
More new lichen records from Brazil

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Abstract: Five lichen species are reported as new to Brazil from the Atlantic rainforest biome, including the first *Oropogon* and *Umbilicaria* species. In addition, 45 other species are newly reported for individual states, based on collections made mostly in this century.

Introduction

In the years 1998-2019, the second and last authors made several joint excursions collecting lichens in Brazil, mostly in São Paulo, Minas Gerais, Santa Catarina, Rio Grande do Sul, and Mato Grosso do Sul states. Although these states are among the lichenologically best explored, many additional species to Brazil or to one of the states were found. Here we report those not pertaining to any ongoing research project, mostly based on identifications by the first author.

Material and methods

Specimens were observed with an Olympus SZX7 with an attached Nikon Coolpix 995. Hand-made sections of ascomata and thallus were studied in water, 5% KOH and/or Lugol's reagent (1% I₂) after pre-treatment with KOH. Microscopic observations were made using an Olympus BX50 with Nomarski interference contrast and an attached Nikon Coolpix 995. Chemical spot reactions were applied where needed, and thin-layer chromatography (Orange et al. 2001) has been undertaken using solvent TDA. All specimens are preserved in CGMS.

Results

Six lichen species are reported as new to Brazil from the Atlantic rainforest biome, including the first *Oropogon* and *Umbilicaria* species in the lowland neotropics. In addition, 41 other species are newly reported for individual states, based on collections made mostly in this century in the Atlantic rainforest biome. Somewhat to our surprise, we can report here even some genera of macrolichens for the first time from Brazil.

Astrothelium confluens (Müll. Arg.) Aptroot & Lücking (Fig. 1A)

Rio Grande do Sul: Vacaria, Fazenda da Estrela, 28°03'57,3"S, 50°57'38,1"W, 905 m alt., on bark, 8 January 1999, Canêz 5120 (CGMS).
New to Rio Grande do Sul.

Astrothelium laevithallinum Lücking, M.P. Nelsen & Marcelli (Fig. 1B)

São Paulo: Pratânia, Fazenda Palmeira da Serra, on bark, about 4 m high on the tree, riparian forest, 15 July 2009, A.A. Spielmann, L.S. Canêz & R. Lücking 7554.
New to São Paulo.

Astrothelium sepultum (Mont.) Aptroot & Lücking (Fig. 1C)

Tocantins: Itaguatins, Fazenda São Paulo, próximo ao rio São Domingos, 05°45'13,2"S, 47°33'25,9"W, 160 m alt., on bark, ca. 4 m high, open forest, 7 June 2007, A.A. Spielmann & I.P.R. Cunha 5294.
New to Tocantins.

Buellia trachyspora Vain. (Fig. 1D)

Minas Gerais: Catas Altas, Caraça, Banho do Belchior, 20°06'52,7"S, 43°29'29,4"W, on siliceous rock, close to a water fall, 1 April 2006, A.A. Spielmann, L.S. Canêz, M.P. Marcelli & A.E. Luchi 14339.
New to Minas Gerais.

Caloplaca lecanorocarpa Aptroot & M. Cáceres (Fig. 1E)

Mato Grosso do Sul, Jaraguari, Furnas do Dionísio, 20°08'51.6"S, 54°34'15.3"W, alt. 430 m., saxicolous on siliceous rock, inside open forest, 21 November 2018, leg. C.M. Bernardo 1104.
New to Mato Grosso do Sul.

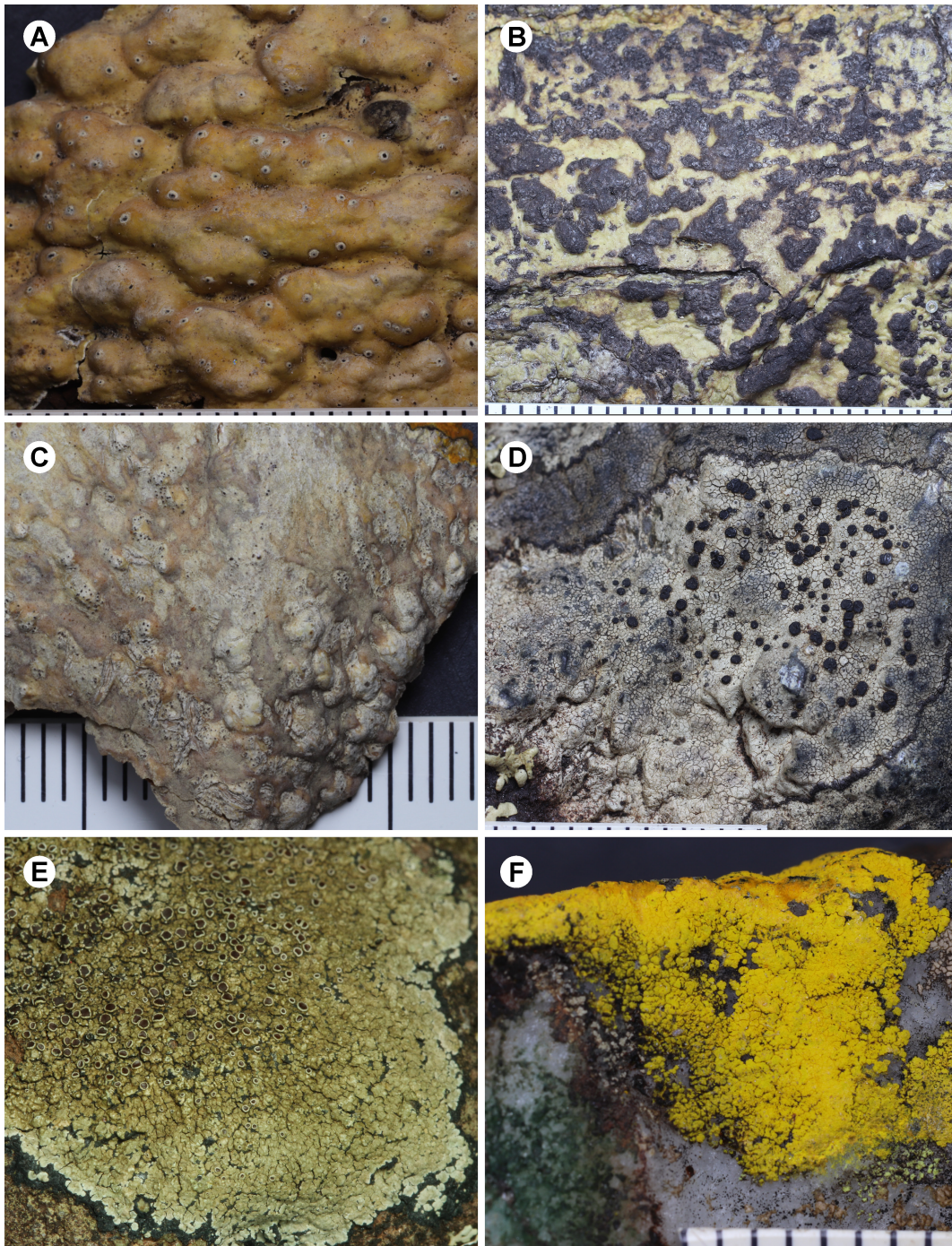


Figure 1. A. *Astrothelium confluens* (Canêz 5120). B. *Astrothelium laevithallinum* (Spielmann 7554). C. *Astrothelium sepultum* (Spielmann 5294). D. *Buellia trachyspora* (Spielmann 14339). E. *Caloplaca lecanorocarpa* (Bernardo 1104). F. *Chrysothrix citrinella* (Spielmann 8768). Scales in millimeters.

Chrysothrix citrinella Aptroot & M. Cáceres (Fig. 1F)

Mato Grosso do Sul, Corumbá, Sub-região Pantanal do Paraguai, topo do Morro do Amolar, 18°01'09.2"S, 57°32'03.8"W, alt. 645 m., on saxicolous riparian rock, 25 November 2010, leg. A.A. Spielmann, L.S. Canêz, T. Yule & M.T. Oliveira 8768.

New to Mato Grosso do Sul.

Cladonia andesita Ahti

Rio Grande do Sul, Cambará do Sul. Estrada de acesso ao Parque Nacional dos Aparados da Serra, Cânion do Itaimbezinho, 29°08'53.5"S, 50°04'06.4"W, alt. 1020 m., saxicolous, outcrop at open field, 30 January 2012, leg. A.A. Spielmann & L.S. Canêz 10199.

New to Rio Grande do Sul.

Cladonia fissidens Ahti & Marcelli

Rio Grande do Sul: Sobradinho. Side of RST 481, 29°24'20.2"S, 53°01'25.9"W, 375 m, on the roadside, terricolous over rocks, with or without mosses, 17 July 2003, A.A. Spielmann 333.

New to Rio Grande do Sul.

Coccocarpia epiphylla (Fée) Kremp. (Fig. 2A)

Minas Gerais: Catas Altas, Parque Natural do Caraça. Trilha para a Cascatinha, 20°06'01,3''S, 43°29'09,9''W, 1260 m, on bark, under bush shade, 31 March 2006, A.A. Spielmann, L.S. Canêz, M.P. Marcelli & A.E. Luchi 2620.

São Paulo: Itanhaém, road Padre Manoel da Nóbrega (SP-55), Manguezal de Itanhaém, 20°10'S, 46°47'W, on bark of *Rhizophora mangle*, 15 October 2003, L.S. Canêz, A.A. Spielmann, M.P. Marcelli, P. Jungbluth, M. Käffer & M.N. Benatti 565.

New to Minas Gerais and São Paulo.

Coccocarpia prostrata Lücking, Aptroot & Sipman (Fig. 2B)

Minas Gerais: Catas Altas, Parque Natural do Caraça. Trilha do Banho do Imperador à Ponte do Bode, 20°06'06.0''S, 43°29'12.9''W, 1265 m, on bark,

open forest, 3 April 2006, A.A. Spielmann, L.S. Canêz, M.P. Marcelli & A.E. Luchi 2319.

São Paulo: São Luís do Paraitinga, Parque Estadual da Serra do Mar, Núcleo Santa Virgínia, 23°19'34.6''S, 45°07'59.4''W, 920 m, on *Tibouchina* bark, 12 January 2007, L.S. Canêz, P. Jungbluth, A.A. Spielmann & M.J. Kitaura 2282.
New to Minas Gerais and São Paulo.

Constrictolumina planorbis (Ach.) Lücking, M.P. Nelsen & Aptroot

São Paulo: Pratânia, Fazenda Palmeira da Serra, 22°48'50.6''S, 48°44'35.3''W, 715 m alt., on bark, cerrado vegetation, 15 July 2009, A.A. Spielmann, L.S. Canêz & R. Lücking 7544.
New to São Paulo.

Cratiria vioxanthina (Elix) Kalb & Elix (Fig. 2C)

Mato Grosso do Sul: Corumbá, Pantanal do Paraguai, RPPN Acurizal, mata do fundo, 17°52'38.2''S, 57°33'12.0''W, alt. 138 m, on siliceous rock, inside "floresta estacional semidecidual", 27 November 2010, A.A. Spielmann, L.S. Canêz, T.E. Lima, T.S. Amaral & I.M. Neves 8804.
Santa Catarina: Porto Belo, Ilha João da Cunha, 27° 8'39.82''S, 48°32'57.27''W, alt. 2 m., on siliceous rock, 14 November 1998, A.A. Spielmann & J. Putzke 377.
New to Mato Grosso do Sul and Santa Catarina.

Dictyomeridium amylosporum (Vain.) Aptroot, M.P. Nelsen & Lücking

São Paulo: Ilha Comprida, near to Villagio, 24°50'31.64''S, 47°41'9.51''W, on bark, 02 April 2004, A.A. Spielmann, M.P. Marcelli, L.S. Canêz & M.N. Benatti 1248.
New to São Paulo.

Endocarpon pusillum Hedwig (Fig. 2D)

Rio Grande do Sul: Canguçu, Baixada do Rodeio. Rio Pantanoso, 31°14'20.1''S, 52°43'56.8''W, on rocks, open place, 16 July 2019, A.A. Spielmann, E.L. Gumboski & A. Aptroot 13675.
New to Rio Grande do Sul.

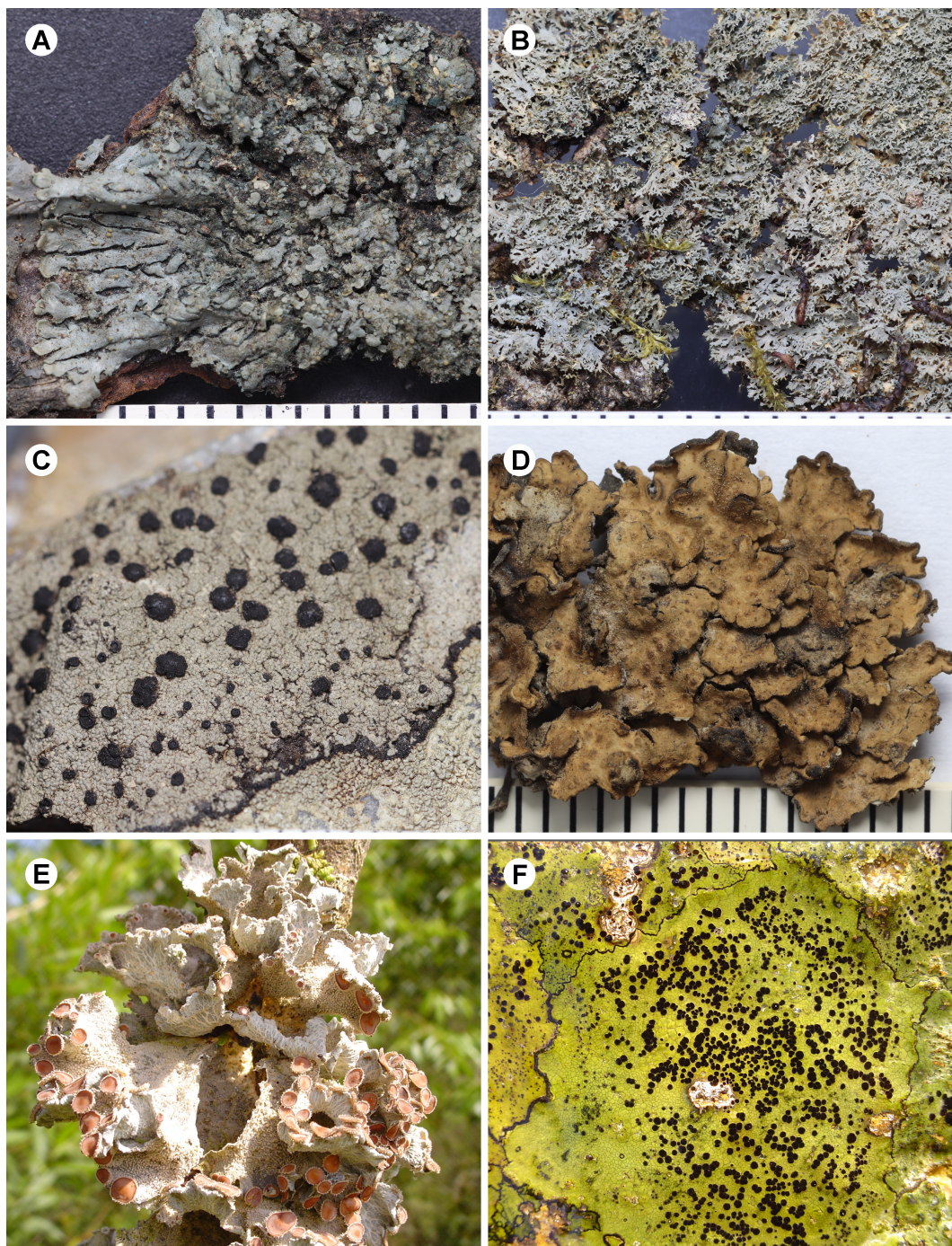


Figure 2. A. *Coccocarpia epiphylla* (Canêz 565). B. *Coccocarpia prostrata* (Canêz 2282). C. *Cratiria vioxanthina* (8804). D. *Endocarpon pusillum* (Spielmann 13675). E. *Erioderma groendalianum* (Spielmann 3252). F. *Ionaspis lacustris* (Spielmann 2713). Scales in millimeters. Figs. 2E and 2F in the habitat.

Eremithallus marusae R. Miranda, Gaya & Lücking

São Paulo: Itanhaém, road Padre Manoel da Nóbrega (SP-55), Manguezal de Itanhaém, 20°10'S, 46°47'W, on bark of *Rhizophora mangle*, 15 October 2003, L.S. Canêz, A.A. Spielmann, M.P. Marcelli, P. Jungbluth, M. Kässer & M.N. Benatti 538.

New to São Paulo.

Erioderma groendalianum (Ach.) Vain. (Fig. 2E)

Minas Gerais: Catas Altas, Parque Natural do Caraça, mata próximo ao Banho do Belchior, 20°06'52,7''S, 43°29'29,4''W, 1265 m, on bark, about 4 m high, inside forest, 4 April 2006, A.A. Spielmann, L.S. Canêz, M.P. Marcelli & A.E. Luchi 2387.

New to Minas Gerais.

Erioderma leylandii (Taylor) Müll. Arg.

São Paulo: São Luís do Paraitinga, Parque Estadual da Serra do Mar, Núcleo Santa Virgínia, 23°20'57,5''S, 45°08'11.6''W, 950 m, on bark, 14 January 2007, L.S. Canêz, P. Jungbluth, A.A. Spielmann & M.J. Kitaura 2288.

New to São Paulo.

Erioderma velligerum Tuck.

São Paulo: São Luís do Paraitinga, Parque Estadual da Serra do Mar, Núcleo Santa Virgínia, 23°21'09,7''S, 45°07'48.6''W, 975 m, on bark, 14 January 2007, A.A. Spielmann, P. Jungbluth, L.S. Canêz & M.J. Kitaura 3321 and 3323.

New to São Paulo.

Graphis evirescens (Redinger) Lücking

Rio Grande do Sul: Agudo, Nova Boêmia, próximo à Usina Hidroelétrica Dona Francisca, 29°27'30.8''S, 53°17'24.4''W, 60 m, on bark, 9 September 2011, L.S. Canêz & A.A. Spielmann 3927.

New to Rio Grande do Sul.

Gyalideopsis haliotidiformis Kalb & Vězda

São Paulo: Pratânia, Fazenda Palmeira da Serra, 22°48'50.0"S, 48°44'35.3"W, 715 m, on bark, inside Cerrado vegetation, 15 July 2009, on bark, 15 July 2009, L.S. Canêz, A.A. Spielmann & R. Lücking 2801.
New to São Paulo.

Ionaspis lacustris (With.) Lutzoni (Fig. 2F)

São Paulo: São Luís do Paraitinga, Parque Estadual da Serra do Mar, Núcleo Santa Virgínia, Trilha da Pirapitinga, Cachoeira das Andorinhas, 23°20'36.24"S, 45° 9'21.00"W, 883 m, on submerged rock, 11 January 2007, A.A. Spielmann, P. Jungbluth, L.S. Canêz & M.J. Kityura 3218.
New to São Paulo.

Jenmania goebelii W. Wächt.

Rio Grande do Sul: Sinimbu, Balneário Engelmann, on siliceous rock, 17 November 2004, Spielmann 704; Boqueirão do Leão, on siliceous rock, 26 December 2018, Spielmann 13356.
New to Brazil. Previously known from northern South America.

Jenmania osorioi Henssen

Mato Grosso do Sul: Jaraguari, Furnas do Dionísio, 20°08'47.4"S, 54°34'07.8"W, 490 m, on siliceous rock, 18 June 2011, A.A. Spielmann 9236.
New to Mato Grosso do Sul.

Koerberiella wimmeriana (Körb.) Stein.

Minas Gerais: Catas Altas, Parque Natural do Caraça, Tabuleiros de Baixo, 20°04'53.6"S, 43°30'19.7"W, 1188 m, on siliceous rock occasionally submerged, 5 April 2006, L.S. Canêz, A.A. Spielmann & M.P. Marcelli 2026.
New to Brazil and South America. Almost cosmopolitan distributed, but often sterile and overlooked.

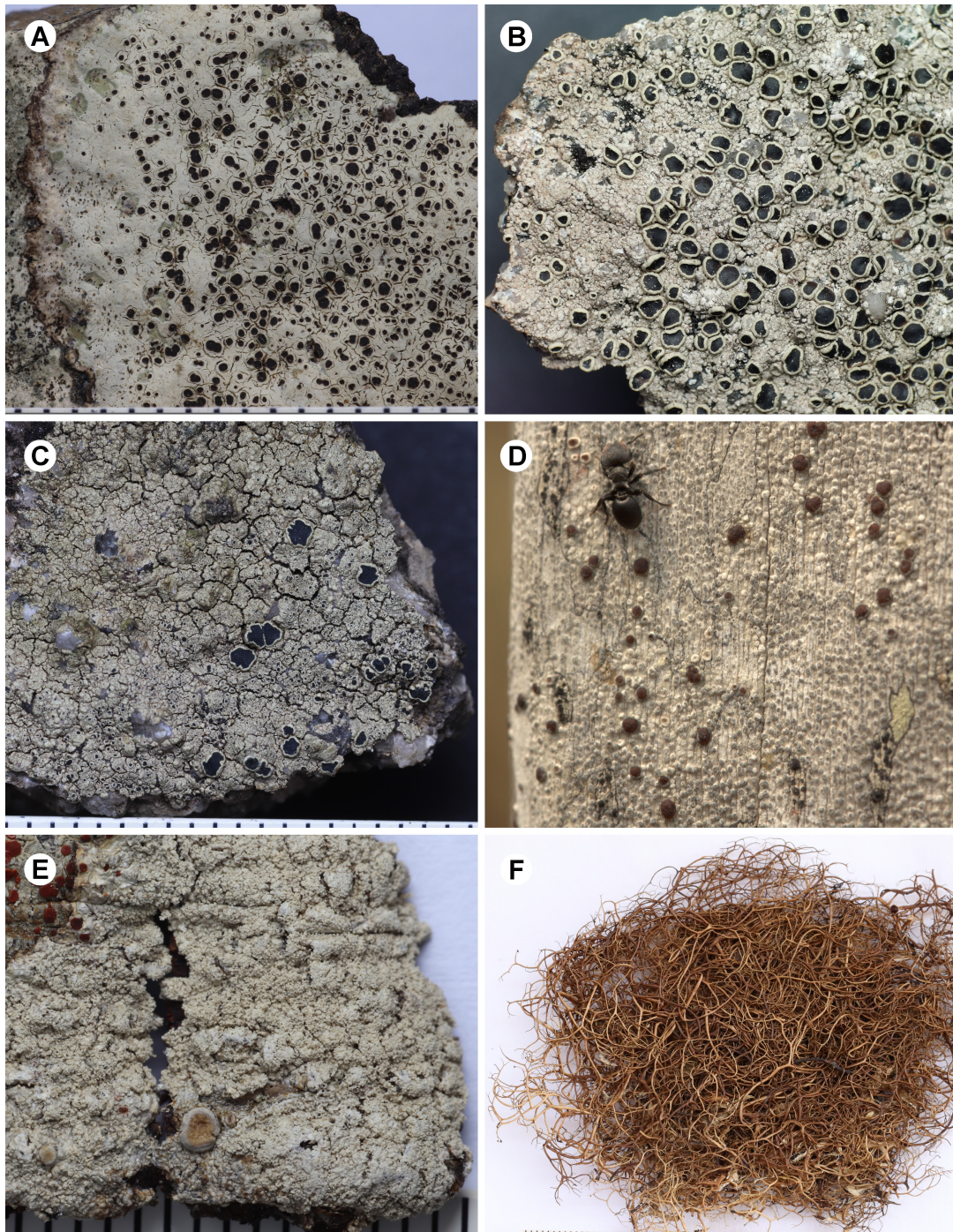


Figure 3. A. *Lecanora brasiliiana* (Spielmann 4924). B. *Lecanora kalbiana* (Spielmann 14115). C. *Lecanora myriocarpa* (Spielmann 13403). D. *Maronora cyanosora* (Spielmann 14628). E. *Ochrolechia isidiata* (Spielmann 7567). F. *Oropogon bicolor* (Spielmann 10137). Scales in millimeters. Fig. 2D in the habitat.

Lecanora brasiliana Zahlbr. (Fig. 3A)

Rio Grande do Sul, Vacaria, Fazenda da Estrela, lajeado acima da Cascata do Oito, 28°02'29.6''S, 50°56'56.3''W, 800 m alt., on siliceous rock, 3 January 2007, A.A. Spielmann, L.S. Canêz & M.A. Sulzbacher 4924.
New to Rio Grande do Sul.

Lecanora kalbiana Lumbsch (Fig. 3B)

São Paulo, Ubatuba. Ilha Anchieta, Saco Grande, 23°32'47.77"S, 45° 3'28.43"W, alt. 10 m., em rocha exposta no costão rochoso, de frente para o mar, 23 November 2003, leg. A.A. Spielmann, L.S. Canêz, D.F. Peralta & D. Barata 14115, 14116, and 14207.
New to São Paulo.

Lecanora myriocarpa Müll. Arg. (Fig. 3C)

Minas Gerais: município de Catas Altas, Parque Natural do Caraça, Banho do Belchior, 20°06'52,7''S, 43°29'29,4''W, 1265 m, on siliceous rock, 1 April 2006, A.A. Spielmann, L.S. Canêz, M.P. Marcelli & A.E. Luchi 14208.
Rio Grande do Sul, Canguçu. Baixada do Rodeio, Rio Pantanoso, 31°14'41.8"S, 52°43'44.2"W, alt. 290 m., on siliceous rock, margin of the river, 29 December 2018, A.A. Spielmann 13403.
New to Minas Gerais and Rio Grande do Sul. The species belongs to the genus *Vainionora* Kalb, if that genus is accepted.

Lecanora stramineoalbida Vain.

São Paulo: Pratânia, Fazenda Palmeira da Serra, 22°48'50.6"S, 48°44'35.3"W, 715 m, on bark, inside Cerrado vegetation, 15 July 2009, A.A. Spielmann, L.S. Canêz & R. Lücking 7578.
New to São Paulo.

Lecanora sulfurescens Fée

São Paulo: Santos, Ruínas do Engenho São Jorge dos Erasmos, 23°56'50.87"S, 46°21'46.22"W, 07 m, on siliceous rock close to the ruins, 17 July 2006, A.A. Spielmann & M.P. Marcelli 2539.
New to São Paulo.

Maronora cyanosora Kalb & Aptroot (Fig. 3D)

São Paulo: Pratânia, Fazenda Palmeira da Serra, 22°48'50.6"S, 48°44'35.3"W, 715 m., on bark, inside Cerrado vegetation, 15 July 2009, A.A. Spielmann, L.S. Canêz & R. Lücking 7580.
New to São Paulo.

Ochrolechia isidiata (Malme) Verseghy (Fig. 3E)

São Paulo: Pratânia, Fazenda Palmeira da Serra, 22°48'50.6"S, 48°44'35.3"W, 715 m., on bark, 15 July 2009, A.A. Spielmann, L.S. Canêz & R. Lücking 7567.
New to São Paulo.

Oropogon bicolor Essl. (Fig. 3F)

Rio de Janeiro: Itatiaia. Parque Nacional do Itatiaia. Estrada das Prateleiras, 22°21'52.22"S, 44°43'37.09"W, 2265 m., on bark, 06 June 2012, A.A. Spielmann, L.S. Canêz, M.P. Marcelli, M.J. Kitaura, F. Lutzoni, J. Miadlikowska & N. Magain 10137.

First report of this fruticose macrolichen genus from Brazil. The genus is most speciose in mountain regions of Central and South America. This is one of the most widespread species, even though it was only known from the Dominican Republic, Jamaica, Mexico, Costa Rica, Panama, Venezuela, Colombia, Ecuador, Peru, and Bolivia (Esslinger 1989). Its occurrence in Brazil is far outside the known distribution range. T.L.C. revealed fumarprotocetraric acid.

Peltula brasiliensis (Zahlbr.) Büdel, Kauff & Bachran (Fig. 4A)

Rio Grande do Sul: Boqueirão do Leão, Linha Sinimbuzinho, Perau da Nega, 29°20'17.2"S, 52°26'33.6"W, 430 m., on rock, close to the river, 23 February 2004, A.A. Spielmann & L.S. Canêz 14210; Canguçu, Baixada do Rodeio, Rio Pantanoso, 31°14'20.1"S, 52°43'56.8"W, 259 m., on siliceous rock, 16 July 2019, A.A. Spielmann, E.L. Gumboski & A. Aptroot 13682; Piratini, on siliceous rock, 31 May 2013, A.A. Spielmann s.n.
New to Rio Grande do Sul.

Peltula farinosa Büdel

Rio Grande do Sul: Sinimbu, Balneário Engelmann, 29°30'6.37"S, 52°33'8.29"W, 92 m., on siliceous rock, 17 February 2004, A.A. Spielmann 14209.
New to Rio Grande do Sul.

Peltula rodriguesii (Cromb.) Büdel (Fig. 4B)

Rio Grande do Sul: Boqueirão do Leão, Linha Sinimbuzinho, Perau da Nega, 29°20'17.1"S, 52°26'34.8"W, 400 m., on siliceous rock, 26 December 2018, A.A. Spielmann, L.S. Canêz, M. Dal-Forno & M.R. Gostel 13374.
New to Brazil. Previously known from Africa.

Polymeridium catapastum (Nyl.) R.C. Harris (Fig. 4C)

São Paulo: Mogi-Graçu, on bark, 7 November 2007, A.A. Spielmann 6430.
New to São Paulo.

Porina pelochroa Müll. Arg.

Rio Grande do Sul: Canguçu, Baixada do Rodeio, Rio Pantanoso, 31°14'49.2"S, 52°43'43.5"W, 285 m, on siliceous rock, 29 December 2018, A.A. Spielmann 13397.
New to Rio Grande do Sul.

Pyrenula psoriformis Zahlbr.

Mato Grosso do Sul: Jardim, Camping Seu Assis, 21°25'14.2"S, 56°23'16.7"W, 230 m, on bark, 4 July 2010, A.A. Spielmann, L.S. Canêz & A. Lorenz Lemke 8380.
New to Mato Grosso do Sul.

Pyxine katendei Swinscow & Krog

Rio Grande do Sul: Vale Verde, 15 May 1999, L.S. Canêz s.n.
New to Rio Grande do Sul.

Ramboldia blochiana Lendemer & R.C. Harris

São Paulo: Pratânia, Fazenda Palmeira da Serra, 22°48'50.6"S, 48°44'35.3"W, 715 m, on bark, inside Cerrado vegetation, 15 July 2009, A.A. Spielmann, L.S. Canêz & R. Lücking 7545.
New to São Paulo.

Scoliciosporum camptosporum (Vain.) Aptroot

São Paulo: Ubatuba, Saco da Ribeira, in siliceous rock, 22 November 2003, A.A. Spielmann & D.F. Peralta 584.
New to São Paulo.

Sphaerophoropsis stereocauloides Vain.

São Paulo: Piquete, Pico dos Marins, arredores do Primeiro Maciço, 22°30'30.8"S, 45°07'46.4"W, 1900 m, on moss on rock, 27 January 2007, L.S. Canêz, D.F. Peralta, J. Bordin & J. Atwood 2459.
New to São Paulo. This species in an endemic monotypic genus was for a century only known from its type collection, and was alternately believed extinct or critically endangered, but was recently (Aptroot et al. 2021) also found in Santa Catarina. In Piquete it grows together with the recently described *Cladonia gumboskii* Aptroot, M.F. Souza & Spielmann, a curious crustose *Cladonia* with lichexanthone and strepsilin.

Tephromela immersa Kalb & Elix

São Paulo: São Luís do Paraitinga, Parque Estadual da Serra do Mar, Núcleo Santa Virgínia, Trilha da Pirapitinga, Cachoeira do Salto Grande, 23°20'36.7"S, 45°09'21.4"W, 870 m, on siliceous rock, exposed, 11 January 2007, A.A. Spielmann, P. Jungbluth, L.S. Canêz & M.J. Kitaura 3166, 3207, 3233, 3236.
New to São Paulo.

Thalloidima ioen (Herre) S. Ekman & Timdal (Fig. 4D)

Mato Grosso do Sul: Aquidauana, Serra de Maracaju, Piraputanga, near Acampamento Batista 20°27'27.4"S, 55°29'12.0"W, 188 m, on siliceous rock, shaded place, 26 November 2014, A.A. Spielmann, A. Pott, V.J. Pott & F.M. Alves 14570.
New to Brazil. Previously known from North and Central America.

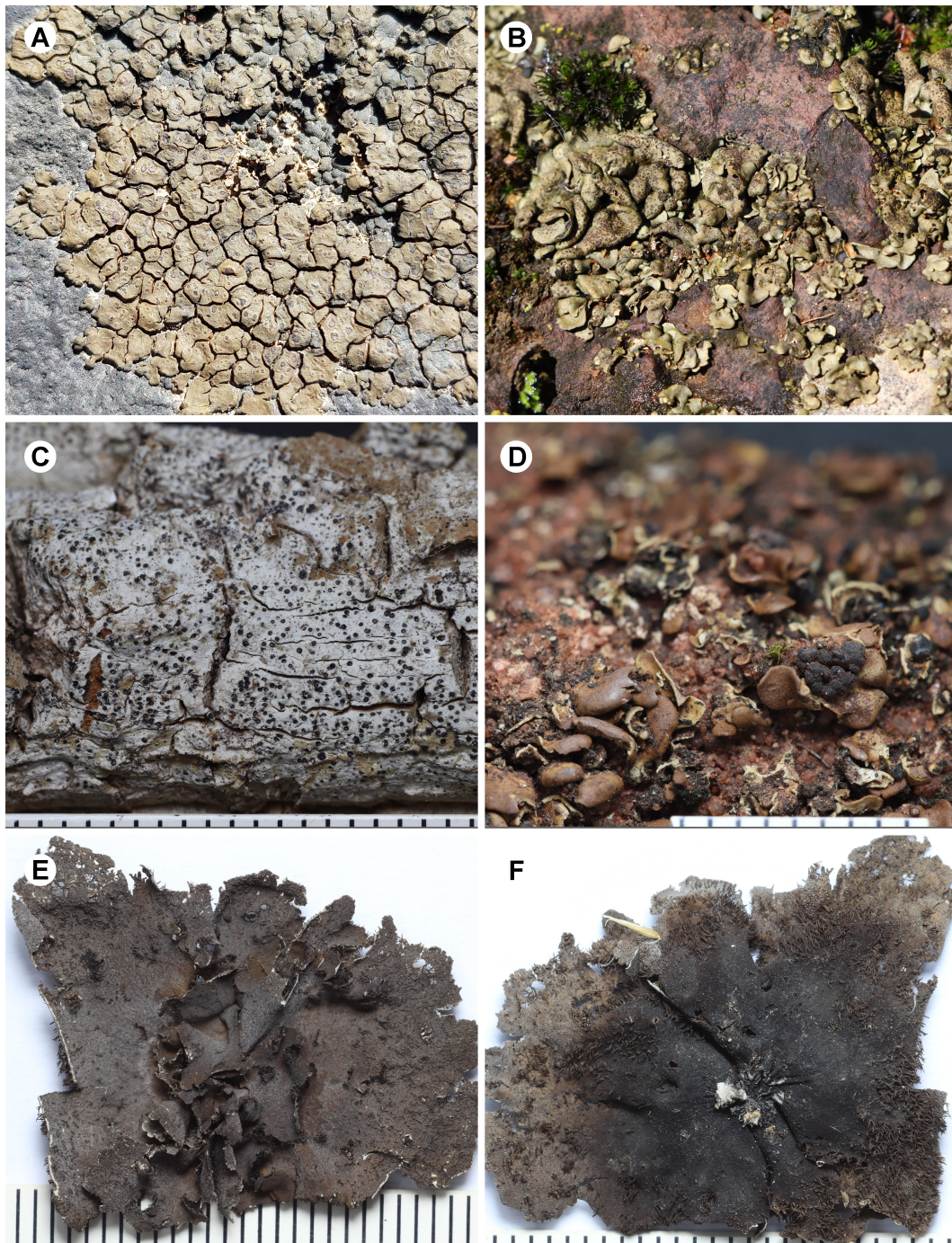


Figure 4. A. *Peltula brasiliensis* (Spielmann 13682). B. *Peltula rodriguesii* (Spielmann 13374). C. *Polymeridium catapastum* (Spielmann 6430). D. *Thalloidima ioen* (Spielmann 14570). E. *Umbilicaria africana*, upper side (Spielmann 7670). F. *Umbilicaria africana*, underside (Spielmann 7670). Scales in millimeters.

Thelidium brasiliense (Müll. Arg.) Servít

Rio Grande do Sul: Vacaria, Fazenda da Estrela, Lajeado acima da Cascata do Oito, 28°02'29.6''S, 50°56'56.3''W, 800 m, on submerged siliceous rock, 3 January 2007, A.A. Spielmann, L.S. Canêz & M.A. Sulzbacher 4923.
New to Rio Grande do Sul.

Umbilicaria africana (Jatta) Krog & Swinscow (Figs 4E-F)

Minas Gerais: Município de Itamonte. Parque Nacional do Itatiaia, Estrada das Prateleiras, 22°22'31.1"S, 44°41'57.1"W, 2435 m, on siliceous rock, 18 July 2009, A.A. Spielmann, L.S. Canêz, M.P. Marcelli & R. Lücking 7670 & 7674.

First report of this umbilicate macrolichen genus from Brazil. The genus is almost exclusively saxicolous and most characteristic of mountains or cold regions. Notwithstanding its name, this species has the widest distribution among the *Umbilicaria* species that are predominantly distributed on the southern hemisphere. It is known from East Africa, Venezuela, Colombia, Ecuador (Sipman & Topham 1992), and Antarctica. The locality in Brazil fills a wide gap in this distribution. It was found on the highest mountain in the subtropical area of Brazil. It had actually been collected there in the last century already by Mattick (specimens are in B, according to Sipman, pers. comm.), and these specimens were seen by several colleagues, but the presence of an *Umbilicaria* in Brazil was never published. T.L.C. revealed gyrophoric acid.

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SIPMAN, H. J. M. & P. TOPHAM. 1992. The genus *Umbilicaria* (lichenized ascomycetes) in Colombia. Nova Hedwigia 54: 63-75.

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