements is represented in the area by many species. Over the half of the mosses of the reserve belong to this distribution type, e.g., *Achrophyllum magellanicum* var. *magellanicum*,

Aongstroemia gayana, *Breutelia subplicata*, *Lembophyllum orbiculatum*, *Chrysoblastella chilensis*, *Dendrocryphaea gorveana*, *D. lechleri*, *Eurhynchiella acanthophylla*, *Fissidens oblongifolius*, *Glyphothecium gracile*, *Hypnum chrysogaster*, *Lepyrodon hexastichus*, *Oligotrichum canaliculatum*, *Pentastichella pentasticha*, *Philonotis krausei*, *Porothamnium panduraefolium*, *Ptychomitrium fernandesianum*, and *Sematophyllum uncinatum*.

Within this group especially noteworthy are those Patagonian endemics which reach their northernmost limit in the Los Ruiles reserve. On the basis of currently known distribution patterns, this group includes *Achrophyllum magellanicum* var. *magellanicum*, *Ancistrodes genuflexa*, *Breutelia subplicata* (northernmost record on the Chilean mainland), *Lembophyllum orbiculatum*, *Campylopus chilensis*, *Catagonium nitens* subsp. *nitens*, *Chrysoblastella chilensis*, *Cryphaea consimilis*, *Cryphaeophilum molle*, *Dendrocryphaea gorveana*, *D. lechleri*, *Leptostomum menziesii*, *Lepyrodon patagonicus*, *Porothamnium panduraefolium*, *Symblepharis krausei* and *Zygodon papillatus*.

A number of widely distributed species were also found in the reserve, including the cosmopolitan or subcosmopolitan species *Ceratodon purpureus*, *Didymodon vinealis*, *Funaria hygrometrica*, *Grimmia trichophylla*, *Pohlia wahlenbergii*, *Polytrichum juniperinum*, which are also widely distributed in South America.

The Los Ruiles nature reserve is characterized by a species-rich moss flora. Altogether 72 species were found. Particularly important for nature conservation is the occurrence of Patagonian endemics at their northern distribution limit, and these species are especially in need of protection. A red list of the bryophytes of Chile does not yet exist. However, our current knowledge of the Chilean moss flora indicates that some of the species of the reserve are rare and endangered (at least in the Maule region) due to the high influence of man on the landscape. The aim of the management of the reserve should be to cease forestry operations, allowing the proportion of old trees and decaying wood to increase, and maintaining the humid

microclimate in valleys along streams. The reserve is very small and therefore highly influenced by marginal disturbances. An enlargement of the reserve and an increase of the proportion of *Nothofagus* trees in the surrounding forests is urgently needed for the protection of the interesting moss flora of the reserve.

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Table 1: List of the moss species recorded in the Los Ruiles nature reserve

Species	Los Ruiles	El Fin	Habitat	Collection number	Distribution in Chile	Worldwide range	New records for the Maule region	Northern-most known occurrence in Chile
<i>Achrophyllum magellanicum</i> var. <i>magellanicum</i> Besch.	x	x	on wet rocks and ground near a brook	C803, C1011, C1018, C1062	VIII, IX, X, XI, XII	Patagonian endemic	x	x
<i>Amphidium tortuosum</i> (Hornsch.) H. Rob.	x	x	on soil along a slope, shaded and wet rocks	C131, C1009, C1016, C1079	M, V, VIII, IX, X, XI, XII, JF	Pantropical (Africa, Papua New Guinea, Neotropics) to circum-subantarctic (S Africa, Australia, New Zealand, southern S America)	x	
<i>Ancistrodes genuflexa</i> (Müll. Hal.) Crosby		x	epiphytic	-	IX, X, XI	Patagonian endemic	x	x
<i>Aongstroemia gayana</i> (Mont.) Müll. Hal.	x		rocks along a street	C180	M, V, VII, VIII, IX, X, XI	Patagonian endemic		
<i>Bartramia ambigua</i> Mont.	x	x	earth-covered slopes in the forest, boulders, shaded rocks, forest floor, wet rocks near a brook	C171, C812, C818, C983, C1020, C1088	M, IV, V, VI, VII, VIII, IX, X, XI, XII, JF	S America		
<i>Bartramia ithyphylloides</i> Schimp. ex Müll. Hal.	x	x	slopes along a path, shaded slopes, wet rocks near a brook	C777, C983, C1053	M, VIII, IX, X, XI, XII, JF	Patagonian endemic	x	
<i>Breutelia subplicata</i> Broth.	x		dry rockface in a valley, shaded rocks, shaded slopes, slopes along a path, rock-face along a street	C175, C778, C789, C820, C1041	VIII, IX, X, XI, XII, JF	Patagonian endemic	x	x
<i>Bryum billardieri</i> Schwägr.	x		rock-face along a street	C126	M, IV, V, VII, VIII, IX, X, JF	pantropical to subtropical, southwards to New Zealand, Australia, southern S		

						America		
<i>Campylopus chilensis</i> De Not.	x	x	on ground in the forest, on dry earth covered slopes	C836, C1030	X, XI, XII	Patagonian endemic	x	x
<i>Campylopus clavatus</i> (R. Brown) Hook.f. & Wilson	x		rock-face along a street	C176	V, VII, IX, X, XI, XII, JF	Circum-subantarctic; in S America at the Pacific west coast north to Peru, Bolivia, Ecuador		
<i>Campylopus incrassatus</i> Müll.Hal.	x		slopes along a path	C1060	M, IV, V, VI, VII, VIII, IX, X, XI	Chile, Peru, Bioko, Ascension I., Azores, Australia		
<i>Campylopus introflexus</i> (Hedw.) Brid.		x	base of a <i>Nothofagus glauca</i> trunk	C1026	M, IV, V, VII, VIII, IX, X, XI, XII, JF	Southern Hemisphere, introduced in Europe		
<i>Catagoniopsis berteriana</i> (Mont.) Broth.	x	x	epiphytic, on rocks, slopes along a path, decaying wood	C990, C1090	M, IV, V, VI, VII, VIII, IX, X, JF	endemic to Chile		
<i>Catagonium nitens</i> subsp. <i>nitens</i> (Brid.) Cardot	x		rock-face along a street, shaded rocks, slopes, base of a trunk	C169, C810	VIII, IX, X, XII, JF	widespread in the Southern Hemisphere (S America, S and E Africa, Australia, Tasmania, New Zealand, New Guinea etc.)	x	x
<i>Ceratodon purpureus</i> (Hedw.) Brid.	x		rockface along a street	C179	IV, V, VII, VIII, IX, X, XI, XII, JF	Cosmopolitan		
<i>Chileobryon callicostelloides</i> (Broth. ex Ther.) Enroth	x	x	on rocks in a valley	C970, C1019, C1025, C1048	IV, V, VI, VII, VIII, IX, X, XI, XII, JF	endemic to Chile		
<i>Chorisodontium aciphyllum</i> (Hook.f. & Wilson) Broth.	x		epiphytic, e.g., on <i>Nothofagus obliqua</i>	C1042, C1070	VIII, IX, X, XI, XII, JF	pan-south-temperate; widely distributed in Patagonia and known elsewhere from Amsterdam Is., Falkland Is., South Georgia, Antarctica and New Zealand	x	x
<i>Chrysoblastella chilensis</i> (Mont.) Reim.	x		on earth along slopes, rockface along a street,	C127, C776, C782, C842		Southern Hemisphere (New Zealand, Australia, Marion Island, S America); in S America	x	x

			shaded rocks and slopes			northwards to Colombia		
<i>Cryphaea consimilis</i> Mont.	x	x	epiphytic	C982, C1046	IX, X, XI	Patagonian endemic	x	x
<i>Cryphaeophilum molle</i> (Dusen) M.Fleisch.		x	epiphytic	C969	VII, IX, X, XI	Patagonian endemic		x
<i>Dendrocryphaea gorveana</i> (Mont.) Paris & Schimp.	x		epiphytic near a brook	C843	X, XI	Patagonian endemic	x	x
<i>Dendrocryphaea lechleri</i> (Müll.Hal.) Paris & Schimp.	x	x	wet boulders in and near a brook	C838, C972, C1087	IX, X	Patagonian endemic	x	x
<i>Dicranoloma billardieri</i> (Brid.) Paris		x	epiphytic	C1027	V, IX, X, XI, XII, JF	widespread in Southern Hemisphere	x	
<i>Didymodon vinealis</i> (Brid.) R.H.Zander	x	x	shaded, earth covered wall, on rocks in a valley	C832, C1013	M, IV, V, VII, VIII, IX, X, XI	Subcosmopolitan		
<i>Distichophyllum krausei</i> (Lorentz) Cardot	x		on rocks in a brook	C1038	V, VIII, IX, X, XI, XII	Patagonian endemic	x	
<i>Ditrichum difficile</i> (Duby) M.Fleisch.	x		rockface along a street, on earth on slopes along a path	C173, C845	VII, VIII, IX, X, XI, XII, JF	Southern Hemisphere (S Africa, SE Asia, Micronesia, Australia, New Zealand, S America)		
<i>Eurhynchiella acanthophylla</i> (Mont.) M.Fleisch.	x	x	on earth along slopes, on boulders, epiphytic, forest floor	C833, C846, C1065	M, IV, V, VI, VII, VIII, IX, X, XI	Patagonian endemic		
<i>Eustichia longirostris</i> (Brid.) Brid.	x		slopes along a path, forest ground	C1069, C1086	M, V, VII, VIII, IX, X, XI, XII, JF	Central and S America, Subantarctic Islands, S Africa, western Indian Ocean		
<i>Fissidens asplenioides</i> Hedw.	x		on rocks near a brook, shaded slopes	C1069	V, VII, VIII, IX, X, XI, XII, JF	pan(sub)tropical-temperate		
<i>Fissidens crispus</i> Mont.	x	x	on earth near a periodic brook, earthy slopes along a path	C1032, C1054	M, V, VI, VII, VIII, IX, X, JF	SW U.S.A., Mexico, Central and S America, West Indies		

<i>Fissidens oblongifolius</i> Hook.f. & Wilson	x		on rocks near a brook, on earthy slopes, rock-face, shaded slopes, shaded boulders, on rocks in a valley	C167, C799, C840, C1044, C1047, C1075	VII, VIII, IX, X	Southern Hemisphere (New Zealand, Australia, Tasmania, Patagonia)		x
<i>Fissidens rigidulus</i> Hook.f. & Wilson		x	on wet rocks near a brook	C1033	M, V, VI, VII, VIII, IX, X, XI, XII, JF	Mexico, Central and S America, Malesia, Australia, New Zealand, SW Pacific, Subantarctic Islands		
<i>Funaria hygrometrica</i> var. <i>hygrometrica</i> Hedw.	x		on a wall near a brook	C825	M, IV, V, VI, VII, VIII, IX, X, XI, XII, JF	Cosmopolitan		
<i>Glyphothecium gracile</i> (Hampe) Broth.	x	x	epiphytic	C769, C1008	V, VI, VII, VIII, IX, X, XI, XII	Patagonian endemic		
<i>Grimmia trichophylla</i> Grev.	x	x	on boulders, dry rockface, rocks, shaded rocks	C128, C791, C795, C1073	M, IV, V, VI, VII, VIII, IX, X, XI	subcosmopolitan		
<i>Hypnodendron microstictum</i> Mitt.	x	x	on wet rocks and forest ground near a brook	C966	M, VI, IX, X, XI, JF	Patagonian endemic	x	
<i>Hypnum chrysogaster</i> Müll.Hal.	x	x	epiphytic on <i>Nothofagus alessandrii</i> , <i>N. glauca</i> , <i>N. obliqua</i> , on decaying wood	C807, C826, C1010, C1059	X, XI, JF	Southern Hemisphere (Patagonia, New Zealand, Australia, Tasmania)	x	x
<i>Juratzkaea seminervis</i> subsp. <i>seminervis</i> (Kunze ex Schwägr.) Lorentz	x	x	epiphytic, e.g., on <i>Nothofagus</i> , on decaying wood	C985, C987, C997, C998, C1004, C1037	M, II, IV, V, VI, VII, VIII, IX, X	endemic to Chile		
<i>Lembophyllum orbiculatum</i> (Thér.) Tangney	x	x	epiphytic, e.g., on <i>Nothofagus dombeyi</i> and on the base of a trunk	C834	VIII, IX, X, XII	Patagonian endemic	x	x
<i>Leptodon smithii</i> (Hedw.) F.Weber & D.Mohr	x	x	epiphytic	C829	M, V, VII, VIII, IX, X, XI, JF	Bipolar (N America, Holarctis, Australia, New		

						Zealand, S Africa, S America)		
<i>Leptostomum menziesii</i> (Hook.) R.Brown	x		epiphytic	-	VIII, IX, X, XII, JF	Patagonian endemic	x	x
<i>Lepyrodon hexastichus</i> (Mont.) Wijk & Margad.	x		epiphytic	C772, C797	VI, VII, VIII, IX, X, XI, XII, JF	Patagonian endemic		
<i>Lepyrodon lagurus</i> (Hook..f.) Mitt.	x		epiphytic	C1077	VII, VIII, IX, X, XI, XII	Patagonia, South Georgia		
<i>Lepyrodon parvulus</i> Mitt.	x	x	epiphytic	C971, C973, C1077, C1082,	IV, V, VIII, IX, X, JF	Patagonian endemic	x	
<i>Lepyrodon patagonicus</i> (Cardot & Broth.) B.H.Allen		x	epiphytic on the base of trunks	C965	V, VIII, IX, X, XI, XII, JF	Patagonian endemic	x	
<i>Macrocoma sullivantii</i> (Müll.Hal.) Grout	x	x	epiphytic	C1056	V, VIII, IX, X, XII, JF	SE U.S.A. to southern S America, Indian Subcontinent, China, E Asia, North-Central Pacific	x	
<i>Neckera chilensis</i> Schimp.	x	x	epiphytic	C800	M, IV, V, VIII, IX, X, XI, XII	Central and S America	x	
<i>Neckera scabridens</i> Müll.Hal.	x	x	epiphytic	C830	M, IV, V, VIII, IX, X, XI	Central and S America	x	
<i>Oligotrichum canaliculatum</i> (Hook.f. & Arnott) Mitt.	x		on earth on slopes along a path, rock-face along a street	C170, C845	M, V, VII, VIII, IX, X, XI, JF	Patagonian endemic		
<i>Orthotheciella varia</i> (Hedw.) Ochyra		x	on wet rocks near a brook	C1006	M, V, VIII, X	Bipolar	x	
<i>Orthotrichum bicolor</i> Thér.	x		epiphytic	C1074	V, VII, VIII, IX, X, XII	Patagonian endemic		
<i>Pentastichella pentasticha</i> (Mont.) Müll.Hal.	x	x	epiphytic, e.g., on <i>Nothofagus dombeyi</i>	C828	V, VII, VIII, IX, X, XI, XII, JF	southern S America, Peru		
<i>Philonotis krausei</i> (Müll.Hal.) Broth.	x		on slopes along a path, shaded slopes, shaded earth covered wall	C827, C844, C1051	M, V, VI, VII, VIII, IX, X, XI, JF	Patagonian endemic		
<i>Pohlia wahlenbergii</i> (F.Weber & D.Mohr)		x	on rocks in a brook	C1021	M, V, VI, VII, VIII, IX, X, XI, XII	subcosmopolitan		

A.L.Andrews								
<i>Polytrichum juniperinum</i> Hedw.	x		rock-face along a street	C177	M, V, VI, VII, VIII, IX, X, XI, XII	subcosmopolitan		
<i>Porothamnium panduraefolium</i> (Müll.Hal.) M.Fleisch.	x	x	on shaded rocks near brooks	C779, C783	VIII, IX, X, XI, XII	Patagonian endemic	x	x
<i>Ptychomitrium fernandesianum</i> (Mitt.) A.Jaeger	x	x	rock-face along a street, on boulders, on decaying wood	C129, C821, C989	X, JF	Patagonian endemic	x	x
<i>Pyrrhobryum mnioides</i> (Hook.f.) Manuel	x		slopes along a path, forest ground	C774	M, V, VII, VIII, IX, X, XI, XII, JF	Central and S America, Australia, Tasmania, New Zealand		
<i>Racomitrium lamprocarpum</i> (Müll.Hal.) A.Jaeger	x		on boulders in and near a brook	C801, C839	M, VIII, IX, X, XI, XII, JF	southern S America	x	
<i>Rhaphidorrhynchium callidum</i> (Mont.) Broth.	x	x	epiphytic in a shaded and humid forest near a brook, on boulders, epiphytic on <i>Nothofagus glauca</i>	C824, C1057	IV, V, VI, VII, VIII, IX, X, XI, XII	endemic to Chile		
<i>Rigodium toxarium</i> var. <i>toxarium</i> (Schwägr.) A.Jaeger	x	x	on decaying wood, rocks near a brook, epiphytic, boulders, boulders near a brook	C780, C785, C804, C808, C813, C967, C1031, C1063,	IV, V, VI, VIII, IX, X, XI, JF	Central and S America (from Mexico to Patagonia), E Africa, East African islands	x	
<i>Schistidium falcatum</i> (Hook.f. & Wilson) Bremer	x		boulders near a brook	C816	X, XI, XII	amphiatlantic subantarctic (Subantarctic Islands, Antarctica, Tierra del Fuego, streets of Magellan)	x	x
<i>Sematophyllum</i> cf. <i>uncinatum</i> I.G.Stone & G.A.M.Scott	x		on boulders near a brook, on slopes	C773, C1068	VI	New Zealand, Australia, Patagonia	x	
<i>Symblepharis krausei</i> (Lorentz) Ochyra & Matteri	x		on boulders in a brook	C817	X, XI, XII, JF	Patagonian endemic	x	x

<i>Thuidiopsis sparsa</i> (Hook.f. & Wilson) Broth.	x		on boulders	C793	VIII, IX, X, XI, JF	Malesia, New Caledonia, Oceania, Australasia, S America, Comores, Tristan da Cunha, Madeira	x	x
<i>Triquetrella patagonica</i> Müll.Hal.		x	sun exposed, earth covered rocks in a clearing of the forest	C1029	V, VIII, IX	endemic to Chile	x	
<i>Vittia pachyloma</i> (Mont.) Ochyra		x	wet rocks in a brook	-	M, V, VI, VII, VIII, IX, X, XI, XII, JF	S America (Colombia to Tierra del Fuego), S Africa		
<i>Weissia</i> cf. <i>kunzeana</i> Müll.Hal.	x		slopes along a path in the forest	C1050	VI, X, JF	endemic to Chile	x	
<i>Weymouthia mollis</i> (Hedw.) Broth.	x	x	epiphytic in a humid forest, pendulous	C986, C992, C1052	IV, IX, X, XI, XII, JF	Patagonia, Australia, Tasmania, New Zealand	x	
<i>Zygodon inermis</i> Malta		x	epiphytic	C991	VII, X, XI	Patagonian endemic		
<i>Zygodon intermedius</i> Bruch & Schimp.	x	x	epiphytic on <i>Nothofagus dombeyi</i> and other trees	C794, C798, C1001, C1035, C1089	VII, X, XI, XII, JF	pantropical-Southern Hemisphere		
<i>Zygodon papillatus</i> Mont.	x		epiphytic	C1089	VIII, IX, X, XI, XII	Patagonian endemic	x	x