


# First records of Ingoldian fungi from the Brazilian Amazon

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**Abstract** Ingoldian fungi play an important ecological role by active participation in the decomposition of submerged leaves in aquatic ecosystems. These fungi produce conidia that are filiform, tetra- or multiradiate, scoleco- or sigmoid, which aid in the adaptation and dispersal in freshwater habitats. Despite their important ecological role in freshwater there have been no taxonomic and distributional studies of these fungi in the Brazilian Amazon. The aim of this study was to report new records of Ingoldian fungi to Americas, Brazil and Brazilian Amazon region. The fungal specimens were obtained from natural foam, found on the surface of streams in the “Reserva Ducke” (municipality of Manaus) and the “Balneário Marupiara” (municipality of Presidente Figueiredo) in Amazonas state, Brazil. The foam samples were transferred to slides and completely evaporated at room temperature. Lactic acid was added to the slides and covered using a glass cover slip and sealed with nail polish. Seventeen taxa were recorded. All identified taxa are new records: one new to the Americas (*Tricladium curvisporum* Descals), three new to Brazil (*Condylospora flexuosa* Nawawi and Kuthub., *C. spumigena* Nawawi and *Dwayaangam cornuta* Descals), and 13 new to the Brazilian Amazon region. Our study provides baseline data on the species composition of Ingoldian fungi from the Brazilian Amazon region, thereby

enhancing the knowledge of aquatic mycology in this biodiversity hotspot. Descriptions, illustrations, geographical distribution patterns and comments are presented for all observed species.

**Keywords** Aquatic ecosystems · Aquatic fungi · Biodiversity · Tropical fungi

## Introduction

Ingoldian fungi are aquatic hyphomycetes characterized by some of the following conidial morphological features: filiform, tetra- or multiradiate, sigmoid, scoleco- or manifesting multiple branches (Chan et al. 2000; Descals 2005a; Zhang et al. 2011). These conidial forms assist in their dispersal in streams and colonizing of submerged plant material (Gulis et al. 2005). These fungi play an important ecological role as decomposers of allochthonous organic matter and therefore play an important role in the flow of energy in water bodies (Wong et al. 1998; Gareth Jones and Pang 2012).

Although this ecological group of microfungi is distributed worldwide (Gareth Jones and Pang 2012), most of its species have been described from temperate regions (Silva and Briedis 2011). However, there are a few recent studies conducted in the neotropical region.

Studies of Ingoldian fungi in Brazil were initiated in 1989 in the Atlantic forest (Schoenlein-Crusius and Milanez 1989), Cerrado (Schoenlein-Crusius 2002), with later studies being extended to the Caatinga biome (Fiuza and Gusmão 2013). Despite 315 species known worldwide, only 68 taxa have been recorded to Brazil: 45 in the Atlantic forest, 12 in the Cerrado and 25 from the Caatinga (Schoenlein-Crusius et al. 2009; Fiuza and Gusmão 2013).

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This study aims to investigate the mycodiversity of Ingoldian fungi in the Brazilian Amazon for the first time, thus providing information on new species records to the Americas, Brazil and the Amazon region.

## Materials and methods

Samples of natural foam were collected in March 2013, during the rainy season, in streams from two localities of the Amazonas State: “Reserva Ducke” (municipality of Manaus) and “Balneário Marupiará” region (municipality of Presidente Figueiredo). Three foam samples were collected from each stream and packaged in 50 mL Falcon™ tubes with 5–10 mL of alcohol (70 %). The fungi were isolated and identified using methods proposed by Descals (2005b). The foam samples were homogenized and 0.2 mL of the homogenized sample was transferred to slides with lactic acid. The slides were completely evaporated at room temperature and a drop of lactic acid was added; soon, the evaporated sample area was covered using a cover slip and sealed with nail polisher. The fungi were identified by observing the micromorphological characteristics of conidia and comparing the observations with available literature (Ingold 1975, Marvanová 1997). Illustrations were made using a camera lucida coupled to an Olympus BX-51 microscope. The semi-permanent sealed slides were deposited in the Herbarium of the State University of Feira de Santana (HUEFS).

## Results and discussion

Seventeen taxa of Ingoldian fungi were observed in this study, one of them being the first record to Americas (*Tricladium curvisporum* Descals), other three are new to Brazil (*Condylospora flexuosa* Nawawi & Kuthub., *C. spumigena* Nawawi and *Dwayaangam cornuta* Descals) and the last 13 taxa to Brazilian Amazon region.

## Taxonomy

*Alatospora acuminata* Ingold, Trans. Br. mycol. Soc. 25 (4): 384, 1942. (Figure 1a)

Conidia tetra- or polyradiate, composed of a central axis with two branches, hyaline; central axis, 3-septate, 35–52.5 × 1.5–3 µm; curved or straight branches, 3–5-septate, 30–52.5 × 2.3 µm, branches arise after the second septum of base from central axis.

Material examined: Brazil. Amazonas: Manaus, Reserva Ducke, 13.III.2013, B.M.P. Ottoni s.n. (HUEFS 209021).

Geographical distribution: Cosmopolitan (Fiuza and Gusmão 2013).

*Alatospora acuminata* was previously observed in the Caatinga (Ceará) (Fiuza and Gusmão 2013) and Atlantic forest regions (São Paulo) (Schoenlein-Crusius and Grandi 2003). This species is a new record to Brazilian Amazon.

*Anguillospora longissima* (Sacc. and P. Syd.) Ingold, Trans. Br. mycol. Soc. 25(4): 402, 1942. (Figure 1b–c)

Conidia filiform, curved to sigmoidal, 7–20-septate, 112.5–345 × 3–5 µm, tapering toward both ends, 1.5–3 µm wide, hyaline.

Material examined: Brazil. Amazonas: Manaus, Reserva Ducke, 13.III.2013, B.M.P. Ottoni s.n. (HUEFS 209023); Presidente Figueiredo, Balneário Marupiará, 15.III.2013, B.M.P. Ottoni s.n. (HUEFS 209024).

Geographical distribution: Cosmopolitan (Fiuza and Gusmão 2013).

Four species of *Anguillospora* were recorded in Brazil: *A. crassa* Ingold, *A. filiformis* Greath., *A. longissima*, and *A. pseudolongissima* Ranzoni (Schoenlein-Crusius and Grandi 2003; Schoenlein-Crusius et al. 2009; Fiuza and Gusmão 2013). *Anguillospora longissima* is widely distributed in Brazil (Schoenlein-Crusius and Grandi 2003; Schoenlein-Crusius et al. 2009) and it was previously reported in the Atlantic Forest (São Paulo) by Schoenlein-Crusius and Milanez (1989) and in the Caatinga (Ceará and Paraíba) by Fiuza and Gusmão (2013). This is a new record for the Brazilian Amazon.

*Articulospora tetracladia* Ingold, Trans. Br. mycol. Soc. 25 (4): 343, 1942. (Figure 1d)

Conidia tetra- or polyradiate, composed of a central axis with three branches, hyaline; central axis, 2–4-septate, 15–50 × 3–6 µm; branches with rounded ends diverging at the apex of central axis, 2–3-septate, 35–45 × 3 µm.

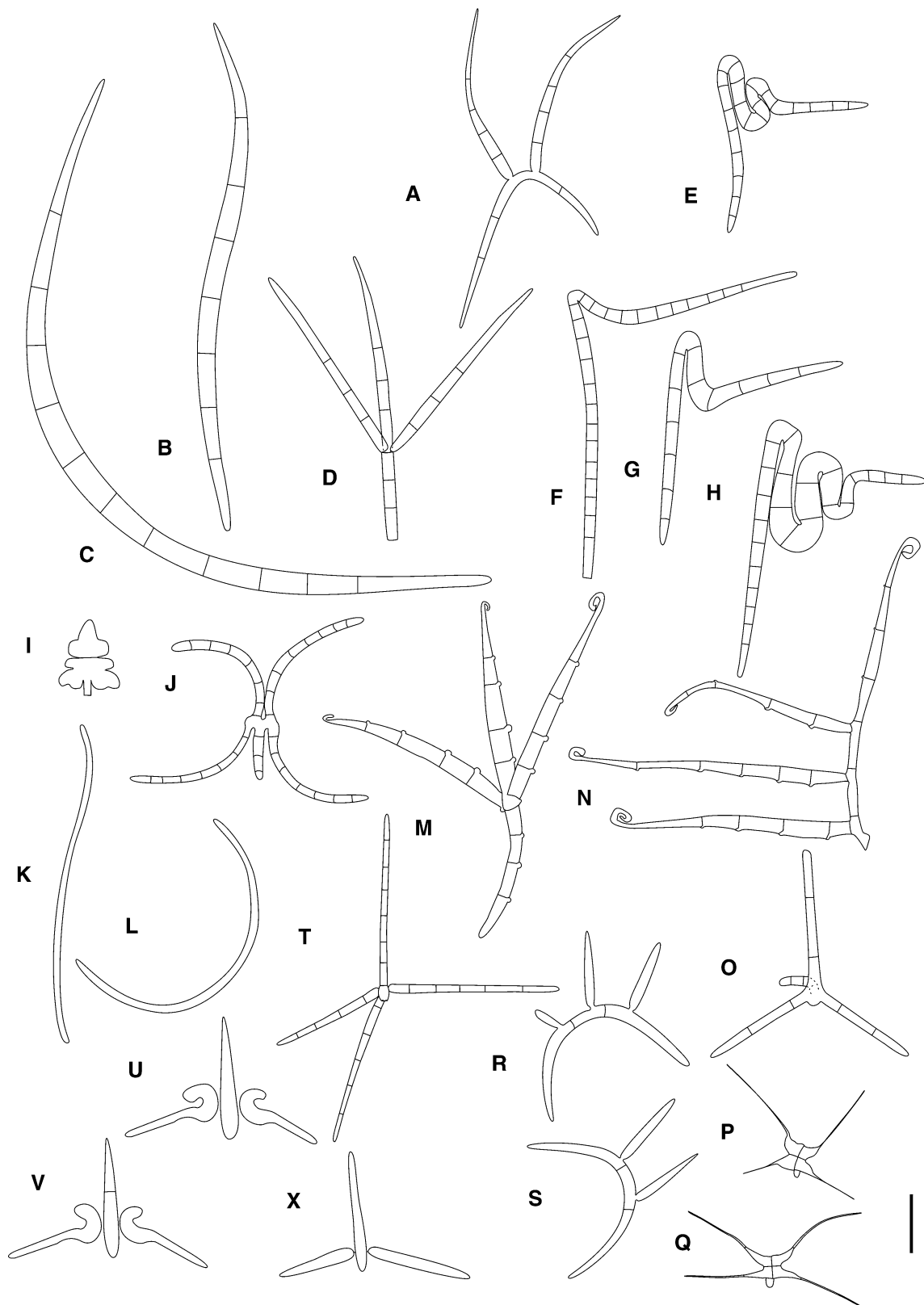
Material examined: Brazil. Amazonas: Manaus, Reserva Ducke, 13.III.2013, B.M.P. Ottoni s.n. (HUEFS 209021); Presidente Figueiredo, Balneário Marupiará, 15.III.2013, B.M.P. Ottoni s.n. (HUEFS 209024).

Geographical distribution: Cosmopolitan (Fiuza and Gusmão 2013).

The species was recorded in the Caatinga (Ceará) (Fiuza and Gusmão 2013) and in the Atlantic forest (São Paulo and Minas Gerais) (Schoenlein-Crusius and Grandi 2003; Rosa et al. 2009). This is a new record for the Brazilian Amazon.

*Condylospora flexuosa* Nawawi and Kuthub., Mycotaxon 33: 329, 1988. (Figure 1e)

Conidia cylindrical, curved three times, 13–21-septate; composed of a basal region, erect, 34.5–45 µm long; region between the first and second curve, 14–18.8 × 2.5–4.5 µm, hyaline; region between the second and third curve, 12–12.5 × 2.5–3.8 µm; erect apex region, in right angle in relation to the basal region, 18.4–25 µm long.



**Fig. 1** a *Alatospora acuminata*; b–c *Anguillospora longissima*; d *Articulospora tetracladia*; e *Condylospora flexuosa*; f *C. gigantea*; g *C. spumigena*; h *Condylospora* sp.; i *Dendrosporium lobatum*; j *Dwayaangam cornuta*; k–l *Flagellospora curvula*; m–n *Ingoldiella*

*hamata*; o *Lemonniera aquatica*; p–q *Scutisporus brunneus*; r–s *Tricladium curvisporum*; t *Triscelophorus acuminatus*; u–v *T. curviramifer*; x *T. deficiens*. (Scale bar: c, d, g–i, p–s and u–x = 10 μm; a, b, e–f, j and k = 15 μm; l = 20 μm; m–o and t = 25 μm)

Material examined: Brazil. Amazonas: Presidente Figueiredo, Balneário Marupiara, 15. III.2013, B.M.P. Ottoni s.n. (HUEFS 209024).

Geographical distribution: Malaysia (Nawawi and Kuthubutheen 1988), Puerto Rico (Santos-Flores et al. 1996) and Venezuela (Smits et al. 2007).

*Condylospora flexuosa* was originally identified or isolated from submerged decaying twigs, and is similar to *C. spumigena*, but with an additional curve in the basal region of conidia (Nawawi and Kuthubutheen 1988). In this study, *C. flexuosa* is a new record for Brazil and it was the most abundant species of *Condylospora* observed.

*Condylospora gigantea* Nawawi and Kuthub., Mycotaxon 33: 334, 1988. (Figure 1f)

Conidia cylindrical, curved, inverted L shape, 22–27-septate, hyaline; composed of a basal region longest, erect,  $75\text{--}87.5 \times 1.5\text{--}3 \mu\text{m}$  and an apex region smallest, slightly curved,  $64.5\text{--}70.5 \times 3\text{--}4.5 \mu\text{m}$ , tapering toward both ends.

Material examined: Brazil. Amazonas: Manaus, Reserva Ducke, 13.III.2013, B.M.P. Ottoni s.n. (HUEFS 209021).

Geographical distribution: Brazil (Fiuza and Gusmão 2013), Malaysia (Nawawi and Kuthubutheen 1988), Poland (Czeczuga et al. 2003), Puerto Rico (Santos-Flores et al. 1996) and Republic of Cameroon (Chen et al. 2000).

*Condylospora gigantea* was described from submerged twigs in Malaysia (Nawawi and Kuthubutheen 1988). This species is usually found in the foam that occurs in tropical streams such as Brazil, Malaysia and Puerto Rico (Santos-Flores and Betancourt-López 1997; Nawawi and Kuthubutheen 1988; Fiuza and Gusmão 2013). This species is also recorded for the first time from the Brazilian Amazon.

*Condylospora spumigena* Nawawi, Trans. Br. mycol. Soc. 66(2): 363, 1976. (Figure 1g)

Conidia cylindrical, curved, inverted L shape, 12–15-septate, hyaline; composed of a basal region longest, erect,  $37.5\text{--}50 \times 2\text{--}3 \mu\text{m}$  and an apex region smallest, slightly curved,  $35\text{--}47 \times 1.5\text{--}3 \mu\text{m}$ , tapering toward both ends.

Material examined: Brazil. Amazonas: Manaus, Reserva Ducke, 13.III.2013, B.M.P. Ottoni s.n. (HUEFS 209021).

Geographical distribution: China (Zhuang 2001), Malaysia (Nawawi and Kuthubutheen 1988), Peru (Matsushima 1993), Puerto Rico (Santos-Flores et al. 1996) and Venezuela (Cressa and Smits 2007).

*Condylospora spumigena* is the type species of the genus, which was found in foam samples in Malaysia (Nawawi 1976). Its conidia are twice smaller than that of *C. gigantea*, a closely related species (Nawawi and Kuthubutheen 1988). *Condylospora spumigena* can easily be distinguished from *C. vietnamensis* L.T.H. Yen and K. Ando by the U- or N-shaped conidia (Yen et al. 2012). This species is recorded for the first time in Brazil

*Condylospora* sp. (Figure 1h)

Conidia cylindrical, curved four times, 17–24-septate, hyaline; composed of a basal region, erect,  $30\text{--}37.5 \mu\text{m}$  long; region between the first and second curve,  $16\text{--}18 \times 3 \mu\text{m}$  long; region between the second and third curve,  $10.5\text{--}14 \times 3 \mu\text{m}$ ; region between the third and fourth curve,  $7\text{--}9 \times 3 \mu\text{m}$ ; erect apex region, in right angle in relation to the basal region,  $17\text{--}22.5 \mu\text{m}$  long.

Material examined: Brazil. Amazonas: Manaus, Reserva Ducke, 13.III.2013, B.M.P. Ottoni s.n. (HUEFS 209021).

Geographical distribution: Brazil (Fiuza and Gusmão 2013) and Puerto Rico (Santos-Flores et al. 1996).

The specimen observed in this study was identical to that observed in Puerto Rico in a previous study (Santos-Flores et al. 1996, Santos-Flores and Betancourt-López 1997). The *Condylospora* sp. was observed in the Caatinga (Bahia) (Fiuza and Gusmão 2013). This is a new record for the Brazilian Amazon.

*Dendrosporium lobatum* Plakidas and Edgerton ex J.L. Crane, Trans. Br. mycol. Soc. 58: 423, 1972. (Figure 1i)

Conidia triangular, flattened, simple, 1-septate, with 2–3 lobes on each side,  $9\text{--}12 \times 6\text{--}7.5 \mu\text{m}$ , large basal lobe, pedicellate base  $3 \times 1.5$ , hyaline.

Material examined: Brazil. Amazonas: Manaus, Reserva Ducke, 13.III.2013, B.M.P. Ottoni s.n. (HUEFS 209023).

Geographical distribution: Cosmopolitan.

*Dendrosporium* currently has two species, *D. lobatum* and *D. candelabroides* R. F. Castañeda. *Dendrosporium candelabroides* differs from *D. lobatum* by the presence of candelabroide (similar to a light stand) conidia and brown conidiophores (Castañeda-Ruiz 1986). *Dendrosporium lobatum* was previously recorded from the Caatinga (Pernambuco and Paraiba) (Cavalcanti and Milanez 2007, Fiuza and Gusmão 2013), and is new to the Brazilian Amazon.

*Dwayaangam cornuta* Descals, Trans. Br. mycol. Soc. 78(3): 408, 1982. (Figure 1j)

Conidia tetradiate, composed of a central axis with four opposing branches,  $52.5\text{--}112.5 \times 45\text{--}62.5 \mu\text{m}$ , hyaline; central axis 2–3-septate, truncated base,  $10\text{--}25 \times 4.5 \mu\text{m}$ ; curved branches that remind bull horns, 5–8-septate,  $18\text{--}52.5 \times 4.5 \mu\text{m}$ .

Material examined: Brazil. Amazonas: Manaus, Reserva Ducke, 13.III.2013, B.M.P. Ottoni s.n. (HUEFS 209021).

Geographical distribution: Cosmopolitan.

*Dwayaangam* Subram. is represented by eight species: *D. colodena* Sokolski and Bérubé, *D. cornuta*, *D. dichotoma* Nawawi, *D. gamundiae* Cazau, Aram. and Cabello, *D. heterospora* G.L. Barron, *D. junci* Kohlm., Baral and Volkm.-Kohlm., *D. quadridens* (Drechsler) Subram., and *D. yakuensis* (Matsush.) Matsush. (Sokolski et al. 2006). These species are differentiated based on the morphological characteristics of the central axis. *Dwayaangam quadridens* is the type species and differs from *D. cornuta*

by the presence of a longer and thinner ( $45\text{--}60 \times 1.8 \mu\text{m}$ ) central axis (Kohlmeyer et al. 1998). The conidia of *D. cornuta* were consistently found in foam, despite the low abundance of the species (Descals and Webster 1982; Ingold 1959). This is a new record for Brazil.

*Flagellospora curvula* Ingold, Trans. Br. mycol. Soc. 25: 404, 1942. (Figure 1k–l)

Conidia filiform, sigmoidal or lunate, 0-septate,  $65\text{--}120.5 \times 2\text{--}3 \mu\text{m}$ , hyaline.

Material examined: Brazil. Amazonas: Manaus, Reserva Ducke, 13.III.2013, B.M.P. Ottoni s.n. (HUEFS 209023).

Geographical distribution: Cosmopolitan (Fiuza and Gusmão 2013).

*Flagellospora curvula* is recorded with high abundance worldwide (Sridhar et al. 2010). The species was recorded in the Atlantic forest and Caatinga, (Schoenlein-Crusius et al. 2009; Fiuza and Gusmão 2013). This species is recorded for the first time for the Brazilian Amazon.

*Ingoldiella hamata* D.E. Shaw, Trans. Br. mycol. Soc. 59(2): 258, 1972. (Figure 1m–n)

Conidia tetra- or polyradial with clamp connections, consisting by cylindrical central axis that rise three branches, hyaline; central axis, 3–6-septate,  $65\text{--}145 \times 3\text{--}6 \mu\text{m}$ ; branches, 4–5-septate,  $75\text{--}195 \times 4.5\text{--}7.5 \mu\text{m}$ ; the branches narrowed towards the apex terminating in hooks.

Material examined: Brazil. Amazonas: Manaus, Reserva Ducke, 13.III.2013, B.M.P. Ottoni s.n. (HUEFS 209023).

Geographical distribution: Australia (Shaw 1972), Brazil (Barbosa and Gusmão 2011; Silva et al. 2014), India (Sudheep and Sridhar 2013), Malaysia (Nawawi 1973), and United States of America (Raja et al. 2009).

*Ingoldiella hamata* is the only basidiomycetes fungi recorded in its asexual state, in this study. *Ingoldiella* has three species: *I. fibulata* Nawawi, *I. hamata*, and *I. nutans* Bandoni and Marvanová (Bandoni and Marvanová 1989). All the clamp connections in the central axis of conidia are formed along the concave side in *I. fibulata*, whereas the *I. hamata* does not show any regular arrangement on the clamp connections (Nawawi 1973). *Ingoldiella nutans* differs from *I. hamata* with the presence of secondary branches (Bandoni and Marvanová 1989). *Ingoldiella hamata* was recorded on submerged leaves in Cerrado (São Paulo) (Schoenlein-Crusius 2002), Atlantic forest (Bahia, Ceará and Paraíba) (Barbosa and Gusmão 2011; Silva et al. 2014), and Brazilian Amazon (this study).

*Lemonniera aquatica* De Wild. Ann. Soc. Belge Microscop. 18: 143, 1894. (Figure 1o)

Conidia tetra- or polyradial, composed of a central body with four branches, hyaline; central body indistinct, 0-septate,  $5\text{--}7.5 \times 4.5\text{--}5.5 \mu\text{m}$ ; cylindrical branches, apex rounded, 2–3-septate,  $40\text{--}65 \times 3.8\text{--}4.5 \mu\text{m}$ .

Material examined: Brazil. Amazonas: Manaus, Reserva Ducke, 13.III.2013, B.M.P. Ottoni s.n. (HUEFS 209021);

Presidente Figueiredo, Balneário Marupiara, 15.III.2013, B.M.P. Ottoni s.n. (HUEFS 209024).

Geographical distribution: Cosmopolitan.

*Lemonniera aquatica* was observed for the first time, associated with the leaves of *Ficus microcarpa* L.F. in the Atlantic forest in Brazil, by Schoenlein-Crusius and Milanez (1989). *Lemonniera alabamensis* and *L. pseudofloscula* were collected from stream foam in Ceará and Paraíba, in the Caatinga (Fiuza and Gusmão 2013). *Lemonniera aquatica* differs from *L. alabamensis* and *L. pseudofloscula*, in the absence of a central spherical cell. This species is commonly observed in the Atlantic forest (Schoenlein-Crusius et al. 1992, 2009). This taxon is a new record for the Brazilian Amazon.

*Scutisporus brunneus* K. Ando and Tubaki, Trans. Mycol. Soc. Japan 26(2): 153, 1985. (Figure 1p–q)

Conidia tetra- or polyradial, consisting of four cells and a basal cuneiform cell, septa cross-shaped, hyaline; basal cuneiform cell  $2.5\text{--}5 \times 2\text{--}5 \mu\text{m}$ , base  $2 \mu\text{m}$ ; branches from each four cells, 0-septate, filiform, hyaline,  $15\text{--}30 \mu\text{m}$  long; septa cross-shaped  $4\text{--}8 \times 3.5\text{--}5 \mu\text{m}$ .

Material examined: Brazil. Amazonas: Manaus, Reserva Ducke, 13.III.2013, B.M.P. Ottoni s.n. (HUEFS 209023).

Geographical distribution: Cosmopolitan.

*Scutisporus brunneus* was newly recorded on submerged leaves in the Atlantic forest (Bahia) (Barbosa and Gusmão 2011) and in the foam obtained from the Caatinga (Ceará and Paraíba) (Fiuza and Gusmão 2013). This is a new record for the Brazilian Amazon.

*Tricladium curvisporum* Descals, Trans. Br. mycol. Soc. 80(1): 71, 1983. (Figure 1r–s)

Conidia tetra- or polyradial, composed of a central axis with 2–3 side branches, hyaline; curved central axis, 1–2-septate,  $28\text{--}45 \times 1.5\text{--}3 \mu\text{m}$ ; cylindrical branches, 0-septate, constricted at the base, rounded apex,  $5\text{--}20 \times 1.5\text{--}2.5 \mu\text{m}$ .

Material examined: Brazil. Amazonas: Manaus, Reserva Ducke, 13.III.2013, B.M.P. Ottoni s.n. (HUEFS 209021).

Geographical distribution: Greenland (Engblom et al. 1986), Ireland (Harrington 1997), Spain (Roldan 1990), Switzerland (Gessner and Robinson 2003) and Wales (Descals and Webster 1983).

*Tricladium curvisporum* was described from foam samples from the Northern Hemisphere (Descals and Webster 1983). This species differs from other *Tricladium* species by the curved central axis of the conidia. A short caudal extension can also be present on the conidia in some cases (Descals and Webster 1983), but this characteristic was not observed in our study. *Tricladium curvisporum* is a new record for the Americas.

*Triscelophorus acuminatus* Nawawi, Trans. Br. mycol. Soc. 64(2): 346, 1975. (Figure 1t)

Conidia tetra- or polyradial, central axis with three branches inserted in basal cell, hyaline, central axis, cylindrical, 4–9-



septate, tapering at the apex, the septa are not constricted,  $20\text{--}150 \times 3\text{--}6.3 \mu\text{m}$ ; cylindrical branches  $3\text{--}5\text{-septate}$ ,  $37.5\text{--}100 \times 3\text{--}6.3 \mu\text{m}$ . The basal cell by axis presents truncated base.

Material examined: Brazil. Amazonas: Manaus, Reserva Ducke, 13.III.2013, B.M.P. Ottoni s.n. (HUEFS 209021); Presidente Figueiredo, Balneário Marupiara, 15.III.2013, B.M.P. Ottoni s.n. (HUEFS 209024).

Geographical distribution: Cosmopolitan (Fiuza and Gusmão 2013).

*Triscelophorus acuminatus* is widely distributed and produces many spores that are abundantly found in samples of foam and on submerged leaves (Sridhar et al. 2010; Sridhar and Sudheep 2010). *Triscelophorus acuminatus* was recorded in the Atlantic forest (São Paulo) by Moreira and Schoenlein-Crusius (2012) and in the Caatinga (Ceará and Paraíba) by Fiuza and Gusmão (2013). This is the first record for the Brazilian Amazon.

*Triscelophorus curviramifer* Matsush., Matsush. Mycol. Mem. 7:70, 1993. (Figure 1u–v)

Conidia tetra- or radiate, central axis with two curved branches inserted in basal cell, hyaline, central axis, cylindrical,  $0\text{--}1\text{-septate}$ ,  $15\text{--}32 \times 2\text{--}7.5 \mu\text{m}$ ; branches  $0\text{-septate}$ ,  $12\text{--}30 \times 3\text{--}4.8 \mu\text{m}$ .

Material examined: Brazil. Amazonas: Manaus, Reserva Ducke, 13.III.2013, B.M.P. Ottoni s.n. (HUEFS 209021).

Geographical distribution: Brazil (Magalhães et al. 2011), Peru (Matsushima 1993) and Venezuela (Silva and Briedis 2011).

*Triscelophorus curviramifer* was firstly described in samples of submerged leaves in Rio Negro, Peru (Matsushima 1993). The curved branches of the conidia distinguish this species from other *Triscelophorus* species. This species was recorded in the Atlantic Forest (Bahia), associated with *Manilkara maxima* Penn leaves (Magalhães et al. 2011), and is recorded from the Brazilian Amazon in this study.

*Triscelophorus deficiens* Matsush., Matsush. Mycol. Mem. 7:70, 1993. (Figure 1x)

Conidia tetra- or radiate, central axis with two branches inserted in basal cell, hyaline; central axis, cylindrical,  $0\text{-septate}$ ,  $15\text{--}25.5 \times 2\text{--}3 \mu\text{m}$ ; branches  $0\text{--}1\text{-septate}$ ,  $15\text{--}21 \times 2\text{--}3.5 \mu\text{m}$ .

Material examined: Brazil. Amazonas: Manaus, Reserva Ducke, 13.III.2013, B.M.P. Ottoni s.n. (HUEFS 209021).

Geographical distribution: Brazil (Cruz et al. 2007), Peru (Matsushima 1993), United States of America (Matsushima 1983) and Taiwan (Matsushima 1983).

*Triscelophorus deficiens* was firstly described from leaves of *Acacia confusa* Merr. in Taiwan (Matsushima 1983). The species displays two or three branches on the conidia (Matsushima 1983), but only two branches were observed in this study. *Triscelophorus deficiens* was

previously recorded in the Caatinga (Bahia) by Cruz et al. (2007) and it is a new record for the Brazilian Amazon.

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