

# New records of interesting corticioid Basidiomycota from Uruguay

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**ABSTRACT:** Twenty species of corticioid Basidiomycota (Cantharellales, Corticiales, Hymenochaetales, Polyporales, Russulales, Thelephorales) are reported for the first time from Uruguay, extending the known species of this group of fungi to 130 in the country. In addition, *Sistotrema biggsiae* Hallenb., *Peniophora guadelupensis* Boidin & Lanq., *Phanerochaete cryptocystidiata* Nakasone, and *Phlebia weldeniana* Nakasone & Burds. are new reports for South America. Brief descriptions are provided for *Hyphoderma granuliferum* P. Roberts, *P. guadelupensis*, *P. cryptocystidiata*, *Phanerochaete incrustans* Parmasto, and *Phlebia weldeniana*. A key to the known species of *Hypochnicium* in Uruguay is provided.

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The corticioid Agaricomycetes are fungi in the Basidiomycota that develop effused basidiomata with a smooth, merulioid, grandinioid, or hydroid hymenophore and holobasidia (Hibbett *et al.* 2007; Larsson 2007). These fungi were historically classified in the family Corticiaceae Herter, a polyphyletic assemblage of species with variable characteristics but with a common growth habit. Molecular phylogenetic analyses have shown that the corticioid Basidiomycota are distributed among all major clades of Agaricomycetes (Hibbett *et al.* 2007; Larsson 2007).

Uruguay has a wet, temperate climate with a diverse flora of native and introduced woody plant species; therefore, a high level of fungal diversity is expected. Recently, an annotated checklist of 110 corticioid basidiomycetes from Uruguay, including substrate data, was compiled from the mycological literature (Martínez and Nakasone 2010). The checklist provides a baseline for future systematic and distributional studies of basidiomycetes from Uruguay. The present work is a contribution to the mycota of Uruguay and includes twenty new records of corticioid species.

The species herein were collected in native and non-native planted forests of mostly *Eucalyptus* and *Pinus* spp. or trees from urban areas. Genera and species are listed alphabetically within each accepted order following the classification system proposed by Hibbett *et al.* (2007) and Larsson (2007).

Microscopic examinations were made from freehand sections of the basidiomata mounted in 5% (weight/volume) aqueous KOH and 1% aqueous phloxine solutions, 5% cotton blue in 25% lactophenol, Melzer's reagent (Kirk *et al.* 2008) and sulpho-benzaldehyde, 5 cc sulfuric acid, 4.5 cc benzaldehyde and 1.5 cc water (Donk 1964). If basidiospore walls turn blue, this positive, cyanophilous reaction is indicated as CB+, a negative result as CB-. Similarly, in a positive reaction in Melzer's reagent (IKI+), the basidiospore wall turns

blue whereas no color change is recorded as IKI-. When cystidial contents turn purple blackish, this is considered a positive reaction to sulpho-benzaldehyde (SA+). Voucher specimens were deposited at the herbarium of the Facultad de Ciencias, Montevideo, Uruguay (MVHC). Author abbreviations are from Kirk and Ansell (1992). Names of species follow Index Fungorum ([www.indexfungorum.org](http://www.indexfungorum.org)) and MycoBank ([www.mycobank.org](http://www.mycobank.org)) except in a few cases where we disagreed with these databases.

CANTHARELLALES Gaüm.

*Botryobasidium obtusisporum* J. Erikss., *Symbolae Botanicae Upsalienses* 16(1): 57, 1958.

Material examined: URUGUAY. Rocha. Punta del Diablo, on bark of *Pinus* sp., 6–7 July 2007, S. Martínez s. n. (MVHC5480).

Remarks: This is a common species known from Europe, Australia, Brazil, and Argentina (Eriksson and Ryvarden 1973; Jülich 1978; De Jesus 1996; Greslebin 2002). See Eriksson and Ryvarden (1973: 169); Jülich (1978), and Greslebin (2002: 44) for descriptions and illustrations.

*Sistotrema biggsiae* Hallenb., *Mycotaxon* 21: 401, 1984.

Material examined: URUGUAY. Florida. Paso de la Arena, on wood of *Salix humboldtiana* Willd. (Salicaceae), 21 September 2009, S. Martínez s. n. (MVHC5520).

Remarks: This species is similar to *S. resinocystidium* Hallenb., reported previously from Uruguay (Martínez and Nakasone 2010). *Sistotrema biggsiae*, however, has a membranous basidioma and lacks gloeocystidia and hyphal strands. It is reported from South America for the first time but is known from North America and Japan (Hallenberg 1984; Maekawa 1993). For a description and illustration, consult Hallenberg (1984) and Maekawa (1993: 103).

CORTICIALES K.H. Larss.

**Galzinia incrustans** (Höhn. & Litsch.) Parmasto, *Eesti NSV Teaduste Akadeemia Toimetised* 14(2): 225, 1965.

Material examined: URUGUAY. Florida. Paso de la Arena, on wood, 21 September 2009, S. Martínez s. n. (MVHC5518).

Remarks: This species is characterized by grayish white, ceraceous hymenia, suburniform basidia, and allantoid basidiospores measuring  $5\text{--}6 \times 1.5\text{--}2.5 \mu\text{m}$ . It is widely distributed in Asia, Europe, North America, and Venezuela (Maekawa 1993; Hjortstam and Ryvar den 2007b). See Maekawa (1993: 100) and Bernicchia and Gorjón (2010: 194) for descriptions and illustrations.

HYMENOCHAETALES Oberw.

**Hyphodontia radula** (Pers.: Fr.) Langer & Vesterh., *Nordic Journal of Botany* 16(2): 212, 1996.

Material examined: URUGUAY. Florida. Paso de la Arena, on wood, 21 September 2009, S. Martínez s. n. (MVHC 5522).

Remarks: *Hyphodontia radula* was recorded earlier from Uruguay as *H. paradoxa* (Schrad.) Langer & Vesterh. (Gazzano 1994). It is closely related to *H. paradoxa* but distinguished by having slightly smaller, ellipsoid basidiospores,  $(4\text{--})4.5\text{--}5(-6) \times 3\text{--}4 \mu\text{m}$ . Greslebin (2002: 127) and Langer (1994: 198) described and illustrated this species.

**Kneiffiella microspora** (J. Erikss. & Hjortstam) Jülich & Stalpers, *Verhandelingen Koninklijke Nederlandse Akademie van Wetenschappen Afdeling Natuurkunde* 74: 130, 1980.

Material examined: URUGUAY. Tacuarembó. San Gregorio de Polanco, on wood of *Eucalyptus grandis* W. Hill ex Maiden, 17 March 2005, S. Martínez s. n. (MVHC5417).

Remarks: This uncommon species has a wide distribution (Maekawa 1994) and was reported from Argentina as *Grandinia microsporella* Jülich (Galán *et al.* 1993). *Kneiffiella stereicola* (Bres.) Nakasone is a similar species recorded from South America, but it lacks clamp connections at some septa in the subicular hyphae (Nakasone 2008). For a detailed description and illustration of *K. microspora*, consult Maekawa (1994: 78), Langer (1994: 147), and Bernicchia and Gorjón 2010: 394).

**Tubulicrinis incrassatus** Hallenb., *Iranian Journal of Plant Pathology* 14: 80, 1978.

Material examined: URUGUAY. Durazno. Villa El Carmen, on wood of *Eucalyptus* sp., 7 May 2008, S. Martínez s. n. (MVHC5487).

Remarks: Originally described from Iran, *T. incrassatus* is known from southern Italy (Hjortstam *et al.* 1988), Menorca Island (Tellería *et al.* 1997), and the Canary Islands (Beltrán-Tejera *et al.* 2013). It may also be present in Venezuela, reported as *T. cf. incrassatus* (Hjortstam and Ryvar den 2007b). For descriptions and illustrations, see Hallenberg (1978) and Hjortstam *et al.* (1988: 1536).

**Xylodon bugellensis** (Ces.) Hjortstam & Ryvar den, *Synopsis Fungorum* 23: 99, 2007.

Material examined: URUGUAY. Florida. Parque Robaina, on fallen branch, no date, S. Martínez s. n. (MVHC5482).

Remarks: This species is morphologically similar to *X. pruni* (Lasch) Hjortstam & Ryvar den but has thick-walled basidia and basidiospores (Melo and Tellería 1997). *Xylodon bugellensis* was reported from Uruguay by Gazzano (2000), as *Hyphodontia pruni*, and from Venezuela (Hjortstam and Ryvar den 2007b). It is widely distributed in southern Europe (Melo and Tellería 1997) and Africa (Hjortstam and Ryvar den 2007a). See Melo and Tellería (1997) and Bernicchia and Gorjón 2010: 736) for a description and illustrations of this species.

POLYPORALES Gaüm.

**Hyphoderma granuliferum** P. Roberts, *Kew Bulletin* 55(4): 814, 2000.

Basidioma effused, flocculose to granulose, white when fresh, cream colored in the fertile zone when dry, slightly cracked, margin thin, diffuse, whitish. Hyphal system monomitic. Hyphae hyaline, thin-walled,  $3\text{--}5 \mu\text{m}$  in diameter; nodose, septate. Cystidia projecting from hymenia, cylindrical, obtuse or subcapitate at apex, some slightly fusoid, hyaline,  $35\text{--}55 \times 5.5\text{--}9 \mu\text{m}$ , thin-walled, encrusted at the base or middle portion. Basidia cylindrical to urniform, with a small stalk,  $20\text{--}28 \times 5\text{--}8 \mu\text{m}$ , 4-sterigmate, entirely encrusted or limited to basal half. Basidiospores cylindrical,  $8\text{--}12 \times 3.5\text{--}4.5 \mu\text{m}$ , smooth, hyaline, thin-walled, CB-, IKI-.

Material examined: URUGUAY. Rocha. Estancia "Santa Paula", on fallen branch, 14 February 2003, S. Martínez s. n. (MVHC5149).

Remarks: *Hyphoderma granuliferum* is characterized by a white, flocculose basidioma and small, encrusted basidia. Originally described from Cameroon (Roberts 2000), it is also reported from Venezuela by Hjortstam and Ryvar den (2005, 2007b). See Roberts (2000) for a description and illustration.

**Hyphoderma transiens** (Bres.) Parmasto, *Conspectus Systematis Corticiacearum*, p. 114, 1968.

Material examined: URUGUAY. Tacuarembó. San Gregorio de Polanco, on wood of *Eucalyptus grandis* W. Hill ex Maiden (Myrtaceae), 17 March 2005, S. Martínez s. n. (MVHC5418).

Remarks: *Hyphoderma transiens* is characterized by an odontoid hymenial surface, thin-walled cylindrical cystidia up to  $100 \mu\text{m}$  long, and cylindrical basidiospores measuring  $9\text{--}14 \times 3.5\text{--}4.5 \mu\text{m}$ .

This species is widely distributed from Asia to Europe (Bernicchia and Gorjón 2010; Yurchenko and Kotiranta 2011). In South America, it is reported from Colombia (Hjortstam and Ryvar den 2008b) and may also occur in Brazil (Hjortstam and Bononi 1987). For descriptions and illustrations, consult Bernicchia and Gorjón (2010: 359) and Yurchenko and Kotiranta (2011).

**Hypochnicium wakefieldiae** (Bres.) J. Erikss., *Symbolae Botanicae Upsalienses* 16(1): 101, 1958.

Material examined: URUGUAY. Florida. Illescas, Puntas de Godoy, on bark of *Eucalyptus globulus* Labill., 15 June 2004, S. Martínez s. n. (MVHC5329).

Remarks: *Hypochnicium wakefieldiae* is characterized by slightly thick-walled subicular hyphae and ornamented basidiospores measuring  $6.3\text{--}8.3 \times 5.5\text{--}6.3 \mu\text{m}$ . It is widely

distributed in Europe (Bernicchia and Gorjón 2010) and reported from Morocco (Malençon 1982, as *H. caucasicum* Parmasto), the Caucasus (Ghobad-Nejhad *et al.* 2009), Brazil (Hjortstam and Larsson 1995, as *H. caucasicum*), and Argentina (Galán *et al.* 1993, as *H. caucasicum*). Descriptions and illustrations of this species are available in Malençon (1982), Galán *et al.* (1993), and Bernicchia and Gorjón (2010: 381).

Key to the known species of *Hypochnicium* from Uruguay

- 1 Hymenophore odontoid, skeletoid encrusted cystidia present ..... *H. lyndoniae*
- 1 Hymenophore smooth, encrusted cystidia absent ... 2
- 2 Basidiospores 6–6.5 × 5–5.5 µm ..... *H. cremicolor*
- 2 Basidiospores larger ..... 3
- 3 Spores 6.5–8 × 5.5–6 µm, thick-walled basal hyphae present ..... *H. wakefieldiae*
- 3 Spores 7.5–8 × 6.5–7 µm, thick-walled basal hyphae absent ..... *H. punctulatum*

***Phanerochaete cryptocystidiata*** Nakasone, *Cryptogamie, Mycologie* 29(3): 236, 2008.

Basidioma resupinate, effused, adnate, thin, membranaceous to subceraceous, smooth to irregular, orange white to grayish orange when dry, margin thin, white, fibrillose. Hyphal system monomitic, generative hyphae simple septate, 3–6 µm, thin-walled. Cystidia uncommon, cylindrical 22–36 × 7–9 µm, thin-walled, encrusted. Basidia clavate to cylindrical, 20–35 × 5–6 µm, thin-walled, hyaline, smooth, (2–)4 sterigmate. Basidiospores ellipsoid, 6–7.5 × 3.5–4.5 µm, thin-walled, hyaline, smooth, CB-, IKI-

Material examined: URUGUAY. Montevideo. Charrúa and Requena, on fallen branch of *Tipuana tipu* (Benth.) Kuntze (Fabaceae), 14 May 2003, S. Martínez s. n. (MVHC5114). *Idem.* Montevideo. Campbell and Rivera, on fallen branch of *T. tipu*, 21 May 2005, M. E. Cedrés & S. Martínez s. n. (MVHC5436).

Remarks: *Phanerochaete cryptocystidiata* is a rare species characterized by thin-walled, simple-septate hyphae, thin-walled, encrusted cystidia, and ellipsoid basidiospores. The specimens cited above and the type from Germany are the only known collections of this species. *Phanerochaete incrustans* is similar to *P. cryptocystidiata* but differs in having thick-walled cystidia and smaller basidiospores (6–6.5 × 3–4 µm). See Nakasone (2008) for a description and illustration of this species.

***Phanerochaete incrustans*** (Speg.) Rajchenb. & J. E. Wright, *Mycologia* 79: 255, 1987.

Basidioma effused, small, membranous, hymenium smooth, adhering to the substrate, thin, cream white, buff to yellow ochraceous when dry, margin diffuse and lighter in color, cracking. Hyphal system monomitic, generative hyphae simple septate, walls thin to slightly thick-walled, hyaline, 3–6 µm diam. Cystidia cylindrical, heavily encrusted, 35–55 × 8–10 µm, with thickened walls. Basidia clavate, 15–25 × 4–6 µm, with four sterigmata. Basidiospores ellipsoid, 6–7 × 3–4 µm, hyaline, smooth, thin-walled, CB-, IKI-

Material examined: URUGUAY. Río Negro. Young, Emp. Milagro SA, on twigs of *Citrus sinensis* (L.) Osbeck

(Rutaceae), 27 July 2000, S. Lupo & S. Martínez s. n. (MVHC5361).

Remarks: *Phanerochaete incrustans* is a rare species that was described on *Citrus aurantium* L. from Paraguay almost a century ago (Rajchenberg and Wright 1987). It is similar to *P. exilis* (Burt) Burdsall, also recorded from Uruguay, which has narrower cystidia, 5–6 µm diam, and smaller ellipsoid basidiospores, 5.5–6.5 × 3–3.5 µm (Burdsall 1985). *Phanerochaete incrustans* is reported also from Brazil (Hjortstam and Ryvarde 2007a). This is only the third collection of this species. For a description and illustration, see Rajchenberg and Wright (1987).

***Phanerochaete subquercina*** (Henn.) Hjortstam, *Windahlia* 17: 58, 1987.

Material examined: URUGUAY. Paysandú. Tres Bocas, Ingral 3, on bark of *E. globulus*, 29 August 2005, S. Martínez s. n. (MVHC5444, 5448).

Remarks: This is a widely distributed species reported from Africa, Asia, South America, Australia (Hjortstam and Ryvarde 2010), and Europe (Bernicchia and Gorjón 2010) under various names. Hjortstam and Ryvarde (2010) recently proposed the genus *Phaneroites* Hjortstam & Ryvarde with *P. subquercina* as type species. See Burdsall (1985: 103, as *P. radulans* Hallenb.) and Bernicchia and Gorjón (2010: 505) for a description and illustration of this species.

***Phlebia fuscoatra*** (Fr.) Nakasone, *Sydowia* 49(1): 59, 1997.

Material examined: URUGUAY. Florida. Parque Robaina, on decomposing wood, 18 August 2008, S. Martínez s. n. (MVHC5494).

Remarks: This species is characterized by a reddish brown basidioma, subulate cystidia 30–35 × 4–5 µm, cylindrical basidiospores measuring 5–6 × 2–2.5 µm, and encrusted tramal hyphae in the aculei. Widely distributed in Europe, North America, and Asia (Nakasone 1997), it is uncommon in South America where it is reported from Brazil (Nietiedt and Guerrero 2000). For descriptions and illustrations of *P. fuscoatra*, see Maekawa (1993: 80), Nakasone (1997), and Bernicchia and Gorjón (2010: 522).

***Phlebia subfascicularis*** (Wakef.) Nakasone & Gilb., *Folia Cryptogamica Estonica* 33: 87, 1998.

Material examined: URUGUAY. Florida. Parque Robaina, on fallen log, 15 May 2006, S. Martínez s. n. (MVHC5463).

Remarks: This species is similar to *P. fuscoatra*, differing principally by its encrusted, thick-walled hyphae in the aculei and the smaller basidiospores, 4–4.5 × 1.8–2.2 µm. *Phlebia fuscoatra* has somewhat larger basidiospores, 5–6 × 2–2.5 µm. *Phlebia subfascicularis* is reported from Australia, New Zealand, Hawaii (Nakasone and Gilbertson 1998), Argentina (Gorjón *et al.* 2012), Ecuador (Hjortstam and Ryvarde 2008a), and Chile (Gorjón and Hallenberg 2013). Descriptions and illustrations of *P. subfascicularis* are available in Nakasone and Gilbertson (1998) and Gorjón *et al.* (2012).

***Phlebia weldeniana*** Nakasone & Burds., *Mycotaxon* 54: 354, 1995.

Basidioma annual, resupinate, effused, thin, ceraceous, hymenial surface smooth to verruculose, with cracks,

brownish orange, light brown to reddish brown, margin thin, concolorous or lighter in color than the hymenium. Hyphal system monomitic, subicular hyphae 3–5 µm diameter, some hyphae encrusted, nodose septate, branched, hyaline, thin-walled. Cystidia embedded, clavate to fusoid, 30–45 × 5–9 µm, heavily encrusted, with a basal clamp. Basidia narrowly clavate, 20–25 × 3–6.5 µm, with basal clamp, 4-sterigmate, walls hyaline, thin. Basidiospores ellipsoid, 4.2–6.5 × 2.1–2.5 µm, hyaline, thin-walled, smooth, CB-, IKI-.

Material examined: URUGUAY. Florida. Paso de La Arena, on wood, 21 September 2009, S. Martínez s. n. (MVHC5523).

Remarks: This uncommon species is known from Louisiana, U.S.A. (Nakasone and Burdsall 1995) and Belize and Mexico, based on specimens in the CFMR herbarium. *Phlebia weldeniana* is characterized by a finely verruculose hymenial surface and embedded, encrusted cystidia. For a description and illustration of this species, see Nakasone and Burdsall (1995).

RUSSULALES Kreisel ex P.M. Kirk, P.F. Cannon & J.C. David  
***Acanthophysellum cerussatum*** (Bres.) Parmasto, *Eesti NSV Teaduste Akadeemia Toimetised, Bioloogia* 16: 378, 1967.

Material examined: URUGUAY. Lavalleja. Cerro Arequita, on fallen branch, 28 September 2009, S. Martínez s. n. (MVHC5525).

Remarks: This common species is widely distributed in the northern hemisphere. In South America, it is reported from Argentina (Greslebin 2002; Gorjón *et al.* 2013), Brazil (Hjortstam and Bononi 1987), and Venezuela (Hjortstam and Ryvarde 2007b). See Greslebin (2002: 18), Bernicchia and Gorjón (2010: 86), and Gorjón *et al.* (2013) for descriptions and illustrations of this species.

***Dichostereum sordulentum*** (Cooke & Masee) Boidin & Lanq., *Bulletin trimestriel de la Société Mycologique de France* 96: 384, 1980.

Material examined: URUGUAY. Paysandú. Tres Bocas, Ingral 3, on bark of *E. globulus*, 29 August 2005, S. Martínez s. n. (MVHC5446).

Remarks: This is an uncommon species known from the U.S.A. and in South America from Argentina (Boidin and Lanquetin 1980) and Brazil (Abrahão *et al.* 2012). For a description and illustration of this species consult Boidin and Lanquetin (1980).

***Peniophora guadelupensis*** Boidin & Lanq., *Bulletin trimestriel de la Société Mycologique de France* 107(3): 151, 1991.

Basidiome effused, membranous, up to 0.2 mm thick, hymenial surface smooth, pinkish gray when fresh, ochraceous pink when dry, margin indistinct, abrupt to effuse in some parts. Hyphal system monomitic with simple septa throughout, basal hyphae 2–5 µm diam, hyaline to yellowish brown, thick-walled. Gloecystidia cylindrical or fusiform, 30–110 × 5–10 µm, with walls basally thickened, SA+. Lamprocystidia conical, encrusted, 25–55 × 9–15 µm. Basidia subcylindrical, 25–40 × 5–7 µm, 4 sterigmate. Basidiospores cylindrical to subballantoid, 6–10 × 2–3.5 µm, hyaline, smooth, thin-walled.

Material examined: URUGUAY. Florida. Parque Robaina, on fallen branch, 9 June 1996, S. Martínez 245 (MVHC5062).

Remarks: This species is similar to *P. confusa* C. E. Gómez, which is also reported from Uruguay (Martínez and Nakasone 2010). *Peniophora confusa*, however, has a violet gray basidiome and smaller lamprocystidia, 20–40 × 10–14 µm (Boidin and Lanquetin 1991). Originally described from Guadeloupe Island, this is the second known collection of *P. guadelupensis*. For a description and illustration of *P. guadelupensis*, see Boidin and Lanquetin (1991).

THELEPHORALES Corner ex Oberw.

***Tomentella nebourdotii*** M.J. Larsen., *Mycologia* 60: 1179, 1968.

Material examined: URUGUAY. Cerro Largo. Tupambaé, on bark of *E. maidenii* F. Muell., May 2005, S. Martínez s. n. (MVHC5411).

Remarks: This cosmopolitan species is characterized by small basidiospores measuring 6–7.5 µm and encrusted, thick-walled subicular hyphae. We follow Martini and Hentic (2005) and recognize *T. nebourdotii* as distinct from *T. lilacinogrisea* based on the presence of brown, thick-walled subicular hyphae in the Uruguayan specimen. For descriptions and illustrations, see Larsen (1968) and Köljalg (1996: 164, as *T. lilacinogrisea* Wakef.).

Twenty species of corticioid species are reported from Uruguay for the first time herein. Earlier, we listed 110 species of corticioid Basidiomycota known from Uruguay (Martínez and Nakasone 2010). Additionally, about 70 polyporoid and 150 agaricoid taxa are reported from the country (Felippone 1928; Herter 1933; Rosa-Mato 1939; Gazzano 1998; Martínez 2006). Mueller *et al.* (2007) estimated that 60–83% of corticioid species are undescribed from the region, of which about 30% are endemic species. They estimate a gradient between 35,000 and 3,000 macrofungal species from the tropical to the temperate regions of South America. These estimations are based in plants:macrofungal species ratio of 2:1 in temperate regions to 5:1 in tropical regions. Uruguay, located in the middle of these regions, should have an intermediate level of species diversity that is augmented by subtropical influences of vegetation type and rainfall regimes. Accordingly, a conservative estimate of 500 to 600 macrofungal species are predicted to occur in Uruguay relative to the 2,500 plant species present. About 350 macrofungal species are known; therefore, there is still much work to be done to document the basidiomycete macrofungal diversity in Uruguay.

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