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ARTÍCULO INVITADO

AN APPROACH TO THE BIOGEOGRAPHY OF POLYPORE FUNGI (AGARICOMYCOTINA, BASIDIOMYCOTA) IN SOUTHERN SOUTH AMERICA

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Abstract. Rajchenberg, M. 2022. An approach to the biogeography of polypore fungi (Agaricomycotina, Basidiomycota) in southern South America. *Darwiniana*, nueva serie 10(2): 451-479.

The polyporoid fungi from the Patagonian Andes forests of Argentina and Chile were analyzed from a biogeographic point of view through the optics of phylogenetic studies. A total of 72 species are accepted, including 4 that are still unpublished. Species were distributed as either Cosmopolitan (14 spp.), Antitropical (7 spp.), Pantropical + Austral-antarctic (3 spp.), Neotropical (4 spp.), South-temperate (= endemic, 28 spp.), Austral-antarctic (14 spp.) or Circum-austral (2 spp.) in distribution. They were recorded in the Valdivian province (71 spp.), but also in the Magellanic province (22 spp.) and the Maule province (21 spp.). Three species were also distributed northward in Chile and other 8 species were also found in Juan Fernández province. Almost 35% of the species are brown wood-rotting taxa, representing a relatively high percentage in the polypore funga of Patagonia as compared with other world regions; they are mostly associated with Nothofagaceae, not conifers as in the North Hemisphere. *Nothophellinus* proved to be the single endemic genus, *Neophellinus* is shown to be a sub-Amazonian genus, and *Arambarria* an austral genus with representatives in southern South America (south of the Tropic of Capricorn) and the Cape floristic region. For each species, a detailed account of the phylogeny is presented according to the literature, along with insights into its geographical distribution and relationships with other taxa in the genus where it is accepted. Austral lineages are highlighted at genus level (*Gloeoporellus*, *Macrohyporia*, *Neolentiporus*, *Ryvardenia*; incl. 5 species) and species level (another 12 taxa). Ongoing and completed speciation processes are pointed out. The following new combinations are proposed: *Cyanosporus venatus*, *Neophellinus livescens* and *Postia exigua*.

Keywords. Mycogeography; Patagonia; polypores; taxonomy.

Resumen. Rajchenberg, M. 2022. Una aproximación a la biogeografía de los hongos políporos (Agaricomycotina, Basidiomycota) del sur de Sudamérica. *Darwiniana*, nueva serie 10(2): 451-479.

Se analizaron los hongos políporoides de los bosques de la Patagonia de Argentina y Chile desde un punto de vista biogeográfico, a través de la óptica de estudios filogenéticos. Se aceptaron 72 especies, incluidas 4 taxones que aún no están descriptos formalmente. Las especies fueron distribuidas ya sea como cosmopolitas (14 spp.), antitropicales (7 spp.), pantropicales + austral-antárticas (3 spp.), neotropicales (4 spp.), sur-temperadas (= endémicas, 28 spp.), austral-antárticas (14 spp.) o circun-australes (2 spp.). Fueron registradas en las provincias Valdiviana (71 spp.), Magellánica (22 spp.) y del Maule (21 spp.). Tres de estas especies también estuvieron distribuidas hacia el norte en Chile y otras 8 también fueron encontradas en la provincia Juan Fernández. Casi el 35% de las especies son taxones productores de pudrición marrón en el leño, representando un porcentaje relativamente alto en la funga de políporos de la Patagonia cuando se la compara con otras regiones del mundo; la mayoría de estas especies están asociadas a Nothofagaceae y no a coníferas, como ocurre en el hemisferio norte. *Nothophellinus* demostró ser el único género endémico, *Neophellinus* mostró ser un género de distribución sub-amazónico, y *Arambarria* un género austral con representantes en el sur de Sudamérica (al sur del Trópico de Capricornio) y en la región florística del Cabo. Para cada especie se presenta un

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reporte de su ubicación filogenética sobre bases bibliográficas, con análisis de su distribución geográfica y sus relaciones con otras especies del género donde se la acepta. Los linajes australes se destacan a nivel de género (*Gloeoporellus*, *Macrohyporia*, *Neolentiporus*, *Ryvardenia*; que incluyen 5 especies) y a nivel de especie (que incluyen otros 12 taxones). Se señalan los casos de especiación en proceso y los completados. Se proponen las siguientes nuevas combinaciones: *Cyanosporus venatus*, *Neophellinus livescens* y *Postia exigua*.

Palabras clave. Micogeografía; Patagonia; políporos; taxonomía.

INTRODUCTION

The understanding of biogeography of Latin America has mainly been built on the basis of plants and animals (Morrone, 2001; cfr. literature therein summarizing the main contributors to the different proposed schemes). Fungi have played almost no role in the definition of regions and provinces (Sanmartín & Ronquist, 2004). The history of basic concepts in biogeography and the reasons for the absence of fungi in such studies have been summarized by González-Ávila et al. (2017) and May (2017), and I refer to those works for references. The southern tip of South America, i.e., the Patagonian forests dominated with Nothofagaceae, has been a leading area regarding the inclusion of fungi in biogeographical studies. This effort began in the pre-molecular era with studies by Pirozynsky (1983, on general Pacific Mycogeography, including the parasitic genus *Cyttaria*), Horak (1983, on Agarics from the southern Pacific) and Rajchenberg (1989, on polypores from the Patagonian forests), among others. Almost contemporaneously, biogeographical studies based on cladistics appeared, mainly by Humphries et al. (1986) and Crisci et al. (1988) on the parasitic genus *Cyttaria*, these were the first to offer explanations of fungal distribution based on analytical methods and within an evolutionary framework. Notwithstanding this, it was not till the development and burst of phylogenetic studies based on molecular data that the field of fungal biogeography could incorporate a reliable geographic dimension.

The biota of the Patagonian forests in Argentina and Chile is strongly influenced by its original belonging to the South Hemisphere Gondwana supercontinent and its progressive fragmentation during the past 165 Mya. (McLoughlin, 2001). Vicariance, isolation and dispersal (of diaspores in the case of Fungi) have built a complex biota, that has also been transformed and influenced by the region's relationship with the Neo- and Paleotropics (either via modern Cenozoic connections or old Gondwanic ones) (Crisci et al., 1991; Villagrán & Hinojosa, 1997; Sanmartín & Ronquist, 2004).

The vascular flora of Chile, as well as its biogeographical relationships, is well known through Moreira-Muñoz (2011); forest types from there and from Argentina are presented by Hueck (1978) and Donoso Zegers (1993). In brief, the forests show a diverse and rich tree and shrubbery-forming vegetation distributed in a relatively small area that is subjected to strong precipitation which decreases from west to east, and to oceanic influence and geographic complexity caused by the Andes. The Patagonian Andean forests of Argentina and Chile harbor, from north to south, three well-recognized provinces: Maule, Valdivian and Magellanic provinces (Morrone, 2001; Moreira-Muñoz, 2011; Arana et al., 2017, 2021) limited to the east by the Patagonian steppe.

Many of the biogeographic studies on fungi in the past decade have been done with parasitic or ectomycorrhizal fungi (Hosaka et al., 2008; Matheny et al., 2009; Peterson et al., 2010; Truong et al., 2017; May, 2017; Wilson et al., 2017). These fungi offer more reliable connections with their host plants due to their trophic relationships, and results show that their distributional patterns are consistent with the evolutionary history of their hosts. In fact, these relationships have provided support for evolutionary clock dating of fungi.

Polypores, referring to fungal poroid forms with tough to woody flesh, are a polyphyletic group of organisms distributed in not less than 9 orders within the Agaricomycetes (Hibbett et al., 2014; He et al., 2019). Most of them are saprotrophic, decaying the wood of living or dead trees, and a few are parasitic or ectomycorrhizal. Their relationships with their hosts have been thought to be less specific than the parasitic and ectomycorrhizal fungi. Nevertheless, several works have envisaged their biogeographic dimension (Moncalvo & Buchanan, 2008; Skrede et al.; 2011; Chen et al., 2015; Song et al., 2016; Song & Cui, 2017; Koch et al., 2017; Coetzee et al., 2018) thanks to the development of molecular tools.

One of the main problems in dealing with the biogeography of fungi is that a well-anchored species concept is needed because species is the unit with which to work biogeographically. The limitations of morphology in order to establish species concepts has been evident since the application of molecular techniques (Cai et al., 2011). Within fungi, the misapplication of names has led to confusion regarding their distribution. For instance, the biogeographic analysis of the Patagonian *Cortinarius magellanicus* Speg. is unreliable (Romano et al., 2017), as it has been shown that it is a species complex with at least four taxa that are distinguished by morphology and host associations (Salgado Salomón et al., 2018). Phylogenetic studies have enabled mycologists to deal with precise species concepts and to finally have a sound basis to define their distribution. Species recognition criteria are key to understand biogeography.

Here, a critically review of the polypore taxa found in Patagonia and their distribution is presented. The aim is to establish the biogeographical distribution of these groups based on published phylogenetic studies, and to highlight the genera and species that present particular lineages and distributions.

MATERIALS AND METHODS

Records of species (chorology) are based on published literature for Argentina (Rajchenberg, 2006) and Chile (Riquelme & Rajchenberg, 2021). Unpublished specimen records kept at herbarium HCFC are also incorporated. Phylogenetic results were taken from previous works by the author and collaborators and from other researchers (see text). Biogeographic provinces were taken from Morrone (2001) and Arana et al. (2017, 2021). For Patagonia the following provinces were taken in consideration: Maule, Valdivian and Magellanic provinces.

Species names and authors of accepted taxa are presented in Table 1, together with information on their hosts(s), distribution, associated wood-rot produced in the host and taxonomic rank.

Species that have been recorded from Patagonia but are herein rejected are listed in Appendices A and B.

RESULTS

The polypore biota of southern Argentina and Chile is represented primarily by 72 species distributed in Polyporales (51 species) and Hymenochaetales (14), but also in Agaricales (3), Gloeophyllales (2), Trechisporales (1) and Russulales (1) (Table 1).

The species' distributions along Patagonia in its different biogeographic provinces and elsewhere are indicated in Table 2. Species were classified as Cosmopolitan (or Widely Distributed, 14 spp. = 19.4%), Antitropical (7 spp. = 9.7%), Pantropical + Austral-antarctic (3 spp. = 4.2%), Neotropical (4 spp. = 5.6%), South-temperate (= Endemic; 28 spp. = 38.9%), Austral-antarctic (= Austral; 14 spp. = 19.4%) and Circum-austral (= Paleoaustral; 2 spp. = 2.8%), following Moreira-Muñoz (2011) (Table 3).

Species not included in the analyses either for being rejected or for growing on exotic hosts are listed in the Appendices A and B.

South-temperate, Austral-antarctic and Circum-austral genera

Patagonia presents one South-temperate, one Circum-austral, and two Austral-antarctic genera, as follows:

Nothophellinus: an endemic, monotypic genus that occupies an isolated position within the Hymenochaetaceae Donk (Rajchenberg et al., 2015; Wu et al., 2022), represented by *N. andinopatagonicus*.

Gloeoporellus: an Austral-antarctic, monotypic genus, is sibling to Incrustoporiaceae Jülich and has an isolated position within the Polyporales (Justo et al., 2017).

Neolentiporus: a formerly Austral-antarctic genus that has shown to be well delimited within the Fomitopsidaceae (Justo et al., 2017) where it is related to *Daedalea* Pers. within the 'antrodia clade' (Ortiz-Santana et al., 2013) or to *Buglossoporus* Kotl. & Pouz. (Han et al., 2016; Shen et al., 2019).

Table 1. Polypore species recorded from Patagonia distributed according to their biogeographic distribution, with indication of their host(s), associated wood-rot and taxonomic rank. Rot type: B = brown-rot, W = white-rot.

SPECIES	HOST	ROT TYPE	ORDER	FAMILY
Cosmopolitan				
Antrodiella semisupina s.l. (Berk. & M.A. Curtis) Ryvarden	*Nothofagus*	W	Polyporales	Steccherinaceae
Bjerkandera adusta (Willd.) P. Karst.	Conifer + Angiosperm	W	Polyporales	Phanerochaetaceae
Ceriporia purpurea (Fr.) Donk	*Nothofagus*	W	Polyporales	Irpicaceae
Ceriporia reticulata (Hoffm.) Domański	Angiosperm	W	Polyporales	Irpicaceae
Ceriporia viridans (Berk. & Broome) Donk	Angiosperm	W	Polyporales	Irpicaceae
Cyanosporus caesius (Schrad.) McGinty*	Conifer + Angiosperm	B	Polyporales	Dacryobolaceae
Ganoderma australe (Fr.) Pat.*	Conifer + Angiosperm	W	Polyporales	Polyporaceae
Gloeophyllum trabeum (Pers.) Murrill	Conifer + Angiosperm	B	Gloeophyllales	Gloeophyllaceae
Gloeoporus dichrous (Fr.) Bres.	*Nothofagus* + ¿Angiosperm?	W	Polyporales	Irpicaceae
Perenniporia medulla-panis (Jacq.) Donk s.l.	Conifer + Angiosperm	W	Polyporales	Polyporaceae
Porpomyces mucidus (Pers.) Jülich	Conifer	W	Trechispales	Incertae sedis
Spongiporus balsameus (Peck) A. David*	Conifer	B	Polyporales	Dacryobolaceae
Trametes betulina (L.) Pilát	*Nothofagus* + Angiosperm	W	Polyporales	Polyporaceae
Trametes versicolor (L.) Lloyd	Conifer + Angiosperm	W	Polyporales	Polyporaceae
Antitropical				
Cartilosoma ramentaceum (Berk. & Broome) Teixeira*	Conifer	B	Polyporales	Fomitopsidaceae
Fibroporia gossypium (Speg.) Parmasto*	*Nothofagus*	B	Polyporales	/fibroporia+amyloporia
Fibroporia vaillantii (DC.) Parmasto*	Conifer	B	Polyporales	/fibroporia+amyloporia
Gloeophyllum abietinum (Bull.) P. Karst.	Conifer	B	Gloeophyllales	Gloeophyllaceae
Oligoporus rennyi (Berk. & Broome) Donk*	Conifer	B	Polyporales	Dacryobolaceae
Polyporus varius Fr. vel aff.	*Nothofagus*	W	Polyporales	Polyporaceae
Rigidoporus aff. *populinus* (Schumach.) Pouzar	Conifer + Angiosperm	W	Hymenochaetales	Rigidoporaceae
Pantropical + Austral-antarctic				
Fuscoporia senex (Nees & Mont.) Ghob.-Nejh.	Angiosperm	W	Hymenochaetales	Hymenocahetaceae
Hymenochaete microcycla (Zipp. ex Lév.) Spirin & Miettinen	*Nothofagus*	W	Hymenochaetales	Hymenocahetaceae
Trametes sanguinea (L.) Lloyd	Angiosperm	W	Polyporales	Polyporaceae
Neotropical				
Arambarria cognata (Speg.) Rajchenb. & Pildain*	Angiosperm	W	Hymenochaetales	Hymenochaetaceae
Fomitiporella umbrinella (Bres.) Murrill*	Angiosperm	W	Hymenochaetales	Hymenochaetaceae
Fulvifomes gr. *rimosus* (Berk.) Fiasson & Niemelä # $^{\text{CILE}}$	Angiosperm	W	Hymenochaetales	Hymenochaetaceae
Picipes dictyopus (Mont.) B.K. Cui, Xing Ji & J.L. Zhou*	Angiosperm	W	Polyporales	Polyporaceae
South-temperate				
Amyloporia nothofaginea Rajchenb. & Gorjón	*Nohofagus*	B	Polyporales	/fibroporia+amyloporia
Aurantiporus albidus Rajchenb. & Cwielong #	*Nothofagus*	W	Polyporales	Meruliaceae
Bondarzewia guaitecasensis (Henn.) J.E. Wright*	*Nothofagus*	W	Russulales	Bondarzewiaceae
Ceriporia retamoana Rajchenb.	Angiosperm	W	Polyporales	---
Fistulina antarctica Speg.*	*Nothofagus*	B	Agaricales	Incertae sedis
Fistulina endoxantha Speg.*	*Nothofagus*	B	Agaricales	Incertae sedis
Fistulina pumiliae G.C. González, Barroetaveña & Pildain*	*Nothofagus*	B	Agaricales	Incertae sedis

SPECIES	HOST	ROT TYPE	ORDER	FAMILY
Fomitiporia chilensis Rajchenb. & Pildain*	Angiosperm	W	Hymenochaetales	Hymeochaetaceae
Grifola gargal Singer*	*Nothofagus* + Angiosperms	W	Polyporales	Grifolaceae
Grifola sordulenta (Mont.) Singer*	*Nothofagus*	W	Polyporales	Grifolaceae
Nothophellinus andinopatagonicus (J.E. Wright & J.R. Deschamps) Rajchenb. & Pildain*	*Nothofagus*	W	Hymenochaetales	Hymeochaetaceae
Perenniporia pauciskeletalis Rajchenb.	Angiosperm	W	Polyporales	Polyporaceae
Phellinopsis andina (Plank & Ryvarden) Rajchenb. & Pildain*	Angiosperm (Myrtaceae)	W	Hymenochaetales	Hymeochaetaceae
Neophellinus livescens (Speg.) Rajchenb.*	*Nothofagus*	W	Hymenochaetales	Hymeochaetaceae
Phellinus ralunensis Adask., Gilb. & Blanchette	Angiosperm	W	Hymenochaetales	Hymeochaetaceae
Phylloporia boldo Rajchenb. & Pildain*	Angiosperm	W	Hymenochaetales	Hymeochaetaceae
Physisporinus 'stillicidiorum' #	*Nothofagus*	W	Polyporales	Meripilaceae
Physisporinus 'eminens' #	Conifer + Angiosperm	W	Polyporales	Meripilaceae
Picipes austroandinus (Rajchenb. & Y.C. Dai) J.L. Zhou & B.K. Cui*	Conifer + Angiosperm	W	Polyporales	Polyporaceae
Postia carbophila Rajchenb.*	*Nothofagus*	B	Polyporales	Incertae sedis
Postia minuta Rajchenb.	Angiosperm	B	Polyporales	---
Pseudoinonotus crustosus (Speg.) Rajchenb. & Pildain*	*Nothofagus*	W	Hymenochaetales	Hymeochaetaceae
Rubellofomes minutisporus (Rajchenb.) B.K. Cui, M.L. Han & Y.C. Dai*	*Nothofagus*	B	Polyporales	Fomitopsidaceae
Skeletocutis nothofagi Rajchenb.	*Nothofagus*	W	Polyporales	Incrustoporiaceae
Skeletocutis araucana sp. nov. ad int. #	Angiosperm	W	Polyporales	Incrustoporiaceae
Skeletocutis chiloensis sp. nov. ad int. #	Angiosperm	W	Polyporales	Incrustoporiaceae
Skeletocutis foliosa sp. nov. ad int. #	Angiosperm	W	Polyporales	Incrustoporiaceae
Xylodon patagonicus J. Fernández-López, Telleria, M. Dueñas, & M.P. Martín*	Conifer + Angiosperm	W	Hymenochaetales	Schizoporaceae
Austral-antarctic				
Amyloporia stratosa (J.E. Wright & J.R. Deschamps) Rajchenb., Gorjón & Pildain *	*Nothofagus*	B	Polyporales	/fibroporia+amyloporia
Cyanosporus venatus (Rajchenb. & J.E. Wright) Rajchenb.*	*Nothofagus*	B	Polyporales	Incertae sedis
Gloeoporellus merulinus (Berk.) Zmitr.*	Conifer + Angiosperm	W	Polyporales	Incertae sedis
Laetiporus portentosus (Berk.) Rajchenb.*	Nothofagus	B	Polyporales	Incertae sedis
Neolentiporus maculatissimus (Lloyd) Rajchenb.*	*Nothofagus*	B	Polyporales	Fomitopsidaceae
Obba valdiviana (Rajchenb.) Miettinen & Rajchenb.*	Angiosperm	W	Polyporales	Gelatoporiaceae
Polyporus gayanus Lév.	*Nothofagus*	W	Polyporales	Incertae sedis
Postia exigua (Colenso) Rajchenb.*	Conifer + Angiosperm	B	Polyporales	Incertae sedis
Postia punctata Rajchenb. & P.K. Buchanan*	*Nothofagus*	B	Polyporales	Incertae sedis
Rigidoporus concrescens (Mont.) Rajchenb.	Angiosperm	W	Polyporales	Meripilaceae
Ryvardenia campyla (Berk.) Rajchenb.*	*Nothofagus*	B	Polyporales	Incertae sedis
Ryvardenia cretacea (Lloyd) Rajchenb.*	*Nothofagus*	B	Polyporales	Incertae sedis
Steccherinum meridionale (Rajchenb.) Westphalen, Tomšovský & Rajchenb.*	Angiosperm	W	Polyporales	Steccherinaceae
Tyromyces stramenticus G. Cunn. #	*Nothofagus*	W	Polyporales	Incrustoporiaceae
Circum-austral				
Macrohyporia dictyopora (Cooke) I. Johans. & Ryvarden	*Nothofagus*	B	Polyporales	Incertae sedis
Postia pelliculosa (Berk.) Rajchenb.*	*Nothofagus*	B	Polyporales	Fomitopsidaceae

(*) indicates phylogenetic studies published with specimens from Patagonia

(#) indicates unpublished phylogenetic studies with specimens from Patagonia

Table 2. General distribution of Polypores recorded from Patagonia

SPECIES	DISTRIBUTION IN PATAGONIA (Argentina and Chile)[*]	DISTRIBUTION ELSEWHERE
Cosmopolitan		
Antrodiella semisupina s.l.	VAL, MAG	North America, Eurasia, Tropical America(?)[#], N Thailand
Bjerkandera adusta	MAU, VAL, MAG	Americas, Eurasia, Africa, Oceania
Ceriporia purpurea	JF, VAL	Americas, Eurasia, Tropical Africa
Ceriporia reticulata	VAL, MAG	Eurasia, E Asia, Tropical America(?)
Ceriporia viridans	VAL	Americas, Eurasia, Tropical Africa
Cyanosporus caesius	MAU, VAL	Americas, Eurasia, Tropical Africa
Ganoderma australe	JF, MAU, VAL, MAG	SE Asia, Australasia, Central America, South Africa
Gloeophyllum trabeum	MAU, VAL	Americas, Eurasia, Tropical Africa
Gloeoporus dichrous	VAL	Americas, Eurasia, Africa, Oceania
Perenniporia medulla-panis s.l.	VAL	Americas, Eurasia, Africa, Oceania
Porpomyces mucidus	VAL	North America, Tropical America, Eurasia, SE Asia
Spongiporus balsameus	VALww	North America, Eurasia, Tropical Africa
Trametes betulina	VAL	Americas, Eurasia, Africa, India, Australia
Trametes versicolor	JF, MAU, VAL, MAG	Americas, Eurasia, Africa, Oceania
Antitropical		
Cartilosoma ramentaceum	MAU, VAL	Temperate Eurasia, North America
Fibroporia gossypium	VAL, MAG	Temperate Eurasia, North America
Fibroporia vaillantii	MAU, VAL	Temperate Eurasia, North America
Gloeophyllum abietinum	VAL	Temperate Eurasia, North America
Oligoporus rennyi	MAU, VAL	Temperate Eurasia, North America
Polyporus varius vel aff.	VAL	Temperate Eurasia, North America, Australia, India
Rigidoporus aff. *populinus*	MAU, VAL	Temperate Eurasia, North America
Pantropical + Austral-antarctic		
Fuscoporia senex	JF, VAL	SE Asia, Tropical America, Tropical Africa, China, New Zealand, Australia
Hymenochaete microcycla	JF, VAL	Tropical/Sub-tropical Africa, Caribbean, Tropical/Sub-tropical S America, China, SE Asia
Trametes sanguinea CHILE	VAL	SE Asia, Papua New Guinea, Indonesia, India, Tropical/Sub-tropical Africa, Caribbean, Tropical/Sub-tropical S America
Neotropical		
Arambarria cognata	SANT, VAL	Central and N Argentina, Uruguay, S Brazil
Fomitiporella umbrinella	JF, VAL	Tropical/Subtropical South-Central-North America
Fulvifomes gr. *rimosus* CHILE	VAL	Tropical America(?)
Picipes dictyopus CHILE	VAL, MAG, JF	South America
South-temperate		
Amyloporia nothofaginea	VAL	——
Aurantiporus albidus	VAL, MAG	——
Bondarzewia guaitecasensis	VAL	——
Ceriporia retamoana	VAL	——
Fistulina antarctica	VAL, MAG	——
Fistulina endoxantha	MAU, VAL	——
Fistulina pumiliae	MAU, VAL	——
Fomitiporia chilensis CHILE	SANT, MAU, VAL	——
Grifola gargal	MAU, VAL	——
Grifola sordulenta	VAL	——

SPECIES	DISTRIBUTION IN PATAGONIA (Argentina and Chile)*	DISTRIBUTION ELSEWHERE
Nothophellinus andinopatagonicus	MAU, VAL, MAG	——
Perenniporia pauciskeletalis	VAL	——
Phellinopsis andina	VAL	——
Neophellinus livescens	VAL, MAG	——
Phellinus ralunensis CHILE	VAL	——
Phylloporia boldo CHILE	SANT, MAU, VAL	——
Physisporinus 'stillicidiorum'	MAU, VAL, MAG	——
Physisporinus 'eminens'	MAU	——
Picipes austroandinus	MAU, VAL, MAG	——
Postia carbophila	VAL	——
Postia minuta	VAL	——
Pseudoinonotus crustosus	VAL, MAG	——
Rubellofomes minutisporus	MAU, VAL	——
Skeletocutis nothofagi	MAG	——
Skeletocutis araucana sp. nov. ad int.	VAL	——
Skeletocutis chiloensis sp. nov. ad int. CHILE	VAL	——
Skeletocutis foliosa sp. nov. ad int. CHILE	VAL	——
Xylodon patagonicus	MAU, VAL, MAG	——
Austral-antarctic		
Amyloporia stratosa	VAL	Tasmania
Cyanosporus venatus	VAL	New Zealand, Tasmania
Gloeoporellus merulinus	VAL, MAG	New Zealand, Australia
Laetiporus portentosus	VAL, MAG	New Zealand, Australia, New Guinea, New Caledonia
Neolentiporus maculatissimus	VAL	Australia
Obba valdiviana	VAL	Tasmania
Polyporus gayanus	VAL, MAG	New Zealand, Australia
Postia exigua	VAL, MAG	New Zealand, Australia (Tasmania)
Postia punctata	VAL	Australia
Rigidoporus concrescens CHILE	VAL, JF	New Zealand, Australia
Ryvardenia campyla	VAL	New Zealand, Australia
Ryvardenia cretacea	VAL	Australia
Steccherinum meridionale	VAL	New Zealand, Australia
Tyromyces stramenticus	VAL	New Zealand, Australia
Circum-austral		
Macrohyporia dictyopora	VAL, MAG	New Zealand, Australia, Tropical Africa
Postia pelliculosa	MAU, VAL, MAG	New Zealand, Australia, Tropical Africa

[*] JF = Juan Fernández; MAG = Magellanic; MAU = Maule; VAL = Valdivian; SANT = Santiagan
CHILE indicates a species so far restricted to Chilean Patagonia
[#] (?) Indicates that records need to be confirmed but the taxon has been recorded in a wide sense

Ryvardenia: an Austral-antarctic genus (2 spp.) that is either related to the North Hemisphere genera *Laricifomes* Kotl. & Pouzar and *Gilbertsonia* Parmasto (Han et al., 2016; Shen et al., 2019) or in an ambiguous position within the fibroporia+amyloporia clade (Justo et al., 2017).

Macrohyporia: this Circum-austral, monotypic genus, has only been treated in phylogenetic studies recently (Liu et al. 2022) and, together with available sequences of its type species *M. dictyopora* at GenBank places it within the Laetiporaceae Jülich.

Recently, Liu et al. (2022) proposed 4 new genera names, 3 monospecific and one with several species, all presenting an Austral-antarctic distribution. Though the phylogenetic analyses and

Table 3. Distribution of Patagonian polypore species according to their number, number of species according to rot-type (B = brown rot; W = white rot) and percentage of brown-rotting taxa.

DISTRIBUTION	N° TAXA	% TAXA	W + B	% BROWN ROTTING TAXA
Cosmopolitan	14	19.4	11 W + 3 B	21.4
Antitropical	7	9.7	2 W + 5 B	71.4
Pantropical + Austral-antarctic	3	4.2	3 W + 0 B	0
Neotropical	4	5.6	4 W + 0 B	0
South-temperate	28	38.9	21 W + 7 B	33.3
Austral-antarctic	14	19.4	6 W + 8 B	57.1
Circum-austral	2	2.8	0 W + 2 B	100
	72	**100**	**47 W + 25 B**	**34.7**

conclusions appear sound, the nomenclature used for naming the species' new combinations has been inadequate (i.e., wrong basionyms were given), for which reason I refrain to use them in this work until proper names will be given.

South-temperate species

Amyloporia nothofaginea: this species is monophyletic with the North Hemisphere *Rhodonia placenta* (Fr.) Niemelä, K.H. Larss. & Schigel (Niemelä et al., 2005; Pildain & Rajchenberg, 2013; Ortiz-Santana et al., 2013). The available phylogenies, though, are based on ITS sequences only and show both species to be either the same taxon (Dämmrich & Rivoire, 2013) or sister species (Pildain & Rajchenberg, 2013). Dämmrich & Rivoire (2013) reported for the first time the existence of North Hemisphere *R. placenta* specimens with white hymenial surface and with skeletal hyphae, both features described for *A. nothofaginea* (Pildain & Rajcheneberg, 2013). Pending further analyses that include other molecular markers we consider this taxon as endemic to Patagonia.

Aurantiporus albidus: the incorporation of this taxon in phylogenetic studies shows it to be unrelated to the type species of the genus, *A. croceus* (Pers.) Murrill (Justo et al., 2017). It was described from southern Argentina, and sequences from there and Chile have been incorporated into GenBank. The species is morphologically related to *Aurantiporus pulcherrimus* (Rodway) P.K. Buchanan & I.A. Hood from New Zealand and Tasmania (Cunningham, 1965; Buchanan & Hood, 2000), with which it shows partial compatibility (Rajchenberg, 1995a); but a BLAST analysis shows this taxon to be unrelated to it. Motato-Vásquez (2019) showed the closest relationship of *A. albidus* to be *Aurantiopileus mayanensis* Ginns, D.L. Lindner & T.J. Baroni, recorded from Belize (Ginns et al., 2010), Costa Rica and Guatemala (Vlásak & Ryvarden, 2016). If this analysis is confirmed, it would document the genus *Aurantiopileus* to present a Neotropical distribution, depending on the other taxa from Malaysia included in the genus but not yet included in phylogenetic studies, i.e. *A. dolosus* (Corner) Ginns & D.L. Lindner and *A. pendens* (Corner) Ginns & D.L. Lindner, effectively pertain to it.

Bondarzewia guaitecasensis (Fig. 1A): this species forms an independent lineage associated exclusively with Nothofagaceae in Patagonia (Chen et al., 2016, Song et al., 2016), related to species from Australia [*B. retipora* (Cooke) M.D. Barrett] and New Zealand (*B. kirkii* J.A. Cooper, Jia J. Chen & B.K. Cui), and with which it forms the basal clade of the genus. It is the unique representative in South America, where it reached rather recently possibly via spore dispersion (i.e., divergence time having been estimated about 3.5 Mya) (Song et al., 2016). The indication that the distribution of *B. guaitecasensis* is tropical is certainly inaccurate (Song et al., 2016). Also, the latter author's proposal that *B. guaitecasensis*, *B. retipora* and *B. kirkii* form the basal clade of the genus conflicts with the idea that tropical East Asia is likely to be its ancestral area.

Ceriporia retamoana: this endemic species is so far known and apparently restricted to the also endemic *Diostea juncea* (Verbenaceae), but phylogenetic studies are needed.

Fistulina antarctica, ***F. endoxantha*** (Fig. 1B) and ***F. pumiliae***: these 3 species are strongly host related and it is suggested that this is the driving force in their diversification. González et al. (2021) showed the existence of a South Hemisphere species clade separated from a North Hemisphere one, the latter being basal to the genus with the southern clade presenting a larger species diversity. *Fistulina antarctica* and *F. pumiliae* are phylogenetically related, the former growing on *N. dombeyi*, *N. antarctica* and more rarely (but also) on *N. pumilio*; and *F. pumiliae* growing exclusively on *N. pumilio*. Both species are related to the Tasmanian *F. tasmanica* B.K. Cui & Y.F. Sun, which grows on *Eucalyptus* sp. *Fistulina endoxantha* grows exclusively on *Nothofagus obliqua* and *N. alpina* (*Nothofagus* subgenus *Lophozonia*). The association of different species to different Nothofagaceae is congruent with the proposed evolution of subgenera *Nothofagus* and *Lophozonia* in this family (Vento & Agrain, 2018). The South Hemisphere species of *Fistulina* present, evidently, an Austral-antarctic track type. Any possible relationship with the South African *Fistulina africana* Van der Byl is unknown at the moment.

Grifola gargal (Fig. 1C) and ***G. sordulenta***: there is no phylogenetic treatment for these two Patagonian species yet, but sequences have been included by Gargano et al. (2020) in a treatment of *G. frondosa* (Dicks.) Gray. Ongoing research and preliminary results show that these two taxa are each phylogenetically related to taxa from Australia and New Zealand, respectively, showing a complex evolutionary history. They grow on different

Fig. 1. Basidiomata of South-temperate polypores. **A,** *Bondarzewia guaitecasensis* (Bar = 7 cm). **B,** *Fistulina endoxantha* (Bar = 3.5 cm). **C,** *Grifola gargal* (Bar = 7 cm). **D,** *Rubellofomes minutisporus* (Bar = 2.5 cm) (photograph P. Sandoval). Figura en color en la versión en línea http://www.ojs.darwin.edu.ar/index.php/darwiniana/article/view/1058/1271

Nothofagaceae; *G. gargal* on *N. obliqua* and *G. sordulenta* on *N. dombeyi*. *Grifola gargal* has also been found on the exotic *Populus nigra* showing its capacity to 'jump' to different hosts (Pozzi et al., 2009); in Chile it has also been recorded on *N. dombeyi*, *Weinmannia trichosperma* and *Eucryphia cordifolia* (Jansen & Schalkwijk, 1979) but those records need confirmation (Rajchenberg, 2002).

Perenniporia pauciskeletalis: an endemic taxon that has not been included in phylogenetic studies yet.

Picipes austroandinus: this taxon is phylogenetically related with temperate and subtropical species of the genus *Picipes* Zmitr. & Kovalenko from the North Hemisphere, such as *P. badius* (Pers.) Zmitr. & Kovalenko, *P. rhizophilus* (Pat.) J.L. Zhou & B.K. Cui, *P. conifericola* (H.J. Xue &L.W. Zhou) J.L. Zhou & B.K. Cui, *P. tibeticus* J.L. Zhou & B.K. Cui and *P. subtropicus* J.L. Zhou & B.K. Cui (Zhou et al., 2016). Though so far restricted to Patagonia, a specimen from the subtropical Yungas forests of NW Argentina has proved to be phylogenetically conspecific with this taxon (G. Robledo, Universidad de Córdoba, Argentina, pers. com.; based on ITS sequences). If this is confirmed, the species could present a Wide Andean distribution. The species was erroneously named as *Polyporus melanopus* Fr. by Rajchenberg (2006) and *P. dictyopus* Mont. by (Wright & Deschamps, 1972).

Postia carbophila: this endemic species presents an isolated position in phylogenetic studies, only associated with the Austral-antarctic *Postia exigua* (Shen et al., 2019, as *P. dissecta*); its placement is not within *Postia* Fr. s. str.

Postia minuta: an endemic taxon that has not been included in phylogenetic studies yet.

Physisporinus 'stillicidiorum': this taxon has been recorded previously from Patagonia under the names *Rigidoporus undatus* (Pers.) Donk (Hjortstam & Ryvarden, 1985), *R: vitreus* (Pers.) Donk (Lowe, 1966, Rajchenberg & Wright, 1987) and *R. crocatus* (Pat.) Ryvarden (Rajchenberg, 2006), which are different species that are morphologically alike and difficult to separate. Ongoing research (Motato-Vásquez et al., Universidad del Valle, Colombia; pers. com.) shows the Patagonian specimens to be separated from all those taxa, the name *Polyporus stillicidiorum* Speg., described from Isla de los Estados (Tierra del Fuego, Argentina), being available for it (Rajchenberg & Wright, 1987).

Physisporinus '***eminens***': *Rigidoporus eminens* Y.C. Dai, a taxon described from NE China and recorded from Japan (Dai, 1998, Núñez & Ryvarden, 1999), was recorded from Patagonia following morphological comparison of specimens with type material (Rajchenberg, 2006). Nevertheless, ongoing research (Motato-Vásquez et al., Universidad del Valle, Colombia; pers. com.) shows these specimens to be separated at the species level, but phylogenetically related. The Patagonian specimens are so far restricted to the Maule province. If this relationship is confirmed, then the species complex *eminens* (China) – '*eminens'* (Patagonia) would present an Antitropical Pacific distribution.

Rubellofomes minutisporus (Fig. 1D): this endemic species restricted to the Maule province belongs to the small genus *Rubellofomes* B.K. Cui, M.L. Han & Y.C. Dai, which belongs to the dimitic, brown-wood rotting fungi in the Fomitopsidaceae (Justo et al., 2017). For the moment the genus presents an Antitropical distribution.

Skeletocutis nothofagi: an endemic species known only from its type specimen from Tierra del Fuego. No sequence is known from it.

Skeletocutis 'araucana' sp. nov. ad int.: this corresponds to the taxon described under the name *Skeletocutis portcrosensis* A. David from Patagonia (Rajchenberg, 1993a). Unpublished phylogenetic studies have shown that specimens described from Patagonia belong to an autonomous species yet to be described (Robledo et al., Universidad de Córdoba, Argentina; pers. com.), far related from the North Hemisphere specimens of *S. portcrosensis*. Rajchenberg (1993a, 2006) already underlined the morphological differences between specimens from S Europe and Patagonia. The phylogeny of *Skeletocutis* is not yet developed for which reason it is not possible to infer the biogeographic relationships among their species.

Skeletocutis '***chiloensis***' sp. nov. ad int.: a species to be described (O. Miettinen, University of Helsinki, Findland; pers. com.) from Chiloé Is., S Chile.

Skeletocutis '***foliosa***' sp. nov. ad int.: a species to be described (O. Miettinen, University of Helsinki, Findland; pers. com.) from Parque Nacional Pumalín, S Chile.

Xylodon patagonicus: this is *Schizopora radula* (Pers.) Hallenb. from Patagonia as described by Rajchenberg (2006). *Schizopora radula* is a cosmopolitan species complex with specimens from southern Chile and Argentina representing a separate taxon, *X. patagonicus*, phylogenetically related with the New Zealand *X. novozelandicus* J. Fernández-López, Telleria, M. Dueñas, &

Fig. 2. Basidiomata of poroid Hymenochaetaceae. **A-E,** South-temperate species. **A,** *Fomitiporia chilensis* (Bar = 2.7 cm). **B,** *Neophellinus livescens* (Bar = 1.5 cm). **C,** *Nothophellinus andinopatagonicus* (Bar = 4 cm). **D,** *Phylloporia boldo* (Bar = 4.5 cm). **E,** *Pseudoinonotus crustosus* (Bar = 3.5 cm). **F,** Neotropical species, *Arambarria cognata* (Bar = 2 cm). Figura en color en la versión en línea http://www.ojs.darwin.edu.ar/index.php/darwiniana/article/view/1058/1271

M.P. Martín (Fernández-López et al., 2019). A vicariance event, i.e. Gondwanan break up, was postulated as the driving force distinguishing both South Hemisphere taxa, and ecological conditions the ones distinguishing the N and S species.

South-temperate Hymenochaetaceae

Fomitiporia chilensis (Fig. 2A): this taxon is phylogenetically related to the Neotropical lineage of the *Fomitiporia punctata* (P. Karst.) Murrill species complex (Rajchenberg et al., 2019), the nearest taxa being *F. neotropica* Camp.-Sant., Amalfi, R.M. Silveira, Robledo & Decock (Campos Santana et al., 2014) described and recorded from the humid rainforest in French Guiana, the semi-deciduous Atlantic Forest in S Brazil, and the subtropical, seasonally drier forests of NE Argentina, and *F. impercepta* Morera, Robledo & Urcelay (Morera et al., 2017) described from Central Argentina and from French Guiana. The whole group presents a Wide Neotropical phylo-biogeographic distribution.

Neophellinus livescens (Speg.) Rajchenb. **comb. nov.** (Fig. 2B)

Bas.: *Fomes livescens* Speg., Bol. Aca. Nac. Cienc. Córdoba 27(4):342, 1924.

MycoBank MB845584

Unexpectedly, this endemic, Patagonian species appeared phylogenetically related to a taxon described from Central Argentina, *Phellinus uncisetus* Robledo, Urcelay & Rajchenb., with which it turned to form a sister group for the genus *Fomitiporia* Murrill (Rajchenberg et al., 2015; Alves-Silva et al., 2020). It is microscopically similar to *Fomitiporia* but differs by basidiospores walls that, though cyanophilous, are IKI–. This group of species has recently been given genus rank (Wu et al., 2022) and, hence, the new combination is proposed. *Neophellinus* seems restricted to sub-Amazonian, warm-temperate to cold-temperate areas in South America. It presents either a Central Andean or a South Amazonian phylo-biogeographic distribution (Fig. 3A).

Nothophellinus andinopatagonicus (Fig. 2C): this is the single species of the genus, which is phylogenetically isolated within the Hymenochaetaceae (Wu et al., 2022). Its phylo-biogeographic relationship is, thus, difficult to assess (Fig. 3B).

Phellinopsis andina: at the moment this is the single species of the genus registered from the S Hemisphere, the other taxa having been recorded from the N Hemisphere in Europe, USA, China, and other Asian countries (Zhou & Song, 2017). The phylo-biogeographic connection of the genus is of the Wide Antitropical distribution type.

Phellinus ralunensis: this species is known from a single specimen (the holotype) from southern Chile in Valdivian rainforest and is distinguished by the formation of trichocysts in the hymenium (Adaskaveg et al., 1991) and, in culture, of drepanocysts (a character described for the Schizoporaceae; Kasim & David, 1983). Its phylogenetic relationships are unknown.

Phylloporia boldo (Fig. 2D): the phylogenetic disposition of this species is striking as it appears related to 3 taxa described from continental and insular China (Wu et al., 2021, 2022). Altogether, this group separates from the main, large group of taxa in *Phylloporia* by forming massive, perennial, rather heavy basidiomata and by presenting chestnut basidiospores (vs. light annual basidiomata with yellowish basidiospores, which is the typical situation in *Phylloporia* spp.). This small group possibly deserves a genus rank of its own. The Patagonian taxon is restricted to living *Peumus boldus* to which it possibly parasites all along its natural distributional range in Chile. The phylo-biogeographic connection of this group of species is difficult to ascertain but could be of the Tropical Pacific type.

Pseudoinonotus crustosus (Fig. 2E): though perfectly matching in *Pseudoinonotus*, the relationships of this taxon with other species in the genus remain to be studied. It is sibling of the Australian *P. chondromyelus* (Pegler) T. Wagner & M. Fisch. (Rajchenberg et al., 2015). The relationships with other species from that country such as *P. australiensis* (Lloyd) T. Wagner & M. Fisch. and *P. victoriensis* (Ryvarden) Y.C. Dai remain to be settled. The genus presents an Antitropical distribution, of the Wide Antitropical type, with taxa described from Australia and Patagonia in the S Hemisphere and Europe, China, NW India, USA and Canada in the N Hemisphere.

Neotropical species

Arambarria cognata (Fig. 2F): this taxon was originally confused with the N Hemisphere *Inocutis jamaicensis* (Murrill) A.M. Gottlieb, J.E. Wright & Moncalvo (Rajchenberg, 2006) but, afterwards, it was recognized as an independent southern phylogenetic lineage at the genus level and described as *A. destruens* Rajchenb. & Pildain (Rajchenberg et al., 2015), a name that showed to be a synonym of *A. cognata*. This species presents a temperate to subtropical distribution in S South America, present in Patagonian Chile and Argentina, but up to Central Chile, and in Argentina along the Andes to Central Argentina and northwards into the Yungas forests; it is also present in Uruguay and possibly also in

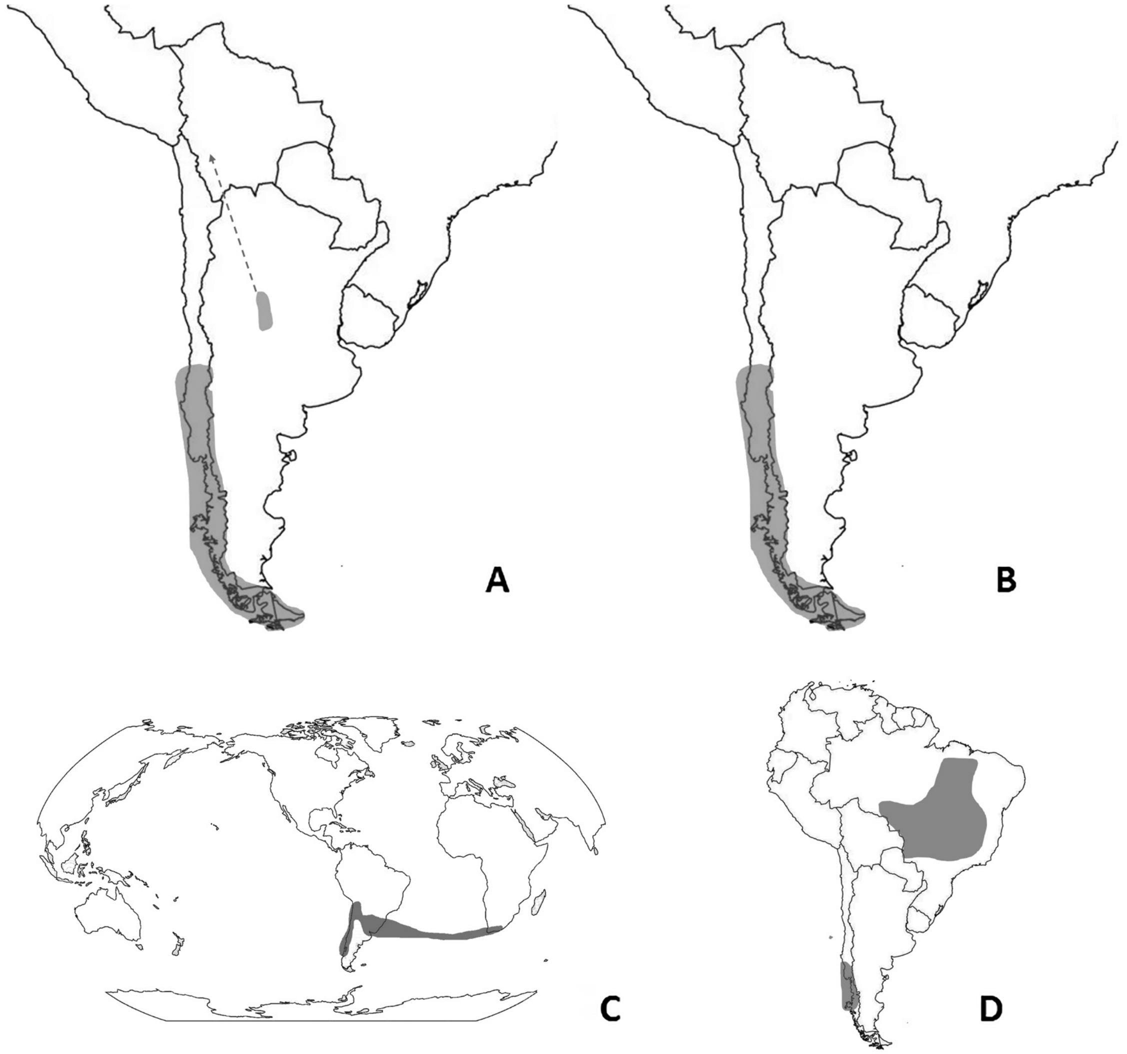

Fig. 3. Distribution of polypore genera and species from Patagonia. **A,** Genus *Neophellinus*, endemic to southern South America with the disjunct species *N. livescens* (Patagonia, South-temperate distribution) and *N. uncisetus* (Central Argentina), the latter purportedly following *Polylepis* spp. along the Andes (arrow, Andean distribution). **B,** Genus *Nothophellinus*, South-temperate to Patagonia. **C,** Genus *Arambarria*, Neotropical distribution, restricted to southern South America, with an undescribed taxon in the Cape Flora of South Africa and Tristan da Cunha. **D,** Species *Picipes dictyopus*, with a Neotropical distribution, with disjunct areas in Patagonia, Juan Fernandez Is. and Cerrado (Brazil).

southern Rio Grande do Sul (Brazil) (Pildain et al., 2017). Its phylo-biogeography is of the South Amazonian type. It is noted that an undescribed taxon in *Arambarria* Rajchenb. & Pildain has been recognized from South Africa (Pildain et al., 2017; Reid, 1955), which makes this small genus to present a particular distribution of possible West-Gondwanan origin (McLoughlin, 2001) (Fig. 3C).

Fulvifomes* gr. *rimosus: an unpublished specimen kept at HCFC and CONC and its preliminary sequences show that a distinct taxon in *Fulvifomes* Murrill is possibly present in the Maule region in Chile, associated to *Lithraea caustica.* Nevertheless, we maintain it among the Neotropical species awaiting further studies and confirmation of its identity.

Fomitiporella umbrinella: this is a widely distributed and frequent species in Patagonia, whose phylogenetic identity has been elucidated recently by Salvador-Montoya et al. (2020). These authors demonstrated that specimens from Patagonia that had previously been named as *Fomitiporella inermis* (Ellis & Everh.) Murrill or *F. americana* Y.C. Dai, X.J. He & Vlasák (Rajchenberg, 2006; Pildain et al., 2018) are this species, which decays many different fallen substrates, and also

Fig. 4. Basidiomata of polypores from Patagonia. **A-C,** Austral-antarctic species. **A,** *Amyloporia stratosa* (Bar = 20 cm) (photograph G. Gates). **B,** *Neolentiporus maculatissimus* (Bar = 8 cm) (photograph N. Costa). **C,** *Postia punctata* (Bar = 5.5 cm). **D,** Circum-austral species *Postia pelliculosa* (Bar = 3.5 cm). Figura en color en la versión en línea http://www.ojs.darwin.edu.ar/index.php/darwiniana/article/view/1058/1271

produces a white heart-rot on standing, endemic conifer *Austrocedrus chilensis*. Its distribution is Neotropical, of the Wide Neotropical type.

Picipes dictyopus: the species was originally described from Juan Fernández Is. and has been widely recorded from Central and Southern Chile (Riquelme & Rajchenberg, 2021) but specimens from there have not yet been included in phylogenetic studies. In Argentinean Patagonia it is not present, but the name was erroneously recorded for specimens of *Picipes austroandinus* by Wright & Deschamps (1972). This taxon was recorded as Pantropical by Núñez & Ryvarden (1995), but Palacio et al. (2017) showed it to represent a species complex with numerous taxa in the Neotropics. Ji et al. (2022) have also described several similar species from Korea and China. Palacio et al. (2017) recorded *P. dictyopus* from the Cerrado province of Mato Grosso state (Brazil) and used those specimens for phylogenetic studies. Pending a molecular, phylogenetic comparison with specimens from Patagonia, I include this species as with a Neotropical distribution, with a South Amazonian type (Fig. 3D).

Austral-Antarctic species

Amyloporia stratosa (Fig. 4A): this species has originally been described from Patagonia but thereafter recorded from Tasmania and shown to be conspecific (Rajchenberg et al., 2011); several other sequences from Australia are represented in GenBank. It is not known from New Zealand (Buchanan & Ryvarden, 2000), and it grows exclusively on *Nothofagus* spp.

Cyanosporus venatus (Rajchenb. & J.E. Wright) Rajchenb. **comb. nov.**

Bas. *Tyromyces venatus* Rajchenb. & J.E. Wright, Bol. Soc. Argent. Bot.22:51, 1983.

=*Postia venata* (Rajchenb. & J.E. Wright) Rajchenb., Sydowia 40: 248, 1987.

MycoBank MB845585

This taxon is phylogenetically close to the type species of *Cyanosporus* McGinty, i.e. *C. caesius* (Schard.) McGinty (Pildain & Rajchenberg, 2013), and specimens from Patagonia show congruence with sequences of *C. venatus* from elsewhere available from GenBank. This species was previously recorded from Patagonia (Argentina and Chile) and New Zealand (Rajchenberg, 1995b), and it was recently recorded also from Tasmania (Gates & Ratkowsky, 2014; duplicate specimens at HCFC confirmed by this author). This taxon presents a typical Austral-antarctic distribution.

Gloeoporellus merulinus: this morphologically peculiar species (Rajchenberg, 2006) presents an independent position within the phylogeny of Polyporaceae (Justo et al., 2017), related and possibly basal to the Incrustoporiaceae (genera *Incrustoporia* Domański, *Tyromyces* P. Karst., *Skeletocutis* Kotl. & Pouzar and *Piloporia* Niemelä). Preliminary analyses of specimens from Patagonia show them to be congruent with specimens from Australia (G. Robledo, Universidad de Córdoba, Argentina, pers. com.) (Fig. 5A).

Laetiporus portentosus: the species appears to present an isolated position in the system, either belonging in the Irpicaceae Spirin & Zmitr. (Lindner & Banik, 2008), where it is an 'odd' element because it produces a brown rot in wood (as does *Leptoporus* Quél.), or presenting an isolated position between *Phaeolus*, *Sparassis* and the core 'Laetiporus clade' (Ortiz-Santana et al., 2013). Specimens from New Zealand and Patagonia are morphologically alike, and so do cultures of the species from Australia as compared with those from Patagonia (Rajchenberg, 1995c), but in-depth phylogenetic studies are still necessary.

Neolentiporus maculatissimus (Fig. 4B): this species is known from Australia (incl. Tasmania) and Patagonia, but not known from New Zealand (Buchanan & Ryvarden, 2000). It nests in the Fomitopsidaceae Jülich (Ortiz-Santana et al., 2013; Justo et al., 2017) as sister genus of *Buglossoporus* Kotl. & Pouz. (Shen et al., 2019; Liu et al., 2022), a genus of mostly North Temperate to E Asian tropical species. Recently, Liu et al. (2022) have described a new species from the tropics.

Obba valdiviana: this species native to Argentinean and Chilean Patagonia has a Tasmanian counterpart that is morphologically indistinguishable as closest taxon; Miettinen & Rajchenberg (2012) showed that the Tasmanian specimens differ from the Argentinian material genetically (ITS distance 1.3%) in spite of the lack of morphological characters to separate them. This is another example of ongoing evolution, as shown for *Ryvardenia cretacea* (Rajchenberg & Pildain, 2012).

Here, *O. valdiviana* is considered as a single taxon with an Austral-antarctic distribution. The Patagonian specimens grow on *Nothofagus dombeyi* whereas the Tasmanian ones grow on *Eucalyptus* sp. The genus *Obba* Miettinen & Rajchenb. has a cosmopolitan distribution, with different species recorded from Eurasia, Australia (Tasmania), the Americas and Thailand, from the tropics, subtropics to boreal and austral zones.

Polyporus gayanus: this taxon has not been incorporated in phylogenetic studies and it is deemed necessary to do that. Available sequences at GenBank (either under this name or under *Tyromyces hypomelanus* Berk. ex Cooke, a purported synonym) place it close to species in the corticioid genus *Cylindrobasidium* Jülich (Physalacriaceae Corner, Agaricales; Larsson, 2007). Preliminary compatibility tests between specimens from New Zealand and Patagonia gave negative results (Rajchenberg, 1993b). It is found in Australia, New Zealand, and Patagonia.

Postia exigua (Colenso) Rajchenb. **comb. nov.**

Bas.: *Polyporus exiguus* Colenso, Trans. Proc. N. Z. Inst. 17:266, 1885.

MycoBank MB845591

Syn.: *Polystictus dissectus* Cooke, Grevillea 14: (n. 71): 14, 1886. *Polyporus dissectus* Lév., Annls. Sci. Nat. sér. 3 5:139, 1846 (Nom. illegit. Art. 53.1). *Postia dissecta* (Cooke) Rajchenb., Sydowia 40: 247, 1988. *Oligoporus dissectus* (Cooke) Huckfeldt & Olaf Schmidt, in Huckfeldt & Schmidt, Z. Mykol. 83(1): 59, 2017.

Phylogenetic studies show this taxon to present an isolated position, only associated with the endemic (Patagonian) *Postia carbophila* (Pildain & Rajchenberg, 2013; Shen et al., 2019, as *P. dissecta*). Its placement is not within *Postia* s.str., as shown by Shen et al. (2019) and Liu et al. (2022). The same authors have shown that the species is also phylogenetically distant from *Oligoporus* Bref., a genus distinguished by thick-walled basidiospores (thin-walled in *Postia* s.str. and *P. exigua*). According to herbarium specimens studied (BAFC, PDD, HCFC) and data at GenBank *P. exigua* is widely present in southern Argentina and Chile, New Zealand, and Australia (Tasmania).

According to Index Fungorum (indexfungorum.org) *Polyporus dissectus* Lév. 1846 (described from southern Chile) is preoccupied by *Polyporus dissectus* Letell. 1826 [from France; which is a synonym of *Cerioporus squamosus* (Huds.) Quél.], for which reason the name *dissectus* is inapplicable for this taxon. The name *Polystictus dissectus* Cooke 1886, based on the same specimen described by Léveillé, could be available; but *Polyporus exiguus* Colenso 1885 (from New Zealand) has priority and, thus, available (Rajchenberg, 1989), for which reason the new combination has been proposed.

In spite of phylogenetically not belonging to *Postia* s.str. (Shen et al., 2019; Liu et al., 2022) this new combination is introduced due to the need of having a name for a phytopathologically important taxon, associated with mortality of *Austrocedrus chilensis* forest stands diseased by *Phytophthora austrocedri* Gresl. & E.M. Hansen (Barroetaveña & Rajchenberg, 1996), until its generic status is resolved.

Postia punctata (Fig. 4C): the phylogenetic disposition of this taxon is isolated among the monomitic, brown-rotting polypores around *Postia* s.l., as is the case with other endemic and Australasiatic species of the group (Pildain & Rajchenberg, 2013, Shen et al., 2019). Sequences of specimens from New Zealand are lacking to confirm their phylogenetic conspecificity with specimens from Patagonia (cfr. Liu et al., 2022). This taxon presents a typical Austral-antarctic distribution.

Rigidoporus concrescens: this species was originally described from Juan Fernández Is. and specimens have been studied from southern Chile by the author. It is also present in Tasmania and New Zealand, where it was named *Tyromyces catervatus* (Berk.) G.H. Cunn. by Cunningham (1965). The type specimen of *Polyporus catervatus* Berk., though, presents clamps in the generative hyphae and represents *Postia exigua* (see above), while specimens at PDD named as *T. catervatus* present simple-septate generative hyphae (Rajchenberg, 1992) and match *R. concrescens* morphologically. Cunningham (1965) also recorded the species from New Guinea. *Rigidoporus umbonatipes* Rajchenb., a taxon described from temperate and subtropical areas of NE Argentina is a synonym to this species (Rajchenberg, 1992). Morphologically similar specimens have been found from Southern Brazil (Westphalen M., Universidad Federal do Rio Grande do Sul, pers. com.; Drechsler-Santos R.E., Universidade Federal do Santa Catarina, pers. com.) and from Colombia (Motato-Vásquez et al., Universidad del Valle, Colombia; pers. com.). No phylogenetic studies have been made, though, with specimens of *R. concrescens* from these different origins, for which reason it is impossible to establish its true limits. Because of the morphological similarity between all the collections we keep them under this name until appropriate phylogenetic studies are made. The species is considered as Austral-antarctic in geographic distribution, but with the peculiarity that it connects southern countries with the Neotropics (Fig. 5B).

Ryvardenia campyla: the phylogenetic conspecificity has been demonstrated between specimens of New Zealand and Patagonia (Pildain & Rajchenberg, 2013), and between Patagonia and Tasmania (Liu et al., 2022). Rajchenberg (1994) already showed a morphological progressive variation among specimens from either side of the Pacific, a fact that could be reflected in more in deep phylogenetic studies. The taxon is also recorded from Australia (Cunningham, 1965) (Fig. 5C).

Ryvardenia cretacea: this species has a disjunct distribution, being present in Australia but not in New Zealand (Buchanan & Ryvarden, 2000) where it grows on *Nothofagus cunninghamii* and *Eucalyptus regnans*, and in southern Argentina and Chile. The phylogenetic conspecificity has been demonstrated (Pildain & Rajchenberg, 2013), but also revealed a strong separation between specimens of *R. cretacea* from either side of the Pacific, suggesting they could be considered different species on phylogenetic grounds. Nevertheless, Rajchenberg (1994) and Rajchenberg & Greslebin (1995) reported biological compatibility between strains from both areas through dikaryotic × monosporous and through monosporous × monosporous confrontation tests. For this reason, as well as the lack of morphological differences, we have deferred describing new taxa from the *R. cretacea* species complex (Rajchenberg & Pildain, 2012) (Fig. 5C).

Steccherinum meridionale: this taxon has been recorded from Patagonia (Rajchenberg, 1987, 2003), New Zealand and Australia (Cunningham, 1965). Westphalen et al. (2018) showed this to be an autonomous taxon from a phylogenetic point of view, related to the morphologically similar *S. nitidum* (Pers.) Vesterh. Rajchenberg (2003) already showed the incompatibility of both taxa and with *S. collabens* (Fr.) Verterh. Records of this taxon from the Neotropics, southern Brazil (Westphalen et al., 2012, 2018) need to be taken cautiously, as sequences from there were not included in phylogenetic studies yet. The species is so far Austral-antarctic in distribution.

Tyromyces stramenticus: preliminary results by Gómez Montoya (2018) have shown that this taxon belongs to *Tyromyces* rather than *Skeletocutis*. Specimens from New Zealand and Australia are morphologically identical and, those from New Zealand, compatible with the Patagonian ones (Rajchenberg, 1995b), but have as yet not been incorporated in phylogenetic studies.

Circum-austral species

Macrohyporia dictyopora: this taxon has been recorded from southern Argentina and Chile, Australia, New Zealand and Tropical Africa. Differences in spores shape and size of specimens from the different continents has been documented (Rajchenberg, 2006) but, otherwise, all other features are highly similar. Here I maintain it as a single species, awaiting phylogenetic studies with specimens from different countries to be performed. Liu et al. (2022) show this genus to be phylogenetically well supported. The record of *M. dictyopora* from Thailand might be an error (Permpornsakul et al., 2016), as sequences fell into the phlebioid clade within the Polyporales (Miettinen et al., 2016), not in the Laetiporaceae (Justo et al., 2017; Wu et al., 2020) (Fig. 5D).

Postia pelliculosa (Fig. 4D): this taxon presents a distribution in Tasmania, New Zealand, southern Argentina and Chile. Their phylogenetic concordance has been demonstrated; ITS analyses showed a geographical grouping, pointing out a possible evolutionary process, but this was not supported by LSU analyses (Pildain & Rajchenberg, 2013).

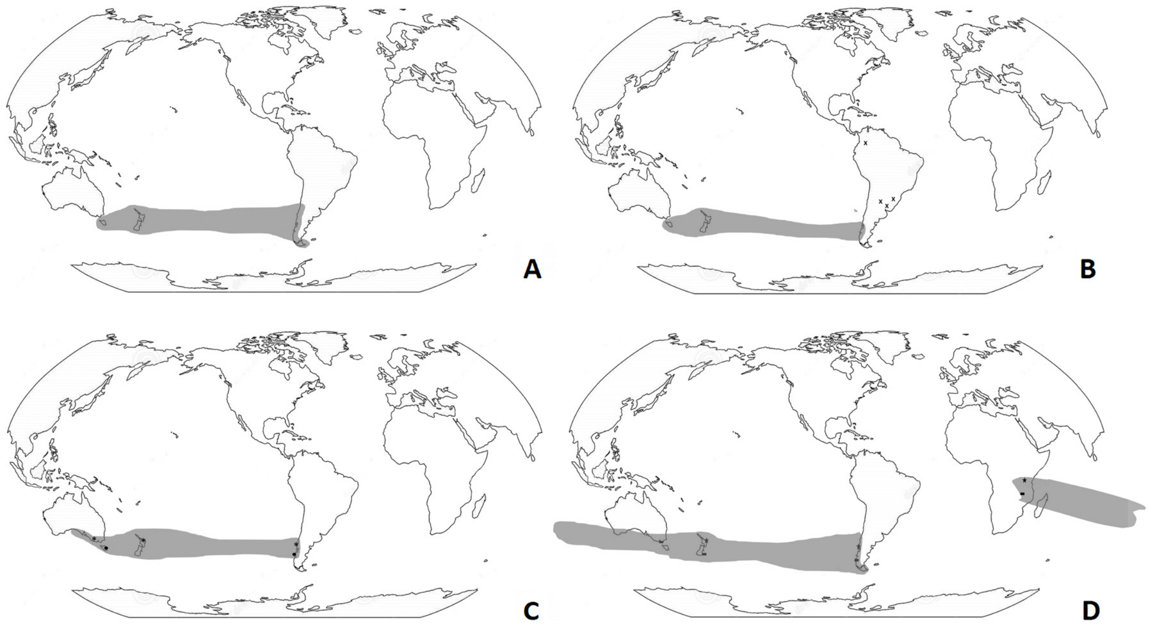

Fig. 5. Distribution of polypore genera and species from Patagonia. **A,** Genus *Gloeoporellus*, with an Austral-antarctic distribution. **B,** Species *Rigidoporus concrescens*, with an Austral-antarctic distribution; (×) indicates specimens recorded from the Neotropics. **C,** Species *Ryvardenia cretacea* (•) and *Ryvardenia campyla* (*), with an Austral-antarctic distribution. **D,** Species *Macrohyporia dictyopora* (—) and *Postia pelliculosa* (*), with a Circum-austral distribution.

Di × mono compatibility tests between specimens from Argentina and New Zealand showed full compatibility (Rajchenberg & Greslebin, 1995). Several records from East Africa (Rwanda, Malawi and Uganda) (Ryvarden & Johansen, 1980; Ryvarden, 2018) based on morphological comparisons warrant its qualification as a Circum-austral species but, certainly, specimens from there need to be included in phylogenetic studies in order to corroborate it. Together with the Austral-antarctic *Postia punctata*, *P. pelliculosa* forms an isolated group among the several phylogenetic lineages in which the genus *Postia* has been dissected (Shen et al., 2019; cfr. Liu et al., 2022) (Fig. 5D).

Pantropical + Austral-antarctic species

The presence of tropical fungal elements in the Patagonian forests is no surprise. Several tree genera present a pantropical (e.g., *Podocarpus*) or neotropical (e.g., *Drimys*, *Myrceugenia*) distribution or pertain to a Tropical Pacific track (e.g., *Araucaria*) (Moreira-Muñoz, 2011); thus, there would be no impediment to find their associated fungi in relatively high latitudes of Southern South America providing appropriate ecological conditions such as those of the Valdivian rainforest.

Fuscoporia senex: this species was originally described from Juan Fernández Is. and has been, since then, reported from many subtropical to tropical areas worldwide (Ryvarden & Johansen, 1980; Núñez & Ryvarden, 2000; Ryvarden, 2004) including also warm temperate areas (Cunningham, 1965; Rajchenberg, 2006; Riquelme & Rajchenberg, 2021) (Fig. 6A). Recent results from global phylogenetic studies of *Fuscoporia* Murrill have shown that *F. senex* might constitute a species complex (Chen et al., 2020) but sequences from Patagonia need yet to be included.

Hymenochaete microcycla: this is a widely distributed species in the tropics and subtropical areas worldwide. There is no general phylogenetic treatment of it.

Trametes sanguinea: a pantropic species (Ryvarden, 2016) that shows phylogenetic, intraspecific invariability (Olou et al., 2020).

Antitropical species

Cartilosoma ramentaceum: phylogenetic studies showed that specimens from Patagonia match perfectly those from Europe (Rajchenberg et al., 2011). The taxon is phylogenetically isolated among the Fomitopsidaceae Jülich (Ortiz-Santana et al., 2013) and deserves a genus of its own (Spirin, 2007). As in the Northern Hemisphere, specimens from Patagonia grow on conifers.

Fibroporia gossypium and ***Fibroporia vaillantii***: both species have been studied thoroughly from a phylogenetic perspective (Rajchenberg et al., 2011, see also Robles et al., 2021) and showed conspecificity with specimens from the North Hemisphere (Fig. 6B). *Fibroporia gossypium* has only been found on fallen *Nothofagus* spp. in Patagonia, in spite of conifers being the main substrates recorded in the North Hemisphere (Gilbertson & Ryvarden, 1986; Bernicchia & Gorjón, 2020, among others).

Gloeophyllum abietinum: specimens from Patagonia are morphologically alike to North Hemisphere ones but have never been compared phylogenetically.

Oligoporus rennyi: specimens from Patagonia and the North Hemisphere proved to be conspecific from a phylogenetic point of view (Pildain & Rajchenberg, 2013; Shen et al., 2019).

Rigidoporus aff. ***populinus***: specimens from Patagonia are morphologically similar to North Hemisphere ones but differ in smaller size of basidiomata and smaller pores. Phylogenetic studies are necessary to elucidate its identity.

Polyporus varius vel aff.: the taxonomy of specimens from Patagonia is still unsolved phylogenetically; its apparent close position to *Cerioporus squamosus* (Huds.) Quél., type species of *Cerioporus* Quél. (Zmitrovich & Kovlenko, 2016) needs further research because it is not well supported (Ji et al., 2022; Palacio et al., 2018). Specimens from Patagonia have been studied from southern Argentina and Chile, but a careful morphological and phylogenetic study is still pending in order to ascertain its identity.

Cosmopolitan species

Few of the cosmopolitan species recorded from Patagonia (Table 1) (Fig. 6C) have been incorporated in phylogenetic studies but when sequence data are available, they proved to fit well into the morphological and phylogenetic species concept. These taxa are *Cyanosporus caesius* (Pildain & Rajchenberg, 2013; Shen et al., 2019), *Ganoderma australe* (Moncalvo & Buchanan, 2008) and *Spongiporus balsameus* (Pildain & Rajchenberg, 2013). For *Antrodiella semisupina* and *Perenniporia medulla-panis* specimens from Patagonia require detailed phylogenetic studies because morphological differences have been found *vis à vis* representative specimens and might represent different taxa (Decock & Ryvarden, 2000; Miettinen et al., 2006).

DISCUSSION AND CONCLUSIONS

The polypore mycobiota of southern South America forests is made up of 72 species of which 25 (34.7%) are brown rotting species growing exclusively on Nothofagaceae (16 spp.), on other angiosperms and conifers (3 spp.), exclusively on angiosperms (1 sp.) and exclusively on conifers (5 spp.) (Tables 1 and 3). This is almost the same percentage reported in previous studies when only 37 (Rajchenberg, 1989) and 62 (Rajchenberg, 2006) polypore species were known and/or considered in Patagonia. The preference of brown wood-rotting species for Nothofagaceae is highlighted, especially in the South-temperate, Austral-antarctic and Circum-austral taxa, as this is in contrast with the situation of brown-rotting species in the North Hemisphere, where a preference for conifers has been repeatedly shown and is associated with the evolutionary origin of Pinaceae (Hibbett & Donoghue, 2001; García-Sandoval et al., 2011). According to García-Sandoval et al. (2011) the 'antrodia clade', to which many brown-rotting polypore genera and species in Patagonia belong (cfr. Table 1, under Fomitopsidaceae, Dacryobolaceae and / fibroporia+amyloporia) originated by the mid Jurassic, but genera such as *Postia*, *Oligoporus*, *Fomitopsis*, *Laetiporus* and *Neolentiporus* developed later, by the mid Cretaceous. Similarly, the Gloeophyllales originated by the early Cretaceous but taxa in *Gloeophyllum* only appeared by the late Cretaceous/early Cenozoic (García-Sandoval et al., 2011, Fig. 4).

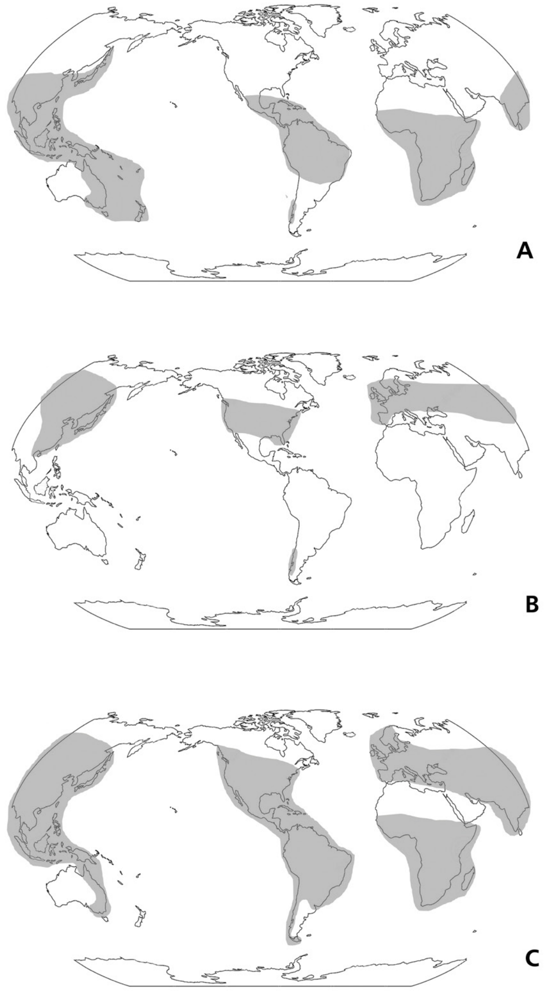

Fig. 6. Distribution of polypores species from Patagonia. **A,** *Fuscoporia senex*, with a Pantropic + Austral-antarctic distribution. **B,** *Fibroporia vaillantii*, with an Antitropical distribution. **C,** *Trametes versicolor*, with a Cosmopolitan distribution.

This timing corresponds with the purported origin of *Nothofagus* in the late Cretaceous (Vento & Agrain, 2018). Jumps from one type of host to another cannot be rejected, as reflected in the present host preference of *Laetiporus portentosus* on both sides of the Pacific: on *Eucalyptus* in Australia, on *Nothofagus* in Patagonia. A more restricted preference of hosts is observed for several species in Patagonia, as compared with the same species in Australia and/or New Zealand. This is the case of *Postia punctata* and *Ryvardenia cretacea* (that are restricted to *Nothofagus* in Patagonia, but grow on *Eucalyptus* and *Nothofagus* in Australia) and *Ryvardenia campyla* (which is restricted to *Nothofagus* in Patagonia, but has been recorded on *Eucalyptus*, *Nothofagus* and *Podocarpus* in Australia, Tasmania and New Zealand).

When considering the biogeographic patterns and relationships of species within major families and genera present in the region a variety of situations occur, some consistent with ancient vicariance and some suggesting dispersal after the break-up of Gondwana. The family Hymenochaetaceae (Hymenochaetales) in Patagonia is represented by 12 species of which 5 present a Tropical distribution (3 Pantropical and 2 Neotropical), and 7 are South-temperate. They represent a special case because, notably, there are no common austral representatives of this important group of organisms at the species level. Also, the South-temperate taxa of poroid Hymenochaetaceae show no relationship with species from New Zealand and/or Australia. Hjortstam & Ryvarden (1985) pointed out that the occurrence of different endemic poroid species of the family Hymenochaetaceae in southern South America and New Zealand/Australia could be an indication that the family evolved rather recently, after the breakup of Gondwanaland. He et al. (2019) estimated 124 Mya as the time when the family originated, in the Lower/Early Cretaceous, at a time when the southern landmasses of Australia + New Zealand + Antarctica were united but already separated from South America (Royer et al., 1992). As far as the species occurring in the Southern Hemisphere, taxa in *Fomitiporia* are totally unrelated, with many of the species from Australia forming a clade of their own (Wu et al., 2022), as does the Patagonian *F. chilensis* with species from the Neotropics (Rajchenberg et al., 2019), both clades being distantly related. Also, as stated above, *Nothophellinus* stands independently in the phylogeny of the family, as does the recently proposed genus *Neophellinus* which appears to be a South American genus with two species present below the Tropic of Capricorn: one in Patagonia and the other in Central and North Argentina. Other Hymenochaetaceae species described from New Zealand, Australia and New Guinea proved to be unrelated to taxa from Patagonia, most of them being phylogenetically linked with SE Asian, tropical Asian and North Hemisphere taxa (Wu et al., 2022).

Phellinopsis andina is the single species of the genus in the South Hemisphere (Wu et al., 2022). The genus origin has been estimated at the end of the Cretaceous by 70 Mya (He et al., 2019), at a time the southern landmasses were already separated from the northern ones suggesting a dispersal event leading to speciation for the Patagonian taxon.

The restricted distribution of the two known species in *Neophellinus* in Argentina (*N. uncinatus* and *N. livescens*) may indicate a relatively recent origin. In contrast, the genus *Arambarria*, with a single widespread species, i.e. *A. cognata*, known from Argentinean and Chilean Patagonia, Central Chile and N Argentina, Uruguay and possibly also S Brazil is related to an undescribed taxon in South Africa (Pildain et al., 2017). He et al. (2019) estimated *Arambarria*'s origin by 45 Mya, whereas Africa-S America separation occurred far before 119-105 Mya; thus suggesting a possible dispersal event.

Nothophellinus (Hymenocahetaceae, Hymenochaetales) proved to be the single South-temperate polypore genus in Patagonia and is relatively young in age. He et al. (2019) estimated its origin by the onset of the Cenozoic by 55 Mya. Three genera, namely *Gloeoporellus* (family *incertae sedis*, Polyporales), *Neolentiporus* and *Ryvardenia* (Fomitopsidaceae, Polyporales) are Austral-antarctic, and *Macrohyporia* (in the Laetiporaceae, Polyporales) is Circum-austral. All of them show an old origin and history.

The genus *Postia* is represented with five species in Patagonia, of which 2 are South-temperate, 2 are Austral-antarctic and 1 is Circum-austral in distribution. In spite of detailed multi-gene phylogenetic studies of this genus and its over-splitting (Shen et al., 2019), the phylogeny proved to be incomplete, and the proposal of new genera has not improved our understanding of the relationships of most of the Patagonian species (*Postia pelliculosa*, *P. punctata*, *P. exigua* (= *P. dissecta*) and *P. carbophila*). Liu et al. (2022) have recently proposed genera names for these species but, while doing so, they did not provide reliable basionyms, for which reason the names cannot be accepted and used. *Postia venata* belongs in *Cyanosporus* McGinty (Pildain & Rajchenberg, 2013, see above) and *P. minuta* has not been included in phylogenetic studies yet.

Three species present in Patagonia were originally described from Juan Fernández Is.: *Fuscoporia senex*, *Rigidoporus concrescens* and *Picipes dictyopus*. From a plant biogeography point of view, those islands are more related to the Magellanic province than with any other Chilean province (Moreira-Muñoz, 2011), which is consistent with the presence of these fungal taxa in southern Chile (specimens studied from the Valdivian province kept at HCFC).

In relation to the distribution within Patagonia several taxa present a restricted distribution, following the bioregionalization scheme proposed by Moreira-Muñoz (2011), Morrone (2015) and Arana et al. (2021). Most of the taxa belong to the Valdivian province. This may be due because the area is more explored and investigated than the other provinces.

Regarding the Maule province, in spite of being a hotspot of biodiversity and a biogeographic node (Morrone, 2001), it has remained understudied mycologically. In this work we have included the fungal species recorded on *Araucaria araucana* and the associated *Nothofagus dombeyi* and *Nothofagus obliqua* and *N. alpina* that characterize this province. No species was found to be restricted to *A. araucana*. *Nothofagus* species from subgenera *Lophozonia* are hosts of two host-specific species: *Fistulina endoxantha* and *Rubellofomes minutisporus*. It should be noted that *N. obliqua* and *N. alpina*, in Argentina, are restricted to northern Patagonia, whereas in Chile they are also present southwards, i.e., they are present in both the Maule and the Valdivian provinces (Donoso Zegers, 1993). *Grifola gargal* is restricted to *N. obliqua* and *N. alpina* in Argentina, but in Chile it has also been recorded on other hosts typical of the Valdivian province (see above). The situation found for *Fistulina* and *Grifola* species may be compared with the ectomycorrhizal fungal associates of *Nothofagus*, subgenera *Nothofagus* and *Lophozonia*. Barroetaveña et al. (2019) showed that the ectomycorrhizal community associated to *Nothofagus* subgenera *Nothofagus* in Patagonia was more related to each other than with the ectomycorrhizal community associated with subgenera *Lophozonia* (and *Fuscospora*); possibly reflecting the larger phylogenetic distances between them (Vento & Agrain, 2018).

Skeletocutis nothofagi is so far known from the Magellanic province from a single collection, but it is difficult to ascertain if only occurs there. For instance, for many years *P. crustosus* was only known from the type collection in Tierra del Fuego, but from 1993 onwards the species was also found and abundantly recorded from the Valdivian province (Rajchenberg, 1993a, 2006; Sandoval, 2014).

Ryvardenia cretacea and *Obba valdiviana* have been shown to present ongoing speciation processes (Pildain & Rajchenberg, 2013; Miettinen & Rajchenberg, 2012), and *Xylodon patagonicus* / *Xylodon novezalandicus* present a recently finished speciation process (Fernández-López et al., 2019). Many other species with Circum-austral and Austral-antarctic distributions need detailed species delimitation studies in order to clarify their situation.

It is necessary to underline that in spite of continuous efforts to record the presence and distribution of polypores in Patagonia (Rajchenberg, 2006), their knowledge is yet limited and scattered. This is especially so in Chile. A recent study has updated the knowledge regarding records and names of these organisms in Chile (Riquelme & Rajchenberg, 2021), but it also highlights the lack of regular surveys and studies of these organisms in that country, a territory that likely hosts, given its rich vascular flora, a wealth of species yet to be uncovered. A hint is the recent description of new polypore taxa of conspicuous size (Rajchenberg et al., 2019), and the inclusion of undescribed species kept at herbarium HCFC that are in the process of formal study (cfr. Table 1 and text). The presence in Chile of several taxa that are unknown in the Argentinean side of Patagonia, where most collecting, surveys and taxonomic efforts have been done supports the need for additional sampling: 8 species (11.1% of the sum total) have so far exclusively been found there (Table 2). The Chilean diverse tree and shrub flora (Moreira-Muñoz, 2011), and the much more humid and temperate climate of southern Chile as compared to the Argentinean side of Patagonia is likely responsible for the distinct fungal community. More taxa at species and, possibly, genus levels are expected to be found in the future. Some taxa found in Argentina only grow in the more western and humid areas of Patagonia; such is the case of *Fuscoporia senex*, *Hymenochaete microcycla*, *Postia punctata* and *Obba valdiviana*. Another indication of the fragmentary knowledge of polypores in Patagonia are the five taxa that, though distinct, are only known from single specimens, i.e. *Fulvifomes* gr. *rimosus*, *Phellinus ralunensis*, *Skeletocutis nothofagi*, *S.* '*chiloensis*' and *S.* '*foliosa*'.

Despite the potential for further discoveries among the polypores of southern South America, the species known so far provide an interesting set of taxa with which to explore biogeographic patterns, shown in this work. The analyses revealed these organisms to present different biogeographic associations. To highlight are the specific Austral-antarctic and Circum-austral fungal lineages at genus and species levels that are consistent with the evolutionary history of their host plants in the South Hemisphere. A high level of endemism at species and genus levels might also be a reflection of the long-time isolation of this area. But relationships of some taxa with northern areas in Argentina and Chile and sub Amazonian regions also shows the interconnectedness of Patagonia with the Neotropical flora and its associated mycobiota.

Future surveys of the polypores in this region are still needed in order (a) to fully know its diversity, (b) to develop a taxonomic arrangement based on molecular methods and, (c) to properly develop biogeographic track analyses.

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APPENDIX A. List of rejected polypore species recorded from Chile.

Emmia latemarginata (Durieu & Mont.) Zmitr., Spirin & Malysheva. Recorded from Marga Marga as *Poria geoderma* Speg. (Spegazzini 1921). The record needs confirmation.

Fuscoporia ferruginosa (Schrad.) Murrill. Recorded from Marga Marga by Spegazzini (1917b) on dead branches of *Drimys winteri*. The record needs confirmation.

Fuscoporia rhabarbarina (Berk.) Groposo, Log.-Leite & Góes-Neto. Recorded from Marga Marga on trunks of *Cryptocarya alba* by Spegazzini (1917). Erroneously listed as an accepted species from Chile by Riquelme & Rajchenberg (2021); Rajchenberg (1987) already referred Spegazzini's specimen as *Phellinus merrillii* (Murrill) Ryvarden, a species in the *Fulvifomes rimosus* (Berk.) Fiasson & Niemelä species complex (originally described from the Philippines). The specimen is here referred to that species' complex as *F.* gr. *rimosus*, based on a different specimen found on *C. alba* in southern Chile by the author.

Inonotus rickii (Pat.) D.A. Reid. Formally recorded based on a specimen from Arica that was received by C. Spegazzini, determined by G. Bresadola and confirmed by Gottlieb et al. (2002). It is excluded because of its distribution outside Patagonia.

Polyporus limbatus Link ex Fr. Recorded by Montagne (1850) from Robinson Crusoe Is., its identity is unknown (type lost) (Ryvarden 1991).

Rigidoporus microporus (Sw.) Overeem. Recorded originally as *Polyporus fernandesianus* Mont. (Montagne 1835) from Robinson Crusoe Island on dead wood, and synonymized by Ryvarden (1982) to *R. microporus*. It is dubious, though, that Montagne's species is *R. microporus* on the basis of the original description 'resupinatus late confluens, pileis tenuissimis papyraceis'. See also Spegazzini (1910). *Rigidoporus microporus* is a pileate species with relatively thick basidiomata. It is also noted that *Polyporus concrescens* Mont. (Montagne 1835, described just before this species) was also determined by Ryvarden as *R. microporus* whereas it is a distinct species (Rajchenberg 1992).

APPENDIX B. List of polypore species recorded from Chile rejected for growing on exotic hosts.

Amyloporia xantha (Fr.) Bondartsev & Singer ex Bondartsev. Recorded from Concepción on stump of *Pinus radiata* (Guillén & al. 2011).

Cerrena unicolor (Bull.) Murrill. Recorded from Los Andes in mycangial glands of *Tremex fuscicornis* (Palma & al. 2005), an entomological pest of *Populus* spp.

Gloeophyllum protractum (Fr.) Imazeki. Recorded from Chile (Concepción) on trunk of *Pinus radiata* (Guillén & al. 2011).

For other species that are considered uncertain and/or only inferred from environmental samples through molecular analysis see Riquelme & Rajchenberg (2021).