The genus *Stilbohypoxylon*

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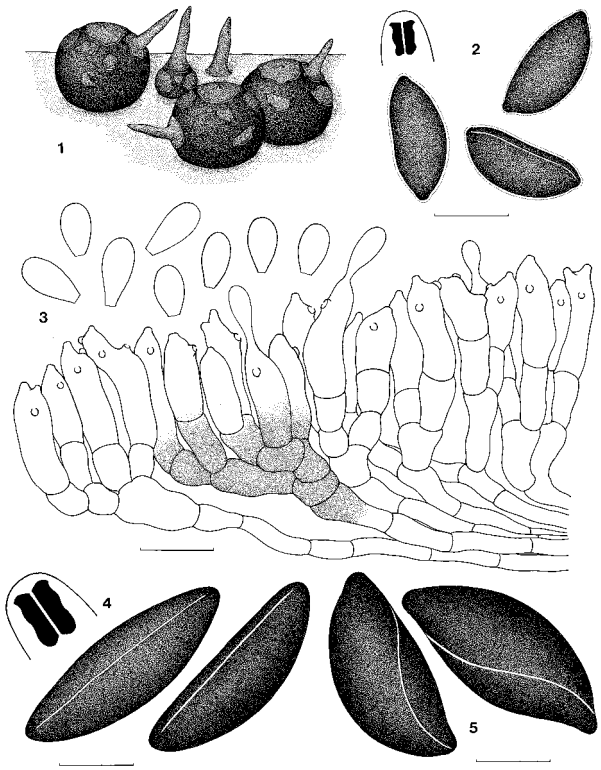
Stilbohypoxylon is resurrected. The type species, *S. moelleri*, is redescribed and *S. samuelsii* is described as new. The third species, *S. quisquiliarum*, represents a new combination. A key to these taxa is provided.

Stilbohypoxylon Henn. was erected by Hennings (1902); a description and illustration by Möller (1901) suggested the new genus. Möller's illustrations (1901, Plate VIII, Fig. 107) include two perithecia without asci enclosed in a stroma that bears a synnema. Möller (1901) apparently believed that the stromata were parasitized and considered the synnematical part to be a *Sphaerostilbe* Tul. & C. Tul. Hennings' diagnosis (1902) of *Stilbohypoxylon* and his description of the type species, *S. moelleri* Henn., were based upon material with immature asci. Hennings tentatively put the genus in the Xylariaceae. We have been unable to locate Hennings' type unequivocally, which was given as: St. Cathar. bei Blumenau auf abgestorbenem Holz. No. 708. However, we located at S a specimen labelled: '*Stilbohypoxylon mölleri* P. Henn., Brasilia, S. Catharina, leg. A. Möller'. It is of Sydow's herbarium and parts of it look much like Möller's illustration. It is our opinion that this packet was labelled following Hennings' creation of the genus and species and, indeed, Möller might have utilized this very material. Hennings might have examined it or been greatly influenced by illustrations of it. In any case, we designate it as the lectotype of *Stilbohypoxylon moelleri*. Our case is strengthened by the fact that Höhnel (1910) also examined and discussed a specimen that might well be the specimen in question. He remarked that the specimen is an overmature pyrenomycete lacking ascospores that is associated with a synnematal fungus. Höhnel believed, in essence, that *S. moelleri* is a member of the Ceratosphaeriaceae that had been colonized by a member of the Hypocreaceae. The material examined by us, and probably by Möller, Hennings, and Höhnel, shows overmature perithecial stromata bearing synnemata, apparently immature perithecial stromata bearing synnemata, and synnemata unassociated with perithecial stromata. Some stromata show yellow scales exactly like numerous other ascospore-bearing specimens that have been examined. There is no evidence of parasitism. We believe that both Möller and Höhnel misinterpreted the yellow scales on the specimen(s) as representing a hypocreaceous fungus, i.e., because this colour is fairly common among the Hypocreales. In an examination of a small amount of lectotype material, we saw neither asci nor ascospores. Such might in fact occur, but we refrained from destroying remaining material.

We will probably never be able to establish unequivocally which specimens were examined by Hennings, Möller, and Höhnel, respectively. We are convinced that Hennings based his type species and genus on teleomorphic material – albeit



Figs 1–3. *S. moelleri* (epitype). **Fig. 1.** Stromata in different developmental stages; *ca* ×30. **Fig. 2.** Ascal apical ring and ascospores. **Fig. 3.** Conidiophores and conidia. **Fig. 4.** *S. samuelsii* (holotype). Ascal apical ring and ascospores. **Fig. 5.** *S. quisquiliarum* (isotype, FH). Ascospores. Scale bars = 10 μm.

immature – and, in fact, gave a good description of his material, except that conidial dimensions are smaller than usually encountered. We believe that, although Hennings interpreted the synemata correctly, the conidia are of another fungus. Based upon the lectotype we believe that synnemata had matured beyond the conidium-bearing stage (and see later herein). In order to preserve *Stilbohypoxylon* as a genus, as recognized by various mycologists over the years and to leave no doubt of our concept, we designate the following specimen as the epitype: British West Indies, Grand Etang, on *Euterpe* sp., coll. R. Thaxter, det. W. G. Farlow, 1913, Reliquiae Farlowianae 633 (S). (The portion at FH is immature.) There are a number of other specimens of Roland Thaxter at FH and, while mostly lacking fully mature teleomorphs, they seem entirely typical of the species. It is apparent that what we believe to be the correct concept of *Stilbohypoxylon moelleri* was established shortly after Hennings published it.

A second species of *Stilbohypoxylon*, *S. rehmii*, was erected by Theissen (1908) on material with mature ascospores. Unfortunately this name has been widely accepted and misinterpreted in the literature. Indeed, Theissen has erroneously been credited with erecting *Stilbohypoxylon* (Saccardo, 1913)! Most collections of *S. moelleri* have been misidentified as *S. rehmii*. Höhnel (1910) examined Theissen's material and concluded that it is a *Xylaria* that develops in the manner of *X. tulasnei* Nitschke as described and illustrated (as *X. pedunculata* 'pusilla') by the Tulasne brothers. He proposed the name *X. rehmii* (Theiss.) Höhn. for it. We accept this as a *Xylaria*. It is possibly an earlier name for *X. schreuderiana* Van der Byl.

Stilbohypoxylon Henn., *Hedwigia* **41**: 16 (1902), non Theiss. (1908).

Kretzschmaria Fr. section *Stilbohypoxylon* (Henn.) P. Martin, *J. S. African Bot.* **36**: 78 (1970).

Stromata perithecioid, spherical, gregarious, with or without conical to acicular synnematal remnants borne on mature stromata; surface smooth or rugulose, usually overlain with yellow, greenish yellow, or ochraceous scales at early stage. *Perithecia* spherical. *Ostioles* papillate, sometimes encircled with vaguely flattened area. *Asci* eight-spored, cylindrical, stipitate, persistent, with apical ring higher than broad, amyloid. *Ascospores* brown to dark brown, unicellular, ellipsoid-inequilateral, with narrowly rounded ends, with or without hyaline sheath, with straight or sigmoid germ slit nearly spore-length on more flattened side.

Key to* Stilbohypoxylon *species

1. Ascospores 14·5–17 × 6–8 µm, with straight germ slit ..... *S. moelleri*
1. Ascospores larger, with straight or spiral germ slit 2
   2. Ascospores 25–32·5 × 11–15 µm, with spiral germ slit ..... *S. quisquiliarum*
   2. Ascospores (27·5–)30–36(–40) × 8·5–11(–13) µm, with straight germ slit ..... *S. samuelsii*

Stilbohypoxylon moelleri Henn., *Hedwigia* **41**: 16 (1902). (Figs 1–3)

Stromata perithecioid, spherical, gregarious, 0·6–1 mm diam., usually bearing one to three conical to acicular synnematal remnants 0·2–0·8 mm long; surface black, smooth but usually overlain with yellow to greenish yellow scales at early stage; interior black, sometimes with a small amount of white tissue below perithecium; texture brittle. *Perithecia* spherical, 0·5–0·8 mm diam. *Ostioles* papillate, sometimes encircled with a vaguely flattened area *ca* 0·2 mm diam. *Asci* 160–220 µm total length × 8–10 µm broad, the spore-bearing part 90–110 µm long, the stipe 60–120 µm long, with apical ring bluing in Melzer's iodine reagent, cylindrical, with two or three constrictions, 3–5 µm high × 2·5–3·5 µm broad. *Ascospores* brown to dark brown, unicellular, ellipsoid-inequilateral, with narrowly rounded ends usually pinched, enclosed by thin, hyaline sheath, 14·5–17 × 6–8 µm, with straight germ slit nearly spore-length on more flattened side.

Colonies initiated from single ascospores on 2% oatmeal agar (Difco) incubated at 20 °C under 12 h fluorescent light covering 9 cm diam. Petri dish in 4–5 wk, at first white, velvety, appressed, with crenate margins, with yellow and green alternating concentric zones. Reverse blackish. *Synnemata* scattered on entire surface of colony, acicular to conical to somewhat cylindrical, branched or unbranched, green, up to 4 mm long × 0·2–0·4 mm diam. *Sporulating regions* on the upper surface of synnemata, olivaceous. *Conidiophores* in dense, dark brown palisades, dichotomously branched several times from bases. *Conidiogenous cells* terminal, cylindrical, 12–18 × 4–5 µm, hyaline, smooth, bearing lateral and terminal denticulate conidial secession scars, 1 µm diam. × 0·5 µm high. Conidia produced holoblastically in sympodial sequence. *Conidia* yellowish to pale olivaceous, smooth, obovate, 6·5–9·5 × 3·5–4·5 µm, with flattened base 1–1·5 µm broad indicating former point of attachment to conidiogenous cell.

Teleomorph produced in 8 wk after entire colony placed on surface of SMEA (Kenerley & Rogers, 1976) in a 9 cm Petri dish. Perithecial stromata developing beneath or in close proximity to synnemata and coming to bear one or more of them as spines. Stromata identical with those from natural material.

Specimens examined: **Brazil**: S. Catharina, Möller, A., decorticated wood (S, lectotype [selected here] of *Stilbohypoxylon moelleri*). **Ecuador**: Prov. Napo, Rio Napo, 22 Jun. 1983, Laessøe, T., AAV-44657, dead palm rachis (*Irartea*), as *Stilbohypoxylon rehmii* by Laessøe, T. (JDR). **French Guiana**: Upper Marouini R, between Roche Koutou and an unnamed granitic 350 m high inselberg, elev. 200–300 m, 19–20 Aug. 1987, Samuels, G. J. *et al.* 5941, palm (JDR; NY); Upper Marouini R, 2 km N of Oumanfou-Langa Soula, elev. 150 m, 12–14, 23, 24 Aug. 1987, Samuels, G. J. *et al.* 5974, palm (JDR; NY); 1994, Huhndorf, S.M. 928 (cultured), decorticated wood (JDR). **Grenada**: Grand Etang, 1913, Thaxter, R., Reliquiae Farlowianae 633, *Euterpe* sp., as *Stilbohypoxylon moelleri* by Farlow, W. G. (FH [immature]; S, epitype [selected here] of *Stilbohypoxylon moelleri*); 1905–6, Thaxter, R. 3854, *Euterpe* sp., as *Stilbohypoxylon moelleri* by Thaxter, R. (FH), immature; Grand Etang, 1912, Thaxter, R., *Euterpe* sp., as *Stilbohypoxylon moelleri* by Thaxter, R. (FH [4 pks.]). **Puerto Rico**: El Yunque, 9 Feb. 1995, Polishook, J., Pr-1756 (cultured), petiole of palm (*Prestoea montana*) (JDR).

Colonies of *S. moelleri* in culture closely resemble colonies on natural substrates. Conspicuous conical pegs are formed throughout the culture. Some of these bear a palisade of the conidiogenous apparatus (Fig. 3) and, thus, can truly be considered as synnemata. Many other of these structures

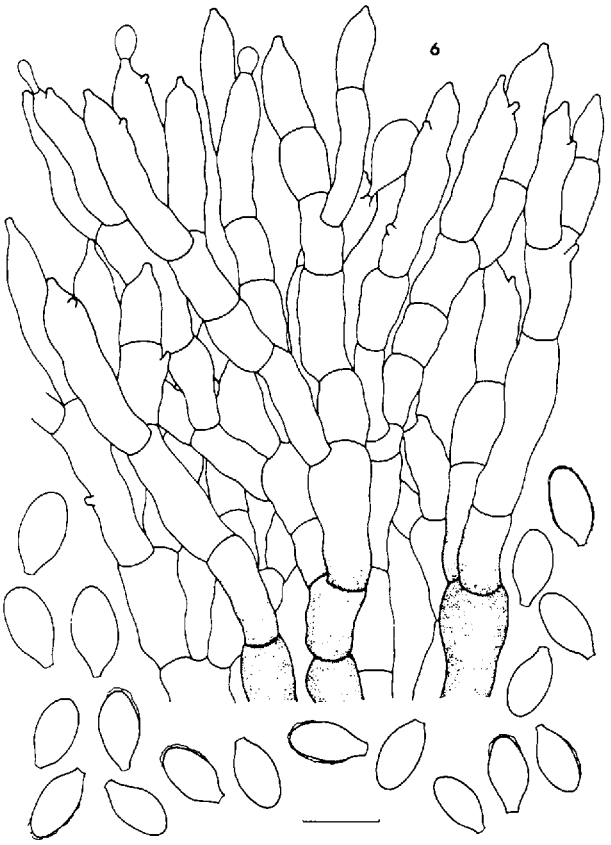


Fig. 6. *Stilbohypoxylon quisquiliarum*. Conidiophores and conidia. Scale bar = 10 μm.

apparently never bear conidia. We call these 'sterile synnemata', but, in fact, are uncertain of their status. Perithecia develop beneath one or more synnemata – fertile, sterile, or both – and the overlying synnema or synnemata adhere to the stromatal wall. Mature stromata come to bear one or more conical spines (Fig. 1). As the spines age, they become brittle and tend to break off. Stromata then appear to bear flattened excrescences. The developmental pattern somewhat resembles that of *Entoleuca mammata* (Wahlenb: Fr.) J. D. Rogers & Y.-M. Ju in that stromata of that species are likewise initiated beneath specialized synnematal structures (Rogers & Ju, in press). That species, however, develops within the bark of dicotyledonous plants and synnemata have a bark-rupturing function.

Stilbohypoxylon quisquiliarum (Mont.) J. D. Rogers & Y. M. Ju, comb. nov. (Figs 5, 6)

Sphaeria quisquiliara Mont., *Ann. Sci. Nat. Bot., sér.* **II**, **14**: 321 (1840).

Hypoxylon quisquiliarum (Mont.) Mont., *Ann. Sci. Nat. Bot., sér.* **IV**, **3**: 117 (1855).

Hypoxylon rosellinioides Henn., *Bot. Jahrb. Syst.* **38**: 115 (1905); as '*rosellinoides*'.

Illustrations: Miller (1961, Figs. 105 & 133).

See Miller (1961) [as *Hypoxylon quisquiliarum*] for a description of the teleomorph.

Colonies from multiple ascospores on 2% oatmeal agar (Difco) incubated at 20° under 12 h fluorescent light covering 9 cm diam. Petri dish in 3 wk, at first white, velvety, appressed, zonate, with plumose margins, then becoming overlain with radiating yellowish and olivaceous hyphae. Reverse tan. *Synnemata* scattered, cylindrical, with subglobose to spherical heads, dark olivaceous to blackish, 0·5–0·8 mm long × 0·5 mm diam., on short, villose, yellow stalk, up to 1 mm high × 0·2–0·3 mm broad. *Sporulating regions* on the entire surface of synnematal heads. *Conidiophores* in dense, brownish palisades, dichotomously branched several times from bases. *Conidiogenous cells* terminal, cylindrical, 10–20 × 3·5–5 μm, hyaline to pale brown, smooth, bearing lateral and terminal denticulate conidial secession scars, 0·5–1 μm diam. × 0·5 μm high. Conidia produced holoblastically in sympodial sequence. *Conidia* yellowish to pale olivaceous, smooth, obovate, 9·5–11·5 × 4·5–5·5 μm, with flattened base 1·5–2 μm broad indicating former point of attachment to conidiogenous cell, often bearing hyaline, roughened sheath.

Specimens examined: **China**: Yunnan, Puerh, 15 Dec. 1933, Tsiang, Y. 376, wood (BPI 3826); Hainan, Tan-hsien, 23 Nov. 1934, Deng, S. Q. 6834, wood, as *Hypoxylon rosellinioides* (BPI 3923); Hainan, Tan-hsien, 12 Oct. 1934, Deng, S. Q. 5230, wood, as *Hypoxylon rosellinioides* (BPI 4221); Hainan, Tan-hsien, 15 Oct. 1934, Deng, S. Q. 5297, wood, as *Hypoxylon rosellinoides* (BPI 4148); Hainan, Ting-an, 5 Nov. 1934, Deng, S. Q. 6527, wood, as *Hypoxylon rosellinioides* (BPI 4178); Hainan, Ting-an, 16 Nov. 1934, Deng, S. Q. 6565, wood, as *Hypoxylon rosellinioides* (BPI 3795). **French Guiana**: Cayenne, Leprieur, C. 366, wood (FH [Patouillard Herb., sheet 7462], isotype of *Sphaeria quisquiliara*); Leprieur, C. 1173, corticated wood, as *Sphaeria quisquiliara* (FH [Patouillard Herb., sheet 7462]); 1994, Huhndorf, S. M. 940 (cultured), bark (JDR). **Taiwan**: Nan-tou Co., Lu-ku, Shi-tou, 22 Aug. 87, Ju, Y.-M. 76082222 (cultured), corticated wood (JDR; NTU); Ping-tung Co, Heng-chun, Ken-ting, 23 Aug. 1988, Ju, Y.-M. 77082335, dead wood (JDR; NTU). **Tanzania**: Amani, Ost-Usambara, 10. 1903, Eichelbaum, F., corticated wood (S, lectotype [selected by Ju & Rogers (1996)] of *H. rosellinioides*).

Unlike mature stromata of *S. moelleri*, those of *S. quisquiliarum* have not been observed to bear synnematal remnants in nature. The synnemata of *S. quisquiliarum* in culture are fragile and those formed in nature probably deteriorate rapidly. Compared with the synnemata of *S. moelleri* that are produced in culture, those of *S. quisquiliarum* are composed of hyphae that are less compact.

Our decision to include this fungus in *Stilbohypoxylon* could be questioned, given the ephemeral nature of the synnemata compared with those of the other species. Colonies in nature and in culture, however, have a striking resemblance to *S. moelleri*, especially in their yellowish aspect and in the yellow perithecial scales. We are convinced that it is well-placed here.

Miller (1961) considered *Hypoxylon quisquiliarum* and *H. rosellinioides* to be distinct species. We have examined type materials of both names and several specimens identified as *H. rosellinioides* by Miller. They appear to be conspecific.

Stilbohypoxylon samuelsii J. D. Rogers & Y. M. Ju, sp. nov. (Fig. 4)

Etym.: After the American mycologist, Gary J. Samuels

Stromata peritheciis similia, sphaerica, gregaria, 0·7–1·2 mm diam., plerumque reliquiis synnematum conicis vel acicularibus 0·2–0·4 mm longis praedita; extus nigra, rugulosa, interdum squamis ochraceis tecta; intus nigra sub peritheciis textura alba leviter evoluta. Textura dura. *Perithecia* sphaerica, 0·5–1 mm diam. *Ostiola* papillata, plerumque area leviter complanata 0·2–0·3 mm diam. circumdata. *Asci* 235–285 (–315) µm longitudine total × 12–15·5 µm crassi, partibus sporiferis 175–210 (–245) µm longitudine, stipitibus 55–80 µm longitudine, annulo apicali in liquore iodato Melzeri cyanescente, obtrullato, 8–13 µm alto × 5·5–7 µm lato. *Ascosporae* fuscae, unicellulares, ellipsoideo-inequilaterales, apicibus angustatis, (27·5–) 30–36 (–40) × 8·5–11 (– 13) µm, rima germinativa recta longa in latere complanato praeditae.

Stroma perithecioid, spherical, gregarious, 0·7–1·2 mm diam., usually bearing a conical to acicular synnematal remnant 0·2–0·4 mm long; surface black, rugulose, sometimes overlain with ochraceous scales; interior black, with a small amount of white tissue below perithecium; texture hard. *Perithecia* spherical, 0·5–1 mm diam. *Ostioles* papillate, usually encircled with a vaguely flattened area 0·2–0·3 mm diam. *Asci* 235–285 (–315) µm total length × 12–15·5 µm broad, the spore-bearing part 175–210 (–245) µm long, the stipe 55–80 µm long, with apical ring bluing in Melzer's iodine reagent, coffin-shaped, 8–13 µm high × 5·5–7 µm broad. *Ascospores* dark brown, unicellular, ellipsoid-inequilateral, with narrowly rounded ends, (27·5–) 30–36 (–40) × 8·5–11 (–13) µm, with straight germ slit nearly spore-length on more flattened side.

Culture unknown.

Specimens examined: **Ecuador**: Prov. Napo, 19 Jun. 1985, Laessøe, T., AAV-59539, dicot yledonous bark, as '*Stilbohypoxylon n. sp.*' by Laessøe, T. (JDR). **French Guiana**: Upper Marouini R, *ca* 3 h walk W of river toward Roche Koutou, 1 km E of Roche Koutou, elev. 150–350 m, 15–18 Aug. 1987, Samuels, G. J. *et al.*, 5797, corticated wood (NY, holotype; WSP, isotype of *Stilbohypoxylon samuelsii*).

Stilbohypoxylon samuelsii and *S. moelleri* are much alike in their stromata features, but differ in the former having larger ascospores and in lacking a hyaline sheath surrounding the ascospore. *Stilbohypoxylon samuelsii* differs from *S. quisquiliarum* in having ellipsoid rather than short fusoid ascospores, in having a straight ascospore germ slit, and in constantly bearing synnematal remnants on the mature stromata.

EXCLUDED SPECIES

Stilbohypoxylon rehmii Theiss., *Ann. Mycol.* **6**: 344 (1908).

Xylaria rehmii (Theiss.) Höhn., *Sitzungsber. Kaiserl. Akad. Wiss. Math.-Naturwiss. Cl., Abt.* **1**, **119**: 930 (1910).

Kretzschmaria rehmii (Theiss.) P. Martin, *J. S. African Bot.* **36**: 78 (1970); [*nom. inval.*, ICBN Art. 37.1]; *J. S. African Bot.* **42**: 74 (1976).

Specimens examined: **Brazil**: São Leopoldo, Nov. 1906, Theissen, F., twigs (S [Sydow herb.], lectotype [selected here] of *Stilbohypoxylon rehmii*); Rio Grande do Sul, São Leopoldo, Mar. 1908, Theissen, F. 16, twigs (FH; S[Rehm herb.], syntypes of *Stilbohypoxylon rehmii*); Rio Grande do Sul, São Leopoldo, Theissen, F., Höhnel's slide A. 4371, marked as 'original' (FH).

As mentioned earlier, we accept this fungus as a *Xylaria* and suspect it to be conspecific with *X. schreuderiana*. The interpretation of *S. rehmii* in Martin (1970) [under *Kretzschmaria*] is the same as our *S. moelleri*.

DISCUSSION

It could be argued that the fungi discussed herein are, in reality, reduced taxa of *Xylaria* Hill ex Schrank or species of *Rosellinia* De Not. (see Laessøe & Spooner, 1994). Our decision to accept *Stilbohypoxylon* as a genus is based on the prominent synnemata within the bases of which perithecia are initiated. Remnants of synnemata usually adhere to mature stromata in two species and, when broken, have been interpreted as warts. All three species have scaly stromata, the scales conspicuously yellow in *S. moelleri* and *S. quisquiliarum*. Material of the same colour as the scales often covers the surface of the substrate in the vicinity of stromata.

It is probable that additional taxa can eventually be accommodated in *Stilbohypoxylon*. It is likely, for example, that *Hypoxylon cyclopicum* Speg. – a species with strongly verrucose stromata – is, in fact, a *Stilbohypoxylon* (see Miller, 1961).

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