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New records and host plants of fly-speck fungi from Panama

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Fly-speck fungi are bitunicate *Ascomycota* forming small thyriothecia on the surface of plant organs. New records of this group of fungi for Panama and new host plants are described and illustrated, *Asterina sphaerelloides* on *Phoradendron novae-helveticae* and *Morenoina epilobii* on unknown host (*Asterinaceae*); *Micropeltis lecythisii* on *Chrysophyllum cainito* (*Micropeltidaceae*); *Schizothyrium rufulum* on *Encyclia* sp. and *Myriangiella roupalae* on *Salacia* sp. (*Schizothyriaceae*) and *Chaetothyrium vermisporum* and its anamorph *Merismella concinna* on a *Rubiaceae* (*Chaetothyriaceae*).

Key words: *Asterinaceae*, *Chaetothyriaceae*, *Micropeltidaceae*, *Schizothyriaceae*, thyriothecia

Introduction

Fly-speck fungi are inconspicuous *Ascomycota* mainly found in the tropics and subtropics. They form small scutellate fruiting bodies, called thyriothecia, on the surface of host organs. They are plant parasites on living leaves and stems (Theissen, 1913; Stevens and Ryan, 1939), saprobes on dead leaves and stems (Ellis, 1976) or commensals (fungal epiphylls) on living leaves (Gilbert *et al*., 2006). Saprobes are found in temperate zones as well as in the tropics or subtropics. True plant parasites and commensals, which are thought to be species-rich, are delimited to tropical or subtropical regions of the world.

Most fly-speck fungi belong to one of two subclasses of bitunicate *Ascomycota*: *Chaetothyriomycetidae* or *Dothideomycetidae* (Kirk *et al*., 2001). The systematic relationships between families, genera and species are not solved yet, as complete phylogenetic studies are lacking for this group, except for some members of *Chaetothyriomycetidae* (Berbee, 1996; Liu and Hall, 2004) and *Dothideomycetidae* (e.g. Tam *et al*., 2003).

In the past, many authors described tropical fly-speck fungi (e.g. Theissen, 1913; Sydow, 1927; Hansford, 1946). During the last decades

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members of fly-speck fungi have been described from many tropical and subtropical regions: Africa (Mibey and Hawksworth, 1997), Asia (e.g. Hosagoudar and Abraham, 1998; Song *et al*., 2004), Australia (Reynolds and Gilbert, 2005) and North America (e.g. Ahn and Crane, 2004). However, only Batista (1959), Batista *et al*. (1963) and Farr (1986, 1987) published morphologic and taxonomic studies on this group in the neotropics, and only from Brazil. As the diversity of fly-speck fungi is very high in tropical latitudes (Batista, 1959), our knowledge is still very incomplete. During recent field work in Panama, many tropical fly-speck fungi were observed. Only the fly-speck fungi *Chaetothyrina panamensis* (F. Stevens & Dorman) Arx (Dennis, 1970), *Chaetothyriopsis panamensis* F. Stevens & Dorman (Stevens, 1927), *Micropeltis bakeri* Syd. & P. Syd. (Cash and Watson, 1955), *Yamamotoa carludovicae* (Bat.) Arx & E. Müll. (Sivanesan, 1984), *Scolecopeltidium bakeri* (Syd. & P. Syd.) F. Stevens & Manter (Batista, 1959) and *Scolecopeltidium mayteni* Bat. & I.H. Lima (Gilbert *et al*., 1997) are known so far from Panama. In the present study six species new for Panama on several new host plants are described and illustrated. We are convinced that many more species will be found in Panama during future field work.

Materials and methods

Specimens of fungi forming black dots on leaves were collected in Panama in 2004. Dried herbarium specimens are deposited in the Herbarium of the University of Panama (PMA) and in the Botanische Statssammlung München (M). For comparison, additional specimens were obtained from BPI (U.S. National Fungus Collections). Microscopic preparations were made in water or embedding medium (Heinze, 1952, modified after M. Göker) and observed with a Leitz Dialux 20 microscope. Cross-sections through sporomata were made with a Leica CM 1510 Freezing-Cryotome. Preparations for measurements and drawings of asci and ascospores were mounted in water or cotton blue in lactic acid. For each specimen 30 ascomata, asci and ascospores were measured. Measurements are given as mean values ± standard deviation (SD) with extreme values in brackets. The drawings were made freehand at a fixed scale or with a drawing mirror.

Results

Subclass: *Dothideomycetidae*

Asterinaceae

Asterina sphaerelloides Spegazzini, F. Guar. non nulli 123; Rev. Argentina Hist. Nat. I, Buenos Aires (1891). (Figs. 1-6, 27)

Synonyms: see Stevens and Ryan (1939).

Colonies black, discrete or laterally adnate, epi- and hypophyllous. *Surface mycelium* brown, hyphae of surface mycelium 4-6 µm broad, septate, branched, smooth, curved, with irregularly undulating walls. *Appressoria* 8-12 × 5-7(-9) µm, elliptical, not lobed, apices slightly hooked, penetration-porus sometimes visible. *Setae* absent. *Thyriothecia* (62-)71-94(-109) µm diam., 35-50 µm high, dimidiate, round, brown, superficial, unilocular, developing directly underneath the surface mycelium. *Scutellum* pseudoparenchymatic, radiate, brown, scutellum cells 3-7 × 3-4.5 µm, isodiametric, thick-walled. *Ostiole* absent, scutellum opening by star-shaped fissures. *Asci* 25-34(-36) µm diam., globose, slightly stalked, bitunicate with fissitunicate dehiscence, 8-spored, few mature asci in one thyriothecium. *Pseudoparaphyses* septate, with clavate, slightly pigmented apices. *Ascospores* 21-24 × 11-12(-13) µm, brown at maturity, elliptic, smooth, two-celled, strongly constricted at septum, cells almost spherical. *Mucous sheaths* or *cilia* absent.

Anamorph: ***Asterostomella* sp.**

Pycnothyria (65-)74-92(-99) µm diam., up to 50 µm high, brown, superficial, scattered between ascomata originating on the same mycelium. *Scutellum* like that of the teleomorph. *Conidiogenous cells* hyaline, inserted below the scutellum. *Conidia* (11-)19-24 × (7-)11-13 µm, brown at maturity, with a hyaline band in the middle, elliptic to slightly clavate, with basal scar not thickened or pigmented.

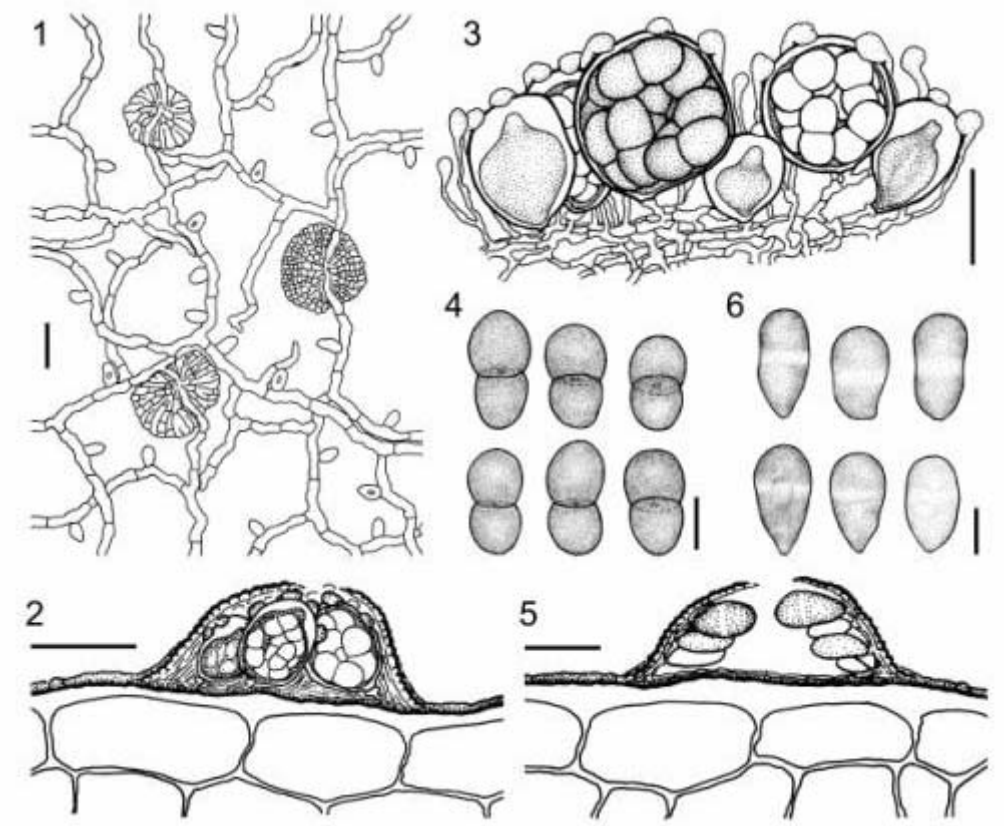
Hosts: *Ilex* sp. (*Aquifoliaceae*), *Clematis* sp. (*Ranunculaceae*), unknown *Loranthaceae* (Stevens and Ryan, 1939). *Phoradendron novae-helveticae* Trel. (*Loranthaceae*) is presented here as a new host plant.

Known distribution: Brazil (Theissen, 1913), new record for Panama.

Material examined: PANAMA, Chiriquí, Bajo Mono, *ca*. 1.500 m, on *Phoradendron novae-helveticae* Trel. (*Loranthaceae*), 5 November 2004, M. Piepenbring *et al*. 3414 (PMA, M).

Additional specimens examined: *Asterina phoradendri* Henn. on *Phoradendron racemosus* L., DOMINICAN REPUBLIC, Moca, E.N.A., 27 February 1930, Ekman s.n. (BPI 690251, type); *Asterina phoradendricola* Stev. & Poll. on *Phoradendron flavescens* (Pursh) Nutt. ex A. Gray, USA, Florida, near Gainesville, 11 November 1943, A.S. Rhoads s.n. (BPI 690232, type).

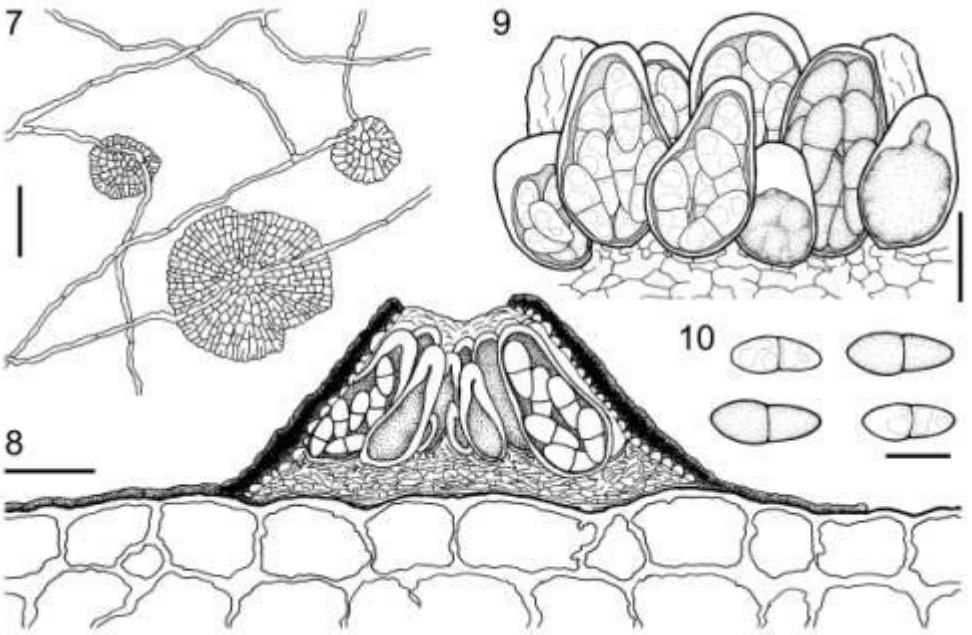
Notes: Until now two species of *Asterina* have been described on *Phoradendron* spp., *A*. *phoradendri* and *A*. *phoradendricola*. *Asterina phoradendri* forms hypostromata in the host tissue and bears short flask-shaped setae. Therefore, *A*. *phoradendri* probably does not belong to the genus *Asterina*. The ascomata of *A*. *phoradendricola* are characterized by a spherical, not dimidiate shape and the scutellum cells become hyaline and slimy at



Figs. 1-6. *Asterina sphaerelloides* and its *Asterostomella*-anamorph on *Phoradendron novae-helveticae* (*Loranthaceae*; Piepenbring 3414). **1.** Surface mycelium with appressoria and young thyriothecia, which develop underneath the mycelium. Bar = 20 µm. **2.** Longitudinal section through a thyriothecium. Bar = 25 µm. **3.** Young and mature asci as well as paraphyses on ascogenous hyphae. Bar = 20 µm. **4.** Mature ascospores. Bar = 10 µm. **5.** Longitudinal section through a pycnothyrium. Bar = 50 µm. **6.** Mature conidia. Bar = 10 µm.

maturity. These characteristics correspond to the Englerulaster-type (Stevenson, 1946), which is known for several species of *Asterina*. The sizes of the thyriothecia, asci and ascospores of the Panamanian species of *Asterina* on *Phoradendron novae-helveticae* correspond to those of *A. sphaerelloides* described by Theissen (1913) on an unknown *Loranthaceae*. The morphology of the surface mycelium is similar and the appressoria have the same shape and size. Up to now, no species of *Asterina* is known from *P. novae-helveticae*.

In this case, we follow the species concept proposed by Stevens and Ryan (1939), in which species of different host plant families can serve as hosts of the same *Asterina* species.



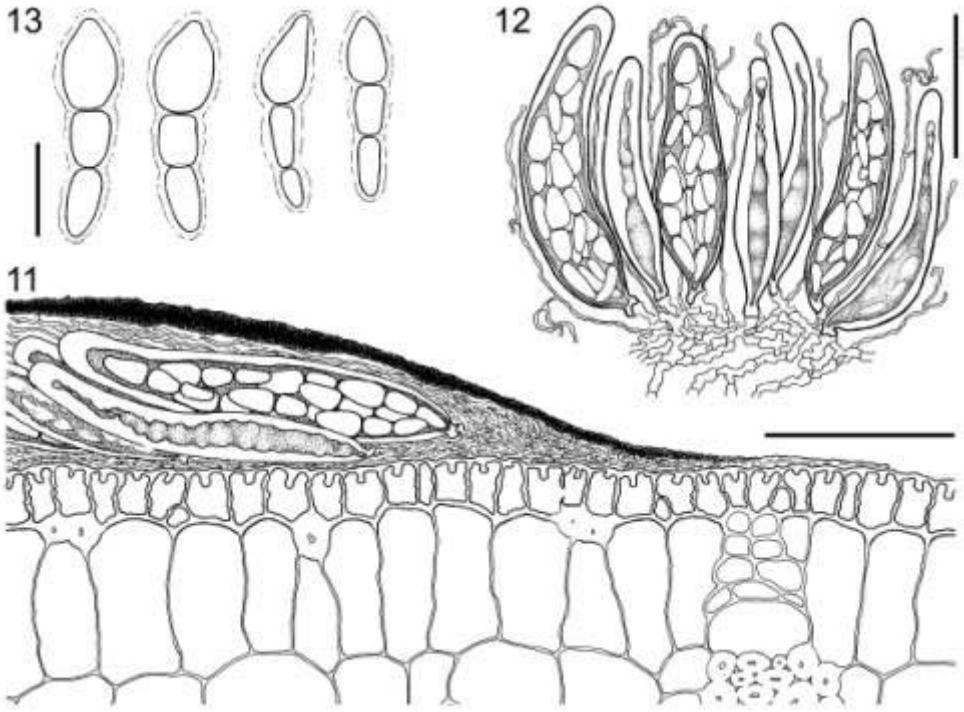
Figs. 7-10. *Morenoina epilobii* on an unknown host (Hofmann 127). **7.** Surface mycelium with young thyriothecia. Bar = 20 µm. **8.** Longitudinal section through a thyriothecium with a basal hymenium. Bar = 10 µm. **9.** Young and mature asci on ascogenous tissue. Bar = 10 µm. **10.** Young and mature ascospores. Bar = 5 µm.

Morenoina epilobii (Libert) Müller & Arx, Beiträge zur Kryptogflora der Schweiz 11(2): 129-130 (1962). (Figs. 7-10, 28)

Synonyms: see Müller and von Arx (1962).

Surface mycelium subhyaline, epi- and hypophyllous, hyphae 2-3 µm broad, septate, branched. *Appressoria* or *setae* not observed. *Thyriothecia* (120-)135-355(-680) × (40-)42-58(-60) µm, 15-30 µm high, elongated, rarely Y- to X-shaped, dark brown, lighter coloured at the margins, superficial. *Scutellum* pseudo-parenchymatic, radiate, several cell-layers thick, scutellum-cells 2-6 × 1.5-4 µm, isodiametric, thick-walled, brown. *Ostiole* absent, scutellum opens with a longitudinal fissure. *Asci* (12-)15-18 × (8-)9-10(-11) µm, ovoid to broadly clavate, not stalked, bitunicate with fissitunicate dehiscence, 6-spored, in two parallel rows underneath the scutellum. *Pseudoparaphyses* not observed. *Ascospores* 6.5-7.5(-8) × 2.5-3.5 µm, pale brown at maturity, elliptic to slightly clavate, straight to slightly curved, with one septum in the middle, slightly constricted at the septum. *Mucous sheaths* or *cilia* absent.

Hosts: *Epilobium* sp. (*Onagraceae*) (von Arx and Müller, 1975); unknown host plant.



Figs. 11-13. *Micropeltis lecythisii* on *Crysophyllum cainito* (*Sapotaceae*; Hofmann 102). **11.** Longitudinal section through a thyriothecium. Bar = 50 µm. **12.** Young and mature asci surrounded by pseudoparaphyses. Bar = 50 µm. **13.** Mature ascospores with mucous sheaths. Bar = 20 µm.

Known distribution: Europe (Müller and von Arx, 1962). This is a new record for Panama.

Material examined: PANAMA, Chiriquí, Parque National Volcán Barú, Sendero Los Quetzales, *ca*. 2,200 m, on unknown host plant together with *Microthyrium* sp., 21 February 2004, T. Hofmann 127 (PMA, M).

Notes: *Morenoina epilobii* is a widely distributed saprobe on *Epilobium* spp. in Europe (Müller and von Arx, 1962). The dead plant material from Panama is not from an *Onagraceae*. Because the sizes of ascomata, asci and ascospores of the Panamanian specimen are similar to those of the European ones and because the fungus from Panama also grows saprophytically on dead plant material, we do not describe a new species of *Morenoina*.

Micropeltidaceae

Micropeltis lecythisii Batista & Lima, Instituto de Micologia, Universidade do Recife 56: 402 (1959). (Figs. 11-13, 29)

Surface mycelium hyaline, densely reticulate, forming one cell-layer, epiphyllous. *Appressoria* or *setae* absent. *Thyriothecia* (240-)280-407(-500) µm diam., up to 50 µm high, gray-black, roundish, dimidiate, discrete, superficial, unilocular. *Scutellum* epidermoid, dark, pelliculous, hyaline at the margins, formed by many layers of cells, not radiate, scutellum-cells 5-15 × 1.5-2 µm, irregularly branched and lobed. *Ostiole* (27-)33-43(-50) µm diam., central, round, bright, closed in young thyriothecia. *Asci* (57-)78-104(-120) × (14-)17-21(-24) µm, hyaline, elliptic to clavate, elongated, erect or curved, bitunicate with fissitunicate dehiscence, (2-)4-8-spored. *Pseudoparaphyses* 1-1.5 µm broad, never longer than asci, filiform, hyaline, rarely septate, at maturity often disappearing. *Ascospores* (33-)34-40(-44) µm long, small basal cell (4-)5-6(-7) µm broad, large upper cell 7-9(-12) µm broad, hyaline, elliptic to clavate, straight or curved, thick-walled, (2-)3-(-4)-celled. Upper cell of ascospore lemon-shaped, basal cell shorter, elliptic to clavate. *Mucous sheath* 1-2 µm thick. *Cilia* absent.

Hosts: *Lecythis* sp. (*Lecythidaceae*) (Batista, 1959). *Chrysophyllum cainito* L. (*Sapotaceae*) is reported here as a new host plant.

Known distribution: Brazil (Batista, 1959), new record for Panama.

Material examined: PANAMA, Bocas del Toro, El Valle, Finca Celestine, *ca*. 600 m, on *Chrysophyllum cainito* (*Sapotaceae*, det. T. Hofmann), 27 February 2004, T. Hofmann 102 (PMA, M); BRAZIL, Pernambuco, Bento Velho, Vitória, on *Lecythis* sp. (*Lecythidaceae*), 5 March 1955, S.J. da Silva s.n. (BPI 645385, BPI 645386, type).

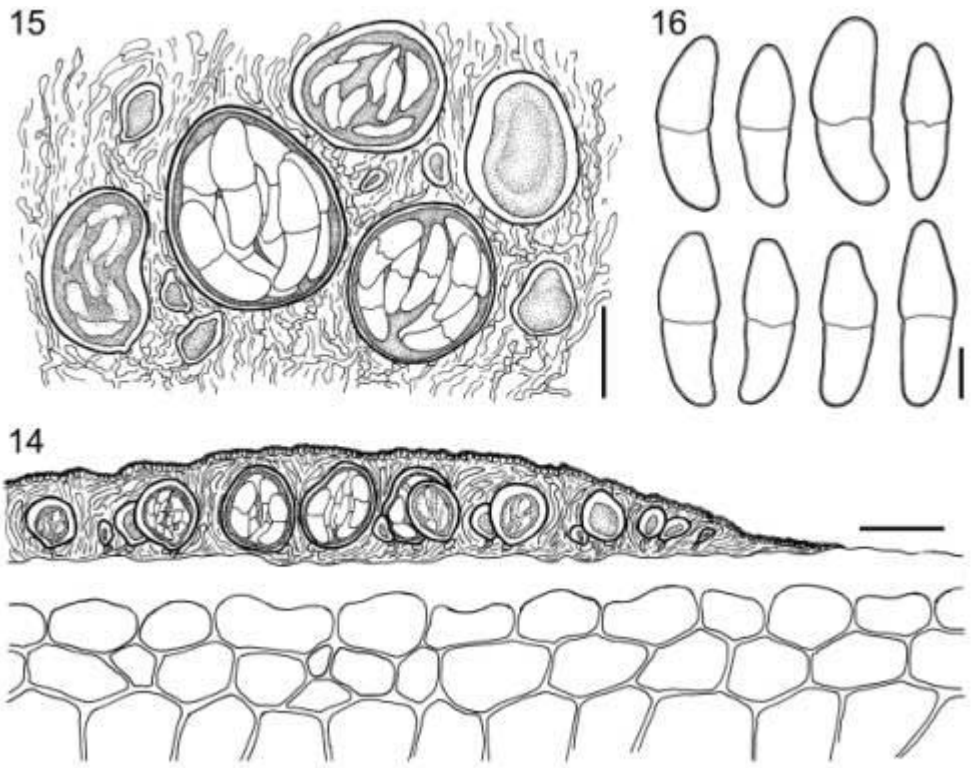
Notes: The type-material from *Lecythis* sp. differs from the Panamanian material only by a brownish colour of the scutellum. Until now, no species of *Micropeltis* is known from *Chrysophyllum* spp. As no detailed analysis of substrate- or host-specificity of *Micropeltis* spp. exists, we do not describe a new species. First of all, studies on the ecology and way of nutrition of *Micropeltis* spp. are necessary.

Schizothyriaceae

Schizothyrium rufulum (Berkley & Curtis) Arx, Beiträge zur Kyptogamenflora der Schweiz 11(2): 201 (1962). (Figs. 14-16, 30)

Synonyms: see Müller and von Arx (1962).

Surface mycelium hyaline, epi- and hypophyllous, forming one cell-layer, hyphae 2-3 µm broad, densely reticulate. *Appressoria* or *setae* absent. *Thyriothecia* (440-)587-869(-940) diam., 25-35 µm high, brown, paler at margins, round, dimidiate, superficial, unilocular. *Scutellum* not radiate, pseudoparenchymatic, formed by one cell layer, scutellum cells 3-8 × 2-3 µm, isodiametric, reticulate, thick-walled, brown. *Ostiole* absent, scutellum opens with irregular fissures, resulting in clod-shaped parts of the scutellum. *Asci*



Figs. 14-16. *Schizothyrium rufulum* on *Encyclia* sp. (*Orchidaceae*; Mangelsdorff 2247). **14.** Longitudinal section through a thyriothecium. Bar = 25 µm. **15.** Young and mature asci embedded in ascogenous tissue. Bar = 25 µm. **16.** Mature ascospores. Bar = 10 µm.

(48-)52-64(-70) × (33-)39-51(-53) µm, globose, not stalked, bitunicate with fissitunicate dehiscence, 8-spored, mature endotunica thin. *Pseudoparaphyses* 1.5-2 µm broad, densely packed and distinct. *Ascospores* (29-)31-35(-37) × 9-11(-12) µm, hyaline, smooth, straight to curved, with one septum, slightly constricted at the septum, upper cell mostly larger, basal cell more acuminate, apices rounded. *Mucous sheaths* or *cilia* absent.

Hosts: Broad host spectrum (Müller and von Arx, 1962); *Fabaceae*, *Sapindaceae*, *Malpighiaceae* (Farr, 1987); *Rubiaceae*, *Encyclia* sp. and *Epidendrum* sp. (*Orchidaceae*).

Known distribution: Tropics (Müller and von Arx, 1962), Brazil (Farr, 1987), new record for Panama.

Material examined: PANAMA, Chiriquí, Caldera, on unknown *Rubiaceae* together with *Chaetothyrium vermisporum* (see below), 3 March 2004, T. Hofmann 142 (PMA, M); PANAMA, Chiriquí, Los Algarrobos, *ca*. 150 m, on *Encyclia* sp. (*Orchidaceae*, det. R. Mangelsdorff), 28 December 2004, R. Mangelsdorff 2247 (PMA, M); PANAMA, Chiriquí, Los Algarrobos, *ca*. 150 m, on *Epidendrum* sp. (*Orchidaceae*, det. R. Mangesdorff), 28 December 2004, R. Mangelsdorff 2248 (PMA, M).

Notes: The sizes of ascomata and ascospores of *Schizothyrium rufulum* vary strongly (Müller and von Arx, 1962). *Schizothyrium rufulum* grows completely superficial on the cuticula of living leaves or on dead plant material in leave spots. When the ascomata develop at the lower surface of leaves of *Encyclia* sp., the scutelli are perforated just above the stomata of the host (Fig. 31). The penetration of hyphae through the stomata was not observed. The fungus probably feeds on plant waxes, which are secreted by the cuticula. This was proved for related fungi causing fly-speck disease and sooty blotch on apples (Belding *et al*., 2000).

Myriangiella roupalae (Sydow) Arx & Müller, Studies in Mycology 9: 28 (1975). (Figs. 17-19, Fig. 31)

Synonyms: see von Arx and Müller (1975).

Surface mycelium hyaline, densely reticulate, one cell-layer thick, at maturity often missing, epipyllous. *Appressoria* or *setae* absent. *Thyriothecia* (209-)300-475(-550) µm diam., up to 50 µm high, pale brown, round, dimidiate, superficial, unilocular. *Scutellum* irregularly pseudoparenchymatic, not radiate, one cell-layer thick, pale brown to brown, brighter at margins, translucent, scutellum cells cylindrical, elongated, 1-2 µm broad. *Ostiole* absent, scutellum opens with irregular fissures. *Asci* (55-)62-73(-76) × (32-)37-47(-50) µm, globose to slightly clavate, bitunicate with fissitunicate dehiscence, slightly stalked, (2-)4-8-spored. *Pseudoparaphyses* hyaline, 1-2 µm broad, numerous. *Ascospores* (33-)39-49(-52) × 8-10(-11) µm, broader in the middle, hyaline, fusiform, straight to curved, with (9-)11-14(-15) transverse septa, constricted at the septa, end-cells rounded. *Mucous sheaths* or *cilia* absent.

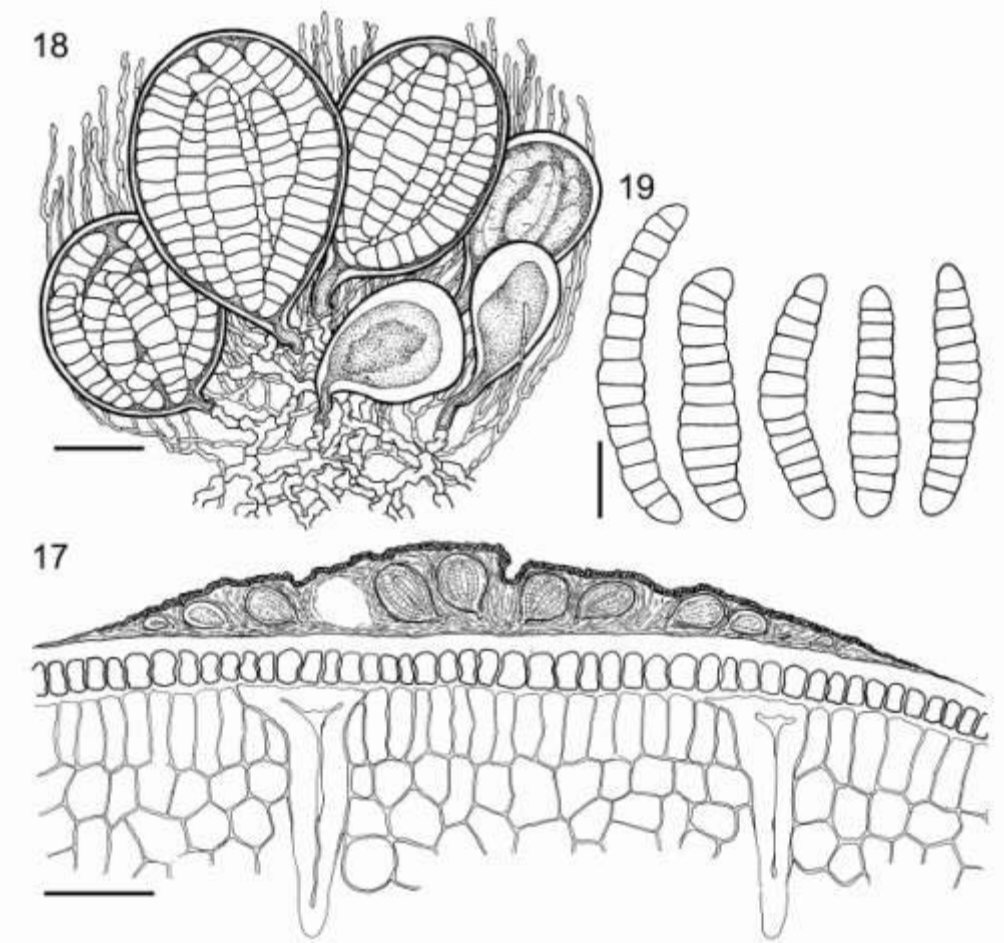
Hosts: *Roupala veraguensis* Klotzsch es. Meissn (*Proteaceae*) (Sydow, 1927). *Salacia* sp. (*Hippocrateaceae*) is a new host plant.

Known distibution: Costa Rica (Batista, 1959), new record for Panama.

Material examined: PANAMA, Chiriquí, Caldera, on *Salacia* sp. (*Hippocrateaceae*, det. T. Hofmann) together with several other, unidentified fly-speck fungi, 3 March 2004, T. Hofmann 128 (PMA, M).

Notes: Batista *et al*. (1963) described *Sydowiellina rionegrensis*, which has ascospores septated as in *M*. *roupalae*. The ascospores of *S*. *rionegrensis*, however, are shorter (22-32 µm) and broader (10-14 µm) than those of *M*. *roupalae*. The genus *Sydowiellina* is now treated as a synonym of *Myriangiella* (Index Fungorum), although most of the included species of *Sydowiellina,* such as *S. rionegrensis*, are not recombined.

The sizes of the different structures of the Panamanian fly-speck fungus on *Salacia* sp. (*Hippocrateaceae*) are slightly different from those of *M*. *roupalae* in Batista's description (1959) and the host belongs to a different



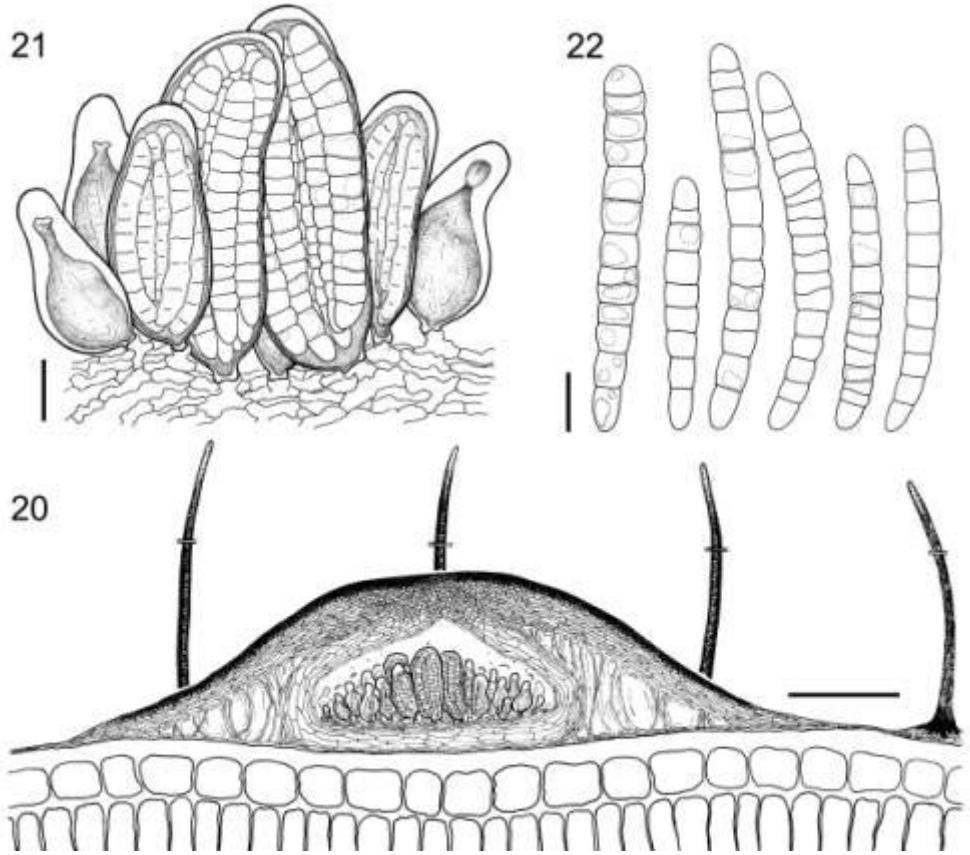
Figs. 17-19. *Myriangiella roupalae* on *Salacia* sp. (*Hippocrateaceae*; Hofmann 128). **17.** Longitudinal section through a young thyriothecium. Bar = 50 µm. **18.** Young and mature asci surrounded by pseudoparaphyses. Bar = 20 µm. **19.** Fusiform ascospores. Bar = 10 µm.

family. Because no information on host and substrate specificity of *Myriangiella* spp. exists, no new species of *Myriangiella* is described here.

In the field it is not possible to distinguish fly-speck fungi with thyriothecia from *Ascomycota* forming perithecia with broad black shields. Therefore, we also collected and investigated the following member of *Chaetothyriomycetidae*.

Subclass*: *Chaetothyriomycetidae

Chaetothyriaceae



Figs. 20-22. *Chaetothyrium vermisporum* (teleomorph) on an unknown *Rubiaceae* (Hofmann 117). **20.** Longitudinal section of a perithecium covered by the pellicle and associated with setae forming a ring around the perithecium. 150 µm of the length of the setae have not been drawn. Bar = 50 µm. **21.** Young and mature asci on ascogenous hyphae. Bar = 10 µm. **22.** Fusiform ascospores with inclusions. Bar = 10 µm.

Chaetothyrium vermisporum Hansford, Mycological Papers 15: 151 (1946). (Figs. 20-22)

Colonies epiphyllous. *Surface mycelium* hyaline, densely reticulate, one cell-layer thick. *Appressoria* not observed. *Mycelial setae* (153-)190-313(-392) µm long, at apex 2-3 µm broad, at base 5-8(-9) µm broad, dark brown, scattered, discrete, unbranched, formed on dense, dark hyphae, (18-)22-32(-36) µm broad. Setae in rings around perithecia (they never form a ring around pycnothyria). Perithecial setae not observed. *Perithecia* 100-200 µm diam., up to 80 µm high, round, flat, superficial, unilocular, covered by a layer of brown cells corresponding to a pellicle. *Pellicle* (284-)300-371(-396) µm diam., brown, merging at margins with hyaline surface mycelium, cells of the pellicle 5-15 × 2-3 µm, thick-walled, epidermoid, irregularily lobed and branched.

Ostiole not observed, perithecia opening by central star-shaped fissures. *Asci* 41-58(-66) × (15-)17-22(-24) µm, clavate to ellipsoid, bitunicate with fissitunicate dehiscence, (4-)6-spored. Young asci with endotunica thickened up to 3 µm, mature asci thin-walled, not numerous in one perithecium. Paraphyses or periphyses not observed. *Ascospores* (42-)45-61(-66) × 6-7(-8) µm, hyaline, fusiform, elongated, with (7-)8-16(-17) transverse septa (rarely 1-3 longitudinal septa present), end-cells rounded. *Mucous sheaths* or *cilia* absent.

Anamorph: *Merismella concinna* Syd. (see below).

Hosts: *Canthium* sp. (*Rubiaceae*), *Hugonia platysepalae* (*Linaceae*), *Ventilago africana* (*Rhamnaceae*) (Hansford, 1946). An unknown *Rubiaceae* and *Clusia* sp. (*Clusiaceae*) are recorded here as new host plants.

Known distribution: Africa, Uganda (Hansford, 1946), new record for Panama.

Material examined: PANAMA, Chiriquí, Caldera, on unknown *Rubiaceae*, together with *Schizothyrium rufulum* (det. T. Hofmann), 3 March 2004, T. Hofmann 117 (PMA, M); PANAMA Chiriquí, Caldera, on *Clusia* sp. (*Clusiaceae*, det. T. Hofmann), together with *Myriangiella* sp., *Schizothyrium* cf. *pomi* (Mont. ex Fr.) Arx and other fly-speck fungi, 3 March 2004, T. Hofmann 119 (PMA, M).

Notes: *Chaetothyrium* spp. have perithecia and are therefore no "true" fly-speck fungi, which have flattened ascomata called thyriothecia. They look like fly-speck fungi because of special pellicle structures, which press the perithecia close to the surface of the leaves.

Chaetothyrium vermisporum differs from other species of this genus by ascospores with numerous septae. The teleomorph *C. vermisporum* is easily distinguished from the anamorph *Merismella concinna* by the presence of a ring of setae around the thyriothecia.

Merismella concinna Sydow, Annales Mycologici 25: 115 (1927).

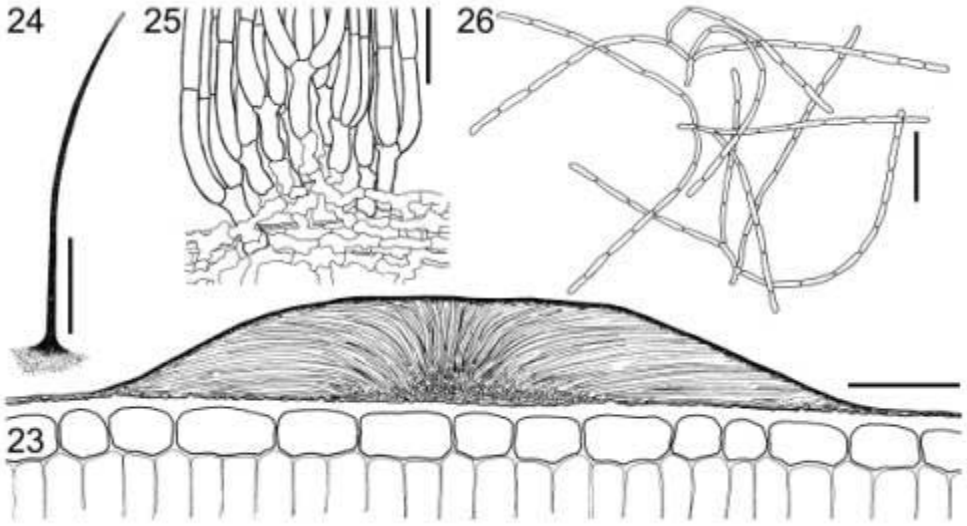
(Figs. 23-26, 32)

Conidiomata (279-)285-416(-630) µm diam., up to 35-55 µm high, round, dimidiate, superficial. *Conidia* (81-)87-103(-107) × 2-3 µm, hyaline, directly arising from basal hyphae of the conidioma, with 4-5(-6) elongated-filiform branches, with (4-)5-7(-9) septa per conidial branch, constricted at septa, fragmentation at constricted parts not observed, mass of conidia liberated in dense bundles.

Teleomorph: *Chaetothyrium vermisporum* Hansf. (see above).

Hosts: *Casearia sylvestris* (*Flacourtiaceae*) (Sydow, 1927). An unknown *Rubiaceae* and *Clusia* sp. (*Clusiaceae*) are recorded here as new host plants.

Known distribution: Greece (Sydow, 1927), other species of *Merismella* from San José, La Caja; Costa Rica, Piedades de San Ramon; Brazil (Sydow, 1927). This is a new record of this species for Panama.



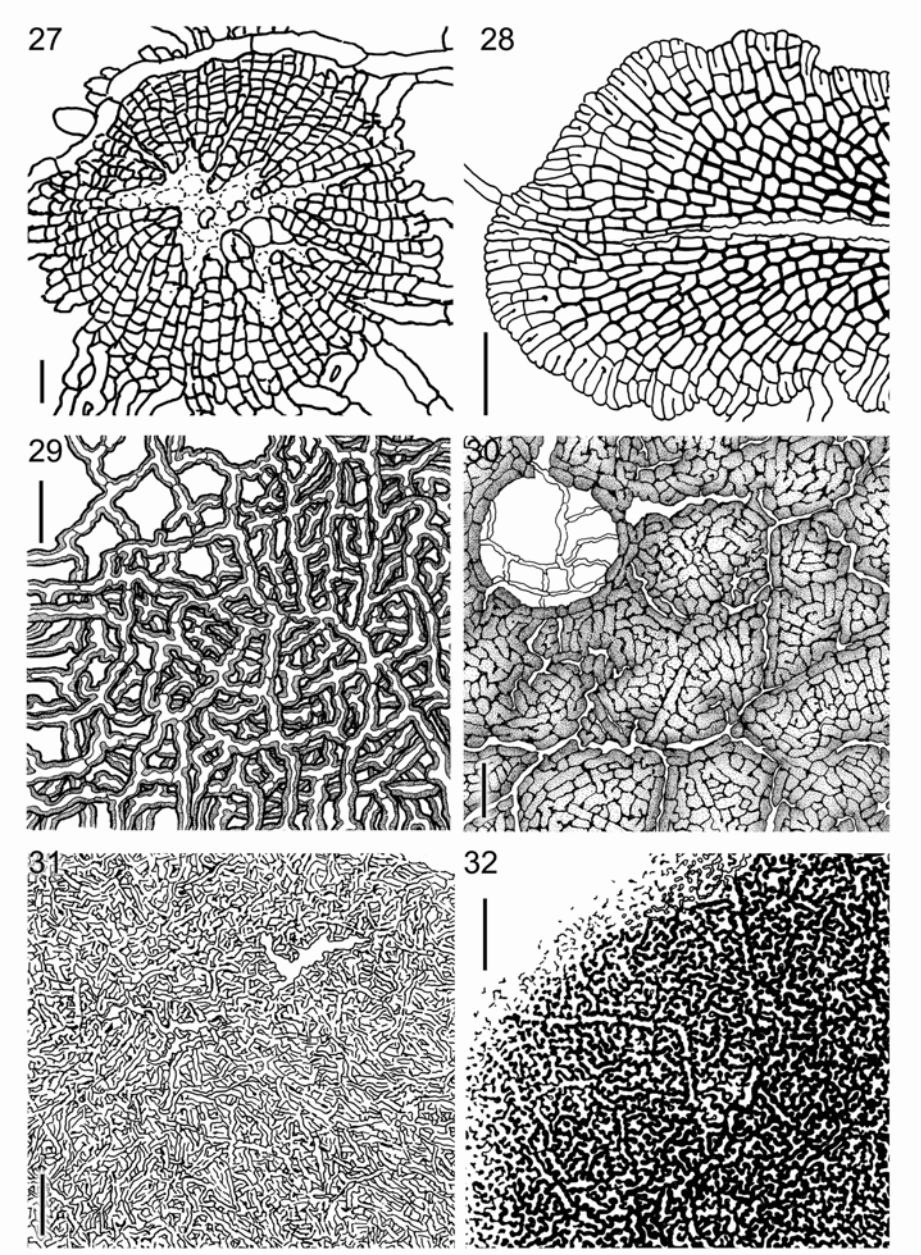
Figs. 23-26. *Merismella concinna*, the anamorph of *Chaetothyrium vermisporum*, on an unknown *Rubiaceae* (Hofmann 117). **23.** Longitudinal section of a conidioma with basal conidiogenous cells. Bar = 50 µm. **24.** Mycelial seta. Bar = 100 µm. **25.** Conidiogenous cells and basal parts of conidia. Bar = 10 µm. **26.** Three branched conidia. Bar = 20 µm.

Material examined: PANAMA, Chiriquí, Caldera, on unknown *Rubiaceae* next to *Schizothyrium rufulum* (det. T. Hofmann), 3 March 2004, T. Hofmann 117 (PMA, M); PANAMA, Chiriquí, Caldera, on *Clusia* sp. (*Clusiaceae*, det. T. Hofmann), together with *Myriangiella* sp., *Schizothyrium* cf. *pomi* and other fly-speck fungi, 3 March 2004, T. Hofmann 119 (PMA. M).

Additional specimen examined: *Merismella amazonensis* Farr on unknown *Sapindaceae*, BRAZIL, Territorio de Roraima, along Boa Vista-Dormida Rd, 4 December 1977, K.P. Dumont *et al*. s.n. (BPI 389173, type).

Notes: When Sydow (1927) proposed four species of *Merismella* he described the conidia as “fructiferous hyphae” ("kurzgliedrige Fruchthyphen") sitting on “short conidiophorous structures” and dissociating at maturity into “rodlet-shaped conidia”. Like Farr (1986) we were unable to observe the described fragmentation of the filiform branches. They have a regular ramification beginning directly on top of the basal cell. We consider them primary propagules that might dissociate at the septa to form secondary propagules at an advanced stage of maturity.

Because of strong morphological similarities among species of *Merismella*, Sydow (1927) assumes a close affinity of the species. Farr (1986) confirmed that theory, nevertheless described a new species, *Merismella amazonensis* Farr. *Merismella amazonensis* differs from other species of the genus *Merismella* by shorter ramifications and smaller conidiomata. We think, however, that the different species of *Merismella* correspond to variable specimens of a single species. The different sizes of conidioma and conidia



Figs. 27-32. Scutelli of different fly-speck-fungi. **27.** *Asterinaceae*: *Asterina sphaerelloides*, pigmentation not shown. Bar = 100 µm. **28.** *Asterinaceae*: *Morenoina epilobii*, pigmentation not shown. Bar = 10 µm. **29.** *Micropeltidaceae*: *Micropeltis lecythisii*, pigmentation not shown. Bar = 10 µm. **30.** *Schizothyriaceae*: *Schizothyrium rufulum*. Bar = 10 µm. **31.** *Schizothyriaceae*: *Myriangiella roupalae*, pigmentation not shown. Bar = 20 µm. **32.** *Chaetothyriaceae*: *Chaetothyrium*-anamorph *Merismella concinna*, pigmentation not shown. Bar = 10 µm.

might be due to different quantities of nutrients available on different substrates.

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