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Diversity of Corticiaceae sens. lat. in Patagonia, Southern Argentina

ALINA G. GRESLEBIN
MARIO RAJCHENBERG
Centro de Investigación y Extensión Forestal Andino Patagónico
C.C. 14
9200 Esquel, Chubut, Argentina
Email: alina@ciefap.cyt.edu.ar

Abstract The diversity of Corticiaceae found in the Patagonian Andes forests of southern Argentina was studied. A total of 168 species of Corticiaceae sens. lat. are recorded. The total diversity of corticioid fungi is estimated to be 250–290 species based on the accumulated increase of taxon diversity on different substrates. Most recorded species (56%) are cosmopolitan or widely distributed, 20% endemic, 4% austral, 17% amphitropical, and 3% show other distributions. The genera *Dendrothele* and *Hyphodontia* contain a high number of endemic species. Taxa that are particularly interesting due to their morphological peculiarities and/or their possible phylogenetic relationships are discussed. On the basis of 110 species recorded from Tierra del Fuego, we estimated that about half of these species are very rare and highly vulnerable in that island.

Keywords Aphyllophorales; *Austrocedrus*; biogeography; conservation; endemic species; *Nothofagus*; Patagonian forests; Tierra del Fuego

INTRODUCTION

The forests

The Patagonian Andes forests of southern Argentina belong to the temperate forests of southern Argentina and Chile, on the eastern slopes of the Andes. They form a long and rather narrow strip of vegetation that covers an area about 2200 km long and 0–75 km wide, c. 63 000 km^2, from 37°S in Neuquén Province to Tierra del Fuego at 55°S. From a phytogeographical perspective, they belong to the Antarctic Region, Subantarctic Domain, and Subantarctic Province (Cabrera 1971). Growing in the rainshadow of the southern Andes, these forests are strongly conditioned by the pronounced diminishing precipitation towards the east (with annual precipitation that decreases from c. 3500 mm to 500 mm over a short distance), the increasing xerophytic conditions that develop in the Patagonian steppe, and the continental climatic conditions. Though geographically linked to the Patagonian steppe, these forests have little in common with its vegetation, but have a fundamental role in the conservation and management of its natural resources. Together with the southern Chilean vascular flora, its direct biogeographical links are with Australia (including Tasmania) and New Zealand (Crisci et al. 1991a,b). The dominating forest elements belong to the genus *Nothofagus* (6 species), together with the conifers *Austrocedrus chilensis* and *Araucaria araucana*. They form pure or mixed forests that cover a wide range of soil, precipitation, and temperature conditions that in turn form a rich spectrum of niches for fungi. Floristic ingressions of the Valdivian rainforest, that occurs predominantly in Chile (Hueck 1978), are highly characteristic but relatively scant and restricted to the westernmost areas of certain national parks. Dimitri (1972) summarised the climate, hydrography, orography, soils, and vascular flora of the whole region, while Hueck (1978) and Donoso Zegers (1993) summarised the main ecological aspects of the different forest types.

Historical background of floristic fungal studies

Because of the peculiarities of this region, fungi have been given special attention, notably through the publication of "Flora Criptogámica de Tierra del Fuego", and numerous articles have been published dealing with different taxonomic groups present in the continental mycobiota. Notwithstanding this, the

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group as a whole remains poorly known, and many taxonomic groups are in need of study. One such group, the Corticiaceae sens. lat. in the Aphyllophorales (Basidiomycota), has been studied by us in recent years.

Carlos Spegazzini was the first person to systematically gather fungi in continental Patagonia, Tierra del Fuego, and other islands (notably Staten Island). Corticioid fungi collected and published by Spegazzini (Spegazzini 1887a,b) remained the only taxa known from the area for many decades. In the mid 1970s, the mycological group at Buenos Aires University headed by Jorge E. Wright made several expeditions during which many Corticiaceae were gathered. Although some collections were identified, the early death of the specialist Carlos Gómez left most of the specimens unnamed. Nevertheless, a valuable source of material and information had been established for future studies. In 1982, a mycological expedition by Leif Ryvarden produced a list of 42 species from Tierra del Fuego, including two new taxa (Hjortstam & Ryvarden 1985). Wright (1988) reviewed the knowledge of macromycetes associated with *Nothofagus*, underlining their ecological function; 44 taxa of Corticiaceae sens. lat. were included. Nils Hallenberg visited Tierra del Fuego and the continental part of the Patagonian Andes forests in 1993, describing four new species (Hallenberg & Hjortstam 1996) and producing an unpublished list of taxa (N. Hallenberg and K. Hjortstam pers. comm.).

Beginning in 1995 we have made several expeditions to Tierra del Fuego and collected in selected forest types of the continent, mainly *Nothofagus pumilio* and *Austrocedrus chilensis* forests, that are the main native forest and timber resources in southern Argentina. Research and studies of the specimens resulted in a mycobiota of Corticiaceae of Tierra del Fuego (Greslebin 2002), a preliminary checklist of Corticiaceae found on *A. chilensis* (Rajchenberg 2002), and a mycobiota of Corticiaceae associated with *N. pumilio* (Greslebin 2001a).

This work summarises the information on Corticiaceae available from southern Argentina, highlighting the novelties and species composition, and presenting a biogeographical analysis.

MATERIALS AND METHODS

Study areas and substrates

Specimens are mainly from Tierra del Fuego, with the following forest trees: *Nothofagus pumilio*, *N. antarctica*, *N. betuloides* (Nothofagaceae), including small patches of *Drymis winteri* (Winteraceae). In continental Patagonia records are from forests dominated by *N. pumilio* and *Austrocedrus chilensis*, that were thoroughly surveyed; isolated collections were also made on *N. obliqua*, *N. antarctica*, *N. nervosa*, and *N. dombeyi*. Visits to areas with Valdivian rainforest ingressions yielded interesting data for other substrates such as *Fitzroya cupressoides* (Cupressaceae), but few visits were made and the information remains scant. Other substrates included two members of the Myrtaceae (*Luma apiculata* and *Myrceugena exsucca*), two Celastraceae (*Maytenus boaria* and *M. magellanica*), *Araucaria araucana* (Araucariaceae), *Lomatia hirsuta* and *Embothrium coccineum* (Proteaceae), the shrubby or herbaceous *Azara microphylla* (Flacourtiaceae), *Escallonia* sp. (Saxifragaceae), *Berberis ilicifolia* (Berberidaceae), and *Chusquea coleu* (Poaceae). Corticiaceae on these substrates have been collected erratically and, together with several other woody substrates, remain largely unstudied.

Records of taxa

Records in this report are based on:

a) published records: Greslebin (2001a,b, 2002), Rajchenberg (2002), Greslebin & Rajchenberg (1997a,b, 1998, 1999a,b, 2000, 2001), Greslebin et al. (2000), Hjortstam & Ryvarden (1985), Hallenberg & Hjortstam (1996), Job (1990), and Rajchenberg & Wright (1987);

b) unpublished records of species determined and kindly provided by N. Hallenberg (Göteborg University, Sweden) and K. Hjortstam (Alingsås, Sweden). They are marked with an asterisk (*);

c) our own unpublished records, on forest types and substrates different from those mentioned in the Introduction.

RESULTS

A list of species and host substrates is presented in Table 1.

Diversity

In spite of many habitats and forest types remaining unexplored, 168 species of Corticiaceae sens. lat. have been recorded in the Patagonian Andes forests to date. A total of 112 species (66%) were recorded in pure *Nothofagus pumilio* forests. The inclusion of other *Nothofagus* substrates (i.e., *N. antarctica* and *N. betuloides*) yielded 23 additional species, while

Table 1 Species of Corticiaceae sens. lat. (Tulasnellales included) recorded in Patagonian Andes forests. Endemic species are indicated in **bold** and species with austral distribution in ***italic bold***. Taxa collected and determined by Hallenberg & Hjortstam are indicated with *. Endemic and austral species classified as having a high degree of vulnerability in Tierra del Fuego are indicated with **#**. Substrates: Ac, _Austrocedrus chilensis_; Dw, _Drymis winteri_; Na, _Nothofagus antarctica_; Nb, _Nothofagus betuloides_; Np, _Nothofagus pumilio_; other: Aa, _Araucaria araucana_; Am, _Azara microphylla_; Bi, _Berberis ilicifolia_; Cc, _Chusquea culeou_; Dj, _Diostea juncea_; Ec, _Embothrium coccineum_; Esp, _Escallonia_ sp.; Fc, _Fitzroya cupressoides_; La, _Luma apiculata_; Lh, _Lomatia hirsuta_; Mb, _Maytenus boaria_; Me, _Myrceugenia exsucca_; Mm, _Maytenus magellanica_; Nd, _Nothofagus dombeyi_; Nsp, _Nothofagus_ sp.

	Substrates					
Species	Ac	Dw	Na	Nb	Np	Other
Acanthophysium cerussatum (Bres.) Boidin	X		X	X	X	
Aleurocystidiellum aff. _disciformis_ (Fr.) Boidin, Terra & Lanq.				X	X	
#Aleurodiscus antarcticus (Speg.) Ryvarden				X	X	Nd
Aleurodiscus subcruentatum (Berk. & M.A.Curtis) P.A.Lemke	X					
Aleurodiscus triviale (Speg.) Greslebin			X	X	X	
#Aleurodiscus vitellinus (Lév.) Pat.					X	Nd
Amauromyces farinaceus Boidin, Lanq. & Gilles				X	X	
Amyloathelia aspera Hjortstam & Ryvarden				X	X	
Amylocorticium cebennense (Bourdot) Pouzar	X				X	Cc, Fc
Amylocorticium rhodoleucum (Bourdot) J.Erikss. & Ryvarden					X	
Asterostroma andinum Pat.		X	X	X	X	
Asterostroma cervicolor (Berk. & M.A.Curtis) Masee					X	
Athelia acrospora Jülich sens. lat.						Nsp
Athelia arachnoidea (Berk.) Jülich			X			
Athelia bombacina Pers.					X	
Athelia decipiens (Höhn. & Litsch.) J.Erikss.			X			
Athelia epiphylla Pers.	X		X	X	X	
Athelopsis glaucina (Bourdot & Galzin) Parmasto		X	X	X	X	Mm
#Athelopsis gloeocystidiata Greslebin & Rajchenb.			X		X	
Athelopsis subinconspicua (Litsch.) Jülich	X				X	
Athelopsis virescens Hallenb. & Hjortstam			X		X	Nd
Boidinia permixta Boidin, Lanq. & Gilles					X	
Boidinia peroxydata (Rick) Hjortstam & Ryvarden	X					
Botryobasidium candicans J.Erikss.		X		X	X	
*_Botryobasidium lembosporum_ (D.P.Rogers) Donk						Unknown
Botryobasidium obtusisporum J.Erikss.	X	X	X	X	X	
Botryobasidium stigmatisporum Boidin & Gilles	X			X		
Botryobasidium subcoronatum (Höhn. & Litsch.) Donk			X	X	X	Ec, Nd
Botryobasidium vagum (Berk. & M.A.Curtis) D.P.Rogers	X			X	X	Mm
Brevicellicium olivascens (Bres.) K.H.Larss. & Hjortstam		X				
*_Bulbillomyces farinosus_ (Bres.) Jülich						Nsp
*_Byssomerulius corium_ (Fr.) Parmasto						Unknown
#Ceraceomyces austroandinum Greslebin & Rajchenb.	X		X	X	X	
Ceraceomyces borealis (Rom.) J.Erikss. & Ryvarden				X	X	
Ceratobasidium cornigerum (Bourdot) D.P.Rogers					X	
Cerinomyces crustulinus (Bourdot & Galzin) Martin		X				
Chondrostereum purpureum (Pers.: Fr.) Pouzar			X		X	Aa, Am
Coniophora arida (Fr.) P.Karst.	X		X	X	X	Dj
Coniophora puteana (Schumach.: Fr.) P.Karst.		X		X		
Corticium lombardiae Larsen & Gilb.					X	
Cristinia rhenana Grosse-Brauckmann					X	
Crustoderma dryinum (Berk. & M.A.Curtis) Parmasto	X				X	Nd
Cylindrobasidium laeve (Pers.: Fr.) Chamuris	X				X	
Dacryobolus sudans (Alb. & Schwein.: Fr.) Fr.	X	X				
Dendrothele andinopatagonica Greslebin & Rajchenb.						Mb
#_Dendrothele biapiculata_ (G.Cunn.) P.A.Lemke						Mm
Dendrothele boidinii Greslebin & Rajchenb.				X	X	

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Table 1 (*continued*)

	Substrates					
Species	Ac	Dw	Na	Nb	Np	Other
Dendrothele aff. *commixta* (Höhn. & Litsch.) J.Erikss. & Ryvarden	X					
Dendrothele incrustans (P.A.Lemke) P.A.Lemke	X		X	X	X	Nd
Dendrothele lemkei Greslebin & Rajchenb.	X	X	X	X	X	Mm
#Dendrothele pitrae Greslebin & Rajchenb.						Bi,Mm, Me
#Dendrothele tuberculata Greslebin & Rajchenb.					X	
Dichostereum rhodosporum (Wakef.) Boidin & Lanq. vel aff.	X				X	
**Dichostereum sordulentum* (Cooke & Massee) Boidin & Lanq.						Fc, Nd
#Epithelopsis fulva (G.Cunn.) Jülich					X	
Fibricium gloeocystidiatum Rajchenb.	X					
Gloeocystidiellum porosum (Berk. & M.A.Curtis) Donk	X	X	X	X	X	
#Hymenochaete americana Greslebin & Parmasto		X				
Hymenochaete attenuata Lév.						Unknown
Hymenochaete australis Parmasto & Greslebin			X	X	X	Nd
Hymenochaete aff. *cinnamomea* (Pers.: Fr.) Bres.						Bi
Hymenochaete cruenta (Pers.: Fr.) Donk						Nsp
Hymenochaete jobii Parmasto				X	X	
Hyphoderma argillaceum (Bres.) Donk	X	X	X	X	X	
Hyphoderma cremeoalbum (Höhn. & Litsch.) Jülich	X				X	
Hyphoderma echinocystis J.Erikss. & Å.Strid	X					
Hyphoderma obtusiforme J.Erikss. & Å.Strid sens. lat.			X		X	
Hyphoderma praetermissum (P.Karst.) J.Erikss. & Å.Strid	X		X	X	X	
Hyphoderma puberum (Fr.) Wallr.	X		X	X	X	Nd
Hyphoderma roseocremeum (Bres.) Donk sens. lat.			X	X	X	
Hyphoderma setigerum (Fr.) Donk		X		X	X	Ec, Mm
Hyphoderma sibiricum (Parmasto) J.Erikss. & Å.Strid	X					
Hyphoderma aff. *subclavigerum* K.H.Larss. & Hjortstam						Nsp
Hyphodontia alutaria (Burt) J.Erikss.	X		X	X	X	Mm
Hyphodontia arguta (Fr.) J.Erikss.	X					Esp
#Hyphodontia australis (Berk.) Hjortstam				X	X	Nd
Hyphodontia cineracea (Bourdot & Galzin) J.Erikss. & Hjortstam					X	
#Hyphodontia crassispora Greslebin & Rajchenb.		X		X		
Hyphodontia crustosoglobosa Hallenb. & Hjortstam	X					
#Hyphodontia decorticans Greslebin & Rajchenb.			X	X	X	
Hyphodontia gamundiae Greslebin & Rajchenb.	X		X	X	X	
Hyphodontia hjortstamii Greslebin & Rajchenb.		X		X	X	
#Hyphodontia magnifica Greslebin & Rajchenb.	X	X			X	Mm
Hyphodontia nesporina Hallenb. & Hjortstam	X					La
Hyphodontia pruni (Lasch.) Svrcek vel aff.	X					
Hyphodontia pumilia Greslebin & Rajchenb.					X	
Hyphodontia sambuci (Pers.: Fr.) J.Erikss.	X	X	X	X	X	Bi
Hyphodontia spathulata (Schard.: Fr.) J.Erikss.	X					
Hyphodontia subalutacea (P.Karst.) J.Erikss.	X		X	X	X	
Hypochniciellum iaganicum (Speg.) Rajchenb. & Wright			X	X	X	Nd
Hypochniciellum oblongisporum (G.Cunn.) Greslebin & Rajchenb.					X	Fc
Hypochnicium bombycinum (Sommerf.: Fr.) J.Erikss.			X		X	Bi
Hypochnicium aff. *erikssonii* Hallenb. & Hjortstam			X			
Hypochnicium lundelli (Bourdot) J.Erikss.					X	
Hypochnicium polonense (Bres.) Å.Strid					X	
Kavinia alboviridis (Morgan) Gilb. & Budington			X	X	X	
Leptosporomyces galzinii (Bourdot) Hauerslev	X					
Leptosporomyces luteofibrillosus Hjortstam & Ryvarden		X	X	X	X	
**Leptosporomyces septentrionalis* (J.Erikss.) L.G.Krieglst.						Nsp
**Litschauerella clematitis* (Bourdot & Galzin) J.Erikss. & Ryvarden						Me
Melzericium rimosum Bononi & Hjortstam				X		
Melzericium udicola (Bourdot) Hauerslev	X			X		
Nothocorticium patagonicum Greslebin & Rajchenb.			X	X	X	

Table 1 (*continued*)

Species	Substrates					
	Ac	Dw	Na	Nb	Np	Other
Peniophora incarnata (Pers.: Fr.) P.Karst.		X	X	X	X	Mm
Peniophora lycii (Pers.) Höhn. & Litsch.	X					
Peniophora rufomarginata (Pers.) Litsch.		X				
Phanerochaete sanguinea (Fr.) Pouzar		X		X		
Phanerochaete sordida (P. Karst.) J.Erikss.		X			X	
Phanerochaete velutina (DC: Fr.) P.Karst.	X				X	Nd
Phlebia femsioeensis (Litsch. & S.Lundell.) J.Erikss. & Hjortstam				X	X	
Phlebia rufa (Fr.) M.P.Christ.			X	X	X	
Phlebia subcretacea (Litsch.) M.P.Christ.			X	X	X	
Phlebiella aff. *christiansenii* (Parmasto) K.H.Larss. & Hjortstam	X					
Phlebiella tulasnelloidea (Höhn. & Litsch.) Oberw.	X	X			X	
Phlebiella vaga (Fr.) P.Karst.			X	X	X	
Pseudolagarobasidium concentricum (Cooke & Ellis) Hjortstam					X	Nd
**Radulomyces confluens* (Fr.: Fr.) M. P.Christ.						Nsp
**Repetobasidium mirificum* J.Erikss.					X	Nsp
Rhizochaete brunnea Greslebin, Nakasone & Rajchenb. Mycologia (submitted)					X	
Schizopora radula (Pers.: Fr.) Hallenb.		X	X	X	X	Ec, Mm
Scopuloides hydnoides (Cooke & Massee) Hjortstam & Ryvarden				X		
Scytinostroma ochroleucum (Bres. & Torrend) Donk	X			X	X	
**Scytinostroma portentosum* (Berk. & M.A.Curtis) Donk						Unknown
Serpula himantioides (Fr.: Fr.) P.Karst.					X	
Sistotrema athelioides Hallenb.					X	
#Sistotrema botryobasidioides Greslebin					X	
Sistotrema brinkmannii (Bres.) J.Erikss.	X		X	X	X	
Sistotrema diademiferum (Bourdot & Galzin) Donk					X	
Sistotrema efibulatum (J.Erikss.) Hjortstam sens. lat.					X	
#Sistotrema globosa Greslebin					X	
Sistotrema oblongisporum M.P.Christ. & Hauerslev		X				
#*Sistotrema* aff**. *otagense*** (G.Cunn.) Stalpers & P.K.Buchanan					X	
Sistotrema porulosum Hallenb.			X			
Sistotrema resinicystidium Hallenb.					X	
Sistotrema sernanderi (Litsch.) Donk		X		X	X	
Sistotremastrum niveocremeum (Höhn. & Litsch.) J.Erikss.						Nsp
Sistotremastrum suecicum Litsch. ex J.Erikss.					X	
Sistotremella perpusilla Hjortstam	X				X	
Steccherinum fimbriatum (Pers.: Fr.) J.Erikss.	X				X	
Stereum gausapatum (Fr.) Fr.					X	Me, Nd
Stereum hirsutum (Willd.: Fr.) S.F.Gray			X	X	X	Lh, Mm
Subulicystidium longisporum (Pat.) Parmasto				X	X	
Tomentella crinalis (Fr.) M.J.Larsen					X	
Tomentella radiosa (P.Karst.) Rick					X	
Tomentella sp.		X				
Tomentellopsis echinospora (Ellis) Hjortstam		X	X	X	X	
**Trechispora byssinella* (Bourdot) Liberta						Nsp
Trechispora cohaerens (Schw.) Jülich & Stalpers	X	X	X	X	X	
Trechispora farinacea (Pers.: Fr.) Liberta	X	X	X	X	X	
Trechispora microspora (P.Karst.) Liberta				X	X	
Trechispora praefocata (Bourdot & Galzin) Liberta	X					
Tubulicrinis accedens (Bourdot & Galzin) Donk					X	
Tubulicrinis chaetophorus (Höhn.) Donk	X					
Tubulicrinis ellipsoideus Greslebin & Rajchenb.	X				X	
Tubulicrinis glebulosus (Fr.) Donk	X	X	X	X	X	
Tubulicrinis hamatus (Jacks.) Donk		X	X	X	X	

(*continued over page*)

Table 1 (*continued*)

Species	Substrates					
	Ac	Dw	Na	Nb	Np	Other
Tubulicrinis inornatus (Jacks. & D.P.Rogers) Donk					X	
Tubulicrinis sororius (Bourdot & Galzin) Oberw.			X		X	
Tubulicrinis subfusiformis Hjortstam & Ryvarden			X	X	X	Mm
Tulasnella allantospora Wakef. & Pears. sens. lat.					X	
Tulasnella calospora (Boud.) Juel					X	
Tulasnella helicospora Raunk.	X					
#Tulasnella robusta Greslebin & Rajchenb.				X		
Tulasnella violea (Quél.) Bourdot & Galzin			X	X	X	
Vararia cunninghamii Boidin & Lanq.				X	X	
Vararia incrustata Greslebin & Rajchenb.		X		X	X	
Vuilleminia subglobispora Hallenb. & Hjortstam						Unknown
Xenasma rimicola (P.Karst.) Donk						Nsp

the inclusion of *Austrocedrus chilensis* forests increased numbers by a further 19 taxa. Although forests of Tierra del Fuego have been surveyed extensively and intensively, only two of the eight predominant forest types of continental Patagonia have been well explored. Assuming an increase of 15–20 species by each other forest type present in the area, the mycobiota of Corticiaceae of the Patagonian Andes forests is estimated to be about 250–290 species.

It also should be noted that many of the species (33) are represented by single collections. This also occurs in well-surveyed areas such as Tierra del Fuego, implying that as collecting trips are increased new taxa will be discovered. Species accumulation curves (Greslebin 2001a) showed that more taxa will be found in the future in Tierra del Fuego. In our experience, the fruiting period of wood-inhabiting fungi is short in most of Patagonia due to harsh climatic conditions.

Several genera, such as *Athelopsis* Oberw. *ex* Parmasto, *Dendrothele* Höhn. & Litsch., *Hyphodontia* J.Erikss., and *Hypochniciellum* Hjortstam & Ryvarden, are considered to be significant because of the relatively high number of species endemic in Patagonian Andes forests.

Geographical distribution

Most of the species (56%) are cosmopolitan or widely distributed, 17% are amphitropical, present in temperate areas of both Northern and Southern Hemispheres, and 3 species (*Botryobasidium lembosporum*, *Dichostereum sordulentum*, and *Melzericium rimosum*) have an American distribution.

Thirty-four species (20%) are endemic, meaning that they are currently known only from the Patagonian Andes forests. As the mycobiota of Corticiaceae of South America is poorly known, the "endemic" status should be considered cautiously; these taxa could be present in other areas outside Patagonia such as the forests of southern Chile.

Seven species (4%) were austral, meaning that they are also present in Australia and/or New Zealand. Since the vascular flora of the Patagonian Andes forests is biogeographically linked with that of Australia (including Tasmania) and New Zealand, the number of austral species is lower than expected. Furthermore, four of these species have been recorded only once in the Patagonian Andes. This could indicate that other austral species have been overlooked because of their low frequency. It is also possible that some of the currently endemic Patagonian species may be found in Australasia, where the corticioid mycobiota is not totally known, and turn out to be austral.

Four species showed an unusual distribution. *Amauromyces farinaceus* and *Botryobasidium stigmatisporum*, previously known only from La Réunion Island in the Indian Ocean, were found in southern Argentinean forests. It was surprising to find them in this cold temperate area, a quite different environment from the tropical topotype. *Amylocorticium rhodoleucum* and *Cristinia rhenana* seem to be rare, and they have been recorded infrequently in Europe. Knowledge of global distribution of corticioid fungi is fragmentary, however, and such apparently disjunct distributions may be considerably altered as more data become available.

Selected taxa of particular interest

There are several taxa that are particularly interesting due to their distinctive morphology and/or possible phylogenetic relationships. Their study addressed taxonomic questions relating to their generic disposition and their phylogenetic and biogeographical relationships with other taxa.

Aleurodiscus antarcticus and *A. triviale* have macro- and micromorphological features that are somewhat intermediate between the genera *Aleurodiscus* and *Stereum*. Basidiocarps are stereoid, and both basidia and spores are large as is typical for *Aleurodiscus*, but the spores are smooth-walled and skeletocystidia are present (Núñez & Ryvarden 1997). Only three species in the genus have this combination of features, the third taxon being *A. parmuliformis* G.Cunn., which is endemic to New Zealand. This suggests a phylogenetic relationship between these three austral species that could indicate a common southern origin of a particular lineage within *Aleurodiscus*.

Three endemic *Hyphodontia* species (i.e., *H. crassispora*, *H. magnifica*, and *H. pumilia*) are distinguished by thick-walled, smooth spores (Greslebin & Rajchenberg 2000). Only one other species, the north temperate *H. detritica* (Bourdot) J.Erikss., shares these features. All other morphological characters, such as cystidia and hyphal features, clearly indicate that these species belong to *Hyphodontia*. We also found that *H. cunninghamii* (G.Cunn.) Greslebin & Rajchenb., a species from New Zealand, also has thick-walled basidiospores and capitate cystidia. Further study of the thick-wall spored *Hyphodontia* species is likely to contribute to taxonomic understanding of the genus and also the phylogenetic relationships between these taxa.

Another distinctive endemic species is *Vararia incrustata* (Greslebin & Rajchenberg 1997a) which stands out from other species in the genus because of its particular dichohyphae that are poorly branched, with blunt apices, and encrusted.

Conservation

Since knowledge of the fungal biota is far from complete and collecting is still in a discovery phase, there is currently little information about the conservation status of corticioid species. In general, there is inadequate knowledge of relative species' abundance, distribution, and ecological preferences.

Greslebin (2001a) evaluated the form of rarity, as defined by Rabinowitz et al. (1986), of corticiod fungi recorded from Tierra del Fuego. This estimation was based on distributional range in Tierra del Fuego, habitat specificity, and local abundance of the 110 species found during a 3-year study period (Table 2).

The high number of species classified in rarity class 7 may in part indicate under-collecting of species in some places or on some substrates. However, this preliminary classification gives an overview that is useful to identify potentially vulnerable species. A degree of vulnerability (low, intermediate, or high) has been assigned to species according to their class of rarity (Table 2).

Regarding vulnerability, we should pay special attention to endemic and austral species because of their uniqueness, restricted distribution, and phylogenetic significance. Thus, they should be given priority in conservation efforts. Thirteen endemic species and four with austral distribution were classified as having a high degree of vulnerability (cf. Table 1). Two endemic species and none with austral distribution were classified as having an intermediate degree of vulnerability, while 12 endemic species and one with austral distribution were classified as having a low degree of vulnerability (Greslebin 2001a).

Table 2 Estimated rarity and vulnerability (in bold in brackets) of corticiod fungal species of Tierra del Fuego.

		Geographical distribution			
		Large		Small	
	Substrate specificity	Broad	Narrow	Broad	Narrow
Frequency	High	Common: 19 spp. (**Low**)	Class 2: 20 spp. (**Low**)	Class 4: 0 spp. (**Intermediate**)	Class 6: 1 sp. (**High**)
	Low	Class 1: 7 spp. (**Low**)	Class 3: 9 spp. (**Intermediate**)	Class 5: 2 spp. (**High**)	Class 7: 52 spp. (**High**)

Wood-rots and pathogenicity of species

Except for a few mycorrhizal or potentially mycorrhizal species (e.g., *Tomentella* species), all corticioid fungi recorded in this study are considered to be wood-rotters. *Coniophora* spp., *Crustoderma dryinum*, *Dacryobolus sudans*, *Leptosporomyces luteofibrillosus*, and *Serpula himantioides* are the only known brown-rot fungi, all others causing white rot.

Most species are non-pathogenic, playing an important role in wood-degradation of fallen trees. *Coniophora arida* has been reported as causing wood decay of standing *Austrocedrus chilensis* (Barroetaveña & Rajchenberg 1996) and *Serpula himantioides* of standing *Nothofagus pumilio* (Rajchenberg 1996). Some other species may be found on the trunks of standing trees (i.e., *Leptosporomyces luteofibrillosus*, *Schizopora radula*, *Sistotrema brinkmanii*, and *Stereum hirsutum*) but do not have phytopathological importance. *Cylindrobasidium evolvens*, *Hymenochaete australis*, *Peniophora incarnata*, *Schizopora radula*, and some species in *Hyphodontia* and *Sistotrema* are found on dead branches of standing trees, probably contributing to the natural pruning of the tree and/or being associated with the onset of the decaying process.

DISCUSSION

Although knowledge of Corticiaceae in Patagonia has steadily increased during the last 15 years it is estimated that the current number of known taxa (168) represents about 60% of the total. Because several taxa appear to be substrate-specific, future surveying efforts need to be undertaken in forest types different from those investigated to date. An increase of 15–20 species may be an over-estimation for some forest types, such as dry areas of *Nothofagus antarctica* forests, but this might be compensated for by the probable under-estimation in some other highly diverse forest types. As an example, *Nothofagus dombeyi* forests comprise a more diverse and complex vascular flora than the previously surveyed forest types. The influence of northern, more temperate climatic conditions should also be considered, especially for *Nothofagus nervosa* and *N. obliqua* forest types. On the other hand, Valdivian rainforest ingressions could harbour a very different corticioid mycobiota with many tropical elements.

Despite ingressions of Valdivian rainforest vascular elements in some areas of southern Argentina, it is likely that the corticioid mycobiota in Chile will most probably be far richer than that in Argentina judging by published records of other groups like agarics (Singer 1969; Garrido 1985, 1988). Knowledge of the mycobiota in that country, largely known through "Flora Fungosa Chilena" (Mujica & Vergara 1980), is deficient for many taxonomic groups, with the notable exception of agarics. Thus, the corticioid mycobiota of southern South America as a whole must still be considered fragmentary, and it is difficult to formulate meaningful comparisons with other regional mycobiotas. Because the vascular flora of southern Argentina and Chile is biogeographically linked to that of New Zealand and Australia, it would be interesting to compare both areas from a mycological point of view. The corticioid mycobiota of the latter countries is mainly known through the work of Cunningham (1963), who recorded and described 291 species. However partial and in need of review it might be, that publication represents surveys of most of the forest types in New Zealand. Comparisons between southern Argentina and Australasia must acknowledge these differences in coverage of various forest types.

Although most species are well known cosmopolitan or widely distributed taxa, the level of endemism is quite high (20%). Together with the rather few austral taxa (7 spp.) the endemic species justify further taxonomic and phylogenetic studies. Also warranting further research are the taxonomic position of *Nothocorticium* Greslebin & Rajchenb., the inclusion of species with thick-walled spores in *Hyphodontia* and associated phylogenetic significance, the understanding of basidiospore variation within such austral species as *Hyphodontia australis* (Greslebin et al. 2000), and the phylogenetic position of the endemic *Aleurodiscus* taxa.

Floristic studies can provide important information on ecology and conservation of species. Relative abundance, distribution, and substrate and habitat specificity are useful parameters relevant to fungal conservation that can be estimated from floristic surveys with only a small increase of sampling effort.

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