
Conidial fungi from the semi-arid Caatinga biome of Brazil. Rare freshwater hyphomycetes and other new records

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During surveys for freshwater hyphomycetes on submerged plant debris in Brazil, six rare species were collected: *Brachydesmiella anthostomelloidea*, *Camposporidium cristatum*, *Dactylaria hyalotunicata*, *Lauriomyces sakaeratensis*, *Pleurophragmium malaysianum* and *Pyricularia rabaulensis*. Descriptions, illustrations and comments are given for these species. Additionally, 37 new records for Western hemisphere, Neotropics, South America, Brazil and Bahia State are listed. These results contribute to knowledge about the geographic distribution of freshwater hyphomycetes and reflect the lack of studies of these fungi in tropical regions.

Key words – aquatic fungi – mitosporic fungi – stream – taxonomy

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Introduction

Among the freshwater conidial fungi, the hyphomycetes have received most attention from taxonomists. Species in this group have been well investigated in temperate regions (Sivichai et al. 2002, Mavanová et al. 2003, Abdullah et al. 2005, Shearer et al. 2007). Study in tropical regions began about 20 years ago and about 280 species of freshwater hyphomycetes have been recorded in this region (Goh 1997). Knowledge of freshwater hyphomycetes is phragedmented, but studies have been reported in countries including India (Sridhar & Kaveriappa 1989), Australia (Hyde & Goh 1998), Malaysia (Nawawi 1985, Kuthubutheen & Nawawi 1991), Cuba (Voglmayr & Delgado-Rodriguez 2001), Thailand (Sivichai & Hywel-Jones 1999, Sivichai et al. 2002). Schoenlein-Crusius & Grandi (2003) compiled data from the literature and registered 90 species of aquatic hyphomycetes for South America, including Argentina, Brazil, Chile, Ecuador, Peru and Venezuela.

During our continuing investigation of freshwater fungi collected on submerged substrate in the semi-arid region of Brazil, six rare hyphomycetes recorded previously only one or two times in the world, and 37 other new records, including for Western hemisphere, Neotropics, South America, Brazil and Bahia, were found.

The goal of this study was to describe and illustrate some rare species of freshwater hyphomycetes and to list new records to expand knowledge about the distribution of freshwater hyphomycetes in tropical regions.

Methods

Expeditions to “Serra da Jibóia”, Bahia, Brazil were made every 3 months, from July 2007 to July 2009. Samples of submerged plant debris (twig, bark, leaf and petiole) were collected in a small stream and placed in a plastic bag containing a wet paper towel. In the laboratory, the samples were placed in Petri dish moist chambers and stored in a 170 L

polystyrene box with 500 mL sterile water plus 2 mL glycerol. The material was scanned at regular intervals and reproductive structures of fungi were removed and mounted in PVL resin (polyvinyl alcohol, lactic acid and phenol). Species were also isolated in culture media. Slides and dry material were deposited in Herbarium HUEFS and cultures deposited in "Coleção de Cultura de Microrganismos da Bahia" CCMB.

Results and discussion

Brachydesmiella anthostomelloidea Goh & K.D. Hyde, Mycology Research 100: 1365, 1996 (Figs 1–2)

Conidiophores single, macronematous, solitary, unbranched, septate, erect, flexuous, geniculate, smooth-walled, pale brown, 25.5–37.5 × 4.5–6 µm. Conidiogenous cells polytretic, terminal, integrated, sympodial, cicatrized. Conidia solitary, dry, 1-septate, upper cell oval, sometimes slightly acuminate at apex, smooth, brown, 22.5–31.5 × 16.5–21 µm; lower cell cylindrical, smooth, truncate at base, light brown to subhyaline, 4.5–7.5 × 3–6 µm.

Material examined – Brazil, Bahia, Santa Terezinha, Serra da Jibóia, on submerged bark, 22 November 2007, F.R. Barbosa and L.F.P. Gusmão (HUEFS 155249); on submerged petiole, 22 October 2008, F.R. Barbosa and L.F.P. Gusmão (HUEFS 155250).

Known distribution – Australia (Goh & Hyde 1996).

Notes – *Brachydesmiella* G. Arnaud presently consists of eight accepted species (Castañeda-Ruiz et al. 2003) found both in freshwater (Goh & Hyde 1996, Sivichai et al. 1998, 2002) and in terrestrial habitats (Castañeda-Ruiz et al. 2003, 2006). The genus was established with the type species *B. bisepitata* G. Arnaud and is characterized by the pyriform or limoniform, 2–3 celled, unequally coloured conidia, produced from simple conidiophores, with integrated, terminal, polytretic, sympodial, cicatrized conidiogenous cells (Ellis 1971). *Brachydesmiella anthostomelloidea* most closely resembles *B. orientalis* (V. Rao & de Hoog) Goh in having 2-celled, obpyriform conidia but differs in having longer, narrower conidia with a cylindrical basal cell (Goh & Hyde 1996). A key to all

species was provided by Castañeda-Ruiz et al (2006).

Morphologically, collections from Brazil agree with the Australian collection (Goh & Hyde 1996). However, the Australian material has slightly larger conidia (29–38 × 14–18 µm; basal cell 6–9 × 3–5 µm) and larger conidiophores 40–90 × 5–7 µm).

Brachydesmiella anthostomelloidea was originally collected on submerged wood in a rain forest stream in Queensland (Goh & Hyde 1996). This is the second record of the species for the world and it is reported for the first time from the western hemisphere.

Camposporidium cristatum Nawawi & Kuthub., Mycotaxon 32: 161, 1988 (Figs 3–5)

Conidiophores single, macronematous, solitary, unbranched, septate, erect, straight or slightly flexuous, with percurrent proliferations, smooth-walled, brown to dark brown, 90–135 × 4.5–6 µm. Conidiogenous cells holoblastic, terminal, integrated, proliferating percurrently, cylindrical. Conidia solitary, dry, 9–11-distoseptate, cylindrical, smooth-walled or rarely slight verruculose, subhyaline to light brown, 75–105 × 9–10 µm; basal cell truncate, darker and shorter than other cells, 3–4.5 × 6–7.5 µm; apical cell rounded and paler, 4.5–7.5 × 5–6 µm, with 4–5 aseptate, hyaline to subhyaline appendages, 37.5–82.5 µm. Two apical septa thicker.

Material examined – Brazil, Bahia, Santa Terezinha, Serra da Jibóia, on submerged petiole, 16 September 2008, F.R. Barbosa and L.F.P. Gusmão (HUEFS 155248); on submerged petiole, 17 December 2008, F.R. Barbosa and L.F.P. Gusmão (HUEFS 165793); on submerged leaf, 12 January 2009, F.R. Barbosa and L.F.P. Gusmão (HUEFS 155247).

Known distribution – Malaysia (Nawawi & Kuthubutheen 1988).

Notes – Three accepted species have been described in *Camposporidium* Nawawi & Kuthub.: *C. cristatum*, the type species of the genus, *C. ghindense* (Bhat) R.F. Castañeda, Guarro & Cano and *C. hughesii* R.F. Castañeda & Guarro (Kirk et al. 2008). *Camposporidium* is close to *Camposporium* Harkn. due to multi-septate conidia with appendages (Peek & Solheim 1958). However, *Camposporium* has polyblastic, sympodial and denticulate conidio-

genous cells and conidia with a persistent portion of the denticle attached (Whitton et al. 2002). Following Nawawi & Kuthubutheen (1988), *C. cristatum* has characteristic conidia with a truncate, rectangular basal cell darker and shorter than the rest of the conidia cells, apical cell is rounded and paler in colour with the two apical septa thicker. *Camposporidium cristatum* clearly differ from *C. hughesii* R.F. Castañeda & Guarro, which has euseptate, verucose, fusiform, cylindrical-fusiform, rarely navicular conidia (Castañeda-Ruiz & Guarro 1998) and *C. ghindense* (Bhat) R.F. Castañeda, Guarro & Cano, which has curved, broadly ellipsoidal conidia and branched appendages (Bhat 1983).

Our collection from Brazil agrees well with the original protologue of *C. cristatum* (Nawawi & Kuthubutheen 1988). However the appendages of our collection are longer ($37.5\text{--}82.5 \times 1.5 \mu\text{m}$) compared to that of the type description (up to $60 \times 1.5 \mu\text{m}$).

Camposporidium cristatum was found on submerged leaves from Malaysia (Nawawi & Kuthubutheen 1988). The Brazil specimens are the second record of the species for the world and the first report from the western hemisphere.

Dactylaria hyalotunicata K.M. Tsui, Goh & K.D. Hyde, Sydowia 49: 182, 1997 (Figs 6–7)

Conidiophores single, macronematous, solitary, unbranched, septate, erect, straight, smooth-walled, hyaline, $33\text{--}53 \times 3\text{--}4.5 \mu\text{m}$. Conidiogenous cells polyblastic, terminal, integrated, denticulate, proliferating sympodially; denticles conspicuous, cylindrical, hyaline, $1.5 \mu\text{m}$ long. Conidia solitary, 1-septate, smooth, thin-walled, naviculate to fusiform, hyaline, $15\text{--}25 \times 2.3\text{--}3 \mu\text{m}$, with an hyaline gelatinous sheath.

Material examined – Brazil, Bahia, Santa Terezinha, Serra da Jibóia, on submerged bark, 30 August 2007, F.R. Barbosa and L.F.P. Gusmão (HUEFS 155284); on submerged twig, 22 September 2007, F.R. Barbosa and L.F.P. Gusmão (HUEFS 165764); on submerged twig, 16 July 2008, F.R. Barbosa and L.F.P. Gusmão (HUEFS 165763); on submerged twig, 8 September 2008, F.R. Barbosa and L.F.P. Gusmão (HUEFS 165762).

Known distribution – China (Tsui et al 1997), United States (Raja et al 2009)

Notes – *Dactylaria* Sacc. is a worldwide, polyphyletic genus with about 109 species (Kirk et al. 2008). *Dactylaria tunicata* Goh & K.D. Hyde is the closest species to *D. hyalotunicata*. However, *D. tunicata* can be distinguished from *D. hyalotunicata* in having mid oliveaceous brown and larger conidiophores ($75\text{--}160 \times 4\text{--}4.5 \mu\text{m}$) and larger conidia ($25\text{--}31 \times 3\text{--}4.5$) (Goh & Hyde 1997). *Dactylaria tunicata* has been also recorded from fresh water habitat and possess a gelatinous sheath around the conidia (Tsui et al. 1997).

The collections from Brazil agree in all aspects with the original description of *D. hyalotunicata* from China (Tsui et al. 1997).

Dactylaria hyalotunicata was recorded on submerged wood in China (Tsui et al. 1997) and on herbaceous and woody debris in United States (Raja et al. 2009). The present collections represent a new record for the Neotropics.

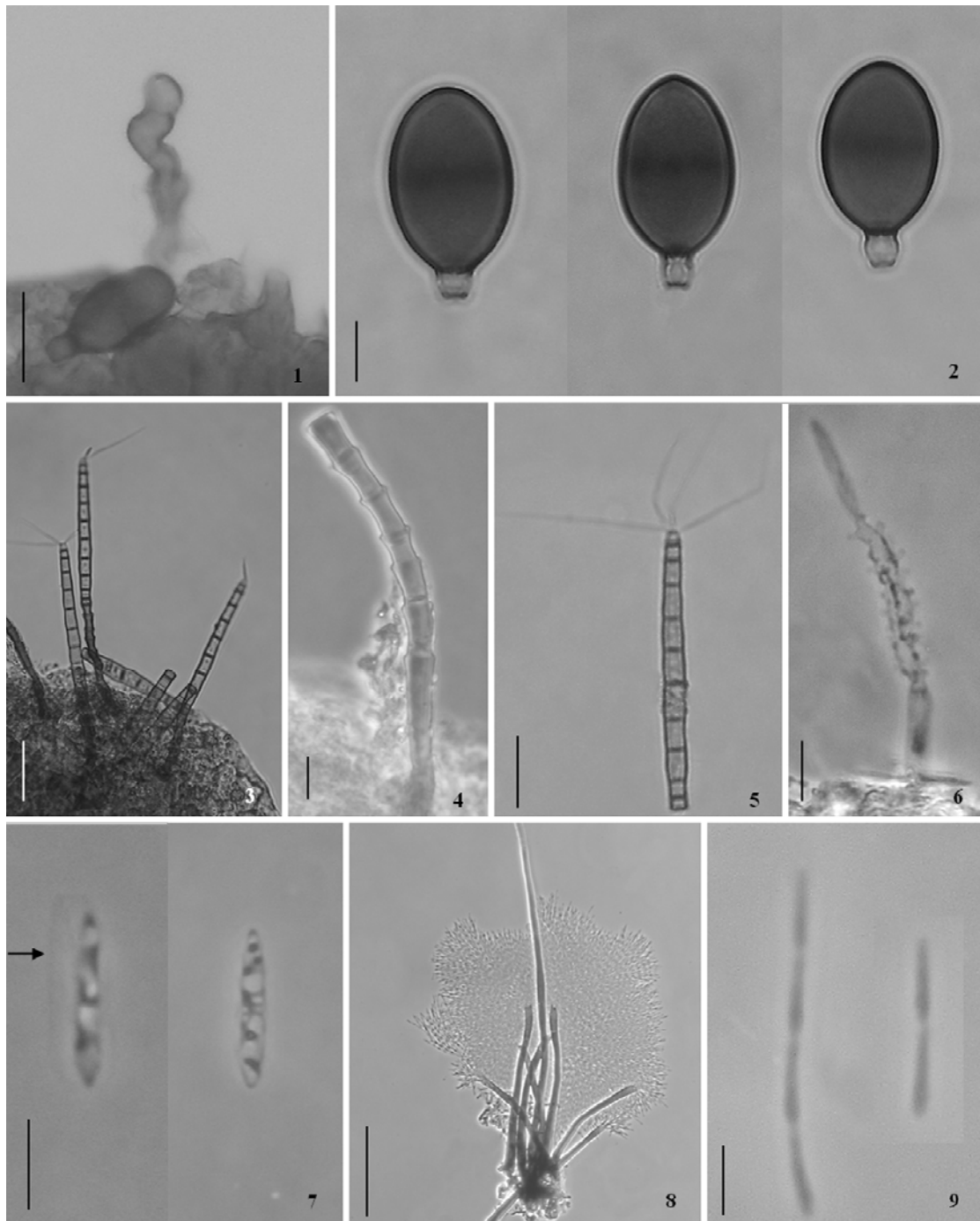
Lauriomyces sakaeratensis Somrith., Kosol & E.B.G. Jones, Nova Hedwigia 82: 210

(Figs 8–9)

Setae unbranched, flexuous, smooth, thick-walled, up to $1230 \mu\text{m}$ long, $5.5\text{--}6.0 \mu\text{m}$ wide at the base, brown to dark brown, paler toward the apex. Conidiophores single, macronematous, solitary or in small groups, septate, erect, straight or flexuous, smooth-walled, brown to dark brown, paler towards the rounded apex, $75\text{--}105 \times 5\text{--}6 \mu\text{m}$; primary branches in group of 3–4, $6\text{--}7.5 \times 2.3\text{--}3 \mu\text{m}$; subsequent branches in group of 3–6, $4\text{--}4.3 \times 1.5 \mu\text{m}$. Ramoconidia 0-septate, smooth, cylindrical to obclavate, hyaline, $4\text{--}5 \times 1.5 \mu\text{m}$. Conidia catenate, dry, 0-septate, smooth, thin-walled, obclavate, hyaline, $3\text{--}4.2 \mu\text{m}$ long, up to $1 \mu\text{m}$ wide at base.

Material examined – Brazil, Bahia, Santa Terezinha, Serra da Jibóia, on submerged leaf, 25 July 2007, F.R. Barbosa and L.F.P. Gusmão (HUEFS 155252); on submerged leaf, 21 January 2009, F.R. Barbosa and L.F.P. Gusmão (HUEFS 155251); on submerged petiole, 23 March 2009, F.R. Barbosa and L.F.P. Gusmão (HUEFS 155253).

Known distribution – Thailand (Somrithipol et al. 2006)



Figs 1–9 – *Brachydesmiella anthostomelloidea*. **1** Conidiophore, **2** conidia. **3–5** *Camposporidium cristatum*, **3** Conidia and conidiophores, **4** Conidiophore, **5** Conidium. **6–7** *Dactylaria hyalotunicata*, **6** Conidiophore, **7** Conidia, Arrow shows gelatinous sheath. **8–9** *Lauriomyces sakaeratensis*, **8** Setae, conidiophores and conidia, **9** Conidia. Scale Bars = 1, 3, 8 = 50 μm ; 2, 4, 6, 7 = 10 μm ; 5 = 30 μm ; 9 = 2.5 μm .

Notes – Castañeda-Ruíz & Kendrick (1990) established the genus *Lauriomyces* RF Castañeda typified by *L. pulcher* R.F. Castañeda & W.B. Kendr. Currently, there are eight accepted species in the genus distinguished by conidial shape and size (Somrithipol & Gareth-Jones 2007). The shapes can be clavate, obclavate, fusiform, cylindrical or ellipsoidal.

Lauriomyces pulcher has clavate conidia and can be distinguished from the obclavate conidia of *L. sakaeratensis* (Castañeda-Ruíz & Kendrick 1990, Somrithipol et al. 2006). A diagrammatic comparison of conidial shape was provided by Somrithipol & Gareth-Jones (2007).

The Brazilian material fits well into the concept of *L. sakaeratensis*, but it has smaller conidiophores than reported in the original description ($100\text{--}160 \times 5.0\text{--}5.5 \mu\text{m}$) (Somrithipol et al. 2006).

Lauriomyces sakaeratensis was originally found on decaying *Dipterocarpus costatus* C.F. Gaertn. fruits from Thailand. The Brazil specimens represent the second record of the species for the world and the first report from the western hemisphere.

Pleurophragmium malaysianum Matsush., Matsush. Mycologia Memoir 9: 20, 1996

(Figs 10–12)

Conidiophores single, macronematous, solitary, unbranched, septate, erect, flexuous, smooth-walled, hyaline, $25.5\text{--}37.5 \times 4.5\text{--}5.5 \mu\text{m}$. Conidiogenous cells polyblastic, terminal, integrated, denticulate, hyaline; denticles conspicuous, cylindrical. Conidia solitary, dry, 10–12-distoseptate, smooth, thick-walled, cylindrical-clavate, with a protruding base, hyaline, $45\text{--}60 \times 4.5\text{--}6 \mu\text{m}$.

Material examined – Brazil, Bahia, Santa Terezinha, Serra da Jibóia, on submerged twig, 30 January 2009, F.R. Barbosa and L.F.P. Gusmão (HUEFS 155255).

Known distribution – Malaysia (Matsushima 1996), United States (Raja et al. 2009)

Notes – *Pleurophragmium* Costantin is found worldwide. There are 21 species (Kirk et al 2008) in the genus, which was erected with the type species *P. bicolor* Costantin. de Hoog (1985) defined the genus as having brown conidiophores with hyaline denticles. However Matsushima (1996) described *P. malaysianum* with hyaline conidiophores. Thus far, the species is accepted into the genus.

Pleurophragmium malaysianum was recorded on a dead leaf from Malaysia (Matsushima 1996) and on submerged wood in the United States (Raja et al. 2009). It is a new record for the Neotropics.

Pyricularia rabaulensis Matsush., Bulletin National Science Museum, Tokyo 14(3): 473, 1971 (Figs 13–15)

Conidiophores single, macronematous, solitary, unbranched, septate, erect, flexuous, smooth-walled, brown, paler toward the apex, $84\text{--}165 \times 3\text{--}4.5 \mu\text{m}$. Conidiogenous cells poly-

blastic, terminal, integrated, denticulate, brown to subhyaline; denticles conspicuous. Conidia solitary, dry, 1-septate, smooth, thin-walled, ellipsoidal, subhyaline $15\text{--}18 \times 6\text{--}7.5 \mu\text{m}$; rostrum conical truncate, hyaline, $7.5\text{--}15 \times 1.5\text{--}2.3 \mu\text{m}$.

Material examined – Brazil, Bahia, Santa Terezinha, Serra da Jibóia, on submerged leaf, 9 November 2008, F.R. Barbosa and L.F.P. Gusmão (HUEFS 155254).

Known distribution – Papua New Guinea (Matsushima 1971).

Notes – *Pyricularia* Sacc. was erected with *P. grisea* Sacc. as the type species of the genus. The present specimen fits well in all aspects with the original description of *P. rabaulensis* (Matsushima 1971).

Pyricularia rabaulensis was originally collected on decaying leaves of *Musa* sp. from Papua New Guinea (Matsushima 1971). The Brazil specimen constitutes the second record of the species for the world and the first report from the western hemisphere.

New records of hyphomycetes for western hemisphere

Brachydesmiella caudata V. Rao & de Hoog, Studied in Mycology 28: 5, 1986

Material examined – Brazil, Bahia, Santa Terezinha, Serra da Jibóia, on submerged petiole, 12 September 2007, F.R. Barbosa and L.F.P. Gusmão (HUEFS 165766).

Canalisporium exiguum Goh & K.D. Hyde, Canadian Journal Botany 76: 145, 1998

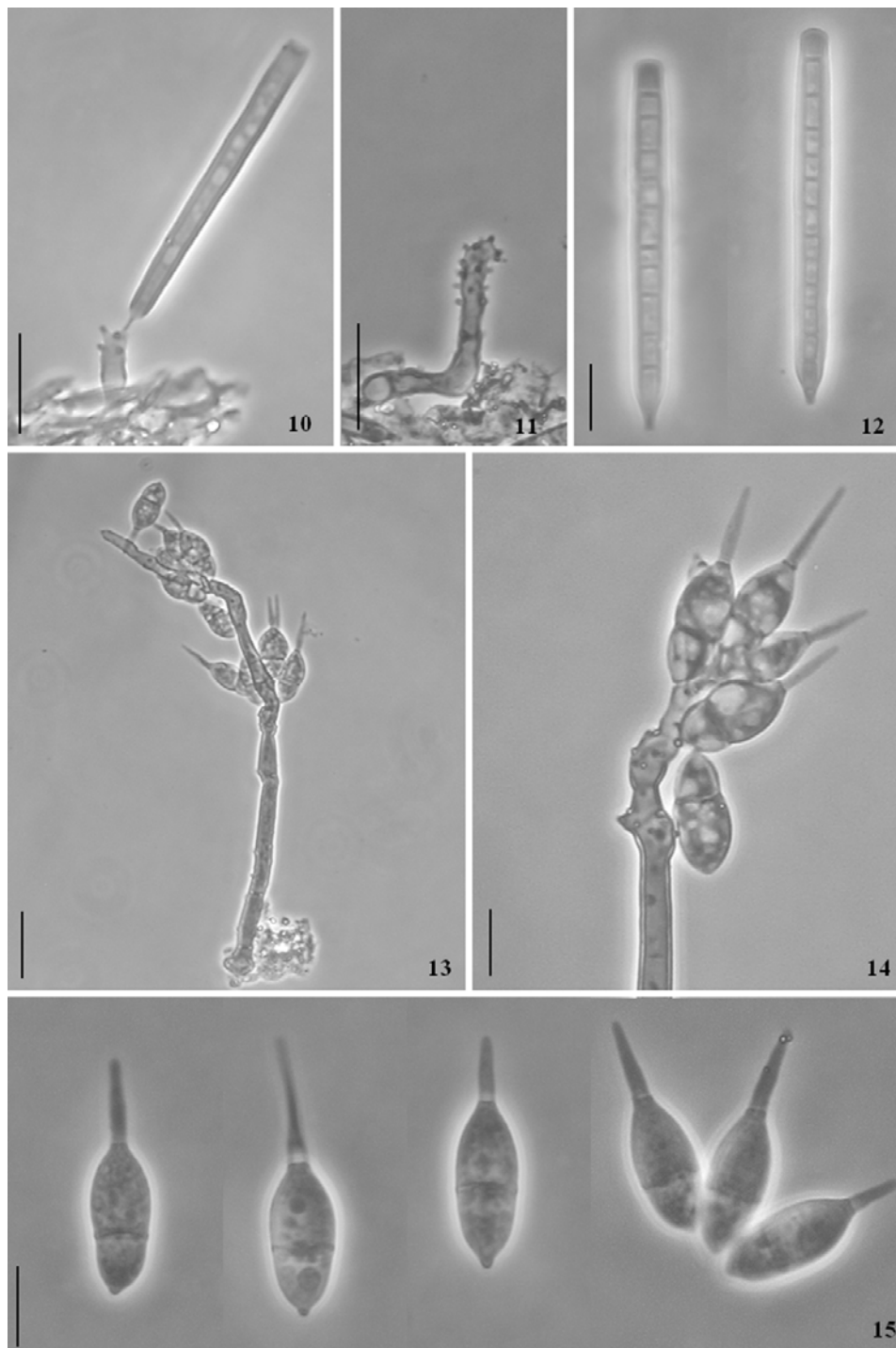
Material examined – Brazil, Bahia, Santa Terezinha, Serra da Jibóia, on submerged leaf, 19 August 2008, F.R. Barbosa and L.F.P. Gusmão (HUEFS 165789).

Cancellidium applanatum Tubaki, Transaction Mycological Society Japan 16: 358, 1975

Material examined – Brazil, Bahia, Santa Terezinha, Serra da Jibóia, on submerged twig, 16 July 2009, F.R. Barbosa and L.F.P. Gusmão (HUEFS 169116).

Pithomyces elaeidicola M.B. Ellis, Mycological Paper 76: 10, 1960

Material examined – Brazil, Bahia, Santa Terezinha, Serra da Jibóia, on submerged bark,



Figs 10–15 – *Pleurophragmium malaysianum*, **10** Conidiophore and conidium, **11** Conidiophore with denticles, **12** Conidia. **13–15** *Pyricularia rabaulensis*, **13** Conidiophore and conidia, **14** Detail of conidia attached to the conidiophores, **15** Conidia. Scale Bars: 10, 11, 13 = 25 μ m; 12, 14, 15 = 10 μ m.

27 December 2007, F.R. Barbosa and L.F.P. Gusmão (HUEFS 165790).

Sporidesmiella ciliastora W.P. Wu, *Sporidesmium*, *Endophragmiella* and related genera from China: 160, 2005

Material examined – Brazil, Bahia, Santa Terezinha, Serra da Jibóia, on submerged bark,

8 August 2007, F.R. Barbosa and L.F.P. Gusmão (HUEFS 165787).

Stachybotrys sphaerospora Morgan-Jones & R.C. Sinclair, Mycotaxon 10: 372, 1980

Material examined – Brazil, Bahia, Santa Terezinha, Serra da Jibóia, on submerged

petiole, 28 August 2007, F.R. Barbosa and L.F.P. Gusmão (HUEFS 165767).

Thozetella pinicola S.Y.Q. Yeung, R. Jeewon & K.D. Hyde, Canadian Journal Botany 55: 681, 2009

Material examined – Brazil, Bahia, Santa Terezinha, Serra da Jibóia, on submerged leaf, 28 October 2008, F.R. Barbosa and L.F.P. Gusmão (HUEFS 165770).

New records of hyphomycetes for Neotropics

Sporoschisma juvenile Boud., Icones Mycological 1: 12, 1904

Material examined – Brazil, Bahia, Santa Terezinha, Serra da Jibóia, on submerged twig, 5 September 2007, F.R. Barbosa and L.F.P. Gusmão (HUEFS 169120); on submerged twig, 12 June 2008, F.R. Barbosa and L.F.P. Gusmão (HUEFS 169123)

Xylomyces elegans Goh, W.H. Ho, K.D. Hyde & K.M. Tsui, Mycology Research 101: 1324, 1997

Material examined – Brazil, Bahia, Santa Terezinha, Serra da Jibóia, on submerged bark, 8 August 2007, F.R. Barbosa and L.F.P. Gusmão (HUEFS 169092); on submerged bark, 6 September 2007, F.R. Barbosa and L.F.P. Gusmão (HUEFS 169111).

New records of hyphomycetes for South America

Bactrodesmium longisporum M.B. Ellis, More Dematiaceous Hyphomycetes: 68, 1976

Material examined – Brazil, Bahia, Santa Terezinha, Serra da Jibóia, on submerged twig, 20 September 2007, F.R. Barbosa and L.F.P. Gusmão (HUEFS 169104); on submerged bark, 30 January 2008, F.R. Barbosa and L.F.P. Gusmão (HUEFS 169103); on submerged twig, 28 May 2008, F.R. Barbosa and L.F.P. Gusmão (HUEFS 169102).

Chloridium obclaviforme J. Mena & Mercado, Acta bot., Szeged 33(1–2): 76, 1987

Material examined – Brazil, Bahia, Santa Terezinha, Serra da Jibóia, on submerged bark,

14 February 2008, F.R. Barbosa and L.F.P. Gusmão (HUEFS 165788).

Cryptophialoidea secunda (Kuthub. & B. Sutton) Kuthub. & Nawawi, Transaction of the British mycological Society 89: 583, 1987

Material examined – Brazil, Bahia, Santa Terezinha, Serra da Jibóia, on submerged twig, 9 September 2008, F.R. Barbosa and L.F.P. Gusmão (HUEFS 165786); on submerged twig, 3 March 2009, F.R. Barbosa and L.F.P. Gusmão (HUEFS 165785).

Dinemasporium lanatum Nag Raj & R.F. Castañeda, Canadian Journal Botany 67: 2527, 1989

Material examined – Brazil, Bahia, Santa Terezinha, Serra da Jibóia, on submerged leaf, 25 July 2007, F.R. Barbosa and L.F.P. Gusmão (HUEFS 165782); on submerged petiole, 9 August 2007, F.R. Barbosa and L.F.P. Gusmão (HUEFS 165783); on submerged leaf, 14 January 2009, F.R. Barbosa and L.F.P. Gusmão (HUEFS 165784).

Ellisemia bambusicola (M.B. Ellis) J. Mena & G. Delgado, Boln Society Mycological Madrid 25: 266, 2000

Material examined – Brazil, Bahia, Santa Terezinha, Serra da Jibóia, on submerged twig, 29 August 2007, F.R. Barbosa and L.F.P. Gusmão (HUEFS 169114).

Hermatomyces sphaericus (Sacc.) S. Hughes, Mycological Paper 50: 100, 1953

Material examined – Brazil, Bahia, Santa Terezinha, Serra da Jibóia, on submerged twig, 3 March 2009, F.R. Barbosa and L.F.P. Gusmão (HUEFS 169113).

Junewangia martinii (J.L. Crane & Dumont) W.A. Baker & Morgan-Jones, Mycotaxon 81: 310, 2002

Material examined – Brazil, Bahia, Santa Terezinha, Serra da Jibóia, on submerged bark, 19 August 2008, F.R. Barbosa and L.F.P. Gusmão (HUEFS 169110).

Linkosia ponapensis (Matsush.) R.F. Castañeda, Saikawa & Gené, Cryptogamie Mycologie 21: 219, 2000

Material examined – Brazil, Bahia, Santa Terezinha, Serra da Jibóia, on submerged leaf, 16 August 2007, F.R. Barbosa and L.F.P. Gusmão (HUEFS 169117).

Xylomyces foliicola W.B. Kendr. & R.F. Castañeda, The University Waterloo Biology Series 33: 54, 1990

Material examined – Brazil, Bahia, Santa Terezinha, Serra da Jibóia, on submerged bark, 8 August 2007, F.R. Barbosa and L.F.P. Gusmão (HUEFS 165771); on submerged petiole, 21 August 2007, F.R. Barbosa and L.F.P. Gusmão (HUEFS 165773); on submerged leaf, 21 August 2007, F.R. Barbosa and L.F.P. Gusmão (HUEFS 165777); on submerged leaf, 29 August 2007, F.R. Barbosa and L.F.P. Gusmão (HUEFS 165778); on submerged leaf, 10 September 2007, F.R. Barbosa and L.F.P. Gusmão (HUEFS 165775); on submerged leaf, 20 September 2007, F.R. Barbosa and L.F.P. Gusmão (HUEFS 165776); on submerged bark, 22 November 2007, F.R. Barbosa and L.F.P. Gusmão (HUEFS 165772); on submerged leaf, 20 December 2007, F.R. Barbosa and L.F.P. Gusmão (HUEFS 165774).

New records of hyphomycetes for Brazil

Berkleasmiium corticola (P. Karst.) R.T. Moore, Mycologia 51: 735, 1961

Material examined – Brazil, Bahia, Santa Terezinha, Serra da Jibóia, on submerged bark, 24 July 2008, F.R. Barbosa and L.F.P. Gusmão (HUEFS 165792).

Brachiosphaera tropicalis Nawawi, Transaction of the British mycological Society 67: 213, 1976

Material examined – Brazil, Bahia, Santa Terezinha, Serra da Jibóia, on submerged bark, 26 May 2008, F.R. Barbosa and L.F.P. Gusmão (HUEFS 169105).

Brachysporiella pulchra (Subram.) S. Hughes, N.Z. Journal Botany 17: 184, 1979

Material examined – Brazil, Bahia, Santa Terezinha, Serra da Jibóia, on submerged twig, 22 January 2009, F.R. Barbosa and L.F.P. Gusmão (HUEFS 169108).

Candelabrum brocchiatum Tubaki Transaction Mycological Society Japan 16: 134, 1975

Material examined – Brazil, Bahia, Santa Terezinha, Serra da Jibóia, on submerged bark, 8 August 2007, F.R. Barbosa and L.F.P. Gusmão (HUEFS 169099); on submerged twig, 10 August 2007, F.R. Barbosa and L.F.P. Gusmão (HUEFS 169097); on submerged twig, 29 August 2007, F.R. Barbosa and L.F.P. Gusmão (HUEFS 169096); on submerged bark, 5 July 2008, F.R. Barbosa and L.F.P. Gusmão (HUEFS 169100); on submerged bark, 28 July 2009, F.R. Barbosa and L.F.P. Gusmão (HUEFS 169098).

Ityorhoptrum verruculosum (M.B. Ellis) P.M. Kirk, Transaction of the British mycological Society 86: 419, 1986

Material examined – Brazil, Bahia, Santa Terezinha, Serra da Jibóia, on submerged bark, 05 July 2008, F.R. Barbosa and L.F.P. Gusmão (HUEFS 169106).

Mirandina corticola G. Arnaud ex Matsush., Icones microfungorum a Matsushima lectorum (Kobe): 96, 1975

Material examined – Brazil, Bahia, Santa Terezinha, Serra da Jibóia, on submerged twig, 13 June 2009, F.R. Barbosa and L.F.P. Gusmão (HUEFS 169091).

Scutisporus brunneus K. Ando & Tubaki, Transaction Mycological Society Japan 26: 153, 1985

Material examined – Brazil, Bahia, Santa Terezinha, Serra da Jibóia, on submerged petiole, 16 September 2008, F.R. Barbosa and L.F.P. Gusmão (HUEFS 169112).

Xylomyces clamidosporus Goos, R.D. Brooks & Lamore, Mycologia 69: 282, 1977

Material examined – Brazil, Bahia, Santa Terezinha, Serra da Jibóia, on submerged bark, 8 August 2007, F.R. Barbosa and L.F.P. Gusmão (HUEFS 169094); on submerged bark, 9 August 2007, F.R. Barbosa and L.F.P. Gusmão (HUEFS 169093); on submerged bark, 11 December 2007, F.R. Barbosa and L.F.P. Gusmão (HUEFS 169095).

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