

Epiphytic lichens of Conguillío National Park, southern Chile

Líquenes epífitos en el Parque Nacional Conguillío, sur de Chile

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ABSTRACT

One hundred and thirty eight epiphytic lichen species in 40 genera, are recorded from Conguillio National Park (38°30' - 38°50' S; 71°30' - 71°55' W), with predominancy of typically southern South American species. Lichen diversity is high, about 9 % of the lichen mycobiota from Chile, due mainly to species of the genera *Bunodophoron*, *Menegazzia*, *Nephroma*, *Pannaria*, *Protousnea* and *Pseudocyphellaria*. Levels of endemism are rather high (nearly 40 %); also austral and cosmopolitan species, about 19 % and 16 % respectively, are the most representative biogeographical elements in the Park.

KEYWORDS: Endemism, epiphytes, lichens, phorophytes, wild protected areas.

RESUMEN

Se registran para la micobiota líquénica epífita en el Parque Nacional Conguillío (38°30' - 38°50' S; 71°30' - 71°55' W) 183 especies en 40 géneros con predominancia de especies típicas del sur de Sudamérica. La diversidad es elevada, alrededor del 9 % de la flora líquénica del país debido, principalmente, a especies de los géneros *Bunodophoron*, *Menegazzia*, *Nephroma*, *Pannaria*, *Protousnea* and *Pseudocyphellaria*. Los niveles de endemismo son elevados, cerca del 40 %; los líquenes australes y cosmopolitas, 19 % y 16% respectivamente, son los elementos biogeográficos más representativos en el Parque.

PALABRAS CLAVE: Endemismo, epífitos, líquenes, forófitos, áreas silvestres protegidas.

INTRODUCTION

Lichens play a very important role in nutrient cycling in the rainforest ecosystem and are therefore essential to the well-being of one of the most useful and important Chile's natural resources. In the forested areas on the western slopes of the Andean mountain range, from latitude 36° S to 49° S, the development of the lichen mycobiota is characterized by both high species diversity and high biomass where epiphytic lichens are dominant (Galloway 1998, Quilhot *et al.* 2012).

Lichens are the most conspicuous epiphytes in trees and shrubs in Conguillio National Park (38°30' - 38°50' S; 71°30' - 71°55' W) located in the Araucanía Region (IX Region) at the foot of the Andean mountain range. Conguillio is part of the Valdivian temperate forests ecoregion (Dinerstein *et al.* 1995). Also it is included in the Araucarias Biosphere Reserve created by UNESCO to protect forests, biodiversity and habitats in one of the most threatened areas in the country.

The dominant feature in the Park is Llaima volcano (3,125 m); its eruptions and those of Sierra Nevada volcano (2,544 m), currently inactive, have modelled the landscape giving origin to lakes, lagoons, rivers and scoria boulders in lava flows. Climate in the area is warm-temperate, with mean temperatures of 15,1 °C in summer and 6,0 °C in winter; precipitations range between 1,500 to 2,500 mm/year. From 1,400 m of altitude, temperatures drop below 0 °C and precipitations increase to 3,000 mm/year.

According to Gajardo (1983), the Conguillio National Park can be considered as a natural reserve representing the Andean-Patagonian forests and the Andean deciduous forests. The forest types have been described by Arriagada & Cares (1996) and Mahncke (1997); the main forest species are *Araucaria araucana* (Molina) K. Koch., *Austrocedrus chilensis* (D. Don) Pic.Ser. et Bizz., *Nothofagus antarctica* (G. Forst.) Oerst., *N. pumilio* (Poepp. et Endl.) Krasser, *N. dombeyi* (Mirb.) Oerst. and *N. obliqua* (Mirb.) Oerst.

Major contributions to present knowledge of lichens

from Conguillio have been made principally by Bjerke (2001, 2005), Bjerke & Elvebakk (2001), Bjerke *et al.* (2003a,b), Elvebakk (2007) and Elvebakk *et al.* (2007, 2010), Galloway (1992, 1994, 2007), Galloway & Guzmán-Grimaldi (1988), Galloway & James (1987), Galloway & Jørgensen (1995), Galloway *et al.* (2006), Wedin (1995), White & James (1988). Currently there is not a compilation about the lichen mycobiota in the Park. This report contributes to better understand the epiphytic lichen flora of Conguillio including data about substrate, ecological requirements of the habitat, distribution and biogeographical affinities.

MATERIAL AND METHODS

Compilation of the lichen mycobiota from Conguillio National Park follows the published lichen records and lichen inventories performed in the last 30 years (Quilhot, pers. comm.). Field work and logistic support was assisted by CONAF IX Region, and funded by grants provided by Dirección de Investigación, Universidad de Valparaíso.

Identification of the species was undertaken in collaboration with David Galloway (Landcare Research

Ltd., New Zealand), Jarle Werner Bjerke and Arve Elvebakk (University of Tromsø, Norway) and Peter W. James (The British Museum, London).

Field studies and collecting trips were performed in different sites in the Park, mainly in the vicinity of Llaima volcano (Fig. 1). Target epiphytes were considered to be all species growing on trees and shrubs between ca. 0 - 2 m height.

Laboratory studies were performed on material collected including lichen specimens from 1978 to 2010.

Comparisons with herbarium material were performed. Observations and measurements of anatomical and external features were performed using a Nikon model 104 microscope, and a Leica DMLS stereomicroscope. Thin sections of thallus –being cut them by hand– were mounted in water, followed by 10 % KOH; acid fuchsin and methylene blue were also used.

The names of the species are given in alphabetical order. The list of taxa includes all lichen material determined at species level. Nomenclature follows Galloway & Quilhot (1998), and more recent taxonomic treatments. Lichen material is deposited in the Herbarium (UV) of the Universidad de Valparaíso.

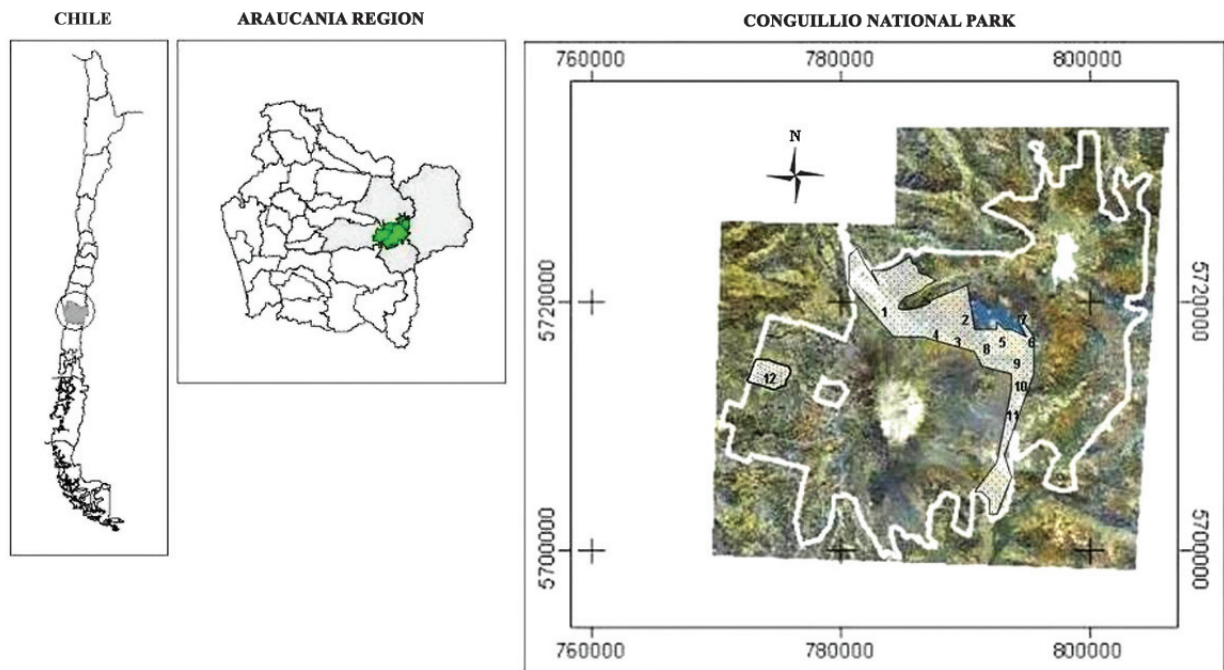


FIGURE 1. Study area in Conguillio National Park, Chile. (1) Laguna Captrén, (2) Los Carpinteros, (3) Centro de Información, (4) Velo de la Novia, (5) Cabañas del Lago, (6) Playa Linda, (7) Road to Sierra Nevada, (8) El Hoyón, (9) La Caseta, (10) Laguna Arcoiris, (11) Laguna Verde, (12) Los Paraguas, (LC) Lago Conguillio.

FIGURA 1. Áreas de estudio en el Parque Nacional Conguillio, Chile. (1) Laguna Captrén, (2) Los Carpinteros, (3) Centro de Información, (4) Velo de la Novia, (5) Cabañas del Lago, (6) Playa Linda, (7) Camino a Sierra Nevada, (8) El Hoyón, (9) La Caseta, (10) Laguna Arcoiris, (11) Laguna Verde, (12) Los Paraguas, (LC) Lago Conguillio.

RESULTS AND DISCUSSION

Conguillio National Park is part of the Valdivian temperate forests ecoregion with predominance of typically southern South American species. The rich and diverse epiphytic flora –138 species in 40 genera– is a consequence of the variety of ecosystems in the area due to geographic and climatic features. Lichen species have increased from 1383 in the last decades (Galloway & Quilhot 1998) to 1450 species up to date, suggesting that epiphytic lichen diversity is high; 9 % of the Chilean lichen mycobiota is present in the Park.

The most representative are: *Bunodophoron*, *Leptogium*, *Menegazzia*, *Nephroma*, *Pannaria*, *Protousnea*, *Pseudocyphellaria*, *Psoroma* and its related genera.

Sixteen species of *Menegazzia* have been registered in Conguillio; except *M. magellanica* and *M. megalospora* from southernmost Chile. *M. globulifera*, one of the most frequent species in the genera, grows better in rather dry, open and sunny environments (Bjerke *et al.* 2003a, Quilhot *et al.* 2012); conversely, *M. wilsonii* and *M. violascens* are found in very humid and shady sites. Other Hypogymniaceae, the genus *Hypogymnia*, is represented by four species.

Protousnea, originally described as a subgenus of *Usnea*, and elevated by Krog (1976) to generic level, is one of the most conspicuous genus in the Park, and includes seven species, six of which grow on trees and shrubs at altitudes ranging from 600 to 1,500 m. The species show high affinities to light; thalli are often more abundant in the canopy than on trunks or lower branches. The genus, an endemic element of southern South America, has a very limited distribution; in Chile it is known from the Andean foot-hills in the VII Region to Navarino Island. A new species, *Protousnea fibrillatae* Calvelo, Socker-Wörgöter, Elix & Stenroos, has been recently described in Argentina (Calvelo *et al.* 2005).

The family Pannariaceae is represented by the genera *Degeliella*, *Pannaria*, *Parmeliella*, *Psoroma*, *Psorophorus* and *XanthopSORoma*. In the last few years, *Psoroma* was a collective name for Pannariaceae species with thalline excipuli. At present, using phylogenetic analysis, foliose species have been included in *Pannaria* (Ekman & Jørgensen 2002, Elvebakk & Galloway 2003, Passo & Calvelo 2006), and in the new genera *Psorophorus* and *XanthopSORoma* (Elvebakk *et al.* 2010).

Species of the family are currently found in areas of Central-South Chile (Bio Bio to Magallanes). Several species of the family registered in Conguillio are found on bark of trees in pure forests of *Austrocedrus chilensis* in Laguna del Laja National Park, considering that this wild protected area could be the dispersion center of Pannariaceae in the country (Rubio & Quilhot, pers. obs.). Trunks and primary branches of *A. chilensis* in the scoria boulders in lava flows are very rich in *Pannaria conoplea*, *P. farinosa* and *P. tavaresii*.

The genus *Parmeliella* is represented by *P. nigrocincta*, a

rather common lichen species, and *P. granulata* considered as an infrequent lichen species. Observations in other wild protected areas and the knowledge of species distribution in the country have shown that ecological features, in terms of micro and macrohabitats, generate a concentration of Pannariaceae (20 species) in Conguillio National Park.

The environment is also favourable to the growth of *Pseudocyphellaria*. Galloway (1992) considers major factors controlling distribution of species such as: rainfall, an adequate illumination, with latitude, altitude and mean annual temperature; these factors would influence on the growth of numerous species of the genus; 54 species have been registered in Chile (Galloway 1992, Bjerke 2003b), 54 % of them occur in the Park. *Pseudocyphellaria coriifolia*, *P. crocata*, *P. granulata*, *P. hirsuta*, *P. faveolata* and *P. nudata* are common species in different areas in the Park.

Seven species of the genus *Sticta* have been collected in Conguillio. *S. caulescens* is the most common and grows in very humid and shady sites, as an epiphyte in the lower part of trunks of different phorophytes. The other species of the genus are found occasionally in the base of trunks.

White & James (1988) described sixteen species of *Nephroma* in Chile; nine of which have been collected in Conguillio. *N. antarcticum* var. *antarcticum* and *N. cellulorum* var. *cellulosum* are the most frequent species in the genus. Their ecological requirements seem to be precarious or they have a high degree of plasticity to tolerate environmental changes in the habitat. Also they have the largest distribution including Juan Fernández Archipelago.

Coelopogon epiphorellus, *Platismatia glauca* and *Tukemannopsis chlorophylla*, are species currently found in steppe areas in Aysén (Quilhot *et al.* 2012) which are very common on *Nothofagus* spp. and *Araucaria araucana* in the area of Laguna Captrén.

Almost all the species of *Bunodophoron* registered in Chile are present in Conguillio National Park on trunks of large trees.

Teloschistes chrysophthalmus and *Physma chilensis* are infrequent in Conguillio. *P. chilensis* is currently found in Araucanía Region, particularly in the Malleco National Reserve at 500 to 800 m altitude, also the species was collected in Laguna Amargo, at 800 m altitude near Parral. Conversely, *T. chrysophthalmus* is found on coastal zones in central and south Chile; the species has not been registered in areas of high altitude near the mountain range.

Collembataceae are poorly represented. *Collema glaucophthalmum* is relatively frequent on bark of large trees in very shady sites. Species of *Leptogium* are occasionally found.

Most lichens frequently occupy wide unexplored distribution areas in terrestrial ecosystems with frequent intercontinental disjunctions. Due to the above, distribution maps are usually incomplete and the composition of lichen floras of remote regions is often poorly known. These

problems and a lack of fossil records have hindered studies on the biogeography of lichens in the past (Printzen 2008). These considerations are important to assess the distribution patterns of some lichen species in Conguillio. Endemic elements from southern South America –nearly 40 %–, austral (18 %) and cosmopolitan (16 %) are predominant in the Park.

CONCLUSIONS

The temperate high-altitude forests along the Chilean-Argentinean border appear to be a climatic equivalent of antiboreal forests at low altitudes and south latitude 48° S (Bjerke *et al.* 2003a). Conversely, lichens that are commonplace at low altitude in antiboreal zones are confined to higher altitude in temperate areas, as occurs in Conguillio. *Protosnea* grows between 600 and 1,300 m in Conguillio (38,3° S); the species are found from 200 to 1,200 m in steppe forests in Aysén, at latitude 47,3° S (Quilhot *et al.* 2012), and at sea level in Navarino Island, at 55,04° S (Redón & Quilhot 1977). The genus *Menegazzia* is very common in southern Chile. Sixteen species have been collected in temperate forests in Conguillio; all the species registered in Chile (18) are found at sea level in Laguna San Rafael National Park in Aysén Region at 46,4° S (Quilhot *et al.* 2002), while in steppe areas, at high altitude, the number of species noticeably decreased.

Lichen diversity and biomass have diminished in the last three decades (Quilhot, pers. obs.). Tourism affects the environment including phorophytes and epiphytes. Large thalli of *Pannaria pallida* and *P. farinosa*, having 25 cm diameter or more, have disappeared; also *Pseudocyphellaria scabrosa*, *P. encoensis*, *P. pluvialis* and *P. santessonii* are difficult to find today in the habitats where they were characteristics.

Nevertheless, field observations and lichen collections in wild protected areas in Araucanía Region (Quilhot & Rubio, unpublished) demonstrate that the major epiphytic lichen diversity is found in Conguillio National Park.

LIST OF THE LICHEN SPECIES

Alectoria ochroleuca (Hoffm.) A. Massal.

Circumpolar. The species grows on bark of large trees, especially on bark of *Araucaria araucana*. In Chile is known from Llanquihue (X Region) to Navarino Island (XII Region). (Redón 1974, Brodo & Hawksworth 1977, Redón & Quilhot 1977).

Bunodophoron australe (Laurer) A. Massal.

The species is known from Argentina, Chile, New Zealand,

Tasmania, New Caledonia and Hawaii. It is currently found on bark of *Araucaria araucana* and *Nothofagus* spp. in humid and shady habitats on the roadside to Velo de la Novia. In Chile is known from Nahuelbuta National Park (IX Region) to Magallanes (XII Region). (Wedin 1995, Elix & McCarthy 1998).

Bunodophoron dodgei (Ohlsson) Wedin

Endemic to southern South America. The species is currently found on trunks of *Araucaria araucana* and old specimens of *Nothofagus* spp. in rather shady places, especially in El Hoyón and La Caseta. In Chile is known from Malleco (X Region) to Magallanes (XII Region). (Wedin 1995).

Bunodophoron imshaugii (Ohlsson) Wedin

The species is widespread in the Southern Hemisphere (Argentina, Chile, New Caledonia, New Zealand and Tasmania). It is found in shady sites on bark of *Araucaria araucana*-*Nothofagus* forests in the area between the Centro de Información and Conguillio Lake. In Chile is known from Nahuelbuta National Park (IX Region) to Magallanes (XII Region). (Wedin 1995, Elix & McCarthy 1998).

Bunodophoron insigne (Laurer) Wedin

The species is known in Argentina, Chile, New Zealand, South Australia and Solomon Islands. It grows on trunks of *Araucaria araucana* and *Nothofagus* spp. on the roadside to Velo de la Novia. In Chile is known from Nahuelbuta National Park (IX Region) to Magallanes (XII Region). (Wedin 1995, Elix & McCarthy 1998).

Bunodophoron patagonicum (C.W. Dodge) Wedin

Austral. The species is found on trunks of large trees. Epiphyte in humid and shaded sites on *Araucaria araucana* and *Nothofagus* spp. In Chile is known in Juan Fernández Archipelago and from Nahuelbuta National Park (IX Region) to Magallanes (XII Region). (Wedin 1995, Elix & McCarthy 1998).

Bunodophoron ramuliferum (I.M. Lamb) Wedin

The species is present in southernmost South America (Argentina and Chile), New Zealand, Australia and New Caledonia. It is common on trunks in large trees in humid and shaded habitats. In Chile is known in Juan Fernández Archipelago, and from Malleco (IX Region) to Magallanes (XII Region). (Wedin 1995, Elix & McCarthy 1998).

Bunodophoron scrobiculatum (C. Bab) Wedin

The species is widely distributed in the Southern Hemisphere (southern South America, New Zealand and Tasmania). It is found on trunks in large trees, particularly in *Araucaria*

araucana. In Chile is known in Juan Fernández Archipelago and from Malleco (IX Region) to Magallanes (XII Region). (Wedin 1995).

Coccotrema cucurbitula (Mont.) Müll. Arg.

The species is known in temperate oceanic or suboceanic regions around the Pacific Ocean. It is found in the Park on trunks and twigs of forest species. In Chile is known from Malleco (IX Region) to Navarino Island and the Antarctic Territory (XII Region). (Redón & Quilhot 1977, Messuti 1996, Øvstedal & Lewis Smith 2001).

Coelopogon epiphorellus (Nyl.) Brusse & Kärnefelt

South American-African element. The species is widely distributed on bark of *Araucaria araucana*, *Nothofagus* spp., other forest trees, shrubs, and also on rocks. In Chile is known in La Campana National Park (V Region), and from Altos de Lircay National Reserve (VII Region) to Navarino Island and the Antarctic Territory (XII Region). (Redón & Quilhot 1977, Redón & Walkowiak 1978, Brusse & Kärnefelt 1991, Øvstedal & Lewis Smith 2001).

Coenogonium luteum (Dicks.) Kalb & Lücking

Cosmopolitan; foliicolous specimens have been reported from tropical regions. It was collected on bark of tree trunks in humid and shaded sites. In Chile is known from Federico Albert National Reserve (VII Region) to Aysén (XI Region). (Lücking & Kalb 2000).

Collema glaucophthalmum Nyl.

Pantropical. The species is an epiphyte of trees and shrubs in rather humid and shaded sites. It is currently found in the area between Centro de Información and Conguillio Lake. Also common on bark of *Nothofagus antarctica* in El Hoyón. In Chile is known from Altos de Lircay National Reserve (VII Region) to Aysén (XI Region). (Filson 1992).

Degeliella versicolor (Müll. Arg.) P.M. Jørg.

Austral. The species is an epiphyte of trees and shrubs in shaded forests. It has been collected on bark of *Nothofagus pumilio* on the roadside to Velo de la Novia. In Chile is known from Los Queñes (VII Region) to Tierra del Fuego (XII Region). (Galloway & James 1985, Jørgensen 2004).

Dictyonema glabratum (Spreng.) D. Hawksw.

Pantropical. The species is found amongst mosses and shrubs, in shady and humid habitats in mixed *Araucaria-Nothofagus* forests. In Chile is known from Putre (I Region), Cerro Moreno (II Region), Juan Fernández Archipelago, and from Altos de Lircay National Reserve (VII Region) to Magallanes (XII Region).

(Parmasto 1978).

Everniastrum sorocheilum (Vain.) Hale ex Sipman

Austral-pantropical. The species is an epiphyte of trees and shrubs in open sites, infrequent in the Park. In Chile is known from Valparaíso (V Region) to Curicó (VII Region), and from Temuco (IX Region) to Magallanes (XII Region). (Sipman 1986, Adler & Calvelo 2002).

Gowardia nigricans (Ach.) P. Halonen, L. Myllys, S. Velmala & H. Hyvärinen.

Circumpolar. The species is an epiphyte of large trees in habitats of high humidity. It has been collected on bark of *Araucaria araucana* in Laguna Captrén. In Chile is known from Valdivia (X Region) to Navarino Island (XII Region). (Brodo & Hawksworth 1977, Redón & Quilhot 1977, Halonen *et al.* 2009).

Hypogymnia mundata (Nyl.) Rassad.

Austral. The species is an epiphyte on *Nothofagus* spp., particularly on *Nothofagus antarctica*, in shady sites. In Chile is known from Malleco (IX Region) to Magallanes (XII Region). (Elix 1992).

Hypogymnia subphysodes (Kremp.) Filson var. *subphysodes* (Kremp.) Filson

Austral. The species is an epiphyte on bark of *Nothofagus* spp. and *Austrocedrus chilensis*, in open sites, and in scoria boulders on lava flows near Laguna Verde. In Chile is known in Fray Jorge National Park (IV Region), and from Altos de Lircay National Reserve (VII Region) to Magallanes (XII Region). (Elix 1992).

Hypogymnia turgidula (Bitter) Elix

Austral. The species is an epiphyte of trunks and twigs in *Nothofagus* forests. It was collected near Laguna Captrén. In Chile is known from Malleco (IX Region) to Magallanes (XII Region). (Elix 1992).

Hypotrachyna brevirhiza (Kurok.) Hale

Pantropical and extending to temperate areas of Argentina and Chile. The species is an epiphyte of *Araucaria araucana*, *Nothofagus* spp. and shrubs in humid forests, such as on the road to Los Carpinteros. In Chile is known from Mocha Island (VIII Region) to Magallanes (XII Region). (Nash III *et al.* 2002, Quilhot *et al.* 2010).

Hypotrachyna laevigata (Sm.) Hale

Cosmopolitan. The species is an epiphyte of trees and shrubs in open sites with high direct solar radiation. It has been collected in Laguna Captrén, El Hoyón and Laguna

Arcoiris. In Chile is known from Altos Lircay National Reserve (VII Region) to Magallanes (XII Region). (Hale 1974, Nash III *et al.* 2002).

Hypotrachyna sinuosa (Sm.) Hale

Cosmopolitan. The species is an epiphyte of trees and shrubs, particularly in *Araucaria-Nothofagus* forests in open sites around Laguna Captrén, El Hoyón, La Caseta and Laguna Arcoiris; also on bark of *Austrocedrus chilensis* in scoria boulders on lava flows near Laguna Verde. In Chile is known from Río de Los Cipreses National Reserve (VI Region) to Magallanes (XII Region). (Hale 1974, Nash III *et al.* 2002).

Leptogium australe (Hook. f. & Taylor) Müll. Arg.

Apparently endemic to southern South America. The species is an epiphyte of shrubs, in humid and rather shaded habitats. In Chile is known from Mocha Island (VIII Region) to Magallanes (XII Region). (Galloway & Jørgensen 1995, Quilhot *et al.* 2010).

Leptogium azureum (Sw. ex Ach.) Mont.

Cosmopolitan. The species is an epiphyte of trees and shrubs in shaded humid conditions. In Chile is known in Cerro Moreno (II Region), Fray Jorge National Park (IV Region), Juan Fernández Archipelago, La Campana National Park (V Region), and from Mocha Island (VIII Region) to Aysén Region. (Redón & Walkowiak 1978, Galloway & Jørgensen 1995; Quilhot *et al.* 2010).

Leptogium decipiens P.M. Jørg.

Endemic to southern South America. An epiphyte of trees and shrubs in humid rainforests. It was collected on the road to Los Carpinteros. In Chile is known from Mocha Island (VIII Region) to Magallanes (XII Region). (Galloway & Jørgensen 1995, Quilhot *et al.* 2010).

Leptogium juresianum C. Tavar.

The species is known in western Europe, east Africa and northern Andes. It is an epiphyte of twigs and shrubs both in shaded, humid forests. In Chile is known from Puyehue (X Region) to Aysén (XI Region). (Galloway & Jørgensen 1995).

Leptogium laceroides De Leds.

The species is known in Mexico, Tristán de Cunha, east Africa and New Zealand. An epiphyte of shrubs and trees both in shaded, humid rainforests. Collected in the area of the Centro de Información. In Chile is known from Conguillio National Park to Aysén (XI Region). (Galloway & Jørgensen 1995).

Melanohalea ushuaiensis (Zahlbr.) Essl.

The species is known in southern South America and Antarctica. It is an epiphyte in *Nothofagus* spp. near Laguna Verde. In Chile is known from Termas de Chillán (VIII Region) to Navarino Island and the Antarctic Territory (XII Region).

(Redón & Quilhot 1977, Øvstedal & Lewis Smith 2001, Blanco *et al.* 2004).

Menegazzia chrysogaster Bjerke & Elvebakk

Endemic to southern South America. It is an epiphyte of trees and shrubs in low to medium light conditions. It has been collected on bark of *Nothofagus* spp. in Laguna Captrén. In Chile is known from Termas de Chillán (VIII Region) to Magallanes (XII Region). (Bjerke & Elvebakk 2001, Bjerke *et al.* 2003a).

Menegazzia cincinnata (Ach.) Bitter

Endemic to southern South America. It grows in open sites on bark and twigs of *Nothofagus antarctica*, on the roadside to El Hoyón and La Caseta. In Chile is known from Termas de Chillán (VIII Region) to Navarino Island (XII Region). (Redón & Quilhot 1977, Bjerke 2005).

Menegazzia dispora R. Sant.

Endemic to southern South America. The species is an epiphyte of *Araucaria araucana* and *Nothofagus* spp. in rather shaded environments. It has been collected in Laguna Captrén. In Chile is known from Cautín (IX Region) to Tierra del Fuego (XII Region). (Bjerke 2005).

Menegazzia fumarprotocetrarica Calvelo & Adler

Endemic to southern South America. It is found in fairly open forests on bark of *Araucaria araucana* and *Nothofagus* spp. in Laguna Captrén. In Chile is known from Mocha Island (VIII Region) to Magallanes (XII Region). (Adler & Calvelo 1996, Bjerke *et al.* 2003a, Quilhot *et al.* 2010).

Menegazzia globulifera R. Sant.

Panaustral. The species is epiphyte of trees and shrubs in light exposed relatively dry vegetation. It has been collected on bark of *Nothofagus* spp. and shrubs in Laguna Captrén, El Hoyón and Playa Linda. In Chile is known from Termas de Chillán (VIII Region) to Navarino Island (XII Region). (Redón & Quilhot 1977, Bjerke *et al.* 2003a, Quilhot *et al.* 2010).

Menegazzia hollermayeri (Räsänen) R. Sant.

Endemic to southern South America. The species is infrequent in the Park, growing on bark of *Nothofagus* spp. in open sites. In Chile is known from Malalcahuello National Reserve (IX Region) to Aysén (XI Region). (Bjerke 2005, Quilhot *et al.* 2012).

Menegazzia kawesqarica Bjerke & Elvebakk
Endemic to southern South America. It is an epiphyte of large trees, with fairly high direct solar radiation; it is also common on shaded rock outcrops. The species is mainly found in Laguna Captrén on bark of *Nothofagus* spp. In Chile is known from Nahuelbuta National Park (IX Region) to Magallanes (XII Region).
(Bjerke & Elvebakk 2001, Bjerke *et al.* 2003a).

Menegazzia neozelandica (Zahlbr.) P. James
Austral. The species is an epiphyte of trees and shrubs. It was collected near Laguna Captrén on bark of *Araucaria araucana* and *Nothofagus* spp. In Chile is known from Fray Jorge National Park (IV Region), Juan Fernández Archipelago, and from Nahuelbuta National Park (IX Region) to Magallanes (XII Region).
(Bjerke *et al.* 2003a).

Menegazzia norsorediata Adler & Calvelo
Austral. The species is an epiphyte of *Nothofagus* spp. and shrubs, in microhabitats with variable light conditions. In Chile is known from Nahuelbuta National Park (IX Region) to Magallanes (XII Region).
(Adler & Calvelo 1996, Bjerke *et al.* 2003a).

Menegazzia sanguinascens (Räsänen) R. Sant.
Austral. The species is an epiphyte of large trees in habitats with high direct solar radiation; it is also common on shaded rock outcrops. It is found in mixed *Araucaria- Nothofagus* forests in Laguna Captrén, El Hoyón, La Caseta and Laguna Arcoiris. In Chile is known from Nahuelbuta National Park (IX Region) to Navarino Island (XII Region).
(Redón & Quilhot 1977, Bjerke *et al.* 2003a).

Menegazzia subpertusa P. James & D.J. Galloway
Austral. The species is an epiphyte of *Nothofagus* spp. in rather sunny and dry microhabitats. In Chile is known from Termas de Chillán (VIII Region) to Magallanes (XII Region).
(Galloway 1983, Bjerke *et al.* 2003a).

Menegazzia tenuis R. Sant.
Endemic to southern South America. The species is infrequent in the Park. It has been collected on bark of *Nothofagus pumilio* in a deep shaded habitat of high humidity in the roadside to Velo de la Novia. In Chile is known from Melipeuco and Icalma (IX Region) to Magallanes (XII Region).
(Bjerke *et al.* 2003a).

Menegazzia valdiviensis (Räsänen) R. Sant.
Endemic to southern South America. The species is an epiphyte on trees and shrubs, often in understory vegetation, avoiding the most shaded habitats. It has been collected on

bark of *Araucaria araucana* and *Nothofagus* spp. in Laguna Captrén and in *N. antarctica* in El Hoyón. In Chile is known from Nahuelbuta National Park (IX Region) to Magallanes (XII Region).
(Bjerke *et al.* 2003a).

Menegazzia violascens (Räsänen) Bjerke
Endemic to southern South America. The species is an epiphyte on trees and shrubs in very humid and shaded sites, currently found on bark of *Nothofagus pumilio*, particularly on the roadside from Centro de Informaciones to Laguna Captrén and in Playa Linda. In Chile is known from Nahuelbuta National Park (IX Region) to Navarino Island (XII Region).
(Bjerke 2005).

Menegazzia wandae Bjerke
Endemic to southern South America. The species is an epiphyte of trees in moderate to dense shade habitats. It was collected on bark of *Nothofagus antarctica* in El Hoyón and in Laguna Captrén. In Chile is known from Mocha Island (VIII Region) to Aysén (XI Region).
(Bjerke 2001, Bjerke *et al.* 2003a, Quilhot *et al.* 2010, 2012).

Menegazzia wilsonii (Vain. ex Räsänen) Bjerke
Endemic to southern South America. The species grows on bark of trees and shrubs, also on mosses in shady and more light-open rainforests. It has been collected on bark of *Araucaria araucana* and *Nothofagus* spp. in Laguna Arcoiris and in a very humid site near Laguna Verde. In Chile is known from Termas de Chillán (VIII Region) to Tierra del Fuego (XII Region).
(Bjerke 2005).

Metus efflorescens D. J. Galloway & P. James
Endemic to southern South America. The species is found on living and dead trees, also on rocks in open sites. In Chile is known from Conguillio National Park to Magallanes (XII Region).
(Galloway & James 1987, Stenroos 1995).

Metus pileatus (Mont.) D.J. Galloway & P. James
Endemic to southern South America. The species is found on bark or decorticated wood, usually over mosses and hepatics in moist, shaded sites. In Chile is known in Juan Fernández Archipelago and from Conguillio National Park to Magallanes (XII Region).
(Galloway & James 1987, Stenroos 1995, Messuti *et al.* 2007).

Nephroma analogicum Nyl.
Endemic to southern South America. The species is an epiphyte of trees and shrubs in moist sites and in high-light conditions. It was collected in Los Paraguas on bark

of *Nothofagus* spp. In Chile is known in Juan Fernández Archipelago and from Conguillio National Park to Tierra del Fuego (XII Region). (White & James 1988).

Nephroma antarcticum (Jaq.) Nyl. var. *antarcticum*
Endemic to southern South America. The species is an epiphyte of trees and shrubs, also on rocks in a wide range of light conditions. It is currently found on bark of *Araucaria araucana*, *Nothofagus* spp. and other forest species. In Chile is known in Fray Jorge National Park (IV Region), Juan Fernández Archipelago, and from Altos de Lircay National Reserve (VII Region) to Navarino Island (XII Region). (Redón & Quilhot 1977, White & James 1988).

Nephroma cellulorum (Ach.) Ach. var. *cellulosum*
Austral. The species is an epiphyte in mixed *Araucaria araucana* and *Nothofagus* forests and shrubs in humid sites, widely distributed in the Park. In Chile is known in Juan Fernández Archipelago and from Valparaíso (V Region) to Navarino Island (XII Region). (Redón & Quilhot 1977, White & James 1988).

Nephroma cellulorum (Ach.) Ach. var. *isidioferum* J.S. Murray
Austral. The species grows on *Nothofagus* spp. and shrubs in humid and shady sites. It was collected in Los Paraguas. In Chile is known from Malalcahuello National Reserve (IX Region) to Navarino Island (XII Region). (White & James 1988, Quilhot *et al.* 2012).

Nephroma chubutense I.M. Lamb
Endemic to southern South America. The species is an epiphyte in *Nothofagus* forests, also on fallen trunks; restricted to very humid habitats. The species has been collected in Los Paraguas. In Chile is known from Conguillio National Park to Aysén (XI Region). (White & James 1988, Quilhot *et al.* 2012).

Nephroma kuehnemannii I.M. Lamb
Endemic to southern South America. The species grows on bark of *Nothofagus* spp. and shrubs, confined to humid and shaded sites in Los Paraguas. In Chile is known from Conguillio National Park to Aysén (XI Region). (White & James 1988; Quilhot *et al.* 2012).

Nephroma microphyllum Henssen
Endemic to southern South America. The species is an epiphyte of trees and shrubs in open, humid and shady sites. It was collected in Los Paraguas. In Chile is known from Temuco (IX Region) to Aysén (XI Region). (White & James 1988, Quilhot *et al.* 2012).

Nephroma parile (Ach.) Ach.

Cosmopolitan. The species is an epiphyte in *Nothofagus* forests in rather open sites in Los Paraguas. In Chile is known from Conguillio National Park to Aysén Region. (White & James 1988, Quilhot *et al.* 2012).

Nephroma skottsbergii F.J. White & P. James
Endemic to southern South America. The species is an epiphyte of trees and shrubs in humid habitats, such as Laguna Arcoiris and Los Carpinteros. In Chile is known from Conguillio National Park to Aysén Region. (White & James 1988, Quilhot *et al.* 2012).

Normandina pulchella (Borrer) Nyl.
Cosmopolitan. The species is found on bark of trunks of *Nothofagus*, near El Hoyón, in high humidity and shade conditions. In Chile is known in Juan Fernández Archipelago, and from Mocha Island (VIII Region) to Magallanes (XII Region). (Galloway 1985, Quilhot *et al.* 2010).

Ochrolechia pallescens (L.) A. Massal.
Widely distributed in Europe, North and South America, Australia and Antarctica. The species is an epiphyte of *Nothofagus* spp. in open sites in Laguna Captrén, El Hoyón and Laguna Verde. In Chile is known from Limarí and Fray Jorge National Park (IV Region), and from Ñuble (VIII Region) to Navarino Island (XII Region). (Redón & Quilhot 1977, Messuti & Lumbsch 2000).

Pannaria conoplea (Ach.) Bory
Pantemperate. The species has been collected from bark of *Austrocedrus chilensis*, also on mosses in open sites in scoria boulders on lava flows near Laguna Verde. In Chile is known from Antuco (VIII Region) to Aysén (XI Region). (Galloway *et al.* 2006, Quilhot *et al.* 2012).

Pannaria farinosa Elvebakk & J. Fritt Rasm.
Panaustral. The species is an epiphyte in *Nothofagus* forests and shrubs, also on mosses and rocks, in both humid areas from Laguna Arcoiris to Laguna Captrén, and in open and drier sites, such as the scoria boulders on lava flows near Laguna Verde on bark of *Austrocedrus chilensis*. It is one of the most common species of the genus growing in the Park. In Chile is known in Fray Jorge National Park (IV Region), Juan Fernández Archipelago, and from Altos de Lircay National Reserve (VII Region) to Navarino Island (XII Region). (Redón & Quilhot 1977, Elvebakk *et al.* 2007).

Pannaria hispidula (Nyl.) Hue
Cosmopolitan. The species is an epiphyte on trunks of *Nothofagus* spp. in sites with high humidity. It was collected on trunks of *Nothofagus pumilio* on the roadside to Velo de la Novia. In Chile is known from Valdivia (X Region) to

Navarino Island (XII Region).
(Redón & Quilhot 1977, Jørgensen 2006, Passo *et al.* 2008).

Pannaria implexa (Stirt.) Passo, Calvelo & Stenroos
Austral. The species is an epiphyte of *Nothofagus* spp. and shrubs, also on rocks, soil and amongst mosses in sites with high humidity. It has been collected on bark of *Nothofagus pumilio* near Velo de la Novia, and in a humid and shaded site on the roadside to Laguna Verde. In Chile is known in Juan Fernández Archipelago, and from Villarrica (IX Region) to Magallanes (XII Region).
(Passo *et al.* 2008).

Pannaria microphyllizans (Nyl.) P.M. Jørg.
Austral. The species is an epiphyte of *Nothofagus* spp., also on rotten wood in habitats with high humidity. In Chile is known from Huerquehue National Park (IX Region) to Aysén (XI Region).
(Passo *et al.* 2008, Quilhot *et al.* 2012).

Pannaria pallida (Nyl.) Hue
Austral. The species is an epiphyte of *Nothofagus* spp. and shrubs in moderate light conditions. From 1970 to 1990, it was one of the commonest species in *Nothofagus antarctica* forests in El Hoyón and La Caseta. In Chile is known from Altos de Lircay National Reserve (VII Region) to Navarino Island (XII Region).
(Redón & Quilhot 1977, Jørgensen 2006, Quilhot pers. comm.).

Pannaria sphinctrina (Mont.) Tuck.
Cosmopolitan. The species grows on bark of *Nothofagus pumilio* and shrubs, also on mosses, in habitats with high humidity. It has been collected in Velo de la Novia, Los Carpinteros and in a very shaded site near Laguna Verde. In Chile is known in Juan Fernández Archipelago, and from Valdivia (X Region) to Tierra del Fuego (XII Region).
(Elvebakk 2007).

Pannaria tavaresii P.M. Jørg.
The species has a warm-temperate, subtropical distribution. It is an epiphyte on trees, also on mosses and rocks in open sites. It was collected on bark of *Austrocedrus chilensis* in scoria boulders on lava flows near Laguna Verde. In Chile is known from Laguna del Laja National Park (VIII Region) to Aysén (XI Region).
(Galloway *et al.* 2006, Quilhot *et al.* 2012).

Pannoparmelia angustata (Pers.) Zahlbr.
Austral. The species grows on bark of *Nothofagus* spp. and shrubs in open sites. In Chile is known from Bio-Bio (VIII Region) to Magallanes (XII Region).
(Galloway 1985).

Parmelia cunninghamii Cromb.
Austral. The species is an epiphyte of *Araucaria araucana*, *Nothofagus* spp. and shrubs in areas of high humidity, from the Centro de Información to Laguna Captrén. In Chile is known from Ñuble (VIII Region) to Magallanes and the Antarctic Territory (XII Region).
(Galloway 1985, Øvstedal & Lewis Smith 2001).

Parmelia protosulcata Hale
Austral. It is an epiphyte of *Araucaria araucana*, *Nothofagus* spp. and shrubs in open sites, widely distributed in the Park. In Chile is known from Termas de Chillán (VIII Region) to Magallanes (XII Region).
(Galloway 1985, Adler & Calvelo 2002).

Parmelia saxatilis (L.) Ach.
Cosmopolitan. The species is an epiphyte of *Araucaria araucana*, also on rocks in open sites. In Chile is known from La Campana National Park (V Region), and from Malleco (IX Region) to Navarino Island and the Antarctic Territory (XII Region).
(Redón & Quilhot 1977, Redón & Walkowiak 1978; Øvstedal & Lewis Smith 2001).

Parmelia sulcata Taylor
Cosmopolitan. The species is an epiphyte of trees and shrubs in open sites, such as Laguna Captrén, El Hoyón and La Caseta. In Chile is known from Valparaíso (V Region) to Navarino Island and the Antarctic Territory (XII Region).
(Redón & Quilhot 1977, Øvstedal & Lewis Smith 2001).

Parmeliella granulata I.M. Lamb
The species is present in Oceania and Central and South America. It is an epiphyte of *Nothofagus* spp., also amongst mosses. It was collected in Los Paraguas, in a rather open site. In Chile is known from Altos de Lircay National Reserve (VII Region) to Aysén (XI Region).
(Jørgensen & Galloway 1992, Galloway 2007)

Parmeliella nigrocincta (Mont.) Müll. Arg.
Austral. The species is an epiphyte in *Nothofagus* forests. It was collected in Los Paraguas. In Chile is known in Juan Fernández Archipelago, and from Malleco (IX Region) to Magallanes (XII Region).
(Galloway 1985).

Parmeliopsis hyperopta (Ach.) Arnold
Circumpolar (North America, Europe and northern Asia). The species is an epiphyte of trees and shrubs in open and humid sites. It was collected on bark of *Nothofagus* spp. near Laguna Captrén. In Chile is known from Río de Los Cipreses National Reserve (VI Region) to Magallanes (XII Region).
(Ryan 2002).

Parmotrema arnoldii (Du Rietz) Hale

Pantropical, extending to into temperate regions to the north and south. The species grows on bark of *Araucaria araucana*, *Nothofagus* spp., shrubs and among mosses in rather shaded sites. In Chile is known from Altos de Lircay National Reserve (VII Region) to Llanquihue (X Region). (Galloway 1985, Nash III & Elix 2002a).

Parmotrema crinitum (Ach.) M. Choisy

Pantropical and pantemperate. The species is currently found on bark of *Araucaria araucana*, *Austrocedrus chilensis* and *Nothofagus* spp. in open sites. In Chile is known from Altos de Lircay National Reserve (VI Region) to Llanquihue (X Region). (Nash III & Elix 2002a).

Parmotrema perlatum (Huds.) M. Choisy

Pantemperate. The species is an epiphyte on *Araucaria araucana* and *Nothofagus* spp. In Chile is known from Chillán (VIII Region) to Magallanes (XII Region). (Nash III & Elix 2002a).

Peltigera collina (Ach.) Schrad.

Circumpolar. The species grows on trunks and amongst mosses in open sites. It was collected from the base of trunks of *Nothofagus antarctica* in El Hoyón. In Chile is known from Cautín (IX Region) to Magallanes (XII Region). (Goward *et al.* 1995, Martínez *et al.* 2003).

Peltigera lepidophora (Vain.) Bitter

Cicumpolar. The species is an epiphyte in trunks of *Nothofagus* spp., also on soil, amongst mosses and rotten wood. It was collected on bark of *Nothofagus antarctica* in Laguna Captrén. In Chile is known from Malleco (IX Region) to Magallanes (XII Region). (Goward *et al.* 1995, Martínez *et al.* 2003).

Peltigera polydacton (Neck.) Hoffm.

Cosmopolitan. The species grows on the base of trunks of *Nothofagus antarctica*. In Chile is known in La Campana National Park (V Region), and from Aysén Region to Navarino Island (XII Region). (Redón & Quilhot 1977, Redón & Walkowiak 1978, Martínez *et al.* 2003).

Pertusaria velata (Turner) Nyl.

Cosmopolitan. The species grows on bark of *Nothofagus* spp., occasionally on rocks. In Chile is known in Juan Fernández Archipelago, Santiago (Región Metropolitana) and Rancagua (VI Region), and from Cauquenes (VII Region) to Magallanes (XII Region). (Messuti 2005).

Phlyctis chilensis D.J. Galloway & Guzmán

Endemic to southern South America. It grows on *Nothofagus* trunks in shady and moist habitats. It was collected in Los Paraguas and near Laguna Arcoiris. In Chile is known from Los Queñes (VII Region) to Magallanes (XII Region). (Galloway & Guzmán Grimaldi 1988).

Physma chilense Hue.

The species is known in Chile, New Zealand and Tasmania. It grows on bark of *Nothofagus* spp. in open sites. In Chile is known in Juan Fernández Archipelago, and from Altos de Lircay National Reserve (VII Region) to Aysén (XI Region). (Verdon *et al.* 1992, Quilhot *et al.* 2012).

Platismatia glauca (L.) W.L. Culb. & C.F. Culb.

Cosmopolitan. The species is an epiphyte of *Araucaria araucana*, *Nothofagus* spp. and shrubs, and currently found in the Park. In Chile is known in La Campana National Park (V Region), and from Altos de Lircay National Reserve (VII Region) to Navarino Island and the Antarctic Territory (XII Region). (Culberson & Culberson 1968, Redón & Quilhot 1977, Redón & Walkowiak 1978, Øvstedal & Lewis Smith 2001).

Protousnea alectoroides (Mont.) Krog

Endemic to southern South America. An epiphyte on bark of trees and shrubs, rare in the Park. In Chile is known from Nahuelbuta National Park (IX Region) to Aysén (XI Region). (Krog 1976, Calvelo *et al.* 2005).

Protousnea dusenii (D.R.) Krog

Endemic to southern South America. It is an epiphyte on trunks and twigs of *Araucaria araucana* and *Nothofagus* spp. in open sites and widely distributed in the Park. In Chile is known from Aysén Region to Navarino Island (XII Region). (Krog 1976, Redón & Quilhot 1977, Calvelo *et al.* 2005).

Protousnea magellanica (Mont.) Krog

Endemic to southern South America. It is an epiphyte on tree trunks, particularly on *Araucaria araucana* and *Nothofagus antarctica* in open sites. In Chile is known from Altos de Lircay National Reserve (VII Region) to Navarino Island (XII Region). (Krog 1976, Redón & Quilhot 1977, Calvelo *et al.* 2005).

Protousnea malacea (Stirt.) Krog

Endemic to southern South America. It is an epiphyte on trees in open sites. It is widely distributed in the Park. In Chile is known from Altos de Lircay National Reserve (VII Region) to Navarino Island (XII Region). (Krog 1976, Redón & Quilhot 1977, Calvelo *et al.* 2005).

Protousnea poeppigii (Nees & Flot.) Krog

Endemic to southern South America. The species is an

epiphyte on *Araucaria araucana* and *Nothofagus* spp. It is widely distributed in the Park. In Chile is known from Antuco (VIII Region) to Magallanes (XII Region). (Krog 1976, Calvelo *et al.* 2005).

Protousnea teretiuscula Krog

Endemic to southern South America. The species is an epiphyte on tree trunks and shrubs. In Chile is known from Nahuelbuta National Park (IX Region) to Aysén (XI Region). (Krog 1976, Calvelo *et al.* 2005).

Pseudocyphellaria berberina (G. Forst.) D.J. Galloway & P. James

Endemic to southern South America. The species is an epiphyte on tree trunks and shrubs, also grows on the ground and mosses, in very humid conditions. It has been collected on trunks of *Nothofagus* spp. and in shrubs on the roadside to Laguna Captrén and Laguna Arcoiris. In Chile is known in Juan Fernández Archipelago, and from Mocha Island (VIII Region) to Tierra del Fuego (XII Region). (Galloway 1992, Quilhot *et al.* 2010).

Pseudocyphellaria coerulescens (Mont.) H. Magn.

Endemic to southern South America. The species is an epiphyte on tree trunks and shrubs in humid and shaded habitats. It was collected on the roadside to Velo de la Novia. In Chile is known in Juan Fernández Archipelago, and from Mocha Island (VII Region) to Tierra del Fuego (XII Region). (Galloway 1992, Quilhot *et al.* 2010).

Pseudocyphellaria compar (Nyl.) H. Magn.

Endemic to southern South America. The species is an epiphyte on trunks of *Araucaria araucana* and *Nothofagus* spp., also in shrubs in moist and shaded sites. In Chile is known from Mocha Island (VIII Region) to Tierra del Fuego (XII Region). (Galloway 1992, Quilhot *et al.* 2010).

Pseudocyphellaria coriifolia (Müll. Arg.) Malme

Endemic to southern South America. The species is an epiphyte on *Araucaria araucana*, *Nothofagus* spp. and shrubs in moderate to high light and humid conditions, in a wide variety of habitats. It appears to be the commonest species of *Pseudocyphellaria* in the Park. In Chile is known in Juan Fernández Archipelago, and from Chillán (VIII Region) to Navarino Island (XII Region). (Redón & Quilhot 1977, Galloway 1992).

Pseudocyphellaria crocata (L.) Vain.

Cosmopolitan. The species is an epiphyte of *Araucaria araucana* and *Nothofagus* spp. in a wide variety of habitats, also on scoria boulders on lava flows near Laguna Verde. In Chile is known in Juan Fernández Archipelago, Fray

Jorge National Park (IV Region), and from Altos de Lircay National Reserve (VII Region) to Navarino Island (XII Region). (Redón & Quilhot 1977, Galloway 1992).

Pseudocyphellaria dasyphyllidia Bjerke

Endemic to southern South America. The species is an epiphyte of trees and shrubs in a wide variety of habitats. In Chile is known from Cauquenes (VII Region) to Magallanes (XII Region). (Bjerke *et al.* 2003b).

Pseudocyphellaria dubia Du Rietz.

Endemic to southern South America. The species is rare in the Park. It grows on bark of *Nothofagus* spp. in deep shade habitats of high humidity. It was collected on the road side to Velo de la Novia. In Chile is known from Malleco (IX Region) to Navarino Island (XII Region). (Redón & Quilhot 1977, Galloway 1992).

Pseudocyphellaria faveolata (Delise) Malme

Austral. The species is an epiphyte of *Araucaria araucana* and *Nothofagus* spp., in open and high-light habitats. In Chile is known from Nahuelbuta National Park (IX Region) to Magallanes (XII Region). (Galloway 1992).

Pseudocyphellaria flavicans (Hook & Taylor) Vain.

Endemic to southern South America. The species is an epiphyte on *Araucaria araucana* and *Nothofagus* spp. in open and high-light habitats. It is widely distributed in the Park. In Chile is known in Juan Fernández Archipelago, and from Mocha Island (VIII Region) to Tierra del Fuego (XII Region). (Galloway 1992, Quilhot *et al.* 2010).

Pseudocyphellaria glabra (Hook. f. & Taylor) C.W. Dodge

Panaustral. The species is an epiphyte of *Nothofagus* spp., dead vegetation on rather humid and shaded sites such as the roadside to Velo de la Novia and near Laguna Arcoiris. In Chile is known in Juan Fernández Archipelago, and from Mocha Island (VIII Region) to Tierra del Fuego (XII Region). (Galloway 1992, Quilhot *et al.* 2010).

Pseudocyphellaria granulata (C. Bab.) Malme

Austral. The species is an epiphyte on *Araucaria araucana* and *Nothofagus* spp. It is widely distributed in the Park in fairly open conditions with relatively high light intensity. In Chile is known from Nahuelbuta National Park (IX Region) to Navarino Island (XII Region). (Redón & Quilhot 1977, Galloway 1992).

Pseudocyphellaria guillemini (Mont.) D.J. Galloway

Endemic to southern South America. The species is an epiphyte of *Nothofagus* spp. in rather low-light situations. It has been collected in Laguna Captrén. In Chile is known in Juan Fernández Archipelago, and from Conguillio National Park to Magallanes (XII Region). (Galloway 1992).

Pseudocyphellaria guzmanii D. J. Galloway

Endemic to southern South America. The species is found on trunks of *Nothofagus* spp. in Laguna Captrén and Los Paraguas, in open forests. In Chile is known from Conguillio National Park to Puyehue National Park (X Region). (Galloway 1992).

Pseudocyphellaria hirsuta (Mont.) Malme

Endemic to southern South America. The species is an epiphyte of *Araucaria araucana* and *Nothofagus* spp. in a wide range of habitats. In Chile is known in Juan Fernández Archipelago, and from Constitución (VII Region) to Tierra del Fuego (XII Region). (Galloway 1992).

Pseudocyphellaria intricata (Delise) Vain.

Cosmopolitan. The species is an epiphyte of *Araucaria araucana*, *Nothofagus* spp. and shrubs on the roadside to Laguna Captrén and to Laguna Verde, in humid and moderate to dense shade habitats, also in scoria boulders on lava flows. In Chile is known in Juan Fernández Archipelago, and from Fray Jorge National Park (IV Region) to Tierra del Fuego (XII Region). (Galloway 1992).

Pseudocyphellaria lechleri (Müll. Arg.) Du Rietz.

Endemic to southern South America. The species occurs sporadically as an epiphyte of *Araucaria araucana* and *Nothofagus* spp. In Chile is known from Conguillio National Park to Tierra del Fuego (XII Region). (Galloway 1992).

Pseudocyphellaria mallota (Tuck.) H. Magn.

Endemic to southern South America. The species is an epiphyte of trees and shrubs in humid and moderate light situations. It was collected on bark of *Nothofagus* spp. in Los Paraguas. In Chile is known in Fray Jorge National Park (IV Region), Juan Fernández Archipelago, and from Conguillio National Park to Magallanes (XII Region). (Galloway 1992).

Pseudocyphellaria neglecta (Müll. Arg.) H. Magn.

Austral. The species is an epiphyte of trees and shrubs in dryish habitats with a high light intensity. It was collected near La Caseta. In Chile is known from La Campana National Park (V Region) to Tierra del Fuego (XII Region). (Redón & Walkowiak 1978; Galloway 1992).

Pseudocyphellaria nitida (Taylor) Malme

Endemic to southern South America. It is an epiphyte of *Nothofagus* spp. It was collected near El Hoyón and Laguna Captrén, in moderate to high-light habitats. In Chile is known in Juan Fernández Archipelago, and from Mocha Island (VIII Region) to Magallanes (XII Region). (Galloway 1992, Quilhot *et al.* 2010).

Pseudocyphellaria norvegica (Gyeln.) P. James

Cosmopolitan. The species is an epiphyte of trees and shrubs in humid habitats, and was collected on bark of *Nothofagus* spp. in Los Paraguas. In Chile is known in Juan Fernández Archipelago, and from Mocha Island (VIII Region) to Aysén (XI Region). (Galloway 1992, Quilhot *et al.* 2010).

Pseudocyphellaria nudata (Zahlbr.) D.J. Galloway

Endemic to southern South America. The species is currently found on trunks of *Nothofagus antarctica* and *N. pumilio*, mainly in drier and moderate to high-light conditions. In Chile is known from Chillán (VIII Region) to Aysén (XI Region). (Galloway 1992).

Pseudocyphellaria obvoluta (S.W. ex Ach.) Malme

Endemic to southern South America. The species is an epiphyte of trees and shrubs in forests in Laguna Captrén. In Chile is known from Nahuelbuta National Park (IX Region) to Navarino Island (XII Region). (Redón & Quilhot 1977, Galloway 1992).

Pseudocyphellaria pilosella Malme

Endemic to southern South America. The species is an epiphyte of *Nothofagus* spp. in moist humid, rather low-light habitats. In Chile is known from Chillán (VIII Region) to Aysén (XI Region). (Galloway 1992).

Pseudocyphellaria piloselloides (Räsänen) H. Magn.

Endemic to southern South America. The species has been collected on bark of *Araucaria araucana* and *Nothofagus* spp. in Laguna Captrén, in open forests. In Chile is known from Conguillio National Park to Tierra del Fuego (XII Region). (Galloway 1992).

Pseudocyphellaria pluvialis R. Sant.

Endemic to southern South America. The species is an epiphyte of trees and shrubs on the roadside to Los Carpinteros and on the roadside to Velo de la Novia, in very humid, shaded habitats. In Chile is known from Mocha Island (VIII Region) to Aysén (XI Region). (Galloway 1992, Quilhot *et al.* 2010).

Pseudocyphellaria redonii D.J. Galloway

Endemic to southern South America. The species is an epiphyte of trees and shrubs in shaded, humid habitats. It was collected in Los Paraguas. In Chile is known from Cautín (IX Region) to Magallanes (XII Region). (Galloway 1992).

Pseudocyphellaria santessonii D.J. Galloway
Endemic to southern South America. It is an epiphyte of *Araucaria araucana* and *Nothofagus* spp. It was collected near Cabañas del Lago, in a humid and moderate light habitat. In Chile is known in Juan Fernández Archipelago, and from Mocha Island (VIII Region) to Magallanes (XII Region). (Galloway 1992, Quilhot *et al.* 2010).

Pseudocyphellaria scabrosa R. Sant.
Endemic to southern South America. The species is widely distributed in the Park and grows on bark of *Araucaria araucana*, *Nothofagus* spp. and shrubs. In Chile is known from Mocha Island (VIII Region) to Navarino Island (XII Region). (Redón & Quilhot 1977, Galloway 1992).

Pseudocyphellaria wandae D.J. Galloway
Endemic to southern South America. It has been collected from bark of *Araucaria araucana* and *Nothofagus antarctica* near El Hoyón, in a humid and moderate shaded habitat. In Chile is known from Constitución (VII Region) to Magallanes (XII Region). (Galloway 1992).

Psoroma aphthosum Vain.
Austral. The species is currently found on bark of old *Nothofagus dombeyi* on the roadside from Centro de Información to Laguna Captrén. In Chile is known from Conguillio National Park to Vicente Pérez Rosales National Park (X Region). (Redón 1974, Jørgensen 2006).

Psoroma caliginosum Stirt.
Australasian. The species is an epiphyte of *Nothofagus pumilio* in rather humid habitats. In Chile is known from Malleco (IX Region) to Valdivia (X Region). (Jørgensen 2006).

Psoroma fruticosum P. James & Henssen
The species is known in South America, Subantarctic Islands, New Zealand and South Africa. It is an epiphyte on twigs and small branches of trees and shrubs, also on soil in humid and shaded habitats. It was collected on bark of *Nothofagus pumilio* on the roadside to Velo de la Novia. In Chile is known from Conguillio National Park to Magallanes and the Antarctic Territory (XII Region). (Jørgensen & Galloway 1992, Øvstedal & Lewis Smith 2001).

Psoroma hypnorum (Vahl) S.F. Gray
Bipolar. The species is an epiphyte on twigs and small branches of trees and shrubs, also on soil in humid and shaded habitats. It has been collected on bark of *Nothofagus antarctica* and *N. pumilio* in El Hoyón. In Chile is known from Altos de Lircay National Reserve (VII Region) to Magallanes and the Antarctic Territory (XII Region). (Øvstedal & Lewis Smith 2001, Quilhot *et al.* 2010).

Psorophorus fuegiensis (Zahlbr.) Elvebakk & S.G. Hong
Endemic to southern South America. The species is an epiphyte of forest trees and shrubs, in humid and shaded habitats. It has been collected on bark of *Nothofagus* spp. in Velo de la Novia and on the roadside to Sierra Nevada. In Chile is known in Juan Fernández Archipelago, and from Conguillio National Park to Aysén (XI Region). (Elvebakk *et al.* 2010).

Psorophorus pholidotus Elvebakk & S.G. Hong
Austral. The species is an epiphyte on trees and shrubs in humid and shaded habitats. It has been collected on bark of *Nothofagus* spp. on the road side to Los Carpinteros and on the roadside to Velo de la Novia. In Chile is known in Juan Fernández Archipelago, and from Conguillio National Park to Magallanes (XII Region). (Elvebakk *et al.* 2010).

Punctelia subrudecta (Nyl.) Krog
Cosmopolitan. The species is an epiphyte of *Nothofagus* spp. and also on rocks. It was collected on bark of *Nothofagus antarctica* near Laguna Captrén. In Chile is known from Mocha Island (VIII Region) to Magallanes (XII Region). (Galloway 1985).

Rimelia reticulata (Taylor) Hale & A. Flechter
Cosmopolitan. The species is an epiphyte of *Nothofagus* spp. present in a wide variety of habitats. In Chile is known from Altos de Lircay National Reserve (VII Region) to Aysén (XI Region). (Nash III & Elix 2002b).

Sticta caulescens De Not.
Endemic to southern South America. The species is an epiphyte of trees and shrubs, also on soil in very humid and often deeply shaded habitats. It is currently found in Laguna Arcoiris. In Chile is known from Mocha Island (VIII Region) to Magallanes (XII Region). (Galloway 1994, Quilhot *et al.* 2010).

Sticta fuliginosa (Hoffm.) Ach.
Cosmopolitan. The species is an epiphyte of bark and twigs of *Nothofagus* spp. and shrubs in rather drier habitats. In Chile is known in Putre (I Region), and from Fray Jorge National Park (IV Region) to Magallanes (XII Region).

(Galloway 1994, Herrera pers. comm.).

Sticta hypochra Vain.

Endemic to southern South America. The species is an epiphyte in *Nothofagus* forests, also on shrubs and amongst mosses and rotten wood. It was collected in Los Paraguas. In Chile is known from Conguillio National Park to Navarino Island (XII Region).

(Redón & Quilhot 1977, Galloway 1994).

Sticta limbata (Sm.) Ach.

Cosmopolitan. The species is an epiphyte on *Araucaria araucana* and *Nothofagus* spp. near Laguna Arcoiris. In Chile is known from Mocha Island (VIII Region) to Tierra del Fuego (XII Region).

(Galloway 1994, Quilhot *et al.* 2010).

Sticta longipes (Müll. Arg.) Malme

Endemic to southern Chile. The species is present in humid and shaded habitats. It has been collected on bark of *Nothofagus pumilio* on the roadside to Velo de la Novia. In Chile is known from Mocha Island (VIII Region) to Aysén (XI Region).

(Galloway 1994, Quilhot *et al.* 2010).

Sticta weigeli (Ach.) Vainio

Cosmopolitan. The species is found on trunks of *Nothofagus* spp. and shrubs, also on soil in fairly open habitats in areas of high humidity, such as Laguna Arcoiris. In Chile is known in Fray Jorge National Park (IV Region) and from Conguillio National Park to Navarino Island (XII Region).

(Redón & Quilhot 1977, Galloway 1994).

Teloschistes chrysoththalmus (L.) Th. Fr.

Cosmopolitan. The species is an epiphyte of trees and shrubs. It was collected on bark of *Nothofagus* spp., in an open site near Laguna Captrén. In Chile is known from Cerro Moreno (II Region) to Puerto Montt (X Region).

(Galloway 1985).

Tukermannopsis chlorophylla (Willd.) Hale

Bipolar. The species is an epiphyte of *Araucaria araucana* and *Nothofagus* spp. in rather drier habitats. It is very common in Laguna Captrén. In Chile is known from La Campana National Park (V Region) to Navarino Island (XII Region).

(Redón & Quilhot 1977, Redón & Walkowiak 1978, Kärnefelt *et al.* 1992).

Usnea pusilla (Räsänen) Räsänen

Austral. The species is an epiphyte of *Nothofagus antarctica* in open sites such as El Hoyón and La Caseta. In Chile is known in Fray Jorge National Park (IV Region), Quebrada Alvarado (V Region), and from Altos de Lircay National

Reserve (VII Region) to Llanquihue (X Region).

(Redón 1974, Galloway 1985).

Usnea rubicunda Stirt.

Cosmopolitan. It grows on bark of *Nothofagus* spp. in rather shaded and humid habitats. In Chile is known from Iquique (I Region) to Aysén (XI Region).

(Galloway 1985).

XanthopSOROMA contextum (Stirt.) Elvebakk

Austral. The species is an epiphyte of *Nothofagus pumilio*. It was collected on the roadside to Velo de la Novia, in an habitat of high humidity. In Chile is known in Juan Fernández Archipelago, and from Malleco (IX Region) to Magallanes (XII Region).

(Elvebakk *et al.* 2010).

XanthopSOROMA soccatum (R. Br. ex Cromb.) Elvebakk

Australasian. The species grows on shrubs and trees, also on mosses, near Velo de la Novia. In Chile is known in Juan Fernández Archipelago and from Villarrica (IX Region) to Aysén (XI Region).

(Elvebakk *et al.* 2010).

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