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The lichen genera *Gondwania* and *Transdrakea* gen. nov. (*Teloschistaceae*) – speciation in three southern continents

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Abstract. Within the lichen family *Teloschistaceae*, a high number of genera are restricted to the extreme southern part of the Southern Hemisphere. The taxonomy and phylogeny of the southern genus *Gondwania* have been analyzed based upon fieldwork in Antarctica, Patagonia, New Zealand and Tasmania and subsequent studies including molecular methods. Five species are accepted in the genus *Gondwanea* including *G. inclinans* and *G. joannae* that are combined into the genus. Two species are included in the neighboring new genus *Transdrakea*, *T. alacalufes*, a saxicolous species from Patagonia, which is described as new to science and *T. schofieldii*. Based on molecular data, *Austroplaca imperialis* is described as a new species to accommodate Patagonian specimens previously named *G. regalis*. Even though morphologically very similar, the two species are distinct based on molecular and chemical characters and distribution. *Gondwania* and *Transdrakea* are chemically homogenous with parietin as the very dominant compound; *Transdrakea* has a very reduced thallus, whereas *Gondwania* includes species with crustose thalli, as well as species with fruticulose growth habits. *G. inclinans* and *G. cribrosa* are only known from Australia/New Zealand. *G. regalis*, *G. joannae* and *T. schofieldii* are only known from Antarctica. *G. sublobulata* is confirmed from Patagonia and the Falkland Islands, but Antarctic specimens previously named *G. sublobulata* belong to *G. joannae. G. sejongensis* is shown to be a synonym to *G. joannae*. A key to *Gondwania* and *Transdrakea* species is presented.

Key words: Antarctica, *Austroplaca*, *Caloplaca*, Falkland Islands, Gondwana, molecular taxonomy, Patagonia, South America

Introduction

The taxonomic structure of the lichen family *Teloschistaceae* in the extreme Southern Hemisphere has been intensely studied in recent years and the family has been shown to include a number of southern genera with no or very few representatives in the Northern Hemisphere: *Amundsenia* (Søchting et al. 2014a), *Austroplaca* (Søchting & Arup 2021), *Catenarina* (Søchting et al. 2014b). *Charcotiana* (Søchting et al. 2014a), *Gondwania* (Arup et al. 2013), *Huea* (Fryday et al. 2022), *Marchantiana* (Søchting & Arup 2018; Søchting et al. 2023), *Sirenophila* (Søchting et al. 2016), *Shackletonia* (Garrido-Benavent et al. 2016), *Teuvoahtiana* (Halıcı et al. 2023) and *Villophora* (Søchting et al. 2021). These genera have representatives in South America, Antarctica, New Zealand and/or Australia (mostly Tasmania), regions derived from the ancient Gondwana Land.

The genus *Gondwania* was described by Arup et al. (2013) in the subfamily *Xanthorioideae* with *G. cribrosa* from Tasmania as type species. They also included the Antarctic *G. regalis* in the genus. Kondratyuk et al. (2014) proposed the combination *G. sublobulata*, and described the new species *G. sejongensis*. Accordingly, four species are presently known in the genus.

Based on morphological, chemical and molecular characters, we have critically examined the species from Antarctica, South America and Australia/New Zealand and present a revised taxonomy of *Gondwania* and closely related species, together with their distribution in the three continents.

Two of the species in *Gondwania* were treated by Poelt and Pelleter (1984) in their paper on subfruticose species of *Caloplaca*. Even though the ten species they treated shared some morphological traits, they are currently separated in different genera: *Austroplaca* (*ambitiosa*, '*imperialis*'), *Teloschistopsis* (*bonae-spei*, *eudoxa*), *Pachypeltis*

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(*cladodes*), *Polycauliona* (*coralloides*, *thamnodes*), *Gondwania* (*cribrosa*, *regalis*), '*Caloplaca*' (*fragillima*, *mauritanica*). New phylogenetic knowledge has thus underlined the convergent evolution of the fruticulose growth-habit, and on the other hand demonstrated that very different thallus forms can evolve within a genus.

Material

The study is based primarily on specimens collected by the authors in Antarctica, Patagonia, Australia and New Zealand, but additional herbarium material from e.g., CHR and TROMS has been included. Voucher locations are indicated after each collection.

Methods

Morphology and anatomy

Macroscopic descriptions are based on observations made with an Olympus SZH dissecting microscope with an Olympus OM-D camera. Sections were made by hand or with a Reichert-Jung Cryostat 2800 Frigocut E microtome and studied with a Leitz Orthoplan microscope. All measurements were made on material mounted in water. Spores were measured outside the asci and measurements are given as averages and standard deviation of 'n' measurements with minimum and maximum measurements in brackets.

Secondary chemistry

Secondary metabolites were identified using HPLC according to Søchting (1997); thallus and apothecia were analyzed separately. The relative composition of the secondary compounds was calculated based on absorbance at 270 nm according to Søchting (1997).

Molecular analyses

PCR amplification was carried out on DNA extracts or using direct PCR following Arup et al. (2015). Amplifications were made of the internal transcribed spacer regions (nrITS) and the large subunit (nrLSU) of the nuclear ribosomal RNA genes, and the small subunit of the mitochondrial ribosomal RNA gene (mrSSU). Primers for amplification were ITS1F (Gardes & Bruns 1993), ITS4 (White et al. 1990), AL1R (Döring et al. 2000), LR5 or LR6 (Vilgalys & Hester 1990), mrSSU1 (Zoller et al. 1999) and mrSSU7 (Zhou & Stanosz 2001). The PCR parameters included an initial hold at 94°C for 5 min, then denaturation at 94°C for 1 min, annealing at 50 or 54°C (mrSSU) or 53–56°C (nrITS and nrLSU) for 1 min, decreasing 1°C per cycle for the first six of the 39 cycles (touchdown), and an extension at 72°C for 3 min.

Sequence alignment

Two different alignments were prepared, one for a combined analysis of the genes nrITS, nrLSU and mrSSU and one alignment of only nrITS sequences. The combined analysis included 69 sequences from most genera of the subfamily *Xanthorioideae* and the ITS alignment included 62 sequences of the genus *Gondwania* and genera closely related to this genus according to the combined analysis. *Leproplaca chrysodeta* from subfamily *Caloplacoideae* was used as outgroup for the first analysis and *Xanthopeltis rupicola* for the ITS analysis. The sequencing was carried out by Macrogen Inc. (the Netherlands), using the same primers as for the PCR. The two resulting strands were assembled using CLC Main Workbench 4.1.2™ or Geneious v. 11.1.5. Subsequent alignments were performed in Geneious v. 11.1.15 using the MAFFT option (auto) and adjusted manually. Unalignable ends, introns in all the aligned genes and ambiguously aligned parts were excluded from the alignment. Sequences have been submitted to GenBank as indicated in Table 1. The alignments of the three different genes were first analyzed separately to check for incongruence between genes. A conflict between the datasets was assumed to be significant if two different relationships were both supported with posterior probabilities ≥ 0.95.

Phylogenetic analysis

Phylogenetic relationships were inferred using maximum likelihood (ML) as implemented in IQ-TREE 2 (Quang Minh et al. 2020) and Bayesian tree inference was carried out using Markov chain Monte Carlo (MCMC) as implemented in MrBayes v. 3.2 (Ronquist et al. 2012). In the combined analysis, the three included genes were treated as separate partitions. A suitable likelihood model for each of the genes was selected, using BIC as implemented in the software jModelTest v. 2.1.4 (Guindon & Gascuel 2003; Darriba et al. 2012), evaluating only the 24 models available in MrBayes (Ronquist et al. 2012). For the concatenated dataset, the GTR + I + G model was found to be optimal for both the nrITS and the nrLSU datasets and HKY+I+G for the mrSSU dataset. For the pure nrITS dataset, the evolutionary model GTR + G was found to be optimal. The parameters used in the analyses followed those of Arup et al. (2013), except for the branch length prior that was set to an exponential with mean 1/10. No molecular clock was assumed. Three parallel runs with 20,000,000 generations starting with a random tree and employing six simultaneous chains were executed, five of which were incrementally heated with a temperature of 0.10. Analyses were diagnosed every 1,000 generations in the last 50% of the tree sample and automatically halted when convergence was reached. Convergence was defined as a standard deviation of splits (of frequency 0.1) between runs below 0.01. Every 2,000th tree was sampled. A majority-rule consensus tree was constructed from the post-burn-in tree samples. The consensus trees were visualized using FigTree v. 1.4.4 and redrawn in Adobe Illustrator. The maximum likelihood analyses used the same evolutionary models as those used in the Bayesian analyses. Branch support values were computed via 1,000 non-parametric bootstrap replicates.

Table 1. Sequences used in any of the five analyses, newly produced in bold and others downloaded from Genbank.

Species	Country, collector, collector nr, herbarium	nrITS	nrLSU	mrSSU
Amundsenia approximata	Norway, Arup L08179, LD	KJ789965	KJ789972	KJ789974
Amundsenia austrocontinentalis	Antarctica, Upper Garwood, A. de los Ríos, MAF-Lich 18173	JX036068	–	KJ789975
Athallia holocarpa	Sweden, Arup L04019, LD	FJ346540	KC179148	KC179478
Athallia pyracea	Sweden, Arup L04039, LD	FJ346553	KC179149	KC179479
Austroplaca ambitiosa	U.K., Falkland Isl., Lewis Smith 11027, AAS (ITS, LSU)	KC179081	KC179151	–
Austroplaca ambitiosa	Chile, Søchting 11271, C (mrSSU)	–	–	KC179481
Austroplaca cirrochrooides	Chile, Søchting 11300, C	KC179082	KC179152	KC179482
Austroplaca darbishirei	Antarctica, Antarctic Peninsula, Søchting 11401, C	KC179083	KC179153	KC179483
Austroplaca erecta	New Zealand, Eagle, 26.iii.2000, C	KC179084	–	–
Austroplaca hookeri	Antarctica, South Shetland Isl., Søchting 7611, C	KC179085	KC179154	KC179484
Austroplaca imperialis 1	Chile, Elvebakk 98:349, TROM	KC179093	KC179160	KC179490
Austroplaca imperialis 2	Chile, Frödén 1567, LD	**OR789157**	**–**	**–**
Austroplaca lucens	France, Kerguelen Isl., Søchting 9417, C	KC179087	KC179155	KC179485
Austroplaca sibirica	Chile, Søchting 10419, C	**OR789158**	**OR773532**	**OR773537**
Austroplaca soropelta	Iceland, Søchting 7536, C (LSU, SSU)	**OR769699**	KC179157	KC179487
Austroplaca thisbe	Chile, Søchting 11272,2b, C	KC179092	KC179159	KC179489
Calogaya arnoldii s.lat.	Denmark, Søchting 7472, C	KC179343	KC179166	KC179497
Calogaya decipiens	Denmark, 1995, Søchting, C	KC179344	KC179167	–
Calogaya decipiens	Sweden, Arup L06187, LD	–	–	KC179498
Cerothallia luteoalba	Sweden, Frödén 1869, LD	KC179099	KC179177	KC179511
Cerothallia subluteoalba	Australia, VIC, Kondratyuk 20433, LD isotype	KC179100	–	KC179512
Cerothallia yorkensis	Australia, Kärnefelt 99601, LD	KC179101	–	–
Charcotiana antarctica	Antarctica, Victoria Land, Bersan A815, TSB (ITS, mrSSU),	KJ789966	–	KJ789975
Charcotiana antarctica	Antarctica, Southern Victoria Land, Smykla, KRAM-L-63612 (LSU)	KJ789973	–	–
Coppinsiella ulcerosa	Sweden, Søchting 10570, C; Greece, Frödén 1902, LD (LSU, mrSSU)	OQ595198	OQ599380	OQ599381
Dufourea bonae-spei	South Africa, Feuerer & Thell 60485ab, LD	KC179353	–	–
Dufourea bonae-spei	South Africa, Feuerer & Thell 60493a, LD	–	KC179181	KC179516
Dufourea flammea	South Africa, Feuerer & Thell 60488a, HBG	KC179357	KC179183	KC179518
Dufourea karrooensis	South Africa, Wetschnig W. & U., GZU 133-8p	KC179358	–	–
Dufourea karrooensis	South Africa, 10 ix 2010, Fröberg s.n., LD	–	KC179184	KC179519
Flavoplaca citrina	Sweden, Arup L03013, LD	DQ173224	KC179186	KC179521
Flavoplaca marina	U.K., England, Arup L92106, LD (ITS); Sweden, Arup L04057, LD (LSU, mrSSU)	AF353946	KC179187	KC179522
Flavoplaca microthallina	Sweden, Søchting 7480, C	KC179368	KC179188	KC179523
Flavoplaca oasis	Sweden, Arup L03017, LD	FJ346546	KC179189	KC179524
Gondwania cribrosa 1	Australia, Tasmania, Søchting 11581, C	KC179102	KC179192	KC179526
Gondwania cribrosa 2	Australia, Tasmania, Kantvilas 771/01, HO	**OR789159**	–	–
Gondwania cribrosa 3	New Zealand, Ford 1008, C	**OR789160**	**–**	**–**
Gondwania inclinans 1	New Zealand, Søchting 11759, C	**OR789161**	**–**	**–**
Gondwania inclinans 2	New Zealand, Søchting 11758, C	**OR789162**	**–**	**–**
Gondwania inclinans 3	New Zealand, Søchting 12017, C	**OR789163**	**–**	**–**
Gondwania inclinans 4	New Zealand, Christensen 12744, C	**OR789164**	**–**	–
Gondwania joannae 1	Antarctica, Leonie Island, Søchting 11408, C	**OR789165**	**–**	**–**
Gondwania joannae 2	Antarctica, Livingston Island, Søchting 12778, C	**OR789166**	**–**	**–**
Gondwania joannae 3	Antarctica, Adelaide Island, Søchting 11523, C	KC179104	KC179194	**–**
Gondwania joannae 4	Antarctica, Livingston Island, Søchting 12719, C	**OR789167**	–	**–**
Gondwania joannae 5	Antarctica, King George Island, Hur ANT 050886, KoLRI	DQ534455	**–**	–
Gondwania joannae 6	Antarctica, Adelaide Island, Søchting 11423, C	**OR789168**	**–**	KC179528
Gondwania joannae 7	Antarctica, Livingston Island, Søchting 12749, C	**OR789169**	**–**	–
Gondwania joannae 8	Antarctica, Weaver Penie, Hur ANT 050913, KoLRI	KJ133467	**–**	**–**
Gondwania joannae 9	Antarctica, Livingston Island, Søchting 12833, C	**OR789170**	–	**–**
Gondwania joannae 10	Antarctica, Weaver Penie, Hur ANT 050943, KoLRI	KJ133465	**–**	–
Gondwania joannae 11	Antarctica, Weaver Penie, Hur ANT 050806, KoLRI	KJ133466	**–**	**–**
Gondwania regalis 1	Antarctica, King George Island, Olech 2009, C	**OR789171**	**–**	**–**
Gondwania regalis 2	Antarctica, King George Island, unknown, Kopri L17	EU161240	**–**	**–**
Gondwania regalis 3	Antarctica, Weaver Pwenie, Hur ANT 050898, KoLRI	KJ133462	–	**–**
Gondwania regalis 4	Antarctica, Weaver Pwenie,Hur ANT09031, KoLRI	KJ133463	–	–
Gondwania regalis 5	Antarctica, Adelaide Island, Søchting 11427, C	**OR789172**	KC179193	KC179527
Gondwania sublobulata 1	Falkland Islands, Søchting 12661, C	**OR789173**	**–**	**–**

Table 1. Continued.

Species	Country, collector, collector nr, herbarium	nrITS	nrLSU	mrSSU
Gondwania sublobulata 2	Falkland Islands, Søchting 12656, C	**OR789174**	–	–
Gondwania sublobulata 3	Falkland Islands, Søchting 12650, C	**OR789175**	–	–
Gondwania sublobulata 4	Falkland Islands, Søchting 12651, C	**OR789176**	–	–
Gondwania sublobulata 5	Falkland Islands, Søchting 12634, C	**OR789177**	–	–
Gondwania sublobulata 6	Falkland Islands, Søchting 12658, C	**OR789178**	–	–
Gondwania sublobulata 7	Chile, Søchting 12237, C	**OR789179**	–	–
Gondwania sublobulata 8	Falkland Islands, Søchting 12651, C	**OR789180**	–	–
Leproplaca chrysodeta	Sweden, Arup L7107, LD	KC179448	KC179206	–
Orientophila diffluens	Japan, Frisch Jp171, LD	KC179372	KC179210	KC179544
Orientophila subscopularis	Japan, Frisch Jp99, LD holotype	KC179375	–	KC179546
Pachypeltis invadens	Norway, Svalbard, Elvebakk 03:109, TROM	KC179108	KC179212	KC179548
Pachypeltis sp. *1*	China, Abbas & Xahidin 500002, XJUG	KC179109	KC179213	KC179549
Pachypeltis sp. *2*	China, Abbas & Mahamat 500113, XJUG	KC179110	KC179214	KC179550
Parvoplaca nigroblastidiata	Sweden, Arup L10208, LD	KC179113	KC179215	KC179551
Parvoplaca tiroliensis	Sweden, Arup L02364, LD (ITS); Sweden, Frödén 1945, LD (LSU, SSU)	KC179116	KC179216	KC179552
Polycauliona candelaria	Iceland, Søchting 7488, C	KC179379	KC179217	KC179553
Polycauliona coralloides	Mexico, Søchting 9887, C	KC179380	KC179218	KC179554
Polycauliona ignea	Mexico, Moberg 10402, UPS (ITS); Mexico, Søchting 9879, C (LSU, SSU)	KC179382	KC179219	KC179555
Polycauliona luteominia	USA, California, Wetmore 73797, LD	KC179387	–	–
Polycauliona luteominia	USA, California, Søchting 11219, C		KC179220	KC179556
Polycauliona phlogina	Sweden, Göransson L02055, LD	DQ173235	KC179221	KC179557
Polycauliona polycarpa	USA, Minnestota, Wetmore 80511, LD	KC179389	–	–
Polycauliona polycarpa	Denmark, 3.V.1995 Fredtoft, C (LSU); Denmark, Søchting 10507, C (SSU)	–	KC179222	KC179558
Polycauliona rosei	USA, California, Arup L89165, LD (ITS)	KC179390	–	–
Polycauliona rosei	USA, California, Søchting 11225, C (LSU, SSU)	–	KC179223	KC179559
Polycauliona tenax	USA, California, Westberg 949, LD	KC179401	KC179230	KC179567
Polycauliona tenuiloba	Mexico, Nash 40170, LD	KC179402	KC179231	KC179568
Polycauliona thamnodes	Mexico, Søchting 9878, C	KC179403	KC179232	KC179569
Polycauliona verruculifera	Sweden, Arup L06209, LD (ITS); Iceland, Søchting 7522, C (LSU, SSU)	KC179404	KC179233	KC179570
Rusavskia elegans	Iceland, Søchting 7530, C	KC179406	–	–
Rusavskia elegans	Russia, Zhurbenko 96376, C	–	KC179238	KC179576
Rusavskia sorediata	Norway, Lindblom 1229, BG (ITS); Iceland, Søchting 7538, C (LSU, SSU)	AY453647	KC179239	KC179577
Shackletonia hertelii	Chile, Søchting 10349, C	KC179118	–	KC179579
Shackletonia hertelii	Antarctica, South Shetland Isl., Søchting 7932, C	–	KC179240	–
Shackletonia sauronii	Antarctica, South Shetland Isl., Søchting 7654, C	KC179120	KC179241	KC179580
Solitaria chrysophthalma	Sweden, Arup L03101, LD	KC179408	KC179251	KC179590
Squamulea squamosa	USA, Arizona, Kärnefelt AM960105, LD	KC179125	KC179252	KC179591
Squamulea subsoluta	Austria, Arup L97072, LD	AF353954	KC179253	KC179592
Teuvoahtiana altoandina	Argentina, Frödén 1700, LD	KC179094	KC179170	KC179503
Teuvoahtiana meridionalis	Antarctica, James Ross Island, Halıcı ERCH JR 0.171	OQ592153	–	OQ592150
Teuvoahtiana rugulosa	Chile, Wang et al. 120331, KoLRI 14500	KY614441	KY614474	KY614518
Transdrakea alacalufes 1	Chile, Søchting 11355, C	**OR789181**	**OR773533**	**OR773539**
Transdrakea alacalufes 2	Falkland Islands, Søchting 12612, C	**OR789182**	–	–
Transdrakea alacalufes 3	Chile, Søgaard 91, C	**OR789183**	–	–
Transdrakea alacalufes 4	Chile, Søchting 12231, C	**OR789184**	–	–
Transdrakea alacalufes 5	Chile, Søchting 12386a, C	**OR789185**	–	–
Transdrakea alacalufes 6	Argentina, Søchting 7557, C	**OR789186**	–	–
Transdrakea alacalufes 7	Chile, Søchting 12384, C	**OR789187**	–	–
Transdrakea alacalufes 8	Chile, Søgaard 88, C	**OR789188**	–	–
Transdrakea alacalufes 9	Falkland Islands, Søchting 12611, C	**OR789189**	–	–
Transdrakea schofieldii 1	Antarctica, Livingston Island, Søchting 12758, C	**OR789190**	–	–
Transdrakea schofieldii 2	Chile, Søchting 12679, C	**OR789191**	–	–
Transdrakea schofieldii 3	Antarctica, Livingston Island, Søchting 12819, C	**OR789192**	–	–
Transdrakea schofieldii 4	Chile, Søgaard 106b, C	**OR789193**	–	–
Transdrakea schofieldii 5	Antarctica, Livingston Island, Søchting 7578, C	**OR789194**	–	**OR773540**
Transdrakea schofieldii 6	Antarctica, Livingston Island, Søchting 7623, C	**OR789195**	–	–

Table 1. Continued.

Species	Country, collector, collector nr, herbarium	nrITS	nrLSU	mrSSU
Transdrakea schofieldii 7	Antarctica, Livingston island, Søchting 12714, C	**OR789196**	–	–
Xanthocarpia crenulatella	Austria, Søchting 9359, C	KC179126	KC179274	KC179613
Xanthocarpia fulva	Italy, Arup L07030, LD	KC179131	KC179276	KC179615
Xanthocarpia ochracea	France, 1998, Roux, C (ITS); Italy, Arup L07009, LD (LSU);	KC179132	KC179277	–
Xanthocarpia ochracea	Italy, Arup L07124, LD (SSU)	–	–	KC179616
Xanthomendoza borealis	Greenland, Søchting 10499, C	KC179133	–	–
Xanthomendoza borealis	Russia, Zhurbenko 94411, UPS	–	KC179278	KC179617
Xanthomendoza fallax	Austria, Arup L97529, LD (ITS); USA, Wisconsin Søchting 9566, C (LSU)	AF353955	KC179279	–
Xanthomendoza fallax	USA, Michigan, Søchting 9566, C (SSU)	–	–	KC179618
Xanthomendoza mendozae	Chile, Søchting 10209, C	KC179138	KC179281	KC179620
Xanthomendoza novozelandica	New Zealand, Kärnefelt 999003, LD	KC179140	–	KC179621
Xanthomendoza oregana	Sweden, Kondratyuk 2, LD holotype	KC179142	–	KC179622
Xanthomendoza oregana	Denmark, Søchting 7473, C	–	KC179282	–
Xanthomendoza trachyphylla	USA, North Dakota, Wetmore 80270, LD	KC179143	KC179283	KC179623
Xanthopeltis rupicola	Chile, Frödén 1654, LD	KC179146	KC179286	KC179626
Xanthoria calcicola	Sweden, Arup L97372, LD	AF353944	–	–
Xanthoria calcicola	Spain, Søchting 9627, C	–	KC179287	KC179627
Xanthoria parietina	Denmark, 2002, Søchting s.n., C	KC179411	–	KC179629
Xanthoria parietina	Denmark, Søchting 7157, C	–	KC179289	–

Results

Phylogeny

We generated 47 new sequences for this study. In the combined data set of 70 taxa, the nrITS partition consisted of 53 sites (219 informative), the nrLSU partion consisted of 707 sites (91 informative) and the mrSSU partition of 811 sites (147 informative). The alignment of the ITS data consisted of the outgroup and 61 terminals of 537 aligned nucleotide sites, of which 191 were parsimony informative. The combined analysis halted after 650,000 generations and the 50% majority-rule tree is shown in Fig. 1. The Bayesian ITS analysis halted after 275,000 generations and a 50% majority-rule tree is shown in Fig. 2. The Maximum Likelihood analysis yielded trees (not presented) very similar to the Bayesian ones and bootstrap values are presented in Figs 1 and 2.

The combined analysis of the subfamily *Xanthorioideae* does not present any surprises and is very similar to previous analyses bases on the three genes used in this paper (e.g., Arup et al. 2013; Halıcı et al. 2023). However, several genera with a distribution mainly in the Southern Hemisphere, including several of the new taxa included in this study sit on a branch in the center of the subfamily. This branch with six genera splits in two clades, one with *Teuvoahtiana* and *Xanthopeltis* and one with *Austroplaca*, *Gondwania*, *Cerothallia* and the genus *Transdrakea*, proposed here as new to science. *Austroplaca* is strongly supported and located in a sister position to the other three genera, all fully supported as monophyletic. *Cerothallia* seems to be basal to *Gondwania* and *Transdrakea*, but this position is only partly supported (PP = 0.95, but BS < 75).

In the second analysis, ITS data shows in greater detail the relationships within and between the genera *Austroplaca*, *Cerothallia*, *Gondwania* and *Transdrakea* (Fig. 2). *Transdrakea* and *Gondwania* are also here sister genera, but with *Austroplaca* outside of them and *Cerothallia* on a separate branch. *Austroplaca*, the largest genus in the group, shares several morphological traits with *Gondwania*, such as being crustose, lobate, and having pseudocyphellate thalli. In addition, both genera also include very diverse morphologies, as well as a varied ecology. *Austroplaca imperialis*, described below, is shown to be firmly positioned within the genus, although very similar to *G. regalis*. *Transdrakea* with *T. alacalufes* and *T. schofieldii* are well separated from five *Gondwania* species *G. cribrosa*, *G. inclinans*, *G. regalis*, *G. joannae*, and *G. sublobulata*. Both genera grow exclusively in different parts of the Southern Hemisphere and *Transdrakea* differs in the poorly developed thallus and in shorter spore septa, in addition to the molecular differences. Sequences of *G. sejongensis* S.Y. Kondr. & Hur are well accommodated within the *G. joannae* clade and is therefore not supported as a separate species by the molecular data. An ITS sequences of *G. cribrosa* from New Zealand differs significantly from the two from Tasmania and the sister position to these is not supported (PP = 0.745, BS = 54). This relationship needs further studies and is discussed below under *G. cribrosa*.

Based on the new molecular results presented here, two species have, in their traditional sense as *Gondwania regalis* and *Gondwania sublobulata*, both turned out to consist of two species that occur on either side of the Drake Passage. The Patagonian specimens previously assigned to G. *regalis* belong in the genus *Austroplaca*, where they are located at the phylogenetic base of the genus. They are described here as *Austroplaca imperialis*. Traditional *G. sublobulata* is located on two separate clades. One clade, representing *G. sublobulata* s.str., includes all specimens from Patagonia, from where the type was collected (Staten Island) and the Falkland

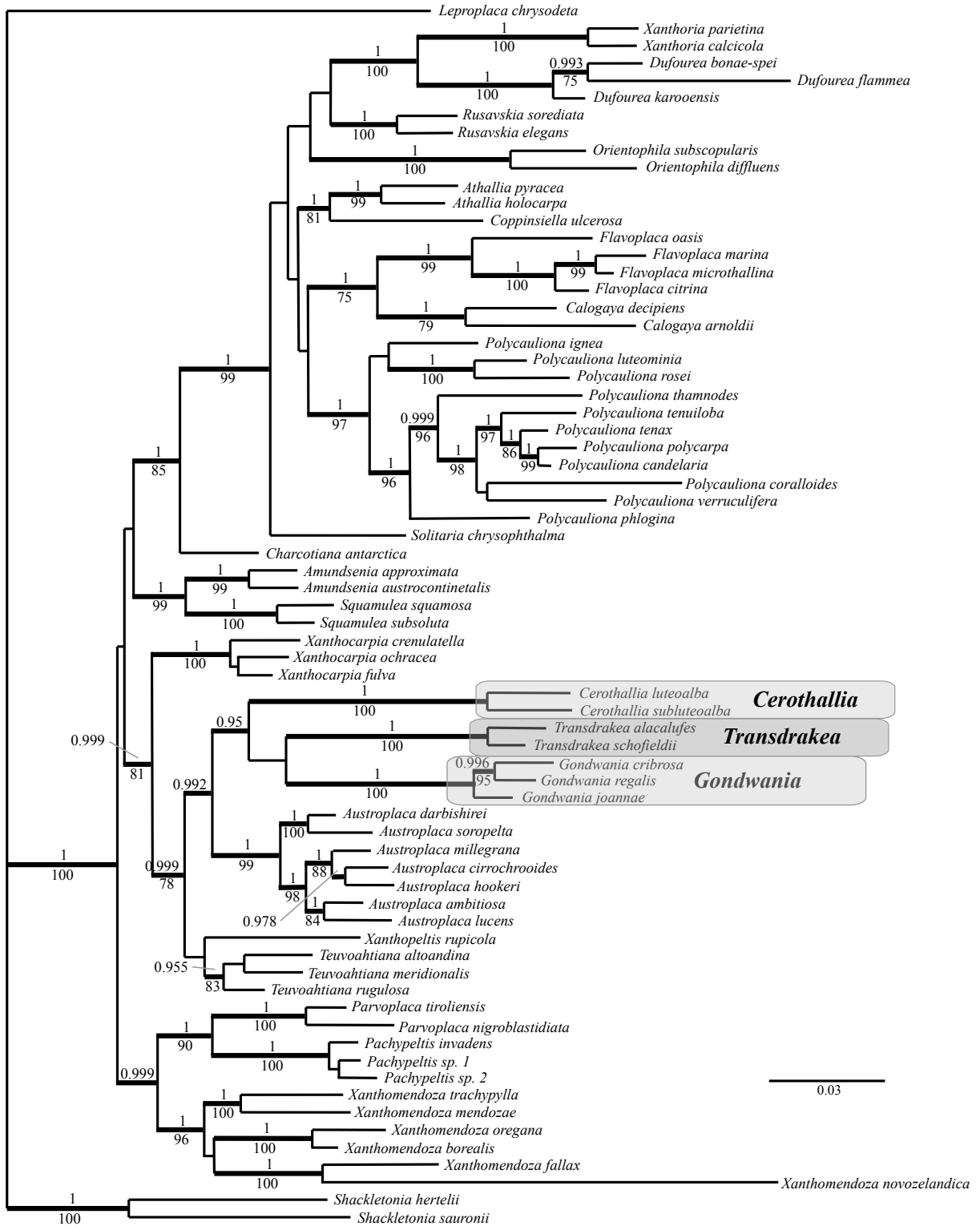

Figure 1. Majority-rule consensus tree based on a Bayesian MCMC analysis of a combined data set of the ITS, LSU and SSU genes showing the genetic placement of the genera *Gondwania*, *Transdrakea* and *Austroplaca*. Branches with posterior probabilities higher or equal to 0.95 are shown in bold. Bootstrap values and posterior probabilities are presented below and above the branches, respectively.

Islands. The other clade, accepted here at species level, includes only Antarctic specimens and is conspecific with *Caloplaca joannae* (Hue) Zahlbr., which accordingly is combined into *Gondwania* and takes priority over the recently described *G. sejongensis*.

Chemistry

All species of *Gondwania* and the related *Transdrakea* (see below) have chemosyndrome A of Søchting (1997) with the following approximate anthraquinone proportions: 1% teloschistin, 2–3% fallacinal, 1–2% parietinic acid, 1–2% emodin, 92–95% parietin. All yellow, orange or reddish-pigmented parts are K+ purple.

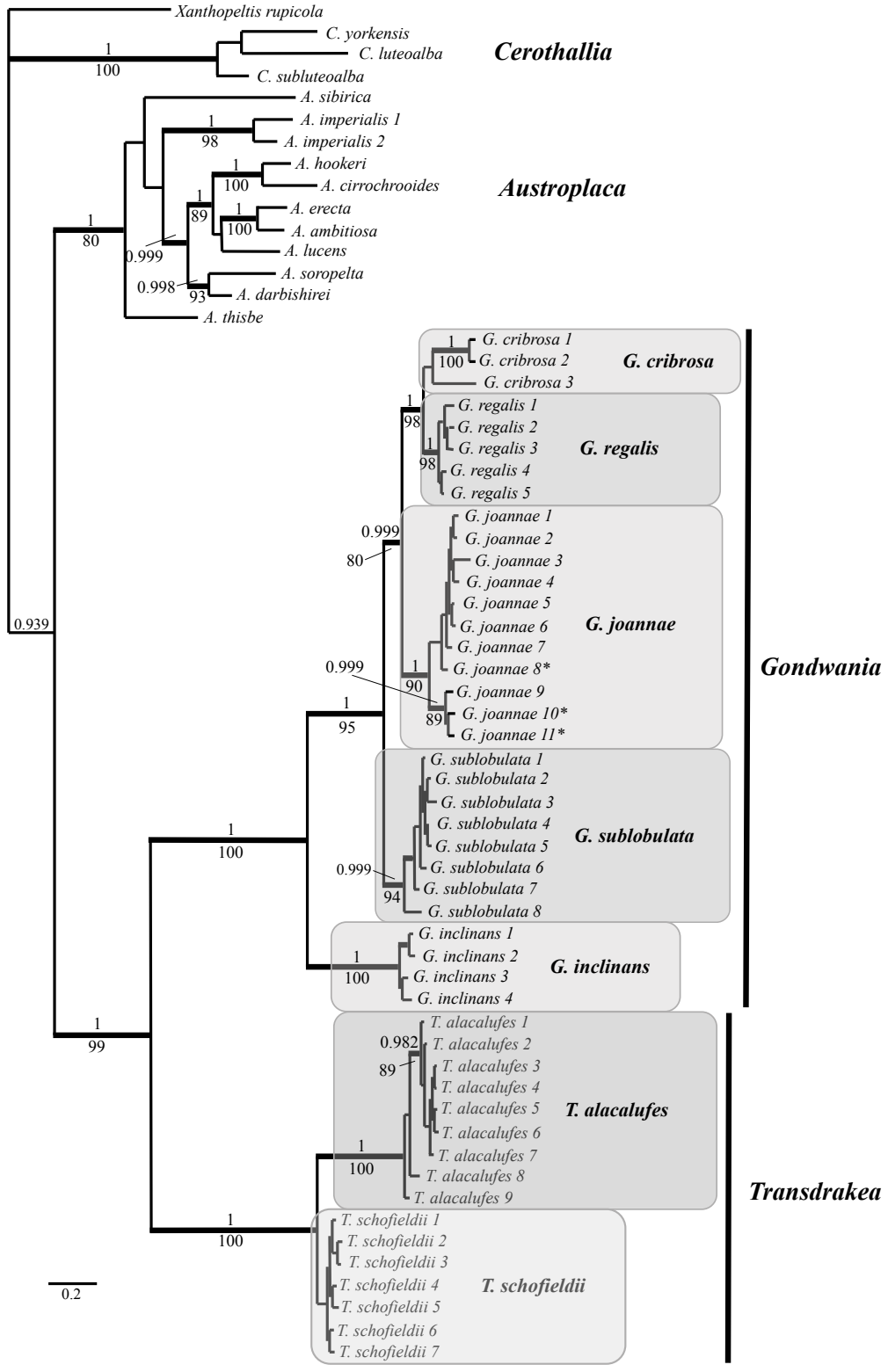

Figure 2. Majority-rule consensus tree based on a Bayesian MCMC analysis of ITS data of *Gondwania*, *Transdrakea* and *Austroplaca*. Branches with posterior probabilities higher or equal to 0.95 are shown in bold. Bootstrap values and posterior probabilities are presented below and above the branches respectively.The asterisks mark the position of specimens identified by Kondratyuk et al. (2014) as *Gondwania sejongensis.*

Biogeography

Gondwania and *Transdrakea* belong to a Southern Hemisphere clade in subfamily *Xanthorioideae* together with the genera, *Austroplaca*, *Cerothallia*, *Teuvoahtiana* and *Xanthopeltis* (Arup et al. 2013). *Austroplaca* has never been monographed, but it was estimated by Søchting & Arup (2021) to hold at least 15–20 species, of which 10 are currently included in the genus (Arup et al. 2013; Søchting & Arup 2021); a further species, *A. imperialis*, is described in this paper. Two species of *Austroplaca*, *A. soropelta* and *A. sibirica*, are bipolar with a wide distribution including the Arctic. *Cerothallia* includes two species in Australia and one species, *C. luteoalba* in Europe.

Teuvoahtiana includes four species from Antarctica and South America (Halıcı et al. 2023) and *Xanthopeltis* is a monotypic genus from South America.

Both *Gondwania* and *Austroplaca* have many species in both South America, Antarctica and New Zealand and an origin in the old Gondwanaland is most likely. Subsequent splitting of the continent has divided populations now isolated by oceans and resulted in the *G. inclinans*-clade in New Zealand and the *Transdrakea alacalufes-schoefieldii*-clade in Antarctica/Patagonia. Migration due to long-range dispersal between regions seems to have happened in some cases. *T. alacalufes* and *T. schofieldii* have most likely evolved after separation of two populations on either side of the Drake Passage, but in more recent times *G. schofieldii* has migrated to Patagonia. Similarly, *G. sublobulata* and *G. joannae* must have diversified genetically after the opening of the Drake Passage, but they are still very difficult to separate except by molecular characters. Distribution and dispersal strategy among lichens in Antarctica and their resulting population structure was studied and discussed by Lagostina et al. (2021). They demonstrated a similar genetic diversification in the genus *Usnea* between different Subantarctic islands.

A most striking case of convergent evolution is revealed in *Gondwania regalis* and *Austroplaca imperialis*. Even though they have even been regarded as conspecific they belong in two different genera and their strikingly similar fruticulose morphology has evolved in two different continents. Furthermore, the two species are accompanied by the same species in the two regions, viz.: *Ramalina terebrata* Hook. f. & Taylor and *Xanthomendoza mendozae* (Räsänen) S.Y. Kondr. & Kärnefelt.

Gondwania cribrosa was described from Tasmania, but is also recorded from a number of localities in New Zealand. The limited molecular data from New Zealand deviate somewhat from those of the Tasmanian collections and may indicate a taxonomic splitting along the Tasman Sea. However, more molecular data from New Zealand are needed.

Taxonomy

Gondwania Søchting, Frödén & Arup, in Arup, Søchting & Frödén, Nordic J. Bot. 31(1): 46. 2013.

MycoBank MB 801995

Generic type: *Gondwania cribrosa* (Hue) Søchting, Frödén & Arup.

Description. Thallus crustose, lobulose or subfruticulose, with or without pseudocyphellae; apothecia lecanorine to zeorine; asci of *Teloschistes*-type with 8 spores; ascospores polardiblastic. Photobiont chlorococcoid.

Gondwania cribrosa (Hue) Søchting, Frödén & Arup, in Arup, Søchting & Frödén, Nordic J. Bot. 31(1): 46. 2013. (Fig. 3)

MycoBank MB 802080

Basionym: *Polycauliona cribrosa* Hue, Bull. Soc. linn. Normandie, sér. 6, 1: 87. 1909 [1907]. MycoBank MB 540272

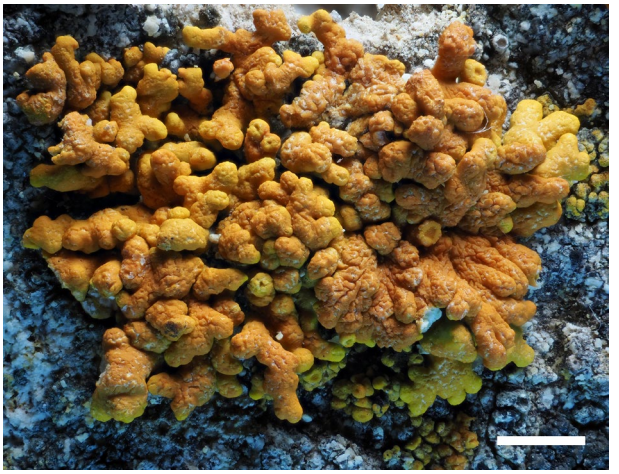

Figure 3. *Gondwania cribrosa*. US 11581. Scale = 2 mm.

Type: Australia, Terra van Diemen [Tasmania], South Fort, ad saxa, Ch. Stuart (P).

= *Kuettlingeria macquariensis* C.W. Dodge. Nova Hedwigia 19: 451. 1971 [“1970”]. MycoBank MB 342354.

Type: Macquarie Island, Gordon Cove, coastal rocks, M-56-Li-20, A.N.A.R.E., 31 Oct. 1956, D.A. Brown 20, (FH)!

Description. Thallus effigurate, with short marginal, radiating lobes and central areoles; areoles and lobes irregular to ± terete, 0.3 mm broad; surface very uneven with abundant irregular or elongated pseudocyphellae, yellow to dark orange with pale whitish exposure in the pseudocyphellae; lobes with well-delimited sclerenchymous longitudinal strands of dense hyphae interspersed with loose algal tissue and protected by about 20–50 µm thick cortex with an irregular epicortex with yellow crystals. Apothecia sparse on central areoles, sessile, zeorine, 0.5–1 mm diam.; margin well-developed, prominent with a pseudocyphellate thalline margin and a smooth proper margin; disc initially deeply concave, later flat. Proper exiple prosoplectenchymatous, fan-shaped, up to 110 µm; hymenium 50–70 µm; paraphyses 1–1.5 µm thick at base; apically branched, only slightly enlarged, up to 3 µm thick; asci with 8 spores. Ascospores polardiblastic, (11.1)13.0 ± 1.8(15.7) × (4.7)5.2 ± 0.3(5.4) µm; length/width ratio 2.5; septum (4.7)5.5 ± 0.7(6.6) µm; length/septum width ratio 2.4 (N = 4).

Pycnidia not seen.

Ecology and distribution. On coastal rocks in Tasmania and New Zealand.

Notes. The limited molecular data could indicate that the studied New Zealand specimens of *G. cribrosa* (e.g., *G. cribrosa* 3 on the tree) represent a distinct clade that may merit status as species. If this is confirmed by further molecular data the southern species from NZ may include also specimens from Macquarie Island, from where *Kuettlingeria macquariensis* C.W. Dodge was described. Galloway (2007) considered *Kuettlingeria macquariensis* to be conspecific with *Caloplaca cribrosa* on New Zealand and accordingly to be a synonym to that species. Based on inspection of the type of *Kuettlingeria macquariensis*

in FH, we agree, and if the southern taxon proves distinct, it could take the name *Gondwania macquariensis*

Unfortunately, collections from Macquarie Island have not been available for molecular studies.

Specimens studied. AUSTRALIA. Tasmania. Tasman Peninsula, ~1 km SE of Whitehouse Point, 42.58°S, 147.44°E, 5 m, on coastal sandstone, 26 Aug. 2001, G. Kantvilas 771/01 (HO 513721), 14 km S of Hobart, Kingston, Blackmans Bay, 43.008°S, 147.329°E, 6 m, horizontal, bird-perching mudstone rock at sea shore, 17 Feb. 2011, U. Søchting 11581 (C). NEW ZEALAND. South Island. Otago, 12 km E of Dunedin, Otago Peninsula, Portobello, 45.82468°S, 170.64436°E, 2 m, beach with outcrops, 29 Jan. 2012, U. Søchting 11783 (C); Stewart Island, Southland, Bungaree Hut Beach, 46.8146°S, 168.0369°E, 9 m, om coastal granite, 22 Mar. 2022. Marley Ford 1008 (C).

Gondwania inclinans (Stirt.) Søchting, comb. nov. (Fig. 4)

MycoBank MB 850720

Basionym: *Lecanora inclinans* Stirt. J. Linn. Soc., Bot. 14: 463(1875). MycoBank MB 388468.

Type: South Island: Otago, 35 km SW of Dunedin, Taieri Beach, 46.1071°S, 170.1792°E, 2 m, bark of dead tree, 28 Jan. 2012, U. Søchting 11758 (AUC – neotype; CHR, C – isoneotypes). MycoBank MBT 10016293.

Description. Thallus, crustose, thin, smooth, up to 5 mm diam., white to pale yellow, sometimes with an orange border and a black hypothallus. Apothecia numerous, dispersed, sessile, zeorine, up to 0.5 mm diam., disc plane to later slightly convex, orange; margin 40–70 µm thick; thalline margin poorly developed, suppressed, rugose at outer part, yellowish like the thallus; proper margin distinct, prominent, concolorous with or slightly lighter than the disc; proper exciple prosoplectenchymatous, fan-shaped, 100–120 µm wide; hymenium 50–70 µm; paraphyses 1–1.5 µm thick, apically branched, enlarged, up to 4 µm thick; asci with 8 spores. Ascospores polardiblastic, (10.3)12.4 ± 1.1(14.5) × (4.2)5.1 ± 0.6(6.6) µm; length/width ratio 2.5 ± 0.2; septum (4.6)5.7 ± 0.7(7) µm; length/septum width ratio 2.2 ± 0.3 (N = 17).

Ecology and distribution. Corticolous on living or dead twigs of e.g., *Coprosma*, particularly in coastal regions together with *Marchantiana* sp. It is recorded primarily from South Island in New Zealand, but the type specimen originates from Wellington in the North Island, from where recent material has also been collected.

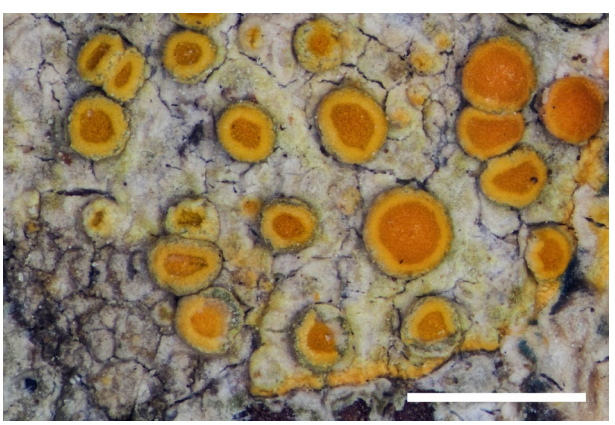

Figure 4. *Gondwania inclinans.* US 11758. Scale = 1 mm.

Notes. The authentic material was collected by J. Buchanan from tree bark in Wellington, NZ. Searches for type material in WELD, BM and GLAM by both Galloway (2007) and ourselves have been unsuccessful. Accordingly, we have here designated a neotype.

Gondwania inclinans was included in Flora of New Zealand lichens by Galloway (1985), where it was merged with *Marchantiana* (*Caloplaca*) *subpyracea* from subfamily *Caloplacoideae*. In the second edition of the flora (Galloway 2007), the species was included as a synonym to *Gyalolechia* (*Caloplaca*) *flavorubescens*, which belongs also in subfamily *Caloplacoideae*. Proper *Gyalolechia flavorubescens* has, however, not been verified from New Zealand by us.

Caloplaca inclinans was treated by Magaya et al. (2013) in a paper showing how easy it is to penetrate even peer-reviewed journals with constructed fake data.

Specimens studied. NEW ZEALAND. North Island. Tanaraki, Stratford, Stratford Power, on *Hoheria populnea*, 16 Dec. 1996, D.J. Galloway (CHR 627611); South Island. Otago, 35 km SW of Dunedin, Taieri Beach, 46.1071°S, 170.1792°E, 2 m, bark of *Coprosma*, 28 Jan. 2012, U. Søchting 11759 (C); Wangaloa Hill, 5 Jul. 1979, Peter Child 433 (CHR 628916); Canterbury, Banks Peninsula, Hinewai Reserve, Otanerito Bay, 43.8334°S, 173.0533°E, 16 m, bark of *Salix* in coastal pasture, 12 Feb. 2012, U. Søchting 12017 (C); Banks Peninsula, Diamond Harbour, at Stoddard Point, 25 m, NNW-facing coastal cliff with *Pinus pinaster* forest mixed with *Cupressus sempervirens*, on stems of a fabaceous shrub on cliff edge, 3 Feb. 2003, S.N. Christensen 12744, 12745 (C). Southland, 65 km E of Invercargill, 2 km S of Haldane, Haldane Bay, 46.6419°S, 169.0426°E, 5 m, dead twigs of shrub along road at the sea, 1 Feb. 2012, U. Søchting 11817 (C).

Gondwania joannae (Hue) Søchting, Sancho & Arup, comb. nov. (Fig. 5)

MycoBank MB 850719

Basionym: *Lecanora joannae* Hue, Lichens Deux. Exp. Antarct. Fr.: 68(1915).

Type: Graham Land, Booth-Wandel Island, 30 Dec. 1908, Gain #119. (P!). MycoBank MB 533768.

= *Gondwania sejongensis* S.Y. Kondr. & Hur, in Kondratyuk, Kärnefelt, Thell, Elix, Kim, Jeong, Yu & Hur, Acta bot. hung. 56: 158. 2014. MycoBank MB 807576.

Description. Thallus crustose, from few mm up to several cm wide, up to 1 mm thick, vivid orange yellow to vivid orange. Thallus border very variable, normally effuse, often with an white prothallus at the edge, followed by a smooth thin yellow prothallus, and then by a sometimes concentric and radially striated thallus zone with increasingly distinct, 0.2–0.4 µm broad areoles; sometimes the margin has even short radiating lobes and no prothallus; surface sometimes mottled by slightly paler pseudocyphellae. Apothecia soon covering the thallus, sessile, strongly zeorine with a fissure between proper and thalline margins, up to 0.6 mm diam; thalline margin very well-developed, irregular, broad and thick, 90–180 µm,

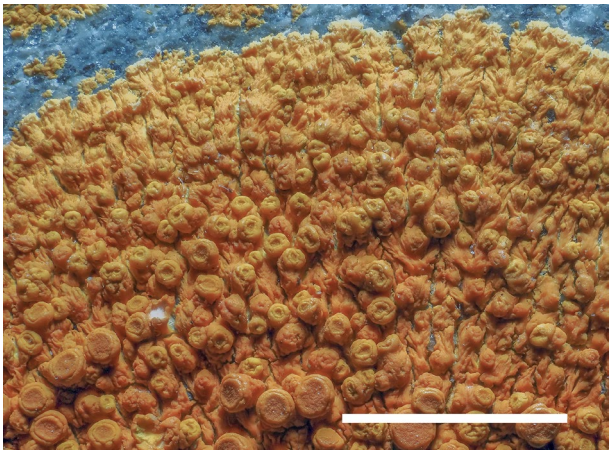

Figure 5. *Gondwania joannae*. US 12763. Scale = 2 mm.

surrounding the proper margin, slightly pseudocyphellate, concolorous with the thallus; proper margin smooth, prominent, 75 ± 12 (n = 15) µm thick, somewhat shining, concolorous with the thallus; disc initially concave, but soon flat, slightly darker than the thallus. Thalline exciple formed by a dense prosoplectenchymatous tissue of hyphae, which are perpendicular to the surface with elongated cells 10–15 × 1–2 µm; proper exciple prosoplectenchymatous, fan-shaped, 75–80 µm; hypothecium with many oil droplets; hymenium 50–80 µm; paraphyses 1–1.5 µm thick at base, apically branched, only slightly enlarged, up to 3 µm thick; asci with 8 spores. Ascospores polardiblastic, ellipsoid, (13.1)13.5 ± 1.2(16.3) × (6.3)6.3 ± 0.2(6.8) µm; length/width ratio 2.2 ± 0.2; septum (4.1)4.7 ± 0.8(5.6) µm; length/septum width ratio 2.7 ± 0.3 (N = 60).

Ecology and distribution. *G. joannae* is only known from maritime rocks and often where there is eutrophication from penguins or sea mammals. It is known only from Antarctica (Booth-Wandal Island, Adelaide Island, South Shetland Islands), but most likely all Antarctic records of *Caloplaca sublobulata* belong to this species.

Notes. *Gondwania joannae* was long considered to belong to a widespread species, *Caloplaca sublobulata*, which was recorded from coastal rocks from all southern continents and all Subantarctic islands (GBIF map). The molecular analysis, however, shows that Antarctic specimens belong to a separate clade different from *Gondwania sublobulata* (see under that species).

The type collection was made by Louis Gain at the Second French Antarctic Expedition led by captain Charcot on the "Pourquoi-Pas?". The specimen was collected at Jeanne Hill on Booth Island and named after the captain's sister, Jeanne Charcot (b. 1865) (Rosove 2000).

It may not be possible to separate the species from the likewise variable *G. sublobulata* without a molecular analysis. However, numerous molecular analyses have shown all Antarctic specimens to belong to *G. joannae*, whereas specimens from Patagonia and the Subantarctic islands belong to *G. sublobulata*. The two species are characterized by their variability of the thallus border and the exceptionally well-developed thalline margin of the apothecia that almost form a pouf for the apothecium to settle on.

Gondwania sejongensis, described from King George Island, South Shetland Islands, has morphological and anatomical characters that fall within the variation of *G. joannae*, and so do its published ITS sequences (Fig. 2).

Specimens studied. ANTARCTICA. Antarctic Peninsula. Marguerite Bay, RILS 98-888 (BAS 10693). Loubet Coast, Adelaide Island. Ryder Bay, Anchorage Island. 67.6046°S, 68.2163°W, 10 m, coastal rocks with bird influence, *Nacella* schales, 12 Jan. 2011, U. Søchting 11433 (C); ibid., vertical NW exposed rock, U. Søchting 11423 (C); Lagoon Island, 67.5916°S, 68.2447°W, 10 m, W-exposed scree, horizontal pebbles, 20 jan. 2011, U. Søchting 11519, 11523 (C); Léonie Island, 67.5980°S, 68.3578°W, 20 m, N-exposed, vertical rocks with skuas, 10 Jan. 2011, U. Søchting 11408 (C); ibid., 67.5931°S, 68.3360°W, 37 m, N-exposed, vertical ledges, 19 Jan. 2011, U. Søchting 11471 (C). South Shetland Islands: Livingston Island, South Bay, Caleta espanola, 62.6664°S, 60.3805°W, 3 m, pebble on beach, 24 Feb. 2018, U. Søchting 12750 (C). ibid., Caleta Argentina, 62.6670°S, 60.4025°W, 3 m, Eutrophicated maritime rocks, 23 Feb. 2018, U. Søchting 12706, 12707, 12709, 12712, 12715, 12719, 12724 (C); Livingston Island, Sally Rocks, 62.7011°S, 60.4185°W, 10 m, 27 Feb. 2018, U. Søchting 12763, 12767, 12768 (C); Livingston Island, Punta Polaca, 62.6621°S, 60.3948°W, 26 m, acid rock, 24 Feb. 2018, U. Søchting 12749 (C); Livingston Island, Punta Hannah, 62.6541°S, 60.6083°W, 20 m, strongly eutrophicated maritime rocks near penguin rookery, 1 Mar. 2018, U. Søchting 12778, 12785, 12789 (C); Livingston Island, Punta Barnard, 62.7530°S, 60.3341°W, 12 m, pebbles on eutrophicated soil, 8 Mar. 2018, U. Søchting 12829, 12830, 12833 (C); ibid. hill above coastline 62.748642°S, 60.326266°W, F. Grewe, U. Ruprecht & C. Printzen 14605f (FR).

Gondwania regalis (Vain.) Søchting, Frödén & Arup, in Arup, Søchting & Frödén, Nordic J. Bot. 31(1): 47. 2013. (Fig. 6)

MycoBank MB 802081

Basionym: *Placodium regale* Vain., Résult. Voy. Belgica, Lich.: 23. 1903.

Type: Antarctica, Detroit de Gerlache. Exped. antarctique belge no. 211, 1898, Racowitza, Acc – no 1050494 (LD-L 3966 – lectotype designated here)! MycoBank MBT 10016297.

Description. Thallus saxicolous, initially crustose forming a whitish hypothallus with more or less terete, horizontal marginal lobes. Eventually central parts form dense, vertical, subfruticulose cushions, up to several cm diam. and up to 2.5 cm high; exposed parts strongly orange yellow to paler yellow, but inside the cushion shaded parts ochraceous whitish; vertical lobes terete, 0.6–0.9 mm thick, up to 2.5 cm high, densely irregularly branched with narrow angles; surface very gnarled, furrowed and foveate by numerous pseudocyphellae that appear as paler spots on the exposed yellow parts. Apothecia zeorine, on mature thalli numerous and crowded at the tips of the central thallus branches, about 4 mm diam., sometimes up to 6 mm diam; disc initially deeply concave, later flat to slightly convex and irregular, brownish orange. Margin 300–600 µm, prominent, eventually distinctly divided in a thin, about 100 µm, regular, proper margin,

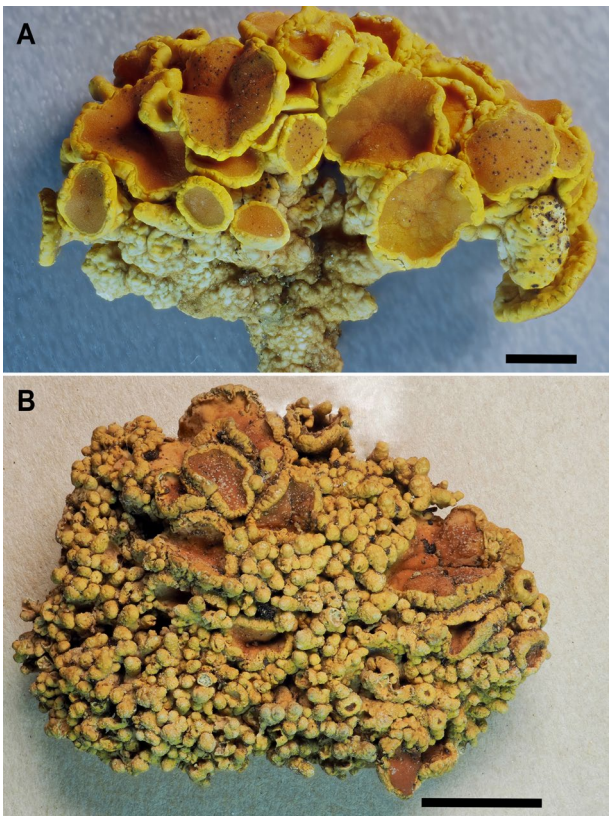

Figure 6. *Gondwania regalis*. A – Olech 16/11/1995; B – lectotype. Scales: A = 2 mm; B = 5 mm.

somewhat lighter than the disc, and an irregular, thicker thalline margin, which is concolorous with the thallus. Thallus branches with a diffuse outer cortex, consisting of a dense prosoplectenchymous tissue with anticlinal orientation towards the surface; algal layer divided by solid sclerenchymatous tissue of mostly longitudinal cells; pseudocyphellae well-developed with the algal layer reaching the thallus surface; thalline exiple anatomy like the thallus; proper exiple laterally fan-shaped, with elongated cell lumina; hypothecium without oil droplets; hymenium 110–130 µm high, with medium coarse epipsamma; paraphyses lax, not apically conglutinated, 1–1.5 µm, simple, apically slightly inflated up to 2.5 µm; asci with 8 spores. Ascospores polardiblastic, narrowly ellipsoid, (11.8)13.6 ± 0.8(15.39) × (4.2)5.4 ± 0.5(6.4) µm; length/width ratio 2.5 ± 0.3; septum 3.3 ± 0.5 µm; length/septum width ratio 4.2 ± 0.6 (n = 45).

Pycnidia immersed in the lobe tips; conidia ellipsoid, 2.7 ± 0.3 × 1.5 ± 0.1 µm (n = 10).

Ecology and distribution. Saxicolous on strongly eutrophicated, mostly vertical rocks, often in crevices. The species is found only along seashores close to penguin rookeries. Often forming continuous, thick crusts.

G. regalis is recorded from the Antarctic Peninsula, South Shetland Islands and South Orkney Islands. Due to low likelihood of misidentification Antarctic specimens listed in the BAS Antarctic Plant Database (http://apex.nerc-bas.ac.uk/f?p=148:1) are included in the distribution map without having being inspected (Fig. 7).

Notes. A collection (no. 212) in TUR-VAINIO (no. 7059) from the chosen type locality is annotated "Lectotype" by O. Almborn, but this lectotypificaton was never published. Furthermore, collection no. 212 is not mentioned in the protologue, as is the case with no. 211. Therefore no. 211 is chosen above as lectotype.

Gondwania regalis is one of the most spectacular species in the earlier large genus *Caloplaca*. The species was thoroughly described and discussed by Poelt & Pelleter (1984). In 2013, it was transferred to the genus *Gondwania* by Arup et al. (2013) based on molecular data. Due to striking similarities, collections from South America have been included in *G. regalis*, e.g., by Poelt & Pelleter (1984). Patagonian collections are described below as a separate species, *Austroplaca imperialis*. For separating characters from *A. imperialis*, see under that species.

Included specimens. ANTARCTIS. Palmer Archipel, Isla Doumer, Station Yelcho, 30 m, Gesellig an stark geneigten, teilweise überrängenden Granitflächen unter Penguinkolonien im Ramalinetum terebratae. G. Follmann: Lichenes exsiccate selecti a museo botanico berolinensi editi No 49., 1963, Follmann (CBG) [not seen]; Isla Doumer, senkrechte Felsen, 20 m, 1963, Follmann 13928 (Follm.), 60 m, Follmann 13931 (Follm.) [not seen]. Cape Calmette, 68.067°S, 67.200°W, Bryant (US) [not seen]; Loubet Coast, Adelaide Island, Rothera Point, Cross Hill. 67.5717°S, 68.1265°W, 2011, Søchting 11416 (C); Adelaide Island, Ryder Bay, Anchorage Island, 67.6046°S, 68.2163°W, 2011, Søchting 11427 (C). SOUTH ORKNEY ISLANDS, Signy Island, Factory Bluff, 1980, Richards (BG) [not seen]; Isla Laurie, Bahia Escocia, Calda rocosa al W del Destac. Arg. Corina Mamatiros manchones auroansados sobre das rocas Poco frecuente, 28 Feb. 1952 Hunziker Nr. 10231 (Follm.) [not seen]. SOUTH SHETLAND ISLANDS, Isla Deception, 1963, Follmann 11829 (Follm.) [not seen], Follmann nr. 11827-L (LD), Follm. 11904-L [not seen]; Bahia Balleneros, 100 m, Tuffgestein, 1963, Follmann 11845 (Follm.); on tuff cliffs above main penguin colony, 20 Jan.1936, British Graham Exped. 1934-1937 nr. 1400 (LD). King George Island, Admiralty

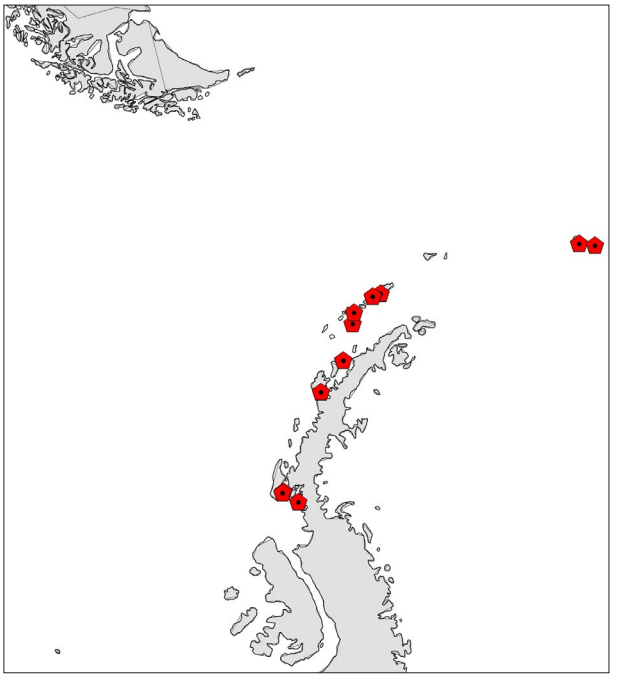

Figure 7. *Gondwania regalis*. Distribution map.

Bay, 13 Nov. 1925, Bennet L-3964 (LD); Admiralty Bay, Llano Point immediately South of Suszczewski Cove, 8 m, basal rocks in penguin rookeries, 1979, Ochyra 4845/79 (GZU) [not seen]; Fildes Strait, low crag near foreshore, 21 Dec. 1934, Discovery Exped. Nr. 1483a (LD); Bransfield Strait, rocks near Blue Dyke. 1987, Olech (KRA) [not seen]; Penguin Ridge, penguin rockery, 1987, Olech (KRA) [not seen]; Turret Oasis, Turret Point, 10 m, 2009, Olech (KRA, C); Rakusa Pt., 1995, Olech (C). Livingston Island, South Bay, Johnsons Dock, 62.650°S, 60.367°W, 1998, Søchting 7820 (C).

Gondwania sublobulata (Nyl.) S.Y. Kondr., Kärnefelt, Elix, A. Thell, Jung Kim, M.H. Jeong, N.N. Yu, A.S. Kondr. & Hur, in Kondratyuk, Kärnefelt, Thell, Elix, Kim, Jeong, Yu & Hur, Acta Bot. Hung. 56: 164. 2014. (Fig. 8)

MycoBank MB 807583

Basionym: *Placodium sublobulatum* Nyl., Lichenes Fuegiae et Patagoniae: 7(1887). MycoBank MB 401310.

Type: Spegazzini. Fuegia, Staten Island, 1882 (H-Nyl 30655 – holotype).

Description. Thallus crustose, up to 15 mm diam., up to 1 mm thick, vivid orange yellow to vivid orange; thallus margin variable, normally effuse, bordered by a yellow prothallus with a fimbriate, sometimes whitish margin, followed by an often radially and concentrically striated thallus with increasingly prominent areoles, 0.3–1.2 mm broad; surface with numerous pseudocyphellae forming depressions in the cortex, orange yellow. Apothecia soon numerous, compressed, developed from each areole, sessile, zeorine, up to 1.3 mm diam.; margin strongly prominent with a slightly shining, 70–130 µm thick proper margin and a broad and thick thalline margin that is often irregularly carved and often pseudocyphellate, concolorous with the thallus; disc initially slightly concave, soon flat, granular and darker than the thallus. Thalline exciple ~30 µm thick, formed by a dense prosoplectenchymous tissue of hyphae with isodiametric cells, 4–6 µm diam, but close to the surface there are perpendicularly elongated cells, 10–15 × 1–2 µm; proper exciple fan-shaped, prosoplectenchymatous, 75–80 µm; hymenium 80–100 µm; paraphyses 1–1.5 µm thick at base, apically branched, only very slightly thickened, up to 3 µm; asci with 8 spores. Ascospores, polardiblastic, ellipsoid, (11.6)16 ± 2(20.6) × (5)6.9 ± 0.7(8.2) µm; length/width ratio 2.4 ± 0.3; septum (2.4)4.5 ± 0.9(6.3) µm; length/septum width ratio 3.7 ± 0.7 (N = 38).

Figure 8. *Gondwania sublobulata*. US 12236. Scale = 2 mm.

Ecology and distribution. *G. sublobulata* is a very common species on maritime rocks in Southern Patagonia including Tierra del Fuego and has confirmed records also from Staten Island (Type, Argentina) and the Falkland Islands. It has also been recorded from Antarctica, South Georgia, South Orkney Islands, Bouvetøya, Herd Island, Gough Island, South Africa, Australia (Tasmania) and New Zealand. However, our molecular studies have not confirmed its presence in Australia and New Zealand, where collections most likely belong to species of *Austroplaca*. Collections from Antarctica have all proved to belong to *G. joannae*, and the presence of *G. sublobulata* in South Africa and the above listed islands need to be molecularly verified.

Notes. *Gondwania sublobulata* is characterized by mostly large thalli with a margin that even on the same thallus can vary from effuse to effigurate. Often, there is a well-developed prothallus in front of a thicker, lobate thallus margin. Apothecia are always abundant and surrounded by a characteristic very thick thalline margin. The species has been generally considered wide-spread in Antarctica and in the Circum-Antarctic region, but molecular data suggest a much more restricted distribution. Many previous records include morphologically similar species of *Austroplaca*.

Specimens studied. CHILE. XII Región de Magellanes y Antártica Chilena. Isla Navarino, Pto Williams, around the airport, 54.9267°S, 67.6164°W, 3 m, stone on beach, 19 Jan. 2015, U. Søchting 12236, 12237, 12243 (C); 40 km W of Pto Williams, Pto Navarino, 54.917°S, 68.317°W, 1 m, maritime rock, 13 Jan. 2005, U. Søchting 10170 (C); E of Pto Navarino, 54.931°S, 68.358°W, 10 m, coastal rock, 28 Jan. 2008, M.Z. Søgaard 113; W of Pto Navarino, 54.930°S, 67.715°W, 0 m, coastal rock, 27 Jan 2008, M.Z. Søgaard 100; 30 km WNW of Pto Williams, Wulaia, 54,033°S, 68.133°W, 7 m, maritime rock, 23 Jan. 2005, U. Søchting 10340, 10351a (C); Rio Verte, 52.6468°S, 71.4689°W, boulder on shore, 16 Feb. 2018, U. Søchting 12702 (C); Seno Almirantazgo, Bahia Bianca, 54.570°S, 69.135°W, 1 m, maritime schistose rocks, 7 Dec. 2009, U. Søchting 11274 (C); Admiral Monttes, 52.0111°S, 72.3682°W, 0 m, rock, 15 Feb. 2018, U. Søchting 12692, 12694, 12696, 12697, 12698 (C); San Isidro, 53.7850°S, 70.9752°W, 2 m, maritime rocks, 17 Dec. 2009, U. Søchting 11368 (C); Canal Beagle, Isla Hoste, Peninsula Dumas, Caleta Letier, 54.9432°S, 68.4468°W, 0.5 m, pebble, 31 Jan. 2015, U. Søchting 12330 (C); Isla Hoste, Peninsula Dumas, 54.9435°S, 68.6548°W, 2 m, maritime rock, 31 Jan. 2015, U. Søchting 12312 (C); Canal Beagle, Isla Chair, 54.900°S, 70.014°W, 2 m, coastal rocks, 16 Dec. 2009, U. Søchting 11323, 11325 (C); Canal Beagle, Isla Basket, 54.701°S, 71.581°W, 1 m, coastal rocks, 17 Dec. 2009, U. Søchting 11333, 11335, 11336, 11339 (C); Canal Beagle, Isla Basket, 54.740°S, 71.570°W, 1 m, maritime rocks, 17 Dec. 2009, U. Søchting 11345 (C); Canal Beagle, Isla Martinez, 54.9133°S, 68.2719°W, 1 m, maritime rocks, 1 Feb. 2015, U. Søchting 12338 (C); Canal Beagle, Seno Holandia, 54.942°S, 69.155°W, 2 m, coastal rocks, 27 Jan. 2015, U. Søchting 11298 (C); 50 km SSW of Punta Arenas, Fuerte Bulnes 53.632°S, 70.9130°W, 3 m, rock, 8 Feb. 2015, U. Søchting 12385 (C); Seno Otway, 100 m from the sea, 53.0936°S, 71.3365°W, 1 m, boulder in coastal pasture, 12 Feb. 2018, U. Søchting 12672 (C); Canal

Fitzroy, 3–4 km S of Rio Verde, 52.667°S, 71.533°W, 1–2 m, 30 Nov. 1959, A. Elvebakk 99:938 (TROMS); 60 km S of Punta Arenas, Puerto del Hambres, 2 m, 53.600°S, 70.917°W, 2 m, maritime rocks, 10 Jan. 2005, U. Søchting 10149 (C). UK. Falkland Islands, East Island, Fitzroy, Bertha's Beach, 51.8995°S, 58.4035°W, stones on beach, 1 m, 1 Feb. 2018, US 12628, 12629 (C); Goose Green, New Haven ferry terminal, 51.7304°S, 59.2142°W, 2 m, pebble on beach with penguins, 2 Feb. 2018, U. Søchting 12634 (C); Cape Pembroke by light house, 51.6829°S, 57.7188°W, 2 m, bird perching maritime rock, 31 Jan. 2018, U. Søchting 12615, 12616, 12617, 12618, 12619 (C); West Island, Port Howard, 51.6134°S, 59.5221°W, 1 m, boulder along the lagoon at water level, 4 Feb. 2018, U. Søchting 12641 (C). Pebble Island, 51.3090°S, 59.4721°W, 1 m, pebble on protected beach, 6 Feb. 2018, U. Søchting 12661 (C); 51.3049°S, 59.6005°W, 3 m, vertical, S-exposed rock, 7 Feb. 2018, U. Søchting 12666 (C); 51.3135°S, 59.5082°W, 2 m, maritime, vertical rocks, 5 Feb. 2051, U. Søchting 12651 (C); 51.3160°S, 59.6061°W, 1 m, dead Macrocystis holdfast on beach, 5 Feb. 2018, U. Søchting 12650 (C); 51.3094°S, 59.6124°W, 20 m, horizontal rock near cormorant colony, 6 Feb. 2018, U. Søchting 12656, 12658, 12659 (C).

Transdrakea Søchting & Arup, gen. nov.

MycoBank MB 850700

Generic type: *Transdrakea alacalufes* Søchting, Sancho & Arup.

Description. Thallus saxicolous, crustose, poorly developed.

Apothecia zeorine, asci of *Teloschistes*-type, with 8 spores. Ascospores small, polardiblastic, with very thin septum, ~1.5 µm. Apothecia with anthraquinones dominated by parietin. Distributed in Antarctica, Patagonia and the Falkland Islands.

Etymology. The genus name reflects the distribution of the genus on both sides of the Drake Passage, dividing Patagonia from Antarctica.

Transdrakea alacalufes Søchting, Sancho & Arup, sp. nov. (Fig. 9)

MycoBank MB 850702

Diagnosis: Thallus poorly developed, with abundant, mostly dispersed, zeorine apothecia. Apothecia up to 0.4 mm diam., yellow. Ascospores small, 10.5 × 4.5 µm; septum very thin, about 1.5 µm. On maritime rocks in Patagonia and the Falkland Islands.

Type: Chile, XII Region de Magellanes, Hosteria Cabo San Isidro, 53.7822°S, 70.9737°W, 2 m, rock, overhang by sea. 17 Dec. 2009, U. Søchting 11355 (C – holotype; LD, SAN – isotypes).

Description. Thallus pale greyish to disappearing, up to 1 cm diam. Apothecia abundant, dispersed or rarely crowded, up to 0.4 mm diam., sessile, regular, zeorine; margin level with disc, 50–70 µm thick; thalline margin discontinuous, soon excluded, yellow; proper margin poorly developed, 50 µm, orange, concolorous with disc; disc flat to soon slightly convex. Thalline exciple with paraplectenchymatous cortex of more or less isodiametric cells, 3–5 µm diam.; proper exciple fan-shaped, 50–80 µm broad of dense paraplectenchymatous tissue with 5–7 µm large cells; hypothecium hyaline and dense; hymenium 50–60 µm; paraphyses 1–2 µm thick at base, apically branched, only slightly enlarged, up to 4.5 µm thick, but generally narrow, about 3 µm thick; asci with 8 spores. Ascospores polardiblastic, small, (9.5)10.7 ± 0.5(12.1) × (3.4)4.3 ± 0.4(5.0); length/width ratio 2.5 ± 0.3; septum very thin, (1.0)1.3 ± 0.2(2) µm; length/septum width ratio 8.3 ± 1.5 (N = 26).

Figure 9. *Transdrakea alacalufes*. US 12612. Scale = 2 mm.

Ecology and distribution. On maritime rocks above *Verrucaria* sp. and *Sirenophila ovis-atra*, rarely on lignum at seashore. The species is recorded from southern Patagonia (Argentina and Chile) and the Falkland Islands.

Etymology. The species is named after the indigenous tribe alacalufes, who inhabited the region of the species prior to the advent of European settlers.

Notes. Based on the ITS phylogeny, *Transdrakea alacalufes* is a distinct taxon.

It is characterized by the narrow septum of its spores and its preference for growth on rocks close to the ocean. It is well separated from its nearest molecular relative, *T. schofieldii*, which forms clusters of few apothecia in stone crevices, and is primarily restricted to Antarctica. They seem to have evolved independently separated by the 1,000 km wide Drake Passage.

Specimens studied. ARGENTINA. Tierra del Fuego. Ushuaia National Park, Lago Roca. Nothofagus coastal forest, 54.831°S, 68.565°W, 2–5 m, dead wood at coast, 5 Jan. 1998, U. Søchting 7557 (C). CHILE. XII Región de Magellanes y Antártica Chilena. Canal Fitzroy, 3–4 km S of Rio Verde, 52.666°S, 71.533°W, 1–2 m, seashore rocks, 30 Nov. 1999, A. Elvebakk 99:938B (TROMS); 50 km SSW of Punta Arenas, Fuerte Bulnes, 53.6321°S, 70.9130°W, 3 m, shaded, vertical, maritime rocks, 8 Feb. 2015, U. Søchting 12384, 12386a (C); Hosteria Cabo San Isidro, 53.7822°S, 70.9737°W, 2 m, sheltered sandstone rock on beach, 17 Dec. 2009, U. Søchting 11354 (C); Isla Navarino, Puerto Williams, around the airport. 54.9304°S, 67.6302°W, 5 m, top of boulder on beach, 19 Jan. 2015, U. Søchting 12231 (C); Isla Navarino, 5 km W of Puerto Williams, 54.946°W, 67.663°S, 0–3 m, maritime stone, 24 Jan. 2008, M.Z. Søgaard 88 (C); Isla Navarino, 2 km E of Puerto Williams, 54.930°S, 67.573°W, 0–2 m, maritime stone, 26 Jan. 2008, M.Z. Søgaard

91 (C). UK. Falkland Islands. East Island, Cape Pembroke by light house, 51.683°S, 57.719°W, 2 m, S-exposed, maritime, quartzite, overhanging rock, 31 Jan. 2018, U. Søchting 12611, 12612 (C).

Transdrakea schofieldii (C.W. Dodge) Søchting, Sancho & Arup, comb. nov. (Fig. 10)

MycoBank MB 850703

Basionym: *Caloplaca schofieldii* C.W. Dodge, Nova Hedwigia 15: 324. 1968. MycoBank MB 344786.

Type: Victoria Land, just below top of hill south of Lake Penny, Wolcott Glacier area, on lava pebbles, E. Schofield AA-93, 78°16′S, 163°12′E. (FH, not seen).

Description. Thallus absent or forming whitish necrotic granules. Apothecia sparse or numerous, mostly crowded, up to 0.4 mm diam., sessile, regular, zeorine, sometimes aggregated in dispersed agglomerates in rock crevices; margin prominent or level with disc, 50–70 µm thick; thalline margin insignificant, slightly paler than the proper margin, soon excluded; proper margin orange, particularly as young thick and prominent, eventually 50 µm, normally level with disc; disc flat, somewhat darker than the proper margin; thalline exciple with poorly developed cortex; proper exciple paraplectenchymatous, fan-shaped, 50–70 µm with narrow, slightly elongated cells; hymenium 50–60 µm; paraphyses 1–1.3 µm thick, simple or apically branched, apically only slightly enlarged, up to 3 µm thick; asci with 8 spores. Ascospores polardiblastic, small, (9.5)10.7 ± 0.5(12.1) × (3.4)4.3 ± 0.4(5.0); length/width ratio 2.5 ± 0.3; septum very thin, (1.0)1.3 ± 0.2(2) µm; length/septum width ratio 8.3 ± 1.5 (N = 26).

Ecology and distribution. On maritime rocks above *Verrucaria* sp. and *Sirenophila ovis-atra*, but also on inland rocks. The species is common in Antarctica and southern Chile, but is also recorded from the Falkland Islands.

Notes. The species is characterized by the narrow septum of its spores. In the ITS based phylogeny, *T. schofieldii* is located on a clade basal to *Gondwania* (Fig. 2) together with the sister species *T. alacalufes*, which has a similar anatomy, but normally has abundant apothecia spread over a vanishing thallus. *T. schofieldii* is the only one of the two, which is represented in both Antarctica and Patagonia, whereas *T. alacalufes* has so far only been found in Patagonia and The Falkland Islands.

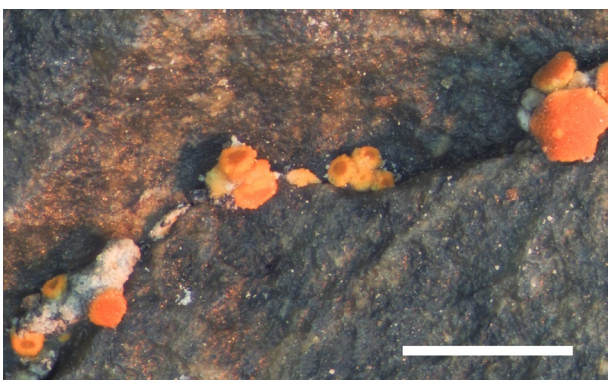

Figure 10. *Transdrakea schofieldii.* US 12714. Scale = 1 mm.

Castello & Nimis (1995) wrote: "The type (Schofield AA-93) is in three envelopes, with rather abundant and relatively well-developed material, and actually corresponds to a *Caloplaca*. The thallus is composed by small areolae with granulose, corticate surface, and a few apothecia are present. This material needs further study." It is to our knowledge the only saxicolous Antarctic *Teloschistaceae* producing spores with very narrow septum as described in the protologue. Therefore, we are confident about the typification even though we have not studied the type, which in any case is too scant for anatomical studies.

Specimens studied. ANTARCTICA. South Shetland Islands. Livingston Island. South Bay, Punta Polaca, 62.65°S, 60.38° W, 5 m, acid, sedimentary bedrock, 13 Jan. 1998, U. Søchting 7578 (C); 62.663°S, 60.394°W, 26 Feb. 2018, U. Søchting 12758 (C); Caleta Argentina, 62.667°S, 60.403°W, 20 m, acid, sedimentary bedrock, 15 Jan. 1998, U. Søchting 7623 (C), 23 Feb. 2018, U. Søchting 12714 (C); Caleta Hesperides, 62.643°S, 60.373°W, 3 m, crevices in vertical rock near sea, 6 Mar. 2018, U. Søchting 12819 (C). CHILE. XII Región de Magellanes y Antártica Chilena. Cueva de Miledon, 51.5630°S, 72.6186°W, 145 m, Sandstone below overhang, 14 Feb. 2018, U. Søchting 12679 (C); Isla Navarino, 54.932°S, 68.355°W, 1–2 m, maritime cliff, 28 Feb. 2008, M.Z. Søgaard 106B (C); Canal Fitzroy, 3–4 km S of Rio Verde, 52.667°S, 71.533°W, 2 m, on seashore rocks. 30 Nov. 1999, A. Elvebakk 99:938B (TROM).

Austroplaca imperialis Søchting, Sancho & Arup, sp. nov. (Fig. 11)

MycoBank MB 850712

Diagnosis: Thallus fruticulose, saxicolous, like *Gondwania regalis*, but with significantly higher proportion of teloschistin in the thallus (chemosyndrome A3).

Type: Chile. XII Region de Magellanes y Antártica Chilena: Pali Aike. 52.1074°S, 69.6758°W, 264 m. N-exposed, vertical, vulcanic rock, 5 Feb. 2015, U. Søchting 12356 (C – holotype; LD, SAN – isotypes).

Description. Thallus saxicolous, subfruticulose, up to several cm diam. and up to 1 cm thick, pale orange yellow, but inside the cushion, shaded parts are ochraceous to whitish; vertical lobes terete, apically ~0.4 mm thick, loose to densely furcate or irregularly branched; surface irregular, foveate by pseudocyphellae that appear as slightly paler, depressed spots on the exposed yellow parts. Apothecia lecanorine to zeorine, dispersed to crowded at the tips of the central thallus branches, up to about 2 mm diam.; margin 0.2–0.4 mm thick, initially prominent, pseudocyphellate, concolorous with the thallus; disc initially deeply concave, later flat, dark orange. Thallus branches with a solid cortex, about 50 µm thick, of prosoplectenchymous tissue with 4–6 µm large globose to slightly elongated cells; algae up to 15 µm diam. in groups separated by solid prosoplectenchymatous tissue with very narrow lumina, radially organized in elongated tissue. Proper exciple fan-shaped, poorly developed, 70–80 µm broad; hypothecium ~90 µm thick, of densely interwoven hyphae, without oil droplets; hymenium 70 µm high, with medium coarse epipsamma, paraphyses 1–1.5 µm, apically slightly branched and inflated up to 6 µm; asci with 8 spores. Ascospores polardiblastic,

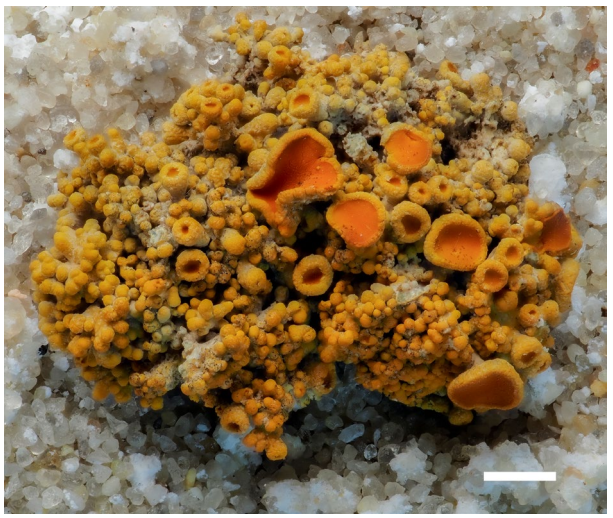

Figure 11. *Austroplaca imperialis*. Holotype. Scale = 2 mm.

ellipsoid, (11.3)13.7 ± 1.2(14.7) × (6.4)7.0 ± 0.5(7.7) µm, length/width ratio 2.0 ± 0.3, septum (5.0)5.5 ± 0.4(6.2) µm, length/septum width ratio 2.5 ± 0.1 (n = 31).

Chemistry. The thallus and apothecia contain a high proportion of teloschistin, and belong to chemosyndrome A3 of Søchting (1997).

Ecology and distribution. Saxicolous on vertical, volcanic rock, particularly in rock crevices. The known localities are old volcanoes in arid steppe vegetation in Patagonia that also host southern species like *Ramalina terebrata* and *Xanthomendoza mendozae*.

A. imperialis has not been recorded outside southern Patagonia in spite of being extremely spectacular.

Etymology. Named *imperialis* in order to match the superficially similar *Gondwania regalis* with which it has previously been merged.

Notes. The surprising morphological and anatomical similarity between *Gondwania regalis* and *Austroplaca imperialis* has led to the previous merging of the two species. This mistake has been supported by the similarities in the lichen communities of their habitats, e.g., the co-occurrence of *Ramalina terebrata* and *Xanthomendoza mendozae.* This is in spite of the climatic differences between the Antarctic habitats and the volcanic habitats in central Patagonia.

In addition to the molecular separation, *Austroplaca imperialis* differs from *G. regalis* by having spores that are broader and with a broader septum. Furthermore, it has chemosyndrome A3 instead of A that is present in all *Gondwania* and *Transdrakea* species, and it occurs only on mainland South America.

The molecular data of *Austroplaca imperialis* is represented as *Austroplaca* sp. 10 in Arup et al. (2013).

Thallus and particularly the hymenia are frequently heavily grazed by microarthropods.

Specimens studied. CHILE. XI Region. Along the road Coyhaique-Coyhaique alto. 45.4898°S, 71.4898°W, 700 m, on exposed cliffs on the top of a hill in open pasture land. 15 Jan. 2015, Frödén 1567, 1560 (LD). XII Región de Magellanes y de l'Antarctica Chileni. Prov. De Magellanes, Rio de los Cruzeros, 60 km NNE of Punta Arenas, 52.6262°S, 70.7785W, on sandstone rocks, 1940, Santesson nr. 1931 (GZU)[not seen]; Parque Nacional Pali-Aike, 5 km E of the Ouarderia, 53.1167°S, 69.6833°W, on volcanic tephra rocks, with *Ramalina terebrata* and *Neuropogon* spp., 300 m, 6 Mar. 1998, Elvebakk 98:349 (TROMS); ibid. 52.1133°S, 69.6967°W, 250 m, vertical volcanic rock, 2. Feb. 2005, Søchting 10431, 10434 (C); ibid., 203 m, vertical lava cliff, 12 Jan. 1908, M. Z Søgaard 15 (C); ibid.; Morro Chico, about 130 km north of Punta Arenas, 52.0570°S, 71.4202°W, 230 m, on dry rocky cliff in open place, 14 Dec. 1981, Kashiwadani 18984. (Kurokawa and Kashiwadani: Lichenes rariores et critici exsiccate 552, LD, CBG); ibid. 52.0570°S, 71.4202°W, 228 m, NE-exposed vertical rock, 5 Feb. 2015, Søchting 12377; 52.1070°S, 69.6769°W, 267 m, N-exposed, vertical rock, Søchting 12348, 12360, 12362 (C).

Key to *Gondwania* and *Transdrakea* species

1	Thallus corticolous; in New Zealand	***Gondwania inclinans***
	Thallus saxicolous	2
2(1)	Thallus crustose	3
	Thallus fruticulose	7
3(2)	Thallus inconspicuous; ascospore septum <2 µm	(***Transdrakea***) 4
	Thallus lobate at circumference; ascospore septum >2 µm	5
4(3)	Apothecia aggregated in crevices; in Antarctica, Patagonia and the Falklands	***T. schofieldii***
	Apothecia numerous, dispersed; only known from Patagonia and the Falklands	***T. alacalufes***
5(3)	Thallus without prothallus, clearly effigurate at circumference, with pseudocyphellae	***G. cribrosa***
	Thallus at least partly with prothallus, partly effuse, partly lobate	6
6(5)	In Patagonia and Subantarctic islands	***G. sublobulata***
	In Antarctica	***G. joannae***
7(2)	Ascospore septum narrow, < 4 µm; chemosyndrome A; in Antarctica and Subantarctic Islands	***G. regalis***
	Ascospore septum broader, > 4 µm; chemosyndrome A3; in Patagonia	***Austroplaca imperialis***

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