The genus *Xylaria sensu lato* (*Xylariaceae*) in Guadeloupe and Martinique (French West Indies) II. Taxa with robust upright stromata

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Abstract: Fifteen species of *Xylaria* collected in Guadeloupe and Martinique, featuring upright stromata more than 5 mm wide, are described and illustrated herein. Twelve of them usually exceed this size, viz.: *X. allantoidea*, *X. cubensis*, *X. cuneata*, *X. flabelliformis*, *X. formosana*, *X. globosa*, *X. moelleroclavus*, *X. olobapha*, *X. regalis*, *X. schweinitzii*, *X. telfairii* and *X. tuberoides*. Three more slender species occasionally featuring more robust stromata are included, viz.: *X. curta*, *X. hyperythra* and *X. scruposa*. All of these are known species, most of which are commonly encountered and have a pantropical distribution. A dichotomous identification key and a synoptic figure plate of stromata are presented.
Keywords: Ascomycota, pyrenomycetes, saproxylic fungi, taxonomy, tropical mycology, *Xylariales*, *Xylarioideae*.

Résumé : quinze espèces de *Xylaria* récoltées en Guadeloupe et Martinique, dont les stromas dressés dépassent 5 mm de large, sont décrites et illustrées. Douze d'entre elles dépassent habituellement cette dimension, à savoir *X. allantoidea*, *X. cubensis*, *X. cuneata*, *X. flabelliformis*, *X. formosana*, *X. globosa*, *X. moelleroclavus*, *X. olobapha*, *X. regalis*, *X. schweinitzii*, *X. telfairii* et *X. tuberoides*. Trois espèces ordinairement plus graciles mais présentant occasionnellement des stromas plus robustes sont ajoutées, à savoir *X. curta*, *X. hyperythra* et *X. scruposa*. Toutes sont des espèces connues, la plupart d'entre elles sont communes et ont une répartition pantropicale. Une clé d'identification dichotomique et une planche synoptique des stromas sont présentées.
Mots-clés : Ascomycota, champignons saproxyliques, mycologie tropicale, pyrénomycètes, taxinomie, *Xylariales*, *Xylarioideae*.

Introduction

This paper is the second in a series of three dedicated to the survey of *Xylaria* spp. collected in Guadeloupe and Martinique during an inventorial program initiated in 2003 in these Caribbean islands (Courtecuisse, 2006). It comes after a survey on penzigioid taxa (Fournier *et al*., 2018b) and deals with taxa with robust upright stromata usually wider than 5 mm. Taxa with slender stromata, which represent the majority, will be dealt with in part III. As noted in part I, this segregation based on width of stromata is artificial but it is maintained because it can be successfully applied to sort out most taxa. Among the fifteen taxa included in part II, twelve usually feature robust stromata, viz.: *X. allantoidea* (Berk.) Fr., *X. cubensis* (Mont.) Fr., *X. cuneata* C.G. Lloyd, *X. flabelliformis* (Schwein.) Berk. & M.A. Curtis, *X. formosana* Y.-M. Ju & Tzean, *X. globosa* (Spreng.) Mont., *X. moelleroclavus* J.D. Rogers, Y.-M. Ju & Hemmes, *X. olobapha* Berk., *X. regalis* Cooke, *X. schweinitzii* Berk. & M.A. Curtis, *X. telfairii* (Berk.) Sacc. and *X. tuberoides* Rehm. Three usually more slender species occasionally featuring wider stromata are included, viz.: *X. curta* Fr., *X. hyperythra* (Mont.) Mont. and *X. scruposa* (Fr.) Fr. It is noteworthy that all these conspicuous species are long known, most of which are commonly encountered in tropics, in contrast with the small penzigioid or slender ones in which new species were discovered (Fournier *et al.*, 2018b; part III to come).

The reader is referred to the introduction to part I for background information on *Xylaria* and comments on former records of this genus in Guadeloupe and Martinique.

Material and methods

Refer to Fournier *et al.* (2018a; 2018b).

Taxonomy

Xylaria allantoidea (Berk.) Fr., *Nova Acta Regiae Societatis Scientiarum Upsaliensis*, 1: 127 (1851). Plate 2.

Stromata broadly clavate to subcylindrical or fusiform, with broadly rounded fertile apices, simple, straight to most often curved, terete to flattened, 28–78 mm in total height × 9–17 mm wide, with perithecial contours unexposed; the stipes ill-defined, 5–10 mm high, smooth, carbonaceous, glabrous, dark brown to blackish, at times swollen at base; surface greyish brown on immature stromata, dark copper brown to blackish at maturity, with a fine network of shallow reticulate cracks before maturity, smooth at maturity between slightly prominent ostioles; hard-textured, with black carbonaceous tissue forming a superficial crust 80–170 µm thick immediately beneath surface; the tissue between perithecia blackish, soft, interior spongy, pale greyish brown, solid. **Perithecia** immersed, subglobose, 0.5–0.6 mm diam, laterally compressed when crowded. **Ostioles** papillate, hemispherical to slightly conical, black, 100–120 µm diam at base.

Asci cylindrical, long-stipitate, fragmentary, with (7–)8 slightly overlapping uniseriately arranged ascospores, the spore-bearing parts 77–86 × 4.5–5.5 µm, the stipes not measured, with apical apparatus 2.3–2.7 × 1.6–1.8 µm (Me = 2.5 × 1.7 µm, N = 20), tubular with a faint upper rim, bluing in Melzer's reagent. **Paraphyses** copious, hyphal, thin-walled, remotely septate, 4–5 µm wide at base, tapering to 1.5–2 µm wide above asci, embedded in mucilaginous material. **Ascospores** (9.4–)10.3–11.9(–12.3) × (3.3–)3.7–4.1(–4.4) µm, Q = (2.4–)2.6–3.1(–3.5), N = 60 (Me = 11 × 3.9 µm, Qe = 2.8), fusiform-inequilateral with narrowly rounded ends, often ventrally concave to suballantoid, unicellular, light brown, with a narrow but conspicuous straight, longitudinally oriented, central germ slit slightly less than spore length on the ventral side, lacking secondary appendages or mucilaginous sheath; epispore smooth.

Asexual morph on the natural substrate not seen. The supposed asexual morph of *X. allantoidea* on the natural substrate is xylocoremium-like, like that of *X. flabelliformis*, occurring independently from the sexual morph (Rogers, 1984). Cultures on OMA yield cylindrical stromata and conidiogenous cells in palisades typical of *Xylaria* (Ju & Rogers, 1999; Callan & Rogers, 1990).

Specimens examined: French West Indies: Guadeloupe: Basse-Terre, Petit- Bourg, Merwart track, hygrophilic rainforest, on a dead decorticated branch, 12 Aug. 2008, *leg.* C. Lechat, CLL 8205 (LIP); Basse-Terre, Vieux-Fort, Ravine Blondeau, hygrophilic rainforest, on a dead decorticated branch, 22 Nov. 2006, *leg.* C. Lechat, CLL 6023 (LIP) (immature).

Dichotomous key to the robust upright *Xylaria* taxa known from French West Indies

(unusually robust stromata of *X. feejeensis*, *X. fissilis* and *X. martinicensis* var. *microspora* sp. nov. are included in the key but these taxa will be documented in part III)

1. Ascospores less than 12 µm long in average **2**
1. Ascospores more than 12 µm long in average **7**

2. Stromatal surface coarsely cracked into thick scales, subsurface a leathery to weakly carbonaceous crust **3**
2. Stromatal surface smooth to finely cracked, subsurface a carbonaceous crust 80–200 µm thick **5**

3. Interior entirely whitish **4**
3. Perithecia embedded in a layer of pale yellow tissue ..... ***X. martinicensis* var. *microspora*** (part III)

4. Ascospores inequilateral, medium brown, 8–10.7 × 3.5–4.4 µm ..... ***X. curta***
4. Ascospores equilateral, dark brown, 8.2–10.6 × 4.4–5.1 µm ..... ***X. feejeensis*** (part III)

5. Ascospores pale to medium brown, suballantoid, 10.3–11.9 × 3.7–4.1 µm ..... ***X. allantoidea***
5. Ascospores darker brown, ellipsoid, smaller **6**

6. Ascospores 6.8–8.9 × 3.5–4.4 µm (Me = 7.8 × 3.9 µm), equilateral, with narrowly rounded ends and a long and conspicuous germ slit ..... ***X. cubensis***
6. Ascospores 7.8–10.2 × 3.4–4.7 µm (Me = 8.8 × 4.1 µm), inequilateral, with broadly rounded ends and a short, inconspicuous germ slit ..... ***X. flabelliformis***

7. Stromata with yellowish to cinnamon or orange brown surface **8**
7. Stromata with dark brown to blackish surface **11**

8. Stromatal surface orange brown, finely reticulately cracked, not releasing pigments in 10% KOH; ascospores brown, 13.1–17.3 × 4.6–5.5 µm ..... ***X. cuneata***
8. Stromatal surface cinnamon, smooth to longitudinally striped, releasing yellow pigments in 10% KOH; ascospores blackish brown, larger **9**

9. Fresh stromata filled with liquid, hollow when dry; ascospores with an obliquely oriented germ slit, 16.9–22.8 × 6–8.6 µm ..... ***X. telfairii***
9. Fresh stromata with solid interior, not to partly hollow when dry; ascospores with a longitudinally oriented germ slit **10**

10. Ascospores 16.3 × 6.1 µm in average; crust weakly carbonaceous, 80–100 µm thick ..... ***X. hyperythra***
10. Ascospores 19.5 × 6.6 µm in average; crust strongly carbonaceous, 170–250 µm thick ..... ***X. olobapha***

11. Stromata carbonaceous, brittle or hard-textured, with a black crust 80–250 µm thick **12**
11. Stromata leathery, soft when moistened, with a thin (40–50 µm) to thick (80–170 µm) black crust **13**

12. Stromata cylindrical to clavate, nodulose, with blackish interior; crust 80–100 µm thick ..... ***X. fissilis*** (part III)
12. Stromata subglobose to obovate, with smooth surface, interior light-coloured; crust 170–250 µm thick ..... ***X. tuberoides***

13. Stromata massive, 8–35 mm wide; subsurface crust 120–170 µm thick; ascospores 12.9–14.6 × 4.9–5.8 µm, with a spore-length, longitudinally oriented germ slit ..... ***X. regalis***
13. Stromata rarely over 20 mm wide; subsurface crust 40–100 µm thick; ascospores larger, with a short obliquely oriented germ slit **14**

14. Stromatal crust 40–50 µm thick, soft **15**
14. Stromatal crust 70–100 µm thick, soft to slightly carbonaceous **17**

15. Ascospores 25.6–30 × 7.8–9.1 µm, blackish brown ..... ***X. formosana***
15. Ascospores 17–24 × 5.4–7.8 µm, dark brown **16**

16. Outermost stromatal layer thin, horny, narrowly and longitudinally striped; ostioles discoid, 80–100 µm diam, barely prominent; ascospores with a minute cellular appendage ..... ***X. moelleroclavus***
16. Outermost stromatal layer thick, fibrous to tomentose, differentiating into polygonal scales; ostioles raised-discoid, 170–250 µm diam; ascospores lacking a cellular appendage ..... ***X. scruposa***

17. Surface coarsely cracked into thick scales; ostioles 180–280 µm diam, prominent; ascospores 21.2–30.2 × 6.7–9.3 µm (Me = 25 × 7.9 µm) with a diagonal germ slit ..... ***X. globosa***
17. Surface minutely cracked into thin scales; ostioles 100–170 µm diam, barely prominent; ascospores 19.9–26.8 × 6–8.3 µm (Me = 23 × 7.1 µm) with an obliquely oriented, less slanted germ slit ..... ***X. schweinitzii***

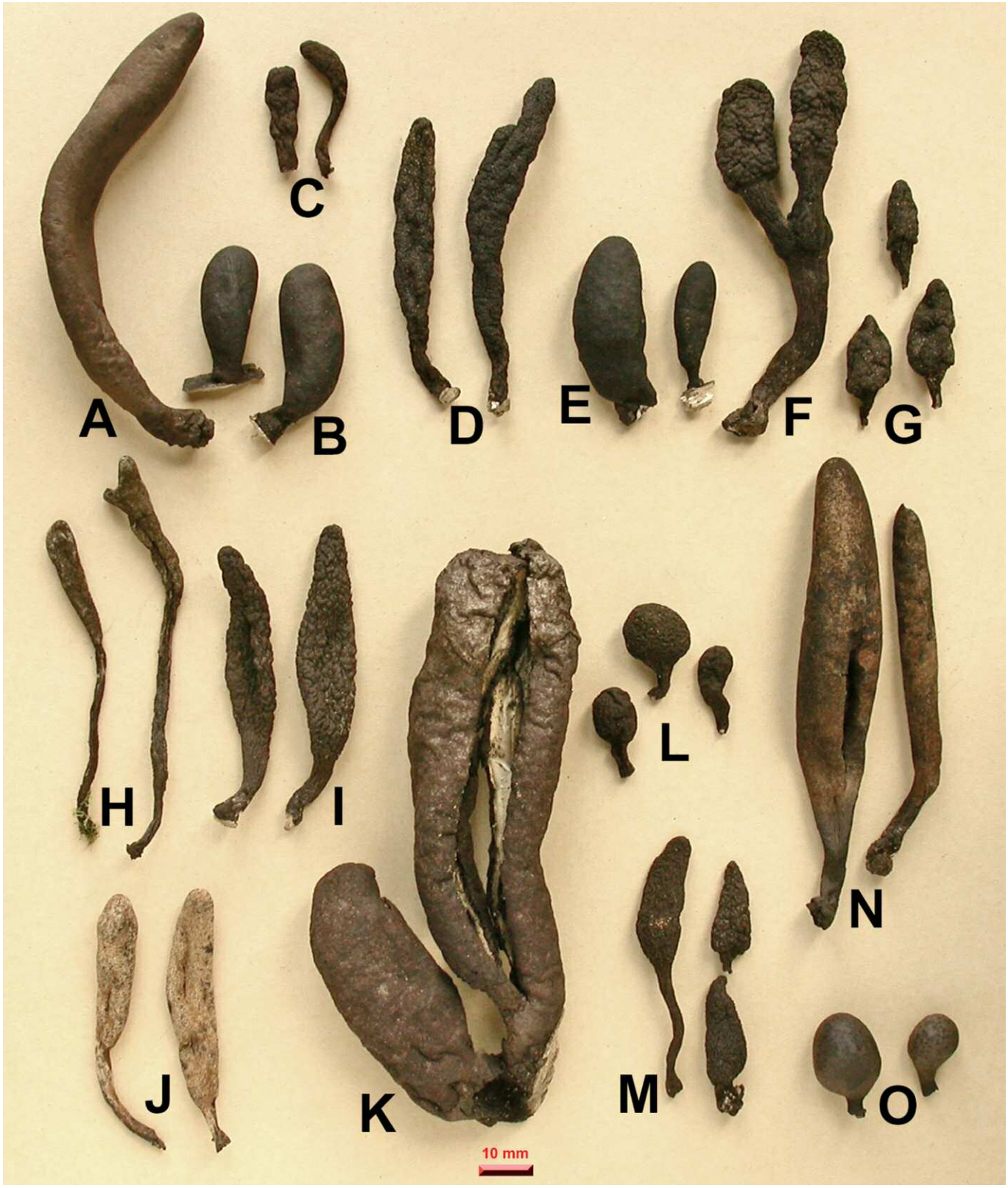

Plate 1 – Synoptic plate of stromata of robust *Xylaria* spp. dealt with in part II
A: *X. allantoidea* CLL 6023; B: *X. cubensis* MJF 13319; C: *X. cuneata* CLL 5131; D: *X. curta* CLL 5260; E: *X. flabelliformis* MJF 10236; F: *X. formosana* CLL 8309; G: *X. globosa* CLL 6139; H: *X. hyperythra* CLL 2132; I: *X. moelleroclavus* CLL 8401; J: *X. olobapha* CLL 2297; K: *X. regalis* CLLMAR 11087; L: *X. schweinitzii* MJF 16174; M: *X. scruposa* CLL 6065; N: *X. telfairii* MJF 13230; O: *X. tuberoides* MJF 10157.

Known distribution: Likely pantropical.

Comments: Our collection CLL 8205 fits well the description of *X. allantoidea* by Rogers (1984) and San Martín & Rogers (1989). The concept of *X. allantoidea* by Dennis (1956) was slightly different in accepting a wider ascospore size range of 11–16 × 3.5–5 µm due to the inclusion of *X. papyrifera* (Link) Fr., a different taxon with larger ascospores (Ju & Rogers, 1999).

Xylaria allantoidea was shown to belong to the PO clade by Hsieh *et al.* (2010), along with its look-alikes *X. cubensis* and *X. flabelliformis*, which likewise feature massive and carbonaceous clavate stromata with a smooth surface just roughened by ostioles. It primarily differs from them by its light brown, ventrally concave ascospores 10.3–11.9 × 3.7–4.1 µm with a conspicuous germ slit. Ascospores of *X. cubensis* likewise have a conspicuous germ slit but they are smaller (6.8–8.9 × 3.5–4.4 µm), darker brown and equilateral with narrowly rounded ends. Ascospores of *X. flabelliformis* are likewise smaller (7.8–10.2 × 3.4–4.7 µm) than those of *X. allantoidea*, further differing in being darker brown, in having more broadly rounded ends and a short inconspicuous germ slit. While *X. allantoidea* can be easily recognized at maturity based on microscopic characters, its immature pale brown stromata may be mistaken for those of *X. telfairii*. Stromata of *X. telfairii* are more yellowish, their interior is hollow and filled with liquid when fresh and they split longitudinally upon drying; moreover, their ostioles, unlike those of *X. allantoidea* (this paper), are not papillate.

Ju & Rogers (1999) reported the occurrence in Taiwan of two different types of stromata referable to *X. allantoidea*, just differing by their stromatal surface either purplish brown or copper brown. Colony characters in culture are strikingly different and correlated with the colour of stromata, which suggests the possible presence of two different, cryptic taxa. However, in absence of microscopic differences between both types of stromata, Ju & Rogers (1999) stated: "they probably represent two color variants of the same taxon".

Based on only two collections from Guadeloupe and none from Martinique, *X. allantoidea* was a rarely encountered species during this long-term survey. Dennis (1956) suggested a worldwide distribution of *X. allantoidea* with a higher prevalence in eastern tropics but his concept of this species likely encompassed several species in the *X. cubensis* complex currently regarded as different.

Xylaria cubensis (Mont.) Fr., *Nova Acta Regiae Societatis Scientiarum Upsaliensis*, 1: 126 (1851). Plate 3, Table 1.

Stromata subcylindrical, clavate or broadly fusiform, with broadly rounded fertile apices, simple, straight to most often curved, terete to flattened, most often splitting longitudinally upon drying and with margins inrolled, (15–)18–52(–100) mm in total height × 6–15 mm wide, with perithecial contours unexposed; the stipes ill-defined, 7–20(–40) mm high, smooth, carbonaceous, glabrous, reddish brown to blackish brown; surface tan to brown on young stromata, dark copper brown to blackish at maturity, slightly roughened by the ostioles, with a finely reticulately cracked superficial pellicle vanishing at maturity; hard-textured, with black carbonaceous tissue forming a crust (120–)150–200 µm thick immediately beneath surface; interior spongy, whitish, solid to most often hollow at dry state. **Perithecia** immersed, subglobose, 0.4–0.5 mm diam, laterally compressed when crowded. **Ostioles** papillate, hemispherical to slightly conical, black, 100–120 µm diam at base, at times surrounded by a whitish discoid halo 120–170 µm diam.

Asci cylindrical, long-stipitate, with eight slightly overlapping uniseriately arranged ascospores, the spore-bearing parts 57–65 × 5–6 µm, the stipes 70–100 µm long, with apical apparatus 1.1–1.4 × 1.5–1.7 µm (Me = 1.3 × 1.6 µm, N = 12), short-cylindrical with a faint upper rim, bluing in Melzer's reagent. **Paraphyses** copious, hyphal, thin-walled, remotely septate, 3–5 µm wide at base, tapering to 1.5–2 µm wide above asci, embedded in mucilaginous material. **Ascospores** (6.2–)6.8–8.9(–9.4) × (3.1–)3.5–4.4(–4.6) µm, Q = (1.6–)1.7–2.3(–2.6), N = 360 (Me = 7.8 × 3.9 µm, Qe = 2), short-fusoid to citriform, equilateral with narrowly rounded ends, one end slightly truncate and bearing a small rounded cellular appendage and opposite end slightly pinched, dark brown, with a conspicuous straight, longitudinally oriented, central germ slit almost spore-length, with 1–2 polar, mucilaginous secondary appendages visible in India ink; epispore smooth.

Asexual morph on the natural substrate not seen. The supposed asexual morph of *X. cubensis* on the natural substrate is xylocoremium-like, occurring independently from the sexual morph (Rogers, 1984). Cultures on OMA yield cylindrical stromata and conidiogenous cells in upright palisade typical of *Xylaria* (Ju & Rogers, 1999, as *X. laevis* C.G. Lloyd).

Specimens examined: French West Indies: Guadeloupe: Marie-Galante, Folle-Anse, coastal xerophilic forest, on dead decorticated wood, 2 Dec. 2005, *leg.* C. Lechat, CLL 5512 (LIP). Martinique: Case-Pilote, Fond-Bourlet, meso- to hygrophilic rainforest, on dead decor-

Table 1 – Ascospore dimensions in six randomly selected collections of *X. cubensis* from Martinique, showing the range of intraspecific variations, compared with those reported in literature. Extreme values in parentheses.

Collections numbers	Ascospore measurements	Q = quotient l/w N = number of measurements	Mean values
CLL 0785	(6.6–)7.1–8.2(–8.7) × (3.4–)3.7–4.1(–4.5) µm	Q = (1.6–)1.8–2.1(–2.3), N = 60	Me = 7.6 × 3.9 µm, Qe = 1.9
CLL 2056	(6.9–)7.5–8.9(–9.4) × (3.4–)3.7–4.3(–4.5) µm	Q = (1.7–)1.8–2.3(–2.6), N = 60	Me = 8.1 × 4 µm, Qe = 2
MJF 10130	(6.2–)6.8–7.9(–8.8) × (3.1–)3.6–4.1(–4.2) µm	Q = (1.6–)1.7–2.1(–2.3), N = 60	Me = 7.4 × 3.9 µm, Qe = 1.9
MJF 13021	(6.3–)6.8–7.9(–8.3) × (3.2–)3.5–4.1(–4.5) µm	Q = (1.7–)1.8–2.2(–2.5), N = 60	Me = 7.4 × 3.8 µm, Qe = 2
MJF 13321	(6.6–)7.3–8.8(–9.6) × (3.5–)3.6–4.4(–4.6) µm	Q = (1.6–)1.8–2.3(–2.4), N = 60	Me = 8.1 × 4 µm, Qe = 2.1
MJF 13335	(6.9–)7.6–8.6(–9.2) × (3.4–)3.8–4.4(–4.6) µm	Q = (1.8–)1.9–2.2(–2.4), N = 60	Me = 8.2 × 4 µm, Qe = 2
Cumulated values	(6.2–)6.8–8.9(–9.4) × (3.1–)3.5–4.4(–4.6) µm	Q = (1.6–)1.7–2.3(–2.6), N = 360	Me = 7.8 × 3.9 µm, Qe = 2
X. cubensis Dennis (1956)	7–9 × 3–4.5 µm	–	Me = 8 × 3.8 µm, Qe = 2.1
X. cubensis holotype Leprieur 403 (Ju *et al.*, 2016)	7–8 × 4–4.5 µm	–	Me = 7.5 × 4.3 µm, Qe = 1.7
X. cubensis Leprieur 404 (Ju *et al.*, 2016)	7–8.5 × 4–4.5 µm	–	Me = 7.8 × 4.3 µm, Qe = 1.8
X. laevis holotype (Ju *et al.*, 2016)	8–9.5 × 4–4.5 µm	–	Me = 8.8 × 4.3 µm, Qe = 2

Plate 2 – *Xylaria allantoidea*

A-C, E-J: CLL 8205; D, K: CLL 6023. A: Two mature stromata connate at base; B: Mature stroma in vertical section showing a solid, pale greyish brown interior; C, D: Stromatal surface in close-up of a mature and immature stroma respectively; E: Ascus with broken stipe, in India ink; F: Two ascal apical apparati in Melzer's reagent; G: Stroma in vertical section in close-up showing subglobose perithecia immersed beneath a thick carbonaceous crust and surrounded by blackish soft tissue; H: Ascospore in ventral view showing a straight germ slit almost spore-length, in 1% SDS; I: Ascospore in India ink showing a lack of appendage or mucilaginous sheath; J: Mature ascospores, some showing a germ slit, in 1% SDS; K: Immature, pale brown, allantoid and flattened stroma. Scale bars: A, B, K = 10 mm; C, D, G = 0.5 mm; E = 20 µm; F, H, I = 5 µm; J = 10 µm.

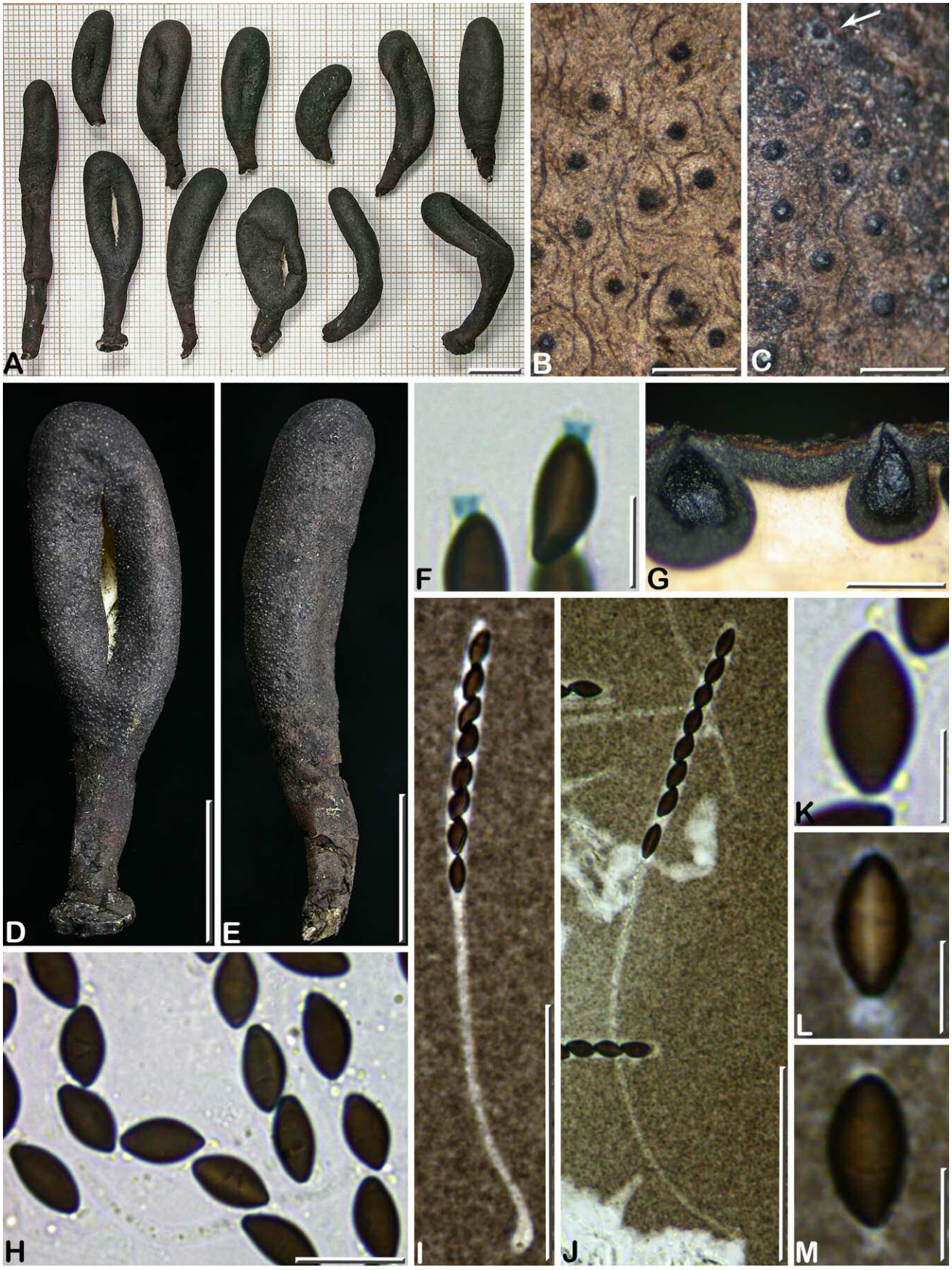

Plate 3 – *Xylaria cubensis*

A,C, D, E, G: CLL 07855; B: CLL 5627; F, H, K-M: MJF 13335; I, J: MJF 13201. A: Variously shaped stromata from the same collection; B: Young stroma in close-up showing a tan finely cracked superficial pellicle pierced by the ostioles; C: Mature stroma in close-up showing a faintly cracked surface and hemispherical ostioles, one surrounded by a whitish discoid halo (arrowed); D: Longitudinally split flattened stroma; E: Intact terete stroma; F: Two ascal apical apparati in Melzer's reagent; G: Stroma in vertical section in close-up showing subglobose perithecia immersed beneath a thick carbonaceous crust, coated with a thin brown superficial pellicle; H: Mature ascospores, some showing a germ slit or a truncate end, in 1% SDS; I, J: Long-stipitate asci, in India ink; K: Ascospore featuring a truncate lower end and a slightly pinched upper end, in 1% SDS; L: Ascospore in India ink, showing a conspicuous germ slit, a basal cellular appendage and bipolar mucilaginous material; M: Ascospore in India ink showing bipolar mucilaginous material. Scale bars: A, D, E = 10 mm; B, C, G = 0.5 mm; F, K-M = 5 µm; H = 10 µm; I, J = 50 µm.

ticated wood, 9 Dec. 2005, *leg.* C. Lechat, CLL 5627 (LIP); Fort-de-France, Fontaine Didier, hygrophilic rainforest, on dead decorticated wood, 19 Aug. 2013, *leg.* J. Fournier, MJF 13319 (LIP); *ibid.*, on dead decorticated wood, 19 Aug. 2013, *leg.* J. Fournier, MJF 13321 (LIP); Le Diamant, Morne-Blanc, trail from Ancinel to Morne du Riz through Morne Fournerey, meso- to xerophilic forest, on dead decorticated wood, 18 Aug. 2013, *leg.* J. Fournier, MJF 13306 (LIP); Le Prêcheur, Anse Couleuvre, coastal mesophilic rainforest, on dead decorticated wood, 3 Sept. 2003, *leg.* C. Lechat, CLL 0769 (LIP); *ibid.*, on dead decorticated wood, 3 Sept. 2003, *leg.* C. Lechat, CLL 0785 (LIP); *ibid.*, on dead decorticated wood, 28 Aug. 2004, *leg.* C. Lechat, CLL 2179 (LIP; HAST 144022); *ibid.*, on dead decorticated wood, 27 Aug. 2007, *leg.* J. Fournier, MJF 07135 (LIP) (depauperate); *ibid.*, on dead decorticated wood, 24 Aug. 2010, *leg.* J. Fournier, MJF 10080 (LIP); *ibid.*, on dead decorticated wood, 6 Aug. 2013, *leg.* R. Courtecuisse, MJF 13021 (LIP); Le Robert, Pointe-Bateau, coastal mesophilic rainforest, on dead decorticated wood, 26 Aug. 2010, *leg.* C. Lechat, MJF 10130 (LIP); Le Saint-Esprit, Bois La Charles, mesophilic rainforest, on dead decorticated wood, 24 Aug. 2004, *leg.* C. Lechat, CLL 2056 (LIP); *ibid.*, on dead decorticated wood, 24 Aug. 2004, *leg.* C. Lechat, CLL 2065 (LIP); *ibid.*, on dead decorticated wood, 20 Aug. 2013, *leg.* O. Roze, MJF 13335; *ibid.*, on dead decorticated wood, 20 Aug. 2013, *leg.* C. Lechat, MJF 13344 (LIP) (depauperate).

Known distribution: Likely pantropical.

Comments: *Xylaria cubensis* shares with *X. allantoidea* and *X. flabelliformis* similar clavate, carbonaceous, brownish black stromata with obtuse apices and a smooth surface just roughened by rounded-papillate ostioles. In absence of reliable diagnostic macromorphological features, distinguishing them in the field is most often challenging. Microscopic observation of ascospores is needed to identify with certainty *X. cubensis*, which is characterized by dark brown, short-fusoid, equilateral ascospores 6.8–8.9 × 3.5–4.4 µm with narrowly rounded ends and a conspicuous germ slit almost spore-length. *Xylaria allantoidea* is recognized based on its light brown, ventrally concave, larger ascospores 10.3–11.9 × 3.7–4.1 µm; ascospores of *X. flabelliformis* are in the same size range 7.8–10.2 × 3.4–4.7 µm as those of *X. cubensis* but they markedly differ in being strongly inequilateral with obtuse ends, with an inconspicuous germ slit much less than spore-length (this paper).

Some confusion occurred in the past about the delimitation of *X. cubensis*, which has been interpreted in a broad sense including *X. flabelliformis* or confused with *X. laevis* (Rogers, 1984; Van der Gucht, 1995; Ju & Rogers, 1999). After revision of *X. fusca* C.G. Lloyd and *X. laevis*, Ju *et al.* (2016) clarified the status of the species formerly confused with *X. cubensis* based on the unambiguous morphological characters of ascospores outlined above. *Xylaria fusca* and *X. laevis* are respectively later synonyms of *X. flabelliformis* and *X. cubensis* (Ju *et al.*, 2016). The current concept of *X. cubensis* is in accordance with that of Dennis (1956) who illustrated ascospores 7–9 × 3–4.5 µm with subacute ends.

Besides a very similar habit, *X. allantoidea*, *X. cubensis* and *X. flabelliformis* supposedly share similar asexual morphs on the natural substrate that Rogers (1984) assigned to *Xylocoremium flabelliforme* (Schwein. : Fr.) J.D. Rogers. This distinctive type of asexual morph is coremial, 5–30 mm high, with a foliate to cerebriform, whitish, yellowish to pinkish fertile head on a black cylindrical base. They occur on the woody substrate prior to the sexual stromata and have usually vanished when sexual stromata develop, which makes the connection difficult to assess. In culture on OMA, Rogers (1984) obtained such coremia for *X. flabelliformis* (as *X. cubensis*) but Ju & Rogers (1999) and Van der Gucht (1996) reported cylindrical conidial stromata lacking the xylocoremium-like habit for *X. allantoidea* and *X. cubensis* (as *X. laevis*). Though the connection is highly suspected, field observations spanning over several months would be required to unambiguously assess if *X. cubensis* is likewise associated with a xylocoremium-like asexual morph in nature.

Xylaria cuneata C.G. Lloyd, *Mycological Writings*, 7: 1180 (1923). Plate 4, Table 2.

Stromata broadly cylindrical to narrowly clavate, with broadly rounded fertile apices, simple, straight to curved, somewhat flattened, with irregular depressions, 10–56 mm in total height × 2.5–7 mm wide, with perithecial contours unexposed; the stipes mostly ill-defined, 3–33 mm high, smooth, dark orange brown to blackish brown, tomentose at base; surface dark orange brown to dark brown, with a persistent outermost layer cracked into minute polygonal scales; fairly hard-textured, with black leathery tissue forming a superficial crust 40–50 µm thick immediately beneath surface; interior spongy, whitish to yellowish, solid but retracting upon drying. **Perithecia** immersed, subglobose, 0.4–0.65 mm diam, rarely in contact. **Ostioles** papillate, bluntly conical, black, 80–100 µm diam at base.

Asci cylindrical, long-stipitate, with (4–6–)8 slightly overlapping uniseriately arranged ascospores, the spore-bearing parts 90–116 × 5.5–7 µm, the stipes 45–95 µm long, with apical apparatus 3.1–3.7 × 2.2–2.8 µm (Me = 3.4 × 2.6 µm, N = 50), slightly barrel-shaped with a faint upper rim and attenuated at base, bluing in Melzer's reagent. **Paraphyses** copious, hyphal, thin-walled, remotely septate, 4–7 µm wide at base, tapering to 1.5–2 µm wide above asci, embedded in mucilaginous material. **Ascospores** (12.8–)13.1–17.3(–18.7) × (4.1–)4.6–5.5(–5.9) µm, Q = (2.4–)2.6–3.4(–3.8) N = 120 (Me = 15 × 5 µm, Qe = 3), ellipsoid strongly inequilateral to suballantoid, with narrowly to broadly rounded ends, medium brown, with a straight, central, longitudinally oriented to slightly oblique germ slit on the ventral side 4.5–6 µm long, without appendages or mucilaginous sheath; epispore smooth.

Asexual morph on the natural substrate not seen. Sterile cultures were obtained on MA by Hamme & Guerrero (1997) (as *X. montagnei* Hamme & Guerrero). Cultures on OMA were described by San Martín (1992), yielding conidiogenous stromata with palisadic conidiogenous cells typical of *Xylaria*.

Specimens examined: French West Indies: Martinique: Case-Pilote, Morne Bois- Laroche, mesophilic rainforest, on dead wood, 22 Aug. 2005, *leg.* C. Lechat, CLL 5131 (LIP; HAST 144023); *ibid.*, on dead wood, 22 Aug. 2005, *leg.* C. Lechat, CLL 5133 (LIP).

Known distribution: Neotropical: Brazil (Theissen, 1908, as *X. corniformis* (Fr.) Fr. var. *macrospora* Bres.; Hamme & Guerrero, 1997, as *X. montagnei*), Martinique (this paper), México (San Martín, 1992, as *X. corniformis* var. *macrospora*).

Comments: These two collections were first identified as *X. corniformis* var. *macrospora*, conforming well to the description given by San Martín (1992) who examined the type collection from Brazil. This identification was confirmed by Dr. Ju (pers. comm., 2005), who informed us about the new taxon *X. montagnei* erected by Hamme & Guerrero (1997) to accommodate this *Xylaria* which indeed, as noted by San Martín (1992), is too different from *X. corniformis* to be just a variety. The examination of "missing" Lloyd's type specimens by Ju *et al.* (2016) led these authors to resurrect *X. cuneata* as an earlier synonym of *X. montagnei*.

The protologue of *X. corniformis* var. *macrospora* mentions stromata with fertile parts 15–30 × 3–25 mm (Theissen, 1908); San Martín (1992) recorded stromata 7–55 × 2.5–9 mm including the stipes and Hamme & Guerrero (1997) recorded 13–28.5 × 7.5–36 mm (fertile parts only). The stromata of our collections are only 2.5–7 mm wide but they are cylindrical to narrowly clavate, unlike the flattened stromata illustrated by Theissen (1908) and Hamme & Guerrero (1997), likely accounting for the larger width recorded by these authors. This is why, despite the small stromata of our collections only reaching 7 mm wide, we provisionally include *X. cuneata* in the group of *Xylaria* spp. with robust stromata, though it may appear arguable.

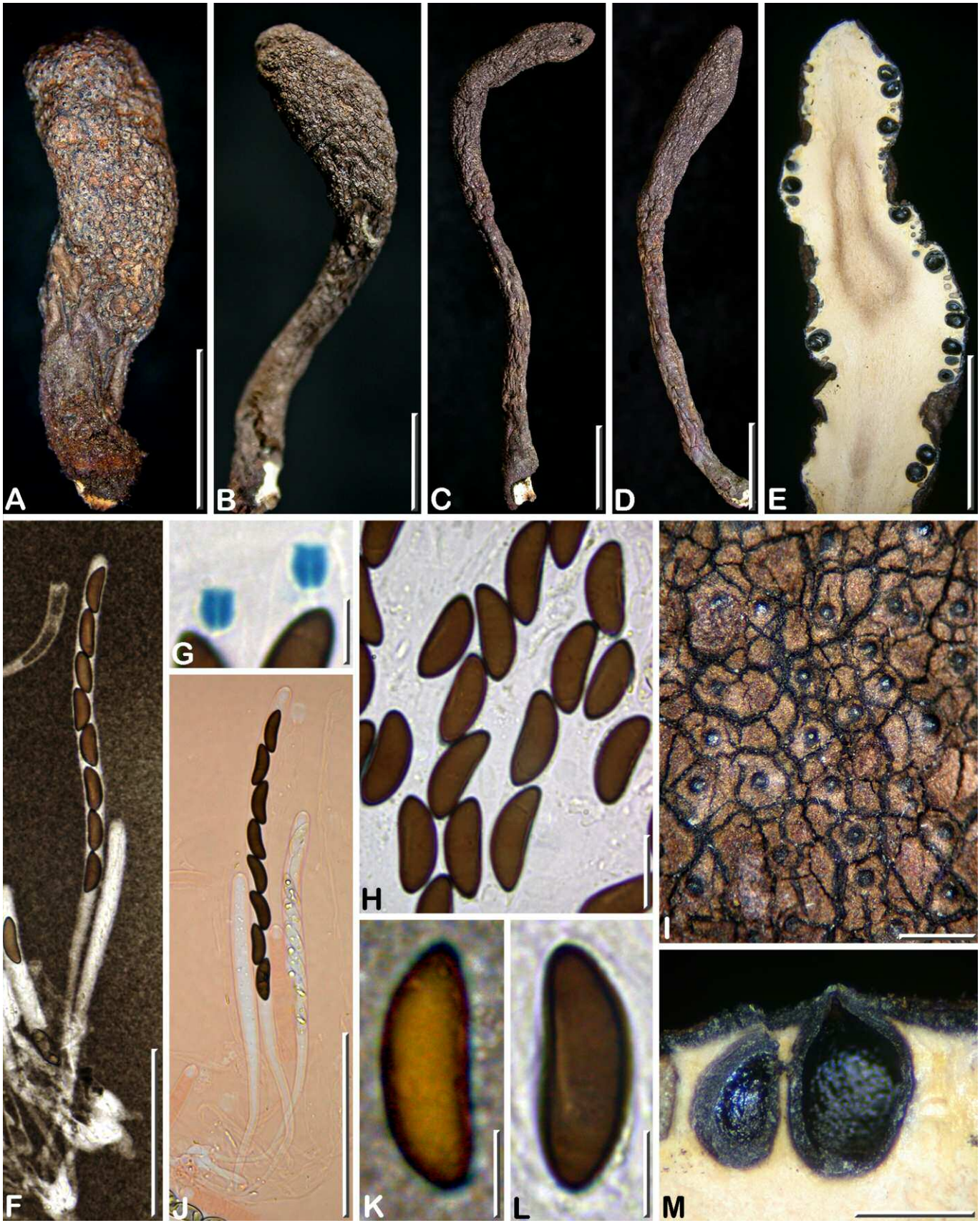

Plate 4 – *Xylaria cuneata*

CLL 5131. A-D: Short- and long-stipitate mature stromata; E: Stroma in vertical section showing scattered, immersed subglobose perithecia and a solid, whitish to pale brown interior; F: Mature ascus in India ink; G: Two ascal apical apparati in Melzer's reagent; H: Mature ascospores, some showing a germ slit, in 1% SDS; I: Stromatal surface in close-up showing a minutely cracked orange brown outermost layer and black rounded-papillate ostioles; J: Mature and immature asci, in Congo red in 1% SDS; K: Ascospore in India ink showing a lack of appendages or mucilaginous sheath; L: Ascospore in latero-ventral view showing a straight, slightly oblique germ slit, in 1% SDS; M: Stroma in vertical section in close-up showing two perithecia immersed under a thin black crust and a finely papillate ostiole. Scale bars: A, B, E = 5 mm; C, D = 10 mm; F, J = 50 µm; H = 10 µm; I, M = 0.5 µm; G, K, L = 5 µm.

Table 2 – Ascospore dimensions in two collections of *X. cuneata* from Martinique, showing the range of intraspecific variations, compared with those reported in literature. Extreme values in parentheses.

Collections numbers	Ascospore measurements	Q = quotient l/w N = number of measurements	Mean values
CLL 5131	(12.8–)13.1–15.1(–16.4) × (4.5–)4.6–5.2(–5.6) µm	Q = (2.4–)2.6–3.1(–3.3), N = 60	Me = 14.1 × 4.9 µm, Qe = 2.9
CLL 5133	(14–)14.9–17.3(–18.7) × (4.1–)4.7–5.5(–5.9) µm	Q = (2.7–)2.8–3.4(–3.8), N = 60	Me = 15.8 × 5.1 µm, Qe = 3.1
Cumulated values	(12.8–)13.1–17.3(–18.7) × (4.1–)4.6–5.5(–5.9) µm	Q = (2.4–)2.6–3.4(–3.8), N = 120	Me = 15 × 5 µm, Qe = 3
X. cuneata (Ju *et al*., 2016)	16–20 × 5–6 µm	–	Me = 18 × 5.5 µm, Qe = 3.3
X. montagnei holotype (Ju *et al.*, 2016)	13.5–16 × 4.5–6 µm	–	Me = 15 × 5.3 µm, Qe = 2.8
X. montagnei (Hamme & Guerrero, 1997)	13–22 × 5–6.6 µm	–	Me = 18 × 5.8 µm, Qe = 3.1
X. corniformis var. *macrospora* San Martín (1992)	12–17(–18) × 5–5.5 µm	–	Me = 14.5 × 5.3 µm, Qe = 2.7

As noted by Ju *et al.* (2016), a similar variability occurs in ascospore dimensions and shape, which is reflected by the fairly wide size range we recorded from two samples collected in the very same site. *Xylaria cuneata* is known from few collections and the range of its intraspecific variations should be assessed on the base of a wider sampling.

The multigene phylogenetic study by Ju *et al*. (2010) included the specimen CLL 5131 (as *X. montagnei*). It showed that *X. cuneata* is nested in the PO clade but on a separate branch distant from both the *X. polymorpha* aggregate and the *X. cubensis* aggregate and likewise distant from *X. curta*, *X. feejeensis* (Berk.) Fr. and other species with supposed affinities with *X. corniformis* (Fr.) Fr.

Xylaria primorskensis Y.-M. Ju, H.-M. Hsieh, Lar. N. Vassiljeva & Akulov, described from Russian Far East, was shown to be likewise morphologically related to the *X. corniformis* complex (Ju *et al.*, 2009) and resembles *X. cuneata* by its paler brown ascospores. Besides its different distribution, it differs primarily from *X. cuneata* by smaller ascospores 9–11 × 4–5 µm with a long germ slit.

In a more recent phylogenetic study carried out by U'Ren *et al*. (2016), *X. cuneata* (as *X. montagnei*) was shown to have unexpected affinities with *Amphirosellinia* Y.-M. Ju, J.D. Rogers, H.-M. Hsieh & Vasilyeva and *Stilbohypoxylon quisquiliarum* (Mont.) J.D. Rogers & Y.-M. Ju.

Xylaria curta Fr., *Nova Acta Regiae Societatis Scientiarum Upsaliensis*, 1: 126 (1851). Plate 5, Table 3.

Stromata gregarious in small or large groups, separate, rarely connate at base, variable in shape, ranging from cylindrical to clavate or fusiform, simple to furcate, terete to strongly flattened, straight to curved, with broadly rounded fertile apices, subsessile to long-stipitate, 10–65 mm in total height, the fertile head 6–55 mm high × 2–12(–20) mm diam, the stipe 2–43 mm high × 1.5–5 mm diam; surface yellowish white to cream-coloured before maturity, gradually turning yellowish grey, eventually dull black at maturity, coarsely cracked into thick polygonal scales, more or less nodulose due to irregularly arranged deep wrinkles and furrows, with perithecial contours not to slightly exposed; the stipes ill-defined, dark brown to black, smooth, puckered, terete to flattened, glabrous, the base often swollen and tomentose; crust including the persistent scales slightly carbonaceous, 80–100 µm thick; interior solid, spongy, white to cream. **Perithecia** subglobose, 0.5–0.75 mm diam, laterally flattened when crowded. **Ostioles** finely papillate on a raised-discoid, convex base 150–220 µm diam, black, occasionally encircled with a ring of white substance.

Asci cylindrical, with (6–)8 slightly overlapping uniseriately arranged ascospores, the spore-bearing parts 58–70 × 4.5–5.5 µm, the stipes 52–90 µm long, with apical apparatus 1.9–2.5 × 1.3–1.7 µm (Me = 2.2 × 1.5 µm, N = 40), short-cylindrical to slightly tubular with a faint upper rim, bluing in Melzer's reagent. **Paraphyses** copious, hyphal, filiform, thin-walled, 0.8–2 µm wide, embedded in mucilaginous material. **Ascospores** (7.6–)8.1–10.2(–11.1) × (3.1–)3.5–4.3 (–4.4) µm, Q = (1.8–)2.1–2.7(–3), N = 300 (Me = 9.1 × 3.9 µm, Qe = 2.3), ellipsoid-inequilateral with broadly to narrowly rounded ends, yellowish brown to medium brown, unicellular, with a conspicuous longitudinally oriented germ slit almost spore-length on the ventral side; a thin mucilaginous coating, sometimes thicker at poles, often present but not constituting well-defined appendages or mucilaginous sheath; epispore smooth.

Asexual morph on the natural substrate not seen. Colonies on OMA based on a collection from French Guiana yielding sterile cylindrical stromata were described by Callan & Rogers (1990). Similar results were reported by Van der Gucht (1996) from material from Papua New Guinea.

Known distribution: Pantropical (Van der Gucht, 1995).

Specimens examined: French West Indies: Guadeloupe: Grande-Terre, Saint-François, Baie Olive, coastal xero-mesophilic forest, on dead wood, 11 Sept. 2003, *leg.* C. Lechat, CLL 1073 (LIP). Martinique: Case-Pilote, Crête Jean-Louis, hygrophilic rainforest, on dead wood, 21 Aug. 2005, *leg.* C. Lechat, CLL 5095 (LIP; HAST 144024); La Trinité, Pointe-Rouge, coastal meso- to xerophilic forest, on a dead corticated branch, 29 Aug. 2010, *leg.* C. Van Wonterghem, MJF 10227 (LIP); Le Prêcheur, Anse Couleuvre, coastal mesophilic rainforest, on dead wood, 21 Aug. 2010, *leg.* J. Fournier, MJF 10021 (LIP); Le Saint-Esprit, Bois La Charles, mesophilic rainforest, on dead wood, 24 Aug. 2004, *leg.* C. Lechat, CLL 2059 (LIP); *ibid.*, on dead wood, 29 Aug. 2005, *leg.* C. Lechat, CLL 5260 (LIP); Sainte-Marie, La Philippe, coastal mesophilic rainforest, on a dead stump, 31 Aug. 2010, *leg.* C. Lechat, MJF 10275 (LIP); *ibid.*, on dead wood, 14 Aug. 2013, *leg.* J. Fournier, MJF 13201 (LIP).

Comments: As discussed by Van der Gucht (1995), *X. curta* has been variously interpreted in the past and we follow her concept of this species since it matches well the abundant material we collected. The most salient feature of *X. curta* is the presence of yellowish white superficial polygonal scales giving the stromata a peculiar mottled appearance. Unfortunately this colour is limited to a thin superficial pellicle that is worn off with age and mature stromata eventually become dull black. However, the stromatal surface showing thick polygonal scales and large raised-discoid ostioles is distinctive enough to distinguish *X. curta* from relatives with robust stromata and a similar ascospore morphology.

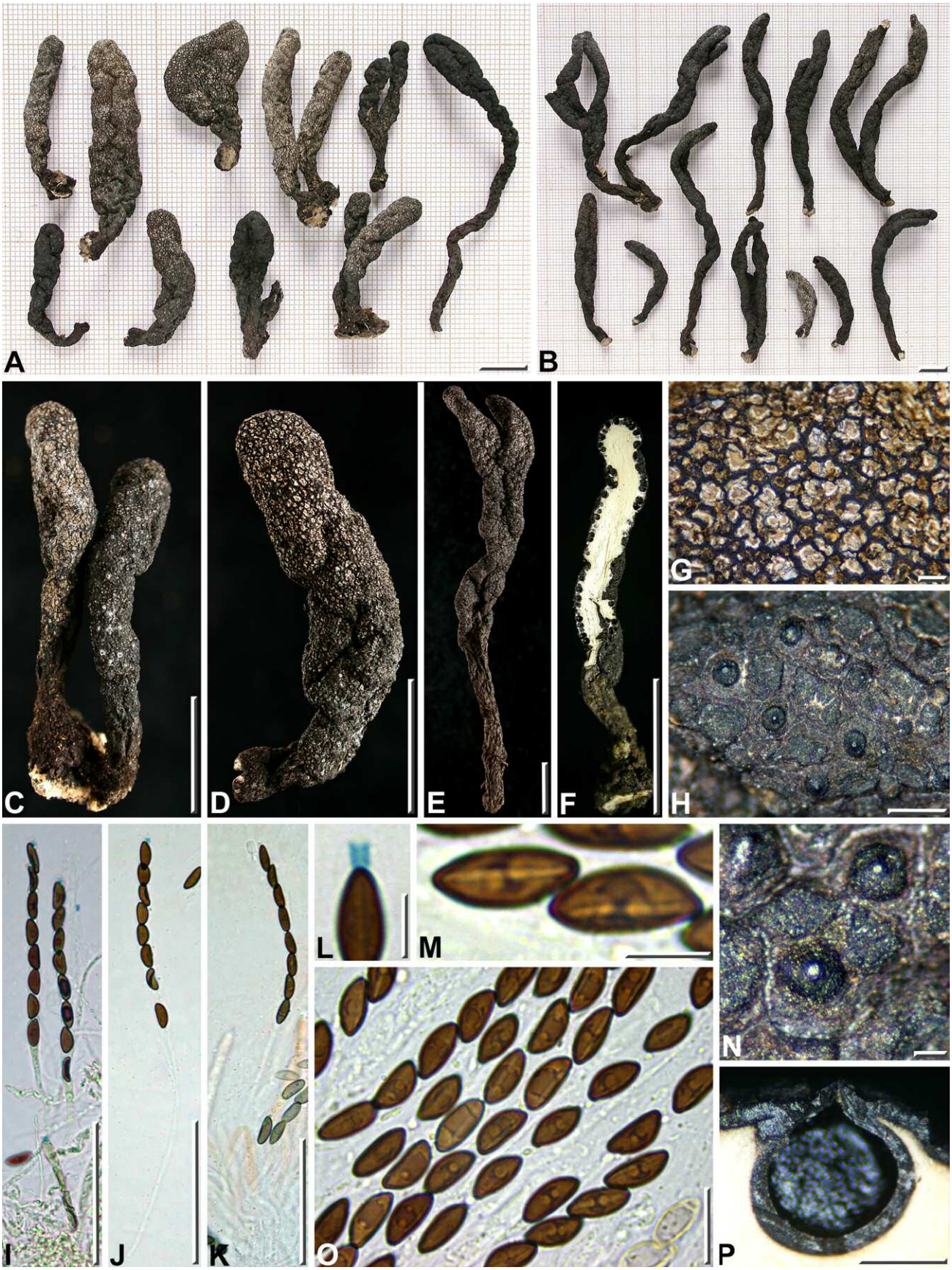

Plate 5 – *Xylaria curta*

A, C, D, G: MJF 10275; B, E, H, L-P: CLL 5260; F: CLL 5095; I-K: MJF 13201. A, B: Variously shaped stromata; C: Two adjacent stromata, one immature (left), the other one mature (right) with some ostioles encircled with a white ring; D: Barely mature stroma; E: Mature, furcate, long-stipitate stroma; F: Mature stroma in vertical section showing a whitish solid interior; G: Surface of an immature stroma in close-up showing white to yellowish scales; H: Surface of a mature stroma in close-up showing black scales and raised-discoid ostioles; I-K: Mature long-stipitate asci, I-J in Melzer's reagent, K in Congo red and 3% KOH; L: Ascal apical apparatus, in Melzer's reagent; M: Two ascospores in ventral and latero-ventral view showing a germ slit, in 1% SDS; N: Ostioles and black superficial scales in close-up; O: Variously shaped ascospores in 1% SDS, some showing a germ slit; P: Vertical section of a perithecium immersed under a slightly carbonaceous crust. Scale bars: A-F = 10 mm; G, H, P = 0.5 mm; I-K = 50 µm; N = 100 µm; L, M = 5 µm; O = 10 µm.

Table 3 – Ascospore dimensions in five collections of *X. curta* with robust stromata from Guadeloupe and Martinique, showing the range of intraspecific variations, compared with those reported in literature. Extreme values in parentheses.

Collections numbers	Ascospore measurements	Q = quotient l/w N = number of measurements	Mean values
CLL 1073	(7.7–)8.3–9.6(–10.8) × (3.1–)3.7–4.2(–4.3) µm	Q = (2–)2.1–2.5(–2.8), N = 60	Me = 9 × 3.9 µm, Qe = 2.3
CLL 5095	(8.1–)8.9–10.2(–11.1) × (3.4–)3.5–4.2(–4.3) µm	Q = (2–)2.2–2.7(–3), N = 60	Me = 9.5 × 3.9 µm, Qe = 2.5
CLL 5260	(7.6–)8.1–9.2(–10.1) × (3.4–)3.6–4(–4.3) µm	Q = (1.8–)2.1–2.5(–2.6), N = 60	Me = 8.6 × 3.8 µm, Qe = 2.3
MJF 10275	(8–)8.4–9.5(–10.1) × (3.4–)3.6–4.3(–4.4) µm	Q = (1.9–)2.1–2.5(–2.8), N = 60	Me = 9 × 3.9 µm, Qe = 2.3
MJF 13201	(8.2–)8.6–9.6(–10.2) × (3.1–)3.5–4.2(–4.3) µm	Q = (2.1–)2.2–2.6(–3.0), N = 60	Me = 9.2 × 3.8 µm, Qe = 2.4
Cumulated values	(7.6–)8.1–10.2(–11.1) × (3.1–)3.5–4.3(–4.4) µm	Q = (1.8–)2.1–2.7(–3) N = 300	Me = 9.1 × 3.9 µm, Qe = 2.3
Callan & Rogers (1990)	8.5–9.5 × 4–4.5 µm	–	Me = 9 × 4.3 µm, Qe = 2.1
Van der Gucht (1995)	8–9.5 × 3–4.5 µm	–	Me = 8.4 × 4 µm, Qe = 2.1

Most of our numerous collections of *X. curta* feature small stromata usually less than 5 mm wide and will therefore be dealt with in part III. The collections illustrated and described above were selected because they featured unusually big stromata, likely in relation with a luxuriant growth in peculiar conditions. However, small and big stromata may occur mixed in the same collection, making our segregation based on width of the stroma sometimes impracticable; the same situation also occurs with *X. scruposa* (this paper), which will be dealt with in part III as well.

Two collections of *X. curta* from Martinique and Taiwan were shown to be phylogenetically very close if not identical (Hsieh *et al*., 2010), supporting a pantropical distribution for this species. The same study likewise showed that *X. curta* is more distant from *X. feejeensis* (Berk.) Fr. than expected from morphological traits by Dennis (1956) and Ju & Rogers (1999).

Xylaria flabelliformis (Schwein.) Berk. & M.A. Curtis, *Journal of the Linnean Society. Botany*, 10: 381 (1869). Plates 6–7, Table 4.

Stromata cylindrical, fusoid or clavate, with obtuse fertile apices, straight to curved, unbranched, terete to less commonly flattened, 18–60(–80) mm in total height × 5–12(–20) mm diam; stipes ill-defined, 5–36 mm high, smooth, glabrous, reddish brown, attached to the substrate by an enlarged base, readily rupturing just above the base; surface copper brown to brownish black, without exposed perithecial contours, roughened by the ostioles, coated with a thin, minutely cracked yellowish brown to reddish brown superficial pellicle, gradually worn off with age and revealing a smooth black subsurface; hard-textured, subsurface a black carbonaceous crust 120–180 µm thick; interior white to yellowish, corky, solid, becoming centrally hollow upon drying. **Perithecia** subglobose 0.6–0.85 mm diam, discrete, less commonly in contact. **Ostioles** conic-papillate to obtusely papillate, dull black to shiny black, 100–120 µm diam at base, often surrounded in developing stromata by a discoid, smooth, white or blackish halo.

Asci cylindrical, with (4–)8 slightly overlapping uniseriately arranged ascospores, the spore-bearing parts 58–68 × 4.5–5.5 µm, the stipes 60–155 µm long, with apical apparatus 1.4–1.8 × 1.7–2 µm (Me = 1.6 × 1.8 µm, N = 25), short cylindrical with a faint upper rim, bluing in Melzer's reagent. **Paraphyses** copious, hyphal, thin-walled, remotely septate, 6–7 µm wide at base, tapering to 1–1.5 µm wide above asci, sparsely guttulate, embedded in mucilaginous material. **Ascospores** (7.2–)7.8–10.2(–10.9) × (3.1–)3.4–4.7(–5.1) µm, Q = (1.8–)1.9–2.6(–2.9), N = 660 (Me = 8.8 × 4.1 µm, Qe = 2.2), ellipsoid strongly inequilateral with mostly broadly rounded ends, unicellular,

Table 4 – Ascospore dimensions in eleven randomly selected collections of *X. flabelliformis* from Martinique, showing a narrow range of intraspecific variations, compared with those reported in literature. Extreme values in parentheses.

Collections numbers	Ascospore measurements	Q = quotient l/w N = number of measurements	Mean values
CLL 0745	(7.3–)7.8–9.1(–9.4) × (3.4–)3.6–4.3(–4.4) µm	Q = (1.9–)2–2.4(–2.6), N = 60	Me = 8.5 × 3.9 µm, Qe = 2.2
CLL 2053	(7.6–)8.2–9.3(–9.9) × (3.4–)3.7–4.3(–4.5) µm	Q = (1.9–)2–2.4(–2.6), N = 60	Me = 8.7 × 4 µm, Qe = 2.2
CLL 5261	(8–)8.3–9.8(–9.9) × (3.4–)3.5–4.3(–4.7) µm	Q = (1.9–)2.1–2.5(–2.6), N = 60	Me = 8.9 × 3.9 µm, Qe = 2.3
CLL 5564B	(7.5–)8.2–9.3(–9.9) × (3.5–)3.7–4.2(–4.4) µm	Q = (1.9–)2.1–2.4(–2.6), N = 60	Me = 8.7 × 3.9 µm, Qe = 2.2
MJF 10013	(8.3–)8.6–10.2(–10.6) × (4.1–)4.2–4.7(–5.1) µm	Q = (1.8–)1.9–2.4(–2.5), N = 60	Me = 9.3 × 4.5 µm, Qe = 2.1
MJF 10127	(7.9–)8.3–9.4(–9.8) × (3.1–)3.4–4(–4.2) µm	Q = (2–)2.2–2.6(–2.8), N = 60	Me = 8.8 × 3.7 µm, Qe = 2.4
MJF 10129	(7.6–)8–9.2(–9.6) × (3.3–)3.6–4(–4.3) µm	Q = (2–)2.1–2.5(–2.7), N = 60	Me = 8.6 × 3.8 µm, Qe = 2.3
MJF 10141	(8.3–)8.6–9.9(–10.4) × (3.4–)3.7–4.3(–4.5) µm	Q = (1.9–)2.1–2.6(–2.8), N = 60	Me = 9.2 × 4 µm, Qe = 2.3
MJF 10236	(7.2–)8–9.1(–9.4) × (3.2–)3.5–4(–4.2) µm	Q = (2–)2.1–2.5(–2.9), N = 60	Me = 8.5 × 3.7 µm, Qe = 2.3
MJF 10267	(7.9–)8.3–9.5(–10.9) × (3.6–)3.8–4.4(–4.7) µm	Q = (1.9–)2–2.4(–2.8), N = 60	Me = 8.9 × 4.1 µm, Qe = 2.2
MJF 16118	(8.1–)8.4–9.4(–10.9) × (3.8–)3.9–4.6(–4.8) µm	Q = (1.8–)1.9–2.2(–2.4), N = 60	Me = 8.9 × 4.3 µm, Qe = 2.1
Cumulated values	(7.2–)7.8–10.2(–10.9) × (3.1–)3.4–4.7(–5.1) µm	Q = (1.8–)1.9–2.6(–2.9), N = 660	Me = 8.8 × 4.1 µm, Qe = 2.2
Hladki & Romero (2010) as *X. cubensis*	9.5–10 × 4–5 µm	–	Me = 9.8 × 4.5 µm, Qe = 2.2
Rogers (1984) as *X. cubensis*	(7–)8–10.5(–13) × (3.5–)4–5(–6) µm	–	Me = 9.3 × 4.5 µm, Qe = 2
Van der Gucht (1995) *as X. cubensis*	(8–)9–10 × (3.5–)4–5(–5.5) µm	–	Me = 9.5 × 4.5 µm, Qe = 2.1

Plate 6 – *Xylaria flabelliformis*

A, C, D, H, I: MJF 10129; B, E: MJF 10013; F, G: CLL 5564B. A: Variously shaped mature stromata from the same collection (note the most often broken stipes); B: Mature stroma; C: Surface of an immature stroma in close-up showing a finely reticulately cracked superficial layer; D: Surface of a mature stroma in close-up showing a finely reticulately cracked superficial layer and ostioles surrounded by a ring of white substance; E: Surface of a mature stroma in close-up showing a finely reticulately cracked superficial layer and shiny black ostioles; F: Surface of a mature stroma in close-up showing a smooth black surface and crowded shiny black ostioles; G: Black mature stroma; H: Stroma in longitudinal section showing a solid whitish interior; I: Vertical section of a stroma in close-up showing a subglobose perithecium immersed under a thick carbonaceous crust pierced by the ostiole (note the thin outermost brown layer). Scale bars: A, B, G, H = 10 mm; C-F, I = 0.5 mm.

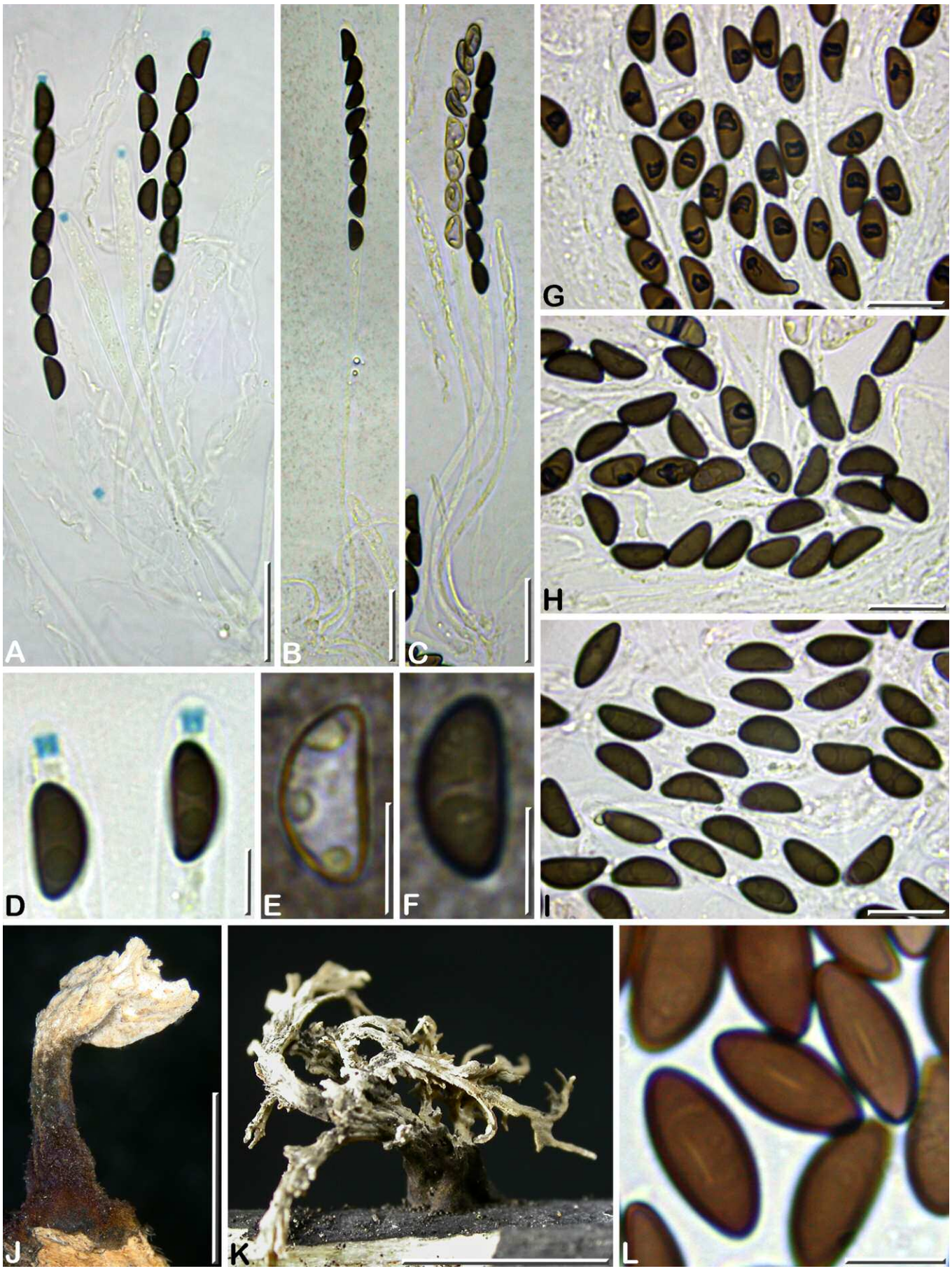

Plate 7 – *Xylaria flabelliformis*

A, D-F, I: MJF 16118; B, C, H: MJF 16167; G: MJF 10129; J: CLL 5358; K: MJF 10126; L: CLL 5261. A: 4-, 7- and 8-spored asci, in Melzer's reagent; B, C: Long-stipitate asci, in diluted India ink; G-I: Ascospores from three different collections, in 1% SDS; D: Ascal apical apparati in Melzer's reagent; E: Immature ascospore in India ink, lacking appendage and mucilaginous sheath; F: Mature ascospore in India ink, showing a polar secondary appendage; J, K: xylocoremium-like coremia on natural substrate; L: Three ascospores in ventral view showing a short germ slit, in heated chloral-lactophenol. Scale bars: A-C = 20 µm; D-F, L = 5 µm; G-I = 10 µm; J, K = 5 mm.

brown to dark brown, with a very inconspicuous, straight, longitudinally oriented, narrow, central germ slit 2–2.5(–5) µm long on the ventral side, usually not visible in water; lacking a cellular appendage but occasionally with a polar mucilaginous secondary appendage; epispore smooth.

Asexual morph on the natural substrate rarely encountered, referred to xylocoremium-like, featuring coremia 5–30 mm high on dark villose stipes, the conidial head whitish, foliaceous or cerebriform (Rogers, 1984), usually vanished when sexual stromata develop.

Specimens examined: French West Indies: Guadeloupe: Basse-Terre, Sainte-Rose, Sofaïa, path to Saut des Trois Cornes, mesophilic to hygrophilic rainforest, on a dead decorticated branch, 3 Sept. 2004, *leg.* C. Lechat, CLL 2308 (LIP); Basse-Terre, Vieux-Fort, Ravine Blondeau, hygrophilic rainforest, on dead wood, 4 Sept. 2005, *leg.* C. Lechat, CLL 5358 (LIP) (asexual morph). Martinique: Case-Pilote, Crête Jean-Louis, hygrophilic rainforest, on dead wood, 27 Aug. 2004, *leg.* C. Lechat, CLL 2163 (LIP); Case-Pilote, Fond Boucher, meso- to xerophilic forest, on dead wood, 25 Aug. 2010, *leg.* R. Courtecuisse, MJF 10109 (LIP) (asexual morph); Case-Pilote, Fond Bourlet, Prise d'Eau, hygrophilic rainforest, on dead corticated wood, 21 Aug. 2005, *leg.* C. Lechat, CLL 5116 (LIP); *ibid.*, on a dead corticated branch, 21 Aug. 2005, *leg.* C. Lechat, CLL 5121 (LIP, HAST); Case-Pilote, Morne Rose, mesophilic rainforest, on a dead decorticated branch, 1 Sept. 2010, *leg.* J. Fournier, MJF 10134 (LIP); Fort-de-France, Absalon, track to Plateau Michel, hygrophilic rainforest, on dead wood, 7 Aug. 2016, *leg.* P.-A. Moreau, MJF 16167 (LIP); Fort-de-France, Fontaine Didier, hygrophilic rainforest, on dead wood, 19 Aug. 2013, *leg.* J. Fournier, MJF 13316 (LIP); *ibid.*, 19 Aug. 2013, *leg.* J. Fournier, MJF 13326; La Trinité, Pointe-Rouge, coastal meso- to xerophilic forest, on a dead decorticated branch, 27 Aug. 2005, *leg.* C. Lechat, CLL 5232 (LIP); *ibid.*, 22 Aug. 2010, *leg.* R. Courtecuisse, MJF 10045 (LIP); *ibid.*, 29 Aug. 2010, *leg.* J. Fournier, MJF 10217; *ibid.*, *leg.* J. Fournier, MJF 10236 (LIP); La Trinité (Caravelle peninsula), Tartane, Pointe Bateau, coastal xero- to mesophilic forest, on dead decorticated wood, 26 Aug. 2010, *leg.* J. Fournier, MJF 10126 (LIP) (asexual morph); *ibid.*, on dead decorticated wood, 26 Aug. 2010, *leg.* J. Fournier, MJF 10127 (LIP); *ibid.*, on dead decorticated wood, 26 Aug. 2010, *leg.* J. Fournier, MJF 10129 (LIP); *ibid.*, on dead decorticated wood, 26 Aug. 2010, *leg.* J. Fournier, MJF 10141 (LIP); Le Lorrain, Rivière Pirogue, mesophilic rainforest, on dead wood, 26 Aug. 2004, *leg.* C. Lechat, CLL 2118 (LIP); *ibid.*, 6 Dec. 2005, *leg.* C. Lechat, CLL 5564B (LIP); Le Morne-Rouge, La Propreté, forest trail, hygrophilic rainforest, on dead wood, 12 Jun. 2014, *leg.* J. Fournier, MJF 14128 (LIP); *ibid.*, 24 Aug. 2007, *leg.* J. Fournier, MJF 07065 (LIP); Le Prêcheur, Anse Couleuvre, coastal mesophilic rainforest, on dead wood, 3 Sept. 2003, *leg.* C. Lécuru, CLL 0745 (LIP); *ibid.*, 3 Sept. 2003, *leg.* C. Lechat, CLL 0768 (LIP); *ibid.*, 3 Sept. 2003, *leg.* C. Lechat, CLL 0769 (LIP); *ibid.*, 28 Aug. 2004, *leg.* C. Lechat, CLL 2179 (LIP); *ibid.*, on dead wood, 19 Aug. 2005, *leg.* C. Lechat, CLL 5054 (LIP); *ibid.*, on dead wood, 23 Aug. 2007, *leg.* C. Lechat, MJF 07041 (LIP); *ibid.*, 27 Aug. 2007, *leg.* J. Fournier, MJF 07138 (LIP); *ibid.*, 2 Sept. 2007, *leg.* J. Fournier, MJF 07264 (LIP); *ibid.*, 5 Sept. 2007, *leg.* J. Fournier, MJF 07319 (LIP); *ibid.*, 21 Aug. 2010, *leg.* J. Fournier, MJF 10009 (LIP); *ibid.*, 21 Aug. 2010, *leg.* J. Fournier, MJF 10012 (LIP); *ibid.*, 21 Aug. 2010, *leg.* J. Fournier, MJF 10013 (LIP); *ibid.*, 21 Aug. 2010, *leg.* C. Lechat, MJF 10020 (LIP); *ibid.*, 21 Aug. 2010, *leg.* J. Fournier, MJF 10026 (LIP); *ibid.*, 24 Aug. 2010, *leg.* J. Fournier, MJF 10090 (LIP); *ibid.*, on dead decorticated wood, 28 Jul. 2016, *leg.* J. Fournier, MJF 16003 (LIP); *ibid.*, 4 Aug. 2016, on dead decorticated wood, *leg.* J. Fournier, MJF 16118 (LIP); Le Saint-Esprit, Bois La Charles, mesophilic rainforest, on dead decorticated wood, 24 Aug. 2004, *leg.* C. Lechat, CLL 2053 (LIP); *ibid.*, on dead decorticated wood, 29 Aug. 2005, *leg.* C. Lechat, CLL 5261 (LIP); *ibid.*, on dead decorticated wood, 30 Aug. 2010, *leg.* J. Fournier, MJF 10239 (LIP); *ibid.*, on dead decorticated wood, 30 Aug. 2010, *leg.* J. Fournier, MJF 10267 (LIP); Le Saint-Esprit, Morne David, mesophilic rainforest, on dead decorticated wood, 23 Aug. 2004, *leg.* C. Lechat, CLL 2018 (LIP); Les Anses-d'Arlet, Anse Noire, coastal mesophilic forest, on dead decorticated wood, 30 Aug. 2005, *leg.* C. Lechat, CLL 5288 (LIP); Sainte-Marie, La Philippe, coastal mesophilic rainforest, on dead decorticated wood, 31 Aug. 2010, *leg.* J. Fournier, MJF 10274 (LIP); *ibid.*, 31 Aug. 2010, *leg.* J. Fournier, MJF 10281 (LIP); *ibid.*, 31 Aug. 2010, *leg.* J. Fournier, MJF 10304 (LIP); Schoelcher, Case Navire River, mesophilic rainforest, on dead decorticated wood, 28 Aug. 2010, *leg.* C. Lechat, MJF 10197 (LIP); *ibid.*, 28 Aug. 2010, *leg.* J. Fournier, MJF 10202 (LIP); *ibid.*, 5 Aug. 2013, *leg.* J. Fournier, MJF 13015 (LIP); Schoelcher, Fond Lahaye, banks of River Fond Lahaye, mesophilic rainforest, on dead decorticated wood, 12 Aug. 2013, *leg.* J. Fournier, MJF 13154 (LIP).

Known distribution: Worldwide (Ju *et al.*, 2016).

Comments: *Xylaria flabelliformis* is a species commonly encountered in the tropics, less commonly in north temperate regions, characterized by robust, hard-textured, copper brown to brownish black cylindrical to clavate stromata with an obtuse fertile apex and slightly papillate ostioles roughening the surface. It is distinguished from morphologically similar species like *X. allantoidea* and *X. cubensis* by its small, dark brown, strongly inequilateral ascospores 7.8–10.2 × 3.4–4.7 µm with a short inconspicuous germ slit. Its xylocoremium-like asexual morph obtained in culture is distinctive; it occurs likewise on natural substrates but its coremia form before the sexual stromata and usually have vanished when stromata develop, making the connection often difficult to assess.

As discussed under *X. cubensis* in this paper, *X. flabelliformis* was long confused in the past with *X. cubensis* and most previous records of *X. cubensis* should be referred to *X. flabelliformis* in its current sense defined by Ju *et al*. (2016). Ascospore morphology unequivocally distinguishes these two species, which are otherwise undifferentiable.

Like those of *X. allantoidea* and *X. cubensis*, young mature stromata of *X. flabelliformis* are overlain with a thin reddish brown pellicle cracking into minute polygonal scales; in this species the scales are slightly thicker and more sharply delimited than in *X. allantoidea* and *X. cubensis*, which led San Martín (1992) to consider possible affinities of collections with such a stromatal surface with *X. holmbergi* Speg., as *X.* cf. *holmbergi*. *Xylaria holmbergi* is a poorly documented species and the striking similarities with *X. flabelliformis* recorded by San Martín (1992), including a xylocoremium-like asexual morph in culture and on natural substrate, suggest a possible synonymy.

Xylaria formosana Y.-M. Ju & Tzean, *Transactions of the Mycological Society of the Republic of China*, 1: 112 (1985). Plate 8.

Stromata 55–75 mm in total height, long-stipitate, fertile heads 14–26 × 6–12 mm, clavate to cylindrical or fusiform, flattened, nodulose to cerebriform due to deep wrinkles appearing upon drying, blackish, perithecial contours not to barely exposed, with broadly rounded and fertile apices; the stipes 40–52 × 3–8 mm, sharply defined, straight to slightly contorted, simple to apically branched, swollen at base and at branching level, black, downy to tomentose, longitudinally furrowed; surface dark greyish brown, with a persistent fibrous outermost layer coarsely cracked into thick polygonal scales, tomentose in places next to the insertion on the stipe; subsurface a thin black leathery crust ca. 40 µm thick; interior whitish to yellowish, spongy, fairly hard-textured at dry state. **Perithecia** immersed, subglobose 0.6–0.75 mm diam to laterally flattened 0.6–0.75 mm high × 0.35–0.5 mm diam; contents reddish brown. **Ostioles** discoid, slightly convex, black, 170–200 µm diam at base.

Asci cylindrical, with (4–6–)8 slightly overlapping uniseriately arranged ascospores, the spore-bearing parts 155–187 × 11–12.5 µm, the stipes 70–95 µm long, with apical apparatus 6.4–7.5 × 4.1–5.2 µm (Me = 7 × 4.7 µm, N = 25), tubular to slightly urn-shaped with an obtuse upper rim, strongly bluing in Melzer's reagent. **Paraphy-**

Plate 8 – *Xylaria formosana*

CLL 8309. A, B: Branched long-stipitate mature stromata; C: Stroma in vertical section showing a solid, whitish interior; D: Stromatal surface in close-up showing a minutely cracked brownish grey outermost layer and black discoid ostioles; E: Stroma in vertical section in close-up showing perithecia immersed under a thin black crust (note the reddish brown perithecial content); F: Immature ascus, in water; G: Mature ascus, in Melzer's reagent; H: Ascal apical apparati in Melzer's reagent; I: Hamathecium in 1% SDS, showing orange-yellow strains of paraphyses; J: Pink reaction of the hamathecium in 10% KOH; K: Immature and mature ascospores embedded in paraphyses containing minute orange droplets, in 1% SDS; L: Ascospores in latero-ventral view showing a short, slightly oblique germ slit (arrows); M, N: Immature subhyaline ascospore and black mature ascospore respectively, in diluted India ink, showing a lack of appendage or mucilaginous sheath. Scale bars: A-C = 10 mm; D, E = 0.5 mm; F, G = 50 µm; H, L-N = 10 µm; I, J = 100 µm; K = 20 µm.

ses copious, hyphal, thin- walled, remotely septate, 4–5 µm wide at base, tapering to 1.5–1.8 µm wide above asci, embedded in mucilaginous material, filled with minute orange droplets giving the whole hamathecium an orange-yellow colour, turning pink within 1–2 min when a drop of 10% KOH is added to the preparation. **Ascospores** (22.6–)25.6–30(–31.1) × (7.5–)7.8–9.1(–9.5) µm, Q = (2.6–)2.9–3.7(–3.9), N = 60 (Me = 27.8 × 8.4 µm, Qe = 3.3), fusoid strongly inequilateral to navicular, with narrowly rounded to subacute ends, slightly heteropolar with one end more acute and slightly pinched, blackish brown to almost black, with a short, straight, mostly central, slightly obliquely oriented germ slit on the ventral side 6.5–9 µm long, inconspicuous at maturity; without appendages or mucilaginous sheath; epispore smooth.

Asexual morph on the natural substrate not seen.

Specimen examined: French West Indies: Martinique: Le Prêcheur, Anse Couleuvre, coastal mesophilic rainforest, on dead corticated wood, 25 Aug. 2008, *leg.* C. Lechat, CLL 8309 (LIP; HAST 144025).

Known distribution: Martinique (this paper), Taiwan (Ju & Tzean, 1985; Ju & Rogers, 1999; Wang & Chou, 2001).

Comments: *Xylaria formosana* is a distinctive but poorly documented species that was so far known from Taiwan only. As stated by Ju & Rogers (1999), it appears morphologically related to the *X. polymorpha* complex, sharing several traits with *X. globosa* and *X. schweinitzii*. *Xylaria globosa* is the most similar as to the cracking pattern of stromatal surface, large discoid ostioles, and ascospore size. *Xylaria formosana* is diagnosed based on its massive fertile heads born on long stout stipes and large, black ascospores with narrowly rounded to subacute, slightly pinched ends. Aside from stromatal habit, ascospore morphology clearly sets *X. formosana* apart from its closest relatives. Though the presence of *X. formosana* in Martinique was unexpected and first appeared unlikely, the habit of stromata in this collection is strikingly reminiscent of the illustration provided by Ju & Tzean (1985), which supports our identification.

The most unusual orange colour of the hamathecium and its reaction with KOH were not documented in the protologue; more collections are needed to assess whether this character is consistent, which would provide a further discriminant feature.

Xylaria globosa (Spreng.) Mont., *Annales des Sciences Naturelles. Botanique, sér. IV*, 3: 103 (1855). Plate 9.

Asexual morph on the natural substrate consisting of sterile primordial stromata covered with orange exudation droplets.

Known distribution: Pantropical (Van der Gucht, 1995).

Specimens illustrated: French West Indies: Guadeloupe: Basse-Terre, Sainte-Rose, Sofaïa, hygrophilic rainforest, on bark, 1 Sept. 2005, *leg.* R. Courtecuisse, CLL 5300 (LIP). Martinique: Fonds-Saint-Denis, Morne Gaubert, mesophilic rainforest, on dead wood, 16 Aug. 2011, *leg.* C. Lechat, CLLMAR 11003 (LIP); Le Prêcheur, Anse Couleuvre, coastal mesophilic rainforest, on dead wood, 2 Dec. 2006, *leg.* C. Lechat, CLL 6139 (LIP).

Comments: *Xylaria globosa* was described in detail in part I (Fournier *et al*., 2018b) because it most often occurs as subsessile to shortly-stipitate subglobose to depressed-spherical stromata. However, this morphologically highly variable species often also features upright stipitate stromata like those illustrated in plate 9. This makes *X. globosa* highly deceiving to the inexperienced taxonomist, especially in occasionally encountered cases where upright long-stipitate stromata are not accompanied by penzigioid ones.

Whatever the shape of the stromata of *X. globosa*, a thorough observation shows that they share a relatively massive leathery crust 80–100 µm thick coated by a thick superficial layer cracked into large persistent warts, and large discoid ostioles 180–280 µm diam. A further diagnostic character of *X. globosa* is the orange colour of the internal tissue at the very base of the stipe, a reminiscence of the asexual state; this colour may be conspicuous, sometimes faint, but can usually be unambiguously detected in at least a part of the colony (Fournier *et al*., 2018b). Microscopically, *X. globosa* is characterized by ascospores 21–30 × 6.7–9.3 µm, fusiform-inequilateral with narrowly rounded ends and a short diagonal germ slit.

The combination of these characters enables in most cases to distinguish *X. globosa* from its closest relatives *X. moelleroclavus*, *X. schweinitzii* and *X. scruposa* (this paper).

Xylaria hyperythra (Mont.) Mont., *Sylloge generum specierumque plantarum cryptogamarum*: 202 (1856). Plate 10, Table 5.

Stromata cylindrical to clavate, terete to strongly flattened, with obtuse fertile apex, straight to curved, simple to apically furcate, 10–75 mm in total height, the fertile head 8–35 mm high × (3–)5–6(–12) mm diam, shrivelling upon drying and occasionally with a longitudinal furrow; stipes most often sharply-defined, (2–)5–34(–40) mm high, yellowish, partly glabrous to most often entirely overlain by a dark brown to blackish tomentum, the base swollen and densely tomentose; surface light yellowish brown to cinnamon, blackish when overlain by released ascospores, with faintly exposed to unexposed perithecial contours, finely cracked into irregular strips; outermost coating bipartite, releasing respectively olivaceous yellow and vinaceous pigments in 10% KOH and NH_3, comprising a thin, superficial, yellow to cinnamon pellicle and an underlying white granular layer ca. 80 µm thick; subsurface a leathery to slightly carbonaceous crust 80–100 µm thick; interior solid, pithy, whitish with a brownish grey inner core. **Perithecia** subglobose to depressed-spherical, 0.4–0.7 mm diam, laterally flattened when in contact. **Ostioles** obtusely papillate, apically discoid, black, 80–100 µm diam, opening between the strips and barely protruding above the surface.

Asci cylindrical, with (4–6–)8 slightly overlapping uniseriately arranged ascospores, the spore-bearing parts 108–118 × 8–8.5 µm, the stipes 68–112 µm long, with apical apparatus tubular to slightly urn-shaped, apically flattened with a sharply to ill-defined, obtuse lateral rim, 4.1–5.1 × 2.5–3 µm (Me = 4.6 × 2.7 µm, N = 40), strongly bluing in Melzer's reagent. **Paraphyses** copious, hyphal, thin-walled, 7–10 µm wide at base, tapering to 1.5–2 µm wide above asci, sparsely guttulate, discretely embedded in mucilaginous material. **Ascospores** (13.7–)15–18(–19.1) × (5–)5.3–6.8(–7.4) µm, Q = (2.1–)2.3–3.3(–3.6), N = 600 (Me = 16.3 × 6.1 µm, Qe = 2.7), ellipsoid-inequilateral to navicular with narrowly to broadly rounded ends, at times with one end slightly pinched, frequently slightly ventrally concave, blackish brown, unicellular, with a narrow, longitudinally oriented, straight germ slit 7–8 µm long on the ventral side; lacking appendages or mucilaginous sheath; epispore smooth.

Asexual morph on the natural substrate not seen.

Known distribution: Likely Neotropical: French Guiana (holotype), Guadeloupe and Martinique (this paper), but rarely recorded.

An excellent illustration[1] of *X. hyperythra* from Amazonian Ecuador by J. Petersen, showing concolourous and glabrous stipes, suggests it is more likely *X. olobapha* rather than *X. hyperythra*.

Specimens examined: French West Indies:Guadeloupe: Basse-Terre, Sainte-Rose, Rivière Janikeste, hygrophilic rainforest, on dead wood,

[1] URL: http://www.jenshpetersen.dk/fungi/Fungal%20Shapes/album/thumbs/XylariaHyperythra.jpg

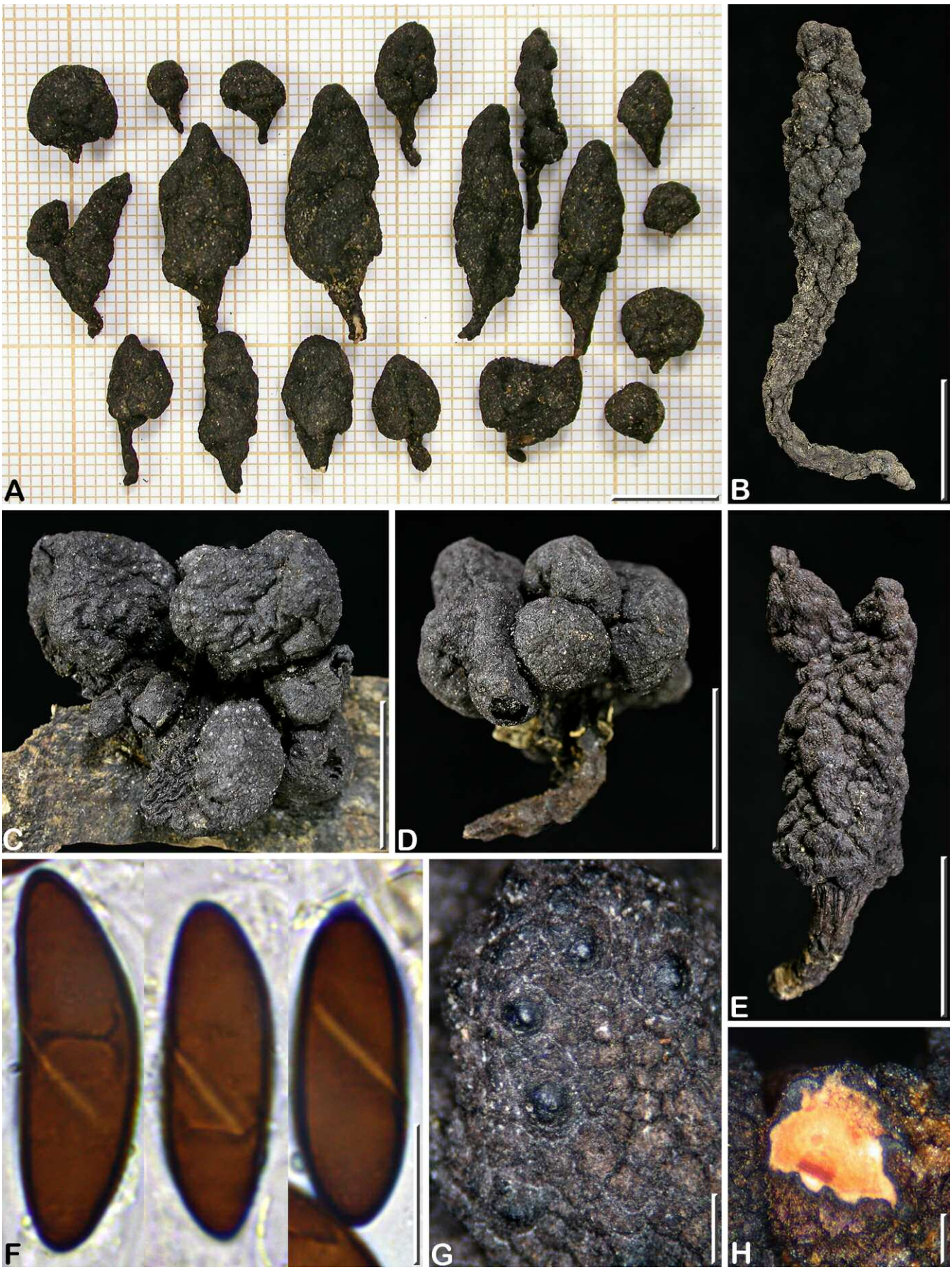

Plate 9 – *Xylaria globosa*

A, F: CLL 6139; B, E, G, H: CLL 5300; C, D: CLLMAR 11003 A: Habit of differently shaped stromata from the same collection; B: Atypical long-stipitate stroma with cylindrical, strongly nodulose fertile head; C: Habit of variously shaped stromata on host surface; D: Atypical stroma featuring a bunch of subglobose to deformed fertile heads on top of a narrow stipe; E: Atypical stroma with a strongly nodulose, apically furcate and apiculate fertile head; F: Three ascospores in ventral view showing a diagonal germ slit, in 1% SDS; G: Stromatal surface in close-up showing black discoid ostioles surrounded by thick polygonal warts; H: Broken base of a stipe of a mature stroma showing orange interior. Scale bars: A-E = 10 mm; F = 10 µm; G, H = 0.5 mm.

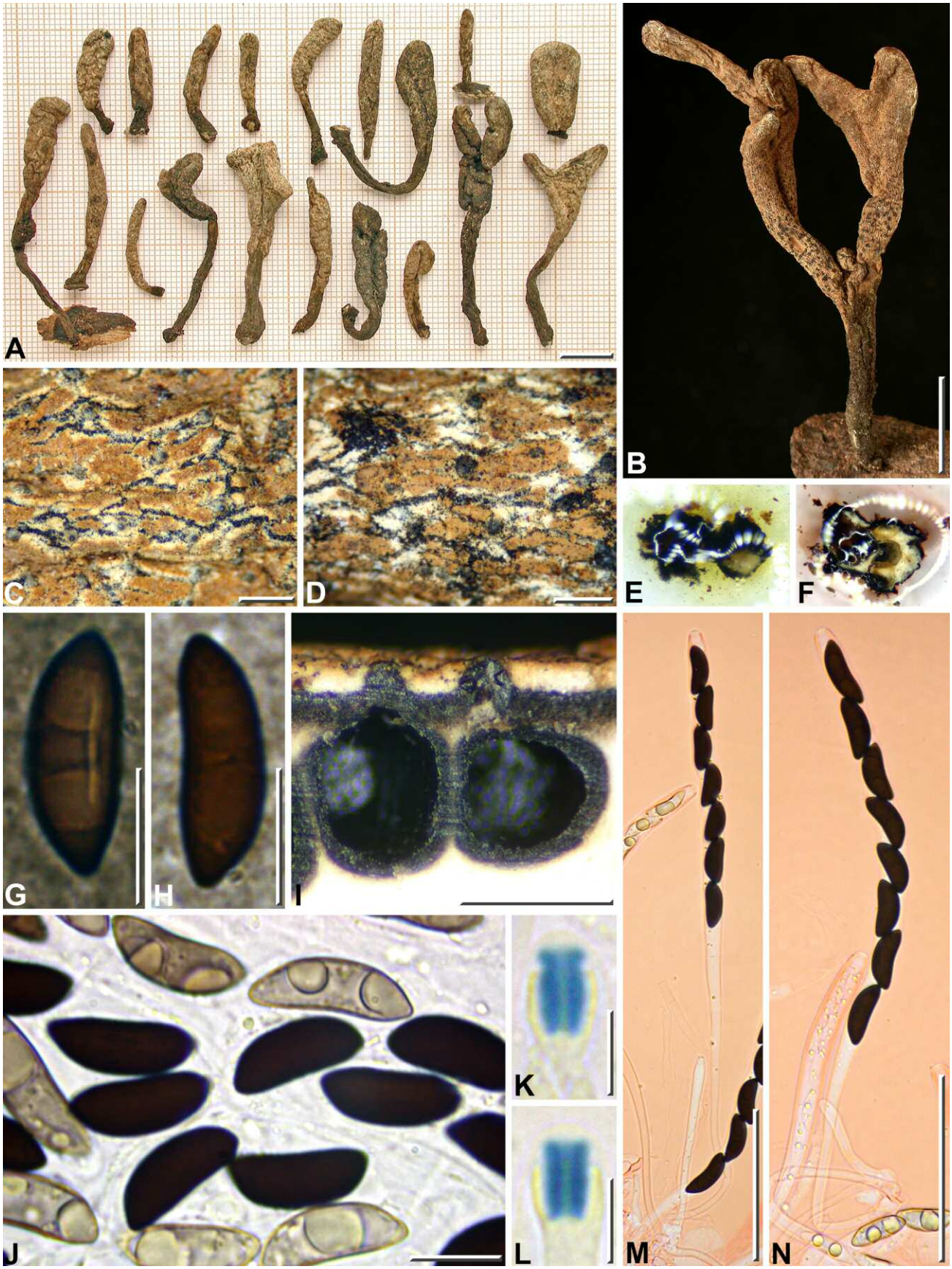

Plate 10 – *Xylaria hyperythra*

A, C-N: MJF 16032; B: MJF 15054. A: Variously shaped immature and mature stromata from the same collection; B: Partly immature, branched and flattened stroma; C: Stromatal surface of an immature stroma; D: Stromatal surface of a mature stroma showing a cracked cinnamon superficial layer exposing a white underlying layer, and low discoid ostioles; E, F: Pigments extracted from a fragment of stromatal surface, in 10% KOH and NH_3 respectively; G: Ascospore in latero-ventral view showing a germ slit and absence of mucilaginous sheath, in India ink; H: Ascospore in side view with slightly pinched ends, showing absence of mucilaginous sheath, in India ink; I: Two adjacent perithecia fully immersed beneath a thin slightly carbonaceous crust and a bipartite superficial layer pierced by two ostioles; J: Immature and mature ascospores, in 1% SDS; K, L: Ascal apical apparati, in Melzer's reagent; M, N: Seven- and eight-spored mature asci, in Congo red and 3% KOH. Scale bars: A, B = 10 mm; C, D, I = 0.5 mm; G, H, J = 10 µm; K, L = 5 µm; M, N = 50 µm.

Table 5 – Ascospore dimensions in ten collections of *X. hyperythra* from Guadeloupe and Martinique, showing a narrow range of intraspecific variations, compared with those reported in literature. Extreme values in parentheses.

Collections numbers	Ascospore measurements	Q = quotient l/w N = number of measurements	Mean values
CLL 2093	(14.4–)15.2–17.4(–18.4) × (5.5–)5.8–6.6(–6.8) µm	Q = (2.2–)2.4–2.9(–3.1), N = 60	Me = 16.2 × 6.2 µm, Qe = 2.6
CLL 2108	(15.4–)15.8–17.5(–18.5) × (5.7–)5.9–6.4(–6.8) µm	Q = (2.3–)2.5–2.9(–3.2), N = 60	Me = 16.6 × 6.2 µm, Qe = 2.7
CLL 2126	(14.6–)15.2–17.2(–19.9) × (5.3–)5.6–6.4(–6.7) µm	Q = (2.3–)2.4–3(–3.7), N = 60	Me = 16.2 × 6 µm, Qe = 2.7
CLL 2132	(15.1–)15.6–17.9(–18.8) × (5.4–)5.8–6.5(–7) µm	Q = (2.4–)2.5–2.9(–3.4), N = 60	Me = 16.7 × 6.2 µm, Qe = 2.7
CLL 2154	(14.3–)15–17.1(–17.9) × (5.4–)5.7–6.5(–6.9) µm	Q = (2.1–)2.5–2.8(–3.3), N = 60	Me = 16.1 × 6.1 µm, Qe = 2.7
CLL 2156	(14.6–)15.3–17.3(–19) × (5.4–)5.6–6.5(–6.8) µm	Q = (2.2–)2.4–3.1(–3.3), N = 60	Me = 16.2 × 6.1 µm, Qe = 2.7
CLL 8226	(13.7–)15.1–16.8(–19.9) × (5.3–)5.8–6.5(–7.1) µm	Q = (2.2–)2.4–2.9(–3.3), N = 60	Me = 16.1 × 6.1 µm, Qe = 2.7
MJF 15054	(14.8–)15.2–17(–18.2) × (5.6–)5.9–6.8(–7.4) µm	Q = (2.1–)2.3–2.8(–3), N = 60	Me = 16 × 6.3 µm, Qe = 2.5
MJF 15055	(13.8–)15.4–18(–18.8) × (5.4–)5.8–6.6(–6.8) µm	Q = (2.2–)2.4–3.1(–3.3), N = 60	Me = 16.5 × 6.1 µm, Qe = 2.7
MJF 16032	(13.7–)15.2–17.6(–19.1) × (5–)5.3–6.1(–6.5) µm	Q = (2.2–)2.6–3.3(–3.6), N = 60	Me = 16.4 × 5.7 µm, Qe = 2.9
Cumulated values	(13.7–)15–18(–19.1) × (5–)5.3–6.8(–7.4) µm	Q = (2.1–)2.3–3.3(–3.6), N = 600	Me = 16.3 × 6.1 µm, Qe = 2.7
Dennis (1956)	16–19 × 5.5–7 µm	–	Me = 17.5 × 6.3 µm, Qe = 2.8
San Martín (1992)	(15–)15.5–18 × (5.5–)6 µm	–	Me = 16.6 × 5.8 µm, Qe = 2.9

15 Aug. 2008, *leg.* C. Lechat, CLL 8226 (LIP). Martinique: Case-Pilote, Crête Jean-Louis, hygrophilic rainforest, on a dead corticated branch, 27 Aug. 2004, *leg.* C. Lechat, CLL 2156 (LIP); Le Lorrain, Rivière Pirogue, Crassous forest, mesophilic rainforest, on a dead corticated branch, 26 Aug. 2004, *leg.* F. Hairie, CLL 2126 (LIP); *ibid.*, on a dead corticated branch, 26 Aug. 2004, *leg.* C. Lechat, CLL 2132 (LIP); *ibid.*, on a dead corticated branch, 26 Aug. 2004, *leg.* C. Lechat, CLL 2154 (LIP); Le Saint-Esprit, Bois La Charles, mesophilic rainforest, on a dead corticated twig, 25 Aug. 2004, *leg.* F. Hairie, CLL 2093 (LIP); *ibid.*, on a dead corticated branch, 25 Aug. 2004, *leg.* R. Courtecuisse, CLL 2108 (LIP); Sainte-Luce, Montravail forest, relict hygrophilic rainforest, on dead corticated branchlets in the leaf litter, 30 Jul. 2016, *leg.* J. Fournier, MJF 16032 (LIP); Sainte-Marie, Perou State Forest, 430–450 m hygrophilic rainforest, on a dead corticated branch, 13 Jun. 2015, *leg.* J. Fournier, MJF 15054 (LIP); *ibid.*, on a dead corticated branch and twigs of mahogany (*Swietenia macrophylla*, *Meliaceae*), 13 Jun. 2015, *leg.* J. Fournier, MJF 15055 (LIP) (largely immature).

Comments: *Xylaria hyperythra* is a poorly documented taxon, known from Dennis' description (1956) and data given by San Martín (1992) in his discussion on *X.* cf. *olobapha* Berk. var. *camptospora* Penz. & Sacc. Our collections fit well Dennis' concept in having clavate, stipitate stromata with obtuse fertile apices, with a pale yellowish brown to cinnamon surface splitting into strips and blackish brown, opaque, inequilateral ascospores 15–18 × 5.3–6.8 µm. Dennis (1956) synonymized *X. olobapha* with *X. hyperythra*, while San Martín (1992), after revision of the type specimen of *X. olobapha*, stated it was a slightly different species with larger stromata, less prominent ostioles and larger ascospores 20–21 × 5.5–6 µm and proposed to keep *X. hyperythra* separate from *X. olobapha*. We follow San Martín's view based on the examination of three collections with larger ascospores 19.5 × 6.6 µm, in correlation with more massive and carbonaceous stromata with a thicker crust, that we consider to represent *X. olobapha* better than *X. hyperythra* (this paper). The synonymy of *X. hyperythra* and *X. olobapha* made by Dennis (1956) likely accounts for the slightly larger ascospore size range given for *X. hyperythra* by this author (Table 5).

The typically narrowly clavate stromata of *X. hyperythra* rarely exceed 5–6 mm wide, which makes their placement in the group of robust species arguable. However, as stromata are frequently branched and flattened and then exceed 10 mm wide, we decided to keep them in this group but to also include *X. hyperythra* in the key to species with slender stromata (part III).

Xylaria hyperythra shares many distinctive morphological traits with *X. enterogena* and *X. telfairii*, including cylindrical, clavate or fusoid stromata with a carbonaceous crust overlain by a bipartite, yellowish and white superficial layer releasing pigments in KOH and in NH_3, poorly developed ostioles and blackish brown inequilateral ascospores with a short germ slit (see comments on *X. telfairii* in this paper for differential characters). This strongly suggests close affinities between these three species and with *X. olobapha* and its variety *camptospora*, and should be investigated by molecular comparative studies.

Xylaria moelleroclavus J.D. Rogers, Y.-M. Ju & Hemmes, *Mycological Research*, 101 (3): 345 (1997). Plates 11–12, Table 6.

Stromata upright, simple, 21–93 mm in total height, the fertile head 10–80 mm high × (3.5–)6–17 mm wide, cylindric-fusiform, fusiform-flattened or ellipsoid-flattened, straight to slightly curved, cerebriform due to deep wrinkles appearing between groups of perithecia upon drying, perithecial contours not to faintly exposed, with broadly rounded to attenuated fertile apices, turning hollow upon drying and frequently longitudinally split with inrolled margins; the stipes ill- to sharply-defined, 5–27 mm high × 2–5 mm diam, blackish, smooth, puckered, slightly swollen and tomentose at base; surface brownish grey to blackish brown, with a persistent, brownish grey to copper brown, horny, adherent outermost layer finely cracked into narrow elongated strips; subsurface a thin black leathery crust 40–45 µm thick, fairly hard-textured at dry state; scattered pits 100–170 µm diam representing the former insertion of conidial pegs commonly present, preferably on immature or young stromata; interior whitish to yellowish, solid around and beneath the perithecia but turning hollow internally. **Perithecia** immersed, subglobose to laterally compressed, 0.6–0.85 mm diam. **Ostioles** discoid, flattened to slightly papillate, 80–100(–120) µm diam, black, rarely surrounded by a white halo.

Asci cylindrical, with (6–)8 slightly overlapping uniseriately arranged ascospores, the spore-bearing parts 118–136 × 7–8.5 µm, the stipes 85–115 µm long, with apical apparatus 4–5 × 2.7–3.5 µm (Me = 4.5 × 3.1 µm, N = 60), slightly urn-shaped with an obtuse upper rim, strongly bluing in Melzer's reagent. **Paraphyses** copious, hyphal, thin-walled, remotely septate, 4–5 µm wide at base, tapering to 1.5–1.8 µm wide above asci. **Ascospores** (16.4–)17.1–20.8(–21.9) × (5.5–)5.8–7.3(–8.2) µm, Q = (2.4–)2.6–3.4(–3.6), N = 300 (Me = 18.8 × 6.4 µm, Qe = 2.9), ellipsoid-inequilateral to navicular with narrowly rounded to slightly pinched ends, dark brown, with a conspicuous

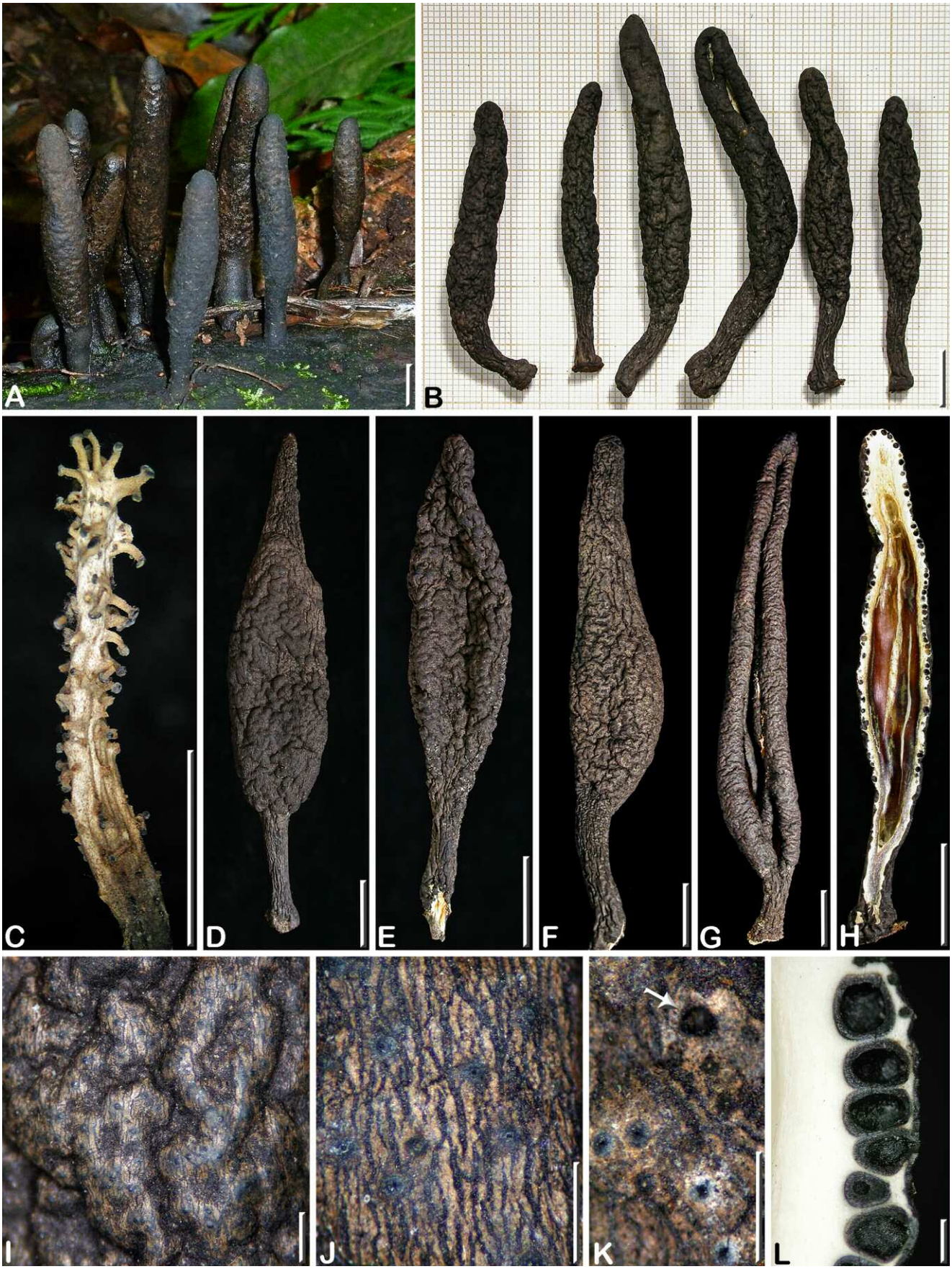

Plate 11 – *Xylaria moelleroclavus*

A, B, H-J, L: MJF 13241; C: CLL 8256; D: CLL 0966; E: CLL 8401; F, G: MJF 07118; K: CLL 0813. A: Habit of turgescent stromata *in situ*; B: Shrivelled stromata at dry state (the same as in A), with cerebriform surface; C: Young stroma with lateral conidial pegs; D: Large flattened stroma with apiculate sterile apex; E, F: Large flattened stroma with tapering fertile apices; G: Large stroma longitudinally split, with margins inrolled; H: Stroma in vertical section showing immersed perithecia and a hollow interior; I: Cerebriform stromatal surface; J: Stromatal surface in close-up showing a light brown outermost layer cracked into elongated strips and slightly papillate black ostioles; K: Stromatal surface in close-up showing perithecial contours slightly exposed with black porate ostioles and a pit (arrow); L: Stroma in vertical section in close-up showing crowded perithecia immersed under a thin black crust and embedded in solid white tissue. Scale bars: A, B, D-H = 10 mm; C, I-L = 0.5 mm.

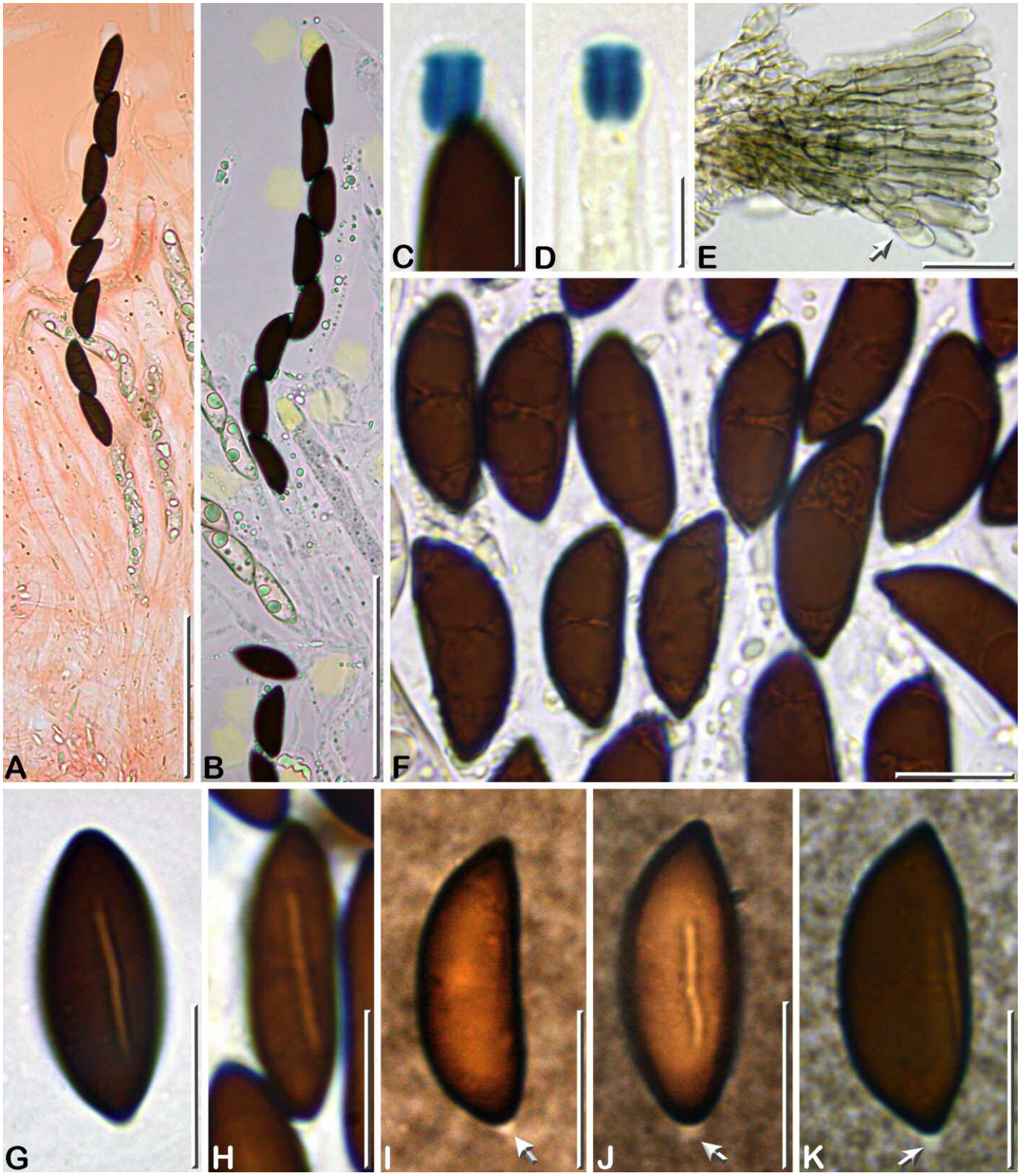

Plate 12 – *Xylaria moelleroclavus*

A-D, F-J: MJF 13241; E: CLL 8256; K: MJF 07118. A, B: Mature asci, in Congo red in 1% SDS and in diluted Pelikan® black ink respectively; C, D: Ascal apical apparati from a mature and an immature ascus respectively, in Melzer's reagent; E: Palisadic conidiophores from a conidial stroma head, with a conidium (arrow) (in 3% KOH); F: Mature ascospores, showing variously pinched ends, in 1% SDS; G: Ascospores in ventral view showing a slightly oblique germ slit, in heated chloral-lactophenol and 1% SDS respectively; I-K: Ascospores in India ink showing a minute polar appendage (arrows) and a longitudinal germ slit in J. Scale bars: A, B = 50 µm; C, D = 5 µm; E = 20 µm; F-K = 10 µm.

obliquely oriented to almost longitudinally oriented germ slit ca. 1/2 spore-length; a minute hemispherical cellular appendage, only detected in India ink, usually present on the less pinched end; epispore smooth.

Asexual morph on the natural substrate consisting of conidial pegs arising laterally from filiform immature stromata, bearing discoid, dark grey heads comprised of palisadic greyish green conidiogenous cells. Asexual morph in nature and in culture were described in detail by Rogers *et al.* (1997).

Known distribution: Pantropical: Brazil, Ecuador, USA (Hawaii) (Rogers *et al*., 1997; Rogers & Ju, 2012), Guadeloupe and Martinique (this paper), Taiwan (Ju & Rogers, 1999).

Specimens examined: French West Indies: Guadeloupe: Basse-Terre, Saint-Claude, Matouba, Victor Hughes track, hygrophilic rainforest, on a dead corticated branch, 19 Aug. 2008, *leg.* C. Lechat & R. Courtecuisse, CLL 8256 (asexual state) (LIP). Basse-Terre, Petit-Bourg, Natural Park of Guadeloupe, Maison de la Forêt, hygrophilic rainforest, on dead decorticated wood, 8 Sept. 2003, *leg.* C. Lechat, CLL 0966 (LIP). Martinique: Case-Pilote, Crête Jean-Louis, hygrophilic rainforest, on dead wood, 4 Sept. 2003, *leg.* C. Lechat, CLL 0813 (LIP); Case-Pilote, Savane Saint-Cyr, trail to Plateau Concorde, hygrophilic rainforest, 600–650 m, on dead wood, 27 Aug. 2010, *leg.* J. Fournier, MJF 10173 (LIP); Fort-de-France, Absalon, track to Plateau Michel, hygrophilic rainforest, on a dead corticated branch, 15 Aug. 2013, *leg.* J. Fournier, MJF 13241 (LIP); Fort-de-France, Colson forest, 550 m, hygrophilic rainforest, on a dead corticated branch, 6 Sept. 2003, *leg.* C. Lechat, CLL 0916 (LIP); Gros-Morne, Forêt domaniale de Rivière Rouge, hygrophilic rainforest, on dead wood, 1 Sept. 2008, *leg.* C. Lechat, CLL 8401 (LIP); Le Lorrain, Rivière Pirogue, mesophilic rainforest, corticated branch, 6 Dec. 2005, *leg.* C. Lechat, CLL 5564 (immature) (LIP); Le Lorrain, Rivière Pirogue, Bois Crassous, ca. 100 m, mesophilic rainforest, corticated branch, 4 Jun. 2014, *leg.* J. Fournier, MJF 14021 (LIP); *ibid.*, 11 Jun. 2014, *leg.* J. Fournier, MJF 14126 (LIP); Le Prêcheur, Anse Couleuvre, coastal mesophilic rainforest, on dead wood, 27 Aug. 2007, *leg.* J. Fournier, MJF 07148 (LIP); Saint-Joseph, Coeur-Bouliki forest, hygrophilic rainforest, on dead wood, 26 Aug. 2007, *leg.* J. Fournier, MJF 07118 (LIP); Sainte-Marie, La Philippe, coastal mesophilic rainforest, on dead wood, 31 Aug. 2010, *leg.* J. Fournier, MJF 10273 (LIP).

Comments: *Xylaria moelleroclavus* has long been confused with *X. scruposa* because of their very similar ascospores and was segregated by Rogers *et al*. (1997) based on its peculiar asexual morph occurring on immature stromata as short pegs bearing a discoid crown of palisadic conidiogenous cells. Conidial pegs come off when the stromata become mature and leave more or less conspicuous pits on surface that are highly diagnostic when present, since this configuration appears unique within known *Xylaria* species.

Xylaria moelleroclavus likewise differs from *X. scruposa* by its usually more robust stromata becoming hollow upon drying, with a cerebriform surface coated with a horny outermost layer splitting into narrow elongated strips and smaller ostioles. The stromata of *X. scruposa*, though highly variable in shape and dimensions, are usually narrowly cylindrical and less than 5 mm wide; they do not turn so drastically hollow upon drying; their outermost layer cracks into small fibrous scales; their surface may be tomentose; and their ostioles are raised-discoid and more conspicuous (Rogers & Callan, 1986; Rogers *et al.*, 1988; San Martín & Rogers, 1989; San Martín, 1992; Van der Gucht, 1995; this paper).

A further differential character discovered during this study is the presence of a minute cellular appendage on ascospores of *X. moelleroclavus*, only visible in India ink. This appendage could be observed on most of ascospores of all collections studied, including material from French Guiana, and is lacking on ascospores of *X. scruposa*.

Atypical small stromata of *X. moelleroclavus* may be confused with those of *X. schweinitzii* which likewise feature a somewhat cerebriform surface at dry state and share with *X. moelleroclavus* small inconspicuous ostioles. *Xylaria schweinitzii* primarily differs from *X. moelleroclavus* by significantly larger ascospores 23 × 7.1 µm in average and small polygonal scales on the surface worn off with age (this paper).

Based on our experience in the West Indies and in French Guiana, *X. moelleroclavus* is more commonly encountered in montane hygrophilic rainforests where its stromata may attain strikingly large dimensions; stromata collected in lowland mesophilic forests are usually much smaller.

Xylaria olobapha Berk., *Grevillea*, 11 (59): 84 (1883). Plate 13, Tables 7–8.

Stromata cylindric-clavate to clavate, terete to slightly flattened, occasionally with transverse constrictions, with an obtuse fertile apex, stunted stromata occasionally with a mucronate sterile apex, straight to slightly curved, simple, 12–52 mm in total height, the fertile head 8–40 mm high × (4–)6–9 mm diam, occasionally longitudinally split; the stipes often sharply-defined, (2–)6–22 mm high, glabrous, hard-textured, concolourous with the fertile head, slightly swollen and darkened at base; surface light yellowish brown to cinnamon, with unexposed perithecial contours, finely cracked into irregularly elongated strips; outermost coating bipartite, releasing amber pigments in 10% KOH and NH_3, comprising a thin, superficial, vanishing yellow to cinnamon pellicle and an underlying white granular layer 30–80 µm thick; subsurface a black, strongly carbonaceous crust 170–250 µm thick; interior a soft, pithy, whitish to blackish tissue surrounding the perithecia, with a whitish, loosely fibrous central part becoming hollow in fully mature stromata. **Perithecia** subglobose, 0.5–0.75 mm diam, laterally flattened when in contact. **Ostioles** obtusely papillate, black, 70–100 µm diam, opening between the scales and barely protruding above the surface.

Asci cylindrical, with (4–6–)8 slightly overlapping uniseriately arranged ascospores, the spore-bearing parts 136–147 × 7.5–8 µm, the stipes 100–130 µm long, with apical apparatus tubular to slightly urn-shaped, apically flattened with a sharply defined, obtuse lateral

Table 6 – Ascospore dimensions in five randomly selected collections of *X. moelleroclavus* from Guadeloupe and Martinique, showing a narrow range of intraspecific variations, compared with those reported in literature. Extreme values in parentheses.

Collections numbers	Ascospore measurements	Q = quotient l/w N = number of measurements	Mean values
CLL 0813	(16.4–)17.3–19.4(–20.4) × (5.5–)5.9–6.5(–7.1) µm	Q = (2.6–)2.7–3.2(–3.6), N = 60	Me = 18.3 × 6.2 µm, Qe = 3
CLL 0966	(17.3–)17.9–20.8(–22.4) × (5.8–)6.2–7.3(–7.7) µm	Q = (2.4–)2.6–3.1(–3.6), N = 60	Me = 19.2 × 6.7 µm, Qe = 2.9
CLL 8401	(16.5–)18.2–20.7(–21.2) × (5.6–)6–7.1(–7.9) µm	Q = (2.4–)2.7–3.3(–3.4), N = 60	Me = 19.3 × 6.6 µm, Qe = 2.9
MJF 07118	(17–)17.8–20.4(–21.9) × (5.6–)5.8–6.5(–6.8) µm	Q = (2.8–)2.9–3.4(–3.6), N = 60	Me = 19 × 6.1 µm, Qe = 3.1
MJF 13241	(16.5–)17.1–19.7(–21.4) × (5.5–)6–6.8(–8.2) µm	Q = (2.4–)2.6–3.2(–3.5), N = 60	Me = 18.4 × 6.4 µm, Qe = 2.9
Cumulated values	(16.4–)17.1–20.8(–21.9) × (5.5–)5.8–7.3(–8.2) µm	Q = (2.4–)2.6–3.4(–3.6), N = 300	Me = 18.8 × 6.4 µm, Qe = 2.9
Rogers *et al.* (1997)	17–21(–23) × 6–7.5 µm	–	Me = 19 × 6.8 µm, Qe = 2.8

Plate 13 – *Xylaria olobapha*

CLL 2364. A: Variously shaped mature stromata from the same collection; B, C: Pigments extracted from a fragment of stromatal surface, in NH_3 and 10% KOH respectively; D: Stroma in vertical section showing a blackish tissue around the perithecia and a loosely fibrous whitish interior; E: Stroma in side view showing a glabrous, sharply-defined stipe concolourous with the fertile head; F: Stromatal surface showing elongated white strips partly overlain with an orange superficial layer; G: Two adjacent perithecia immersed beneath a thick carbonaceous crust and embedded in a blackish soft tissue; H, I: Long-stipitate mature asci, in Congo red and 3% KOH and in black Pelikan® ink respectively; J: Ascal apical apparati, in Melzer's reagent; K: Immature ascospore in ventral view showing a conspicuous germ slit, in 1% SDS; L: Obtusely papillate ostiole in close-up; M: Mature ascospore in latero-ventral view showing an inconspicuous germ slit and a pinched end, in 1% SDS; N: Mature ascospores in side view, in 1% SDS. Scale bars: A, E = 10 mm; D, F = 1 mm; G = 0.5 mm; H, I = 50 µm; J, K, M = 5 µm; L = 100 µm; N = 10 µm.

Table 7 – Ascospore dimensions in three collections of *X. olobapha* from Guadeloupe, showing a narrow range of intraspecific variations, compared with those reported from the holotype in literature. Extreme values in parentheses.

Collections numbers	Ascospore measurements	Q = quotient l/w N = number of measurements	Mean values
CLL 2297	(17.3–)18.3–20.5(–21.5) × (5.9–)6.2–7.1(–7.3) µm	Q = (2.5–)2.7–3.2(–3.4), N = 60	Me = 19.2 × 6.7 µm, Qe = 2.9
CLL 2364	(17.9–)18.7–20.8(–22.2) × (5.7–)6.3–7.1(–7.5) µm	Q = (2.6–)2.7–3.3(–3.6), N = 60	Me = 19.8 × 6.7 µm, Qe = 3
CLL 8208B	(17.4–)18.6–20.8(–21.8) × (5.6–)5.9–6.9(–8) µm	Q = (2.5–)2.8–3.3(–3.6), N = 60	Me = 19.5 × 6.5 µm, Qe = 3
Cumulated values	(17.3–)18.3–20.8(–22.2) × (5.6–)5.9–7.1(–8) µm	Q = (2.5–)2.7–3.3(–3.6), N = 180	Me = 19.5 × 6.6 µm, Qe = 3
San Martín (1992)	(18.5–)20–21(–22) × 5.5–6(–7) µm	–	Me = 20.5 × 5.8 µm, Qe = 3.5

rim, 4.4–5.2 × 2.6–3.3 µm (Me = 4.7 × 3 µm, N = 25), strongly bluing in Melzer's reagent. **Paraphyses** sparse, hyphal, thin-walled, 7–10 µm wide at base, tapering to 1–2 µm wide above asci, sparsely guttulate, collapsed, discretely embedded in mucilaginous material. **Ascospores** (17.3–)18.3–20.8(–22.2) × (5.6–)5.9–7.1(–8) µm, Q = (2.5–)2.7–3.3(–3.6), N = 180, (Me = 19.5 × 6.6 µm, Qe = 3), ellipsoid-inequilateral to navicular with narrowly to broadly rounded ends, at times with one end slightly pinched, frequently slightly ventrally concave, blackish brown, unicellular, with a narrow, longitudinally oriented, straight germ slit 10–11 µm long on the ventral side; lacking appendages or mucilaginous sheath; epispore smooth.

Asexual morph on the natural substrate not seen.

Known distribution: Brazil (holotype), Guadeloupe (this paper). An excellent illustration of *X. hyperythra* from Amazonian Ecuador by J. Petersen (see URL on page 90), showing concolourous and glabrous stipes suggests it is more likely *X. olobapha* rather than *X. hyperythra*.

Specimens examined: French West Indies: Guadeloupe: Basse-Terre, Capesterre-Belle-Eau, third Carbet waterfall, hygrophilic rainforest, on a dead corticated branch, 13 Aug. 2008, *leg.* C. Lechat, CLL 8208B (LIP); Basse-Terre, Sainte-Rose, Sofaïa, path to Saut des Trois Cornes, meso- to hygrophilic rainforest, on dead wood, 3 Sept. 2004, *leg.* C. Lechat, CLL 2297 (LIP); Grande-Terre: Les Abymes, Chazeau, lowland mesophilic forest, on dead wood, 6 Sept. 2004, *leg.* C. Lechat, CLL 2364 (LIP).

Comments: Out of thirteen collections first referred to *X. hyperythra* based on overall morphology (this paper), three of them, illustrated above, were different in having slightly larger ascospores, in average 19.5 × 6.6 µm vs 15–18 × 5.3–6.8 µm. A more detailed morphological comparison showed that this difference in ascospore dimensions was correlated with differences in black crust thickness, stipe vestiture, colour and texture of the interior and pigments released by a fragment of stroma in NH_3 (Table 8). This set of deviating characters suggesting a species different from *X. hyperythra*, we considered *X. olobapha*, a poorly documented species whose type was examined by San Martín (1992). According to this author, ascospores of *X. olobapha* are (18.5–)20–21(–22) × 5.5–6(–7) µm, and Cooke (1883) gives the range of 20–22 × 8.5 µm based on the same material.

After revision of type collections, *X. columnifera* Mont. (1855), with ascospores 18.5–22.5 × 6–8.5 µm, appears to be an earlier synonym of *X. olobapha*, and *X. paraensis* Henn. (1902) a later synonym (Ju, pers. comm., 2019).

Ascospores of our collections from Guadeloupe average slightly smaller but the stouter stromata reported by both authors and the glabrous stipes reported by Cooke (1883) match fairly well our material. In absence of additional information regarding the black crust thickness and the NH_3 reaction of the type of *X. olobapha*, our identification to this species cannot be more than tentative until more fresh material becomes available from the Amazonian forests. It is noteworthy that collections from French Guiana referable to *X. olobapha* var. *camptospora* based on their larger ascospores likewise feature a thick carbonaceous crust, glabrous stipes and amber NH_3 reaction (JF, unpublished data).

Xylaria regalis Cooke, *Grevillea*, 11 (59): 86 (1883). Plate 14, Table 9.

Stromata upright, simple, at times connate at base by 2–3, 45–130 mm in total height, the fertile head 20–95 mm high × 8–35 mm wide, cylindrical to clavate, terete to flattened, often strongly irregular to grotesque, straight to contorted, with deep cracks and furrows when dry, perithecial contours not exposed, with broadly rounded fertile apices, turning partly hollow upon drying and occasionally longitudinally split with inrolled margins; the stipes ill- to sharply-defined, 10–50 mm high × 4–20 mm diam, blackish brown, smooth, puckered, glabrous; surface yellowish grey when immature, dark copper brown at maturity, with a thin, persistent, yellowish, greyish or rust-brown outermost pellicle finely cracked into small polygonal scales at maturity; subsurface a black crust 130–170 µm, leathery to slightly carbonaceous at dry state; interior whitish or cream-coloured, grey in places, woody, solid to partly hollow. **Perithecia** immersed, subglobose to laterally compressed, 0.5–0.85 mm diam. **Ostioles** discoid, slightly convex, papillate, 130–170(–250) µm diam, black, at times overlain by white substance.

Asci cylindrical, with (4–)8 overlapping uniseriately arranged ascospores, the spore-bearing parts 78–94 × 6–7.5 µm, the stipes 42–95 µm long, with apical apparatus 2.5–3.2 × 1.8–2.4 µm (Me = 2.9 × 2 µm, N = 40), short-cylindrical to slightly tubular with a faint upper rim, bluing in Melzer's reagent. **Paraphyses** copious, hyphal, thin-

Table 8 – Differential characters between *X. olobapha* and *X. hyperythra*, based on collections from Guadeloupe and Martinique.

	X. olobapha	***X. hyperythra***
Fertile head diameter	(4–)6–9 mm	(3–)5–6(–12) mm
Ascospore dimensions	18.3–20.8 × 5.9–7.1 µm, Me = 19.5 × 6.6 µm, Qe = 3	15–18 × 5.3–6.8 µm, Me = 16.3 × 6.1 µm, Qe = 2.7
Black crust thickness	170–250 µm	80–100 µm
Stipe vestiture	glabrous, pale orange brown	tomentose, dark brown
Interior	blackish and solid at periphery, whitish and loosely fibrous at centre	solid, whitish, pithy
NH_3 reaction	amber	vinaceous

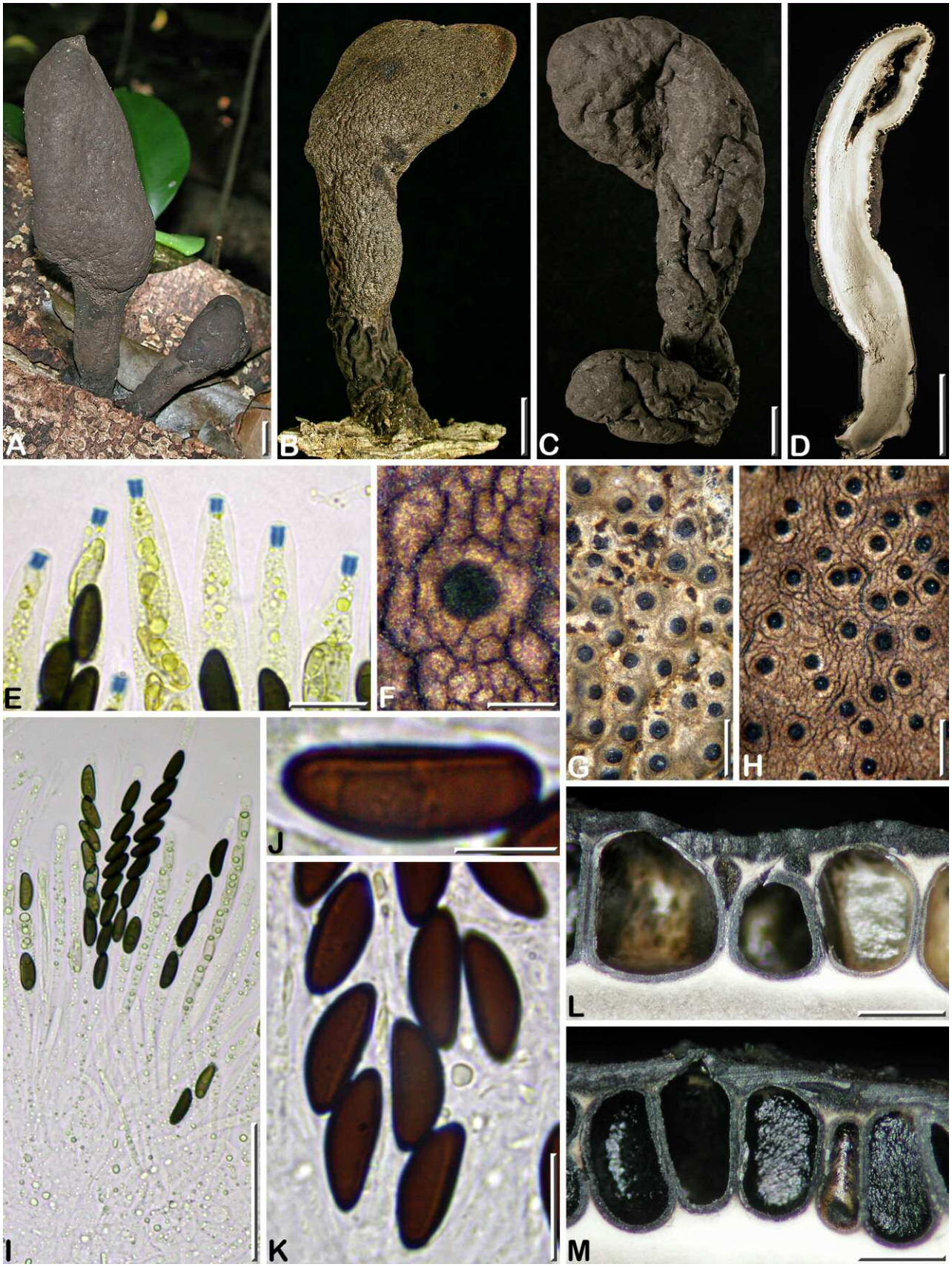

Plate 14 – *Xylaria regalis*

A-E, G-J, L, M: MJF 10035; F, K: CLLMAR 11052. A: Habit of two connate turgescent stromata *in situ*; B: Immature stroma at dry state; C: Two connate shrivelled stromata at dry state; D: Stroma in longitudinal section showing a solid white to grey interior, hollow at apex; E Ascal apical apparati from mature and immature asci, in Melzer's reagent; F: Stromatal surface of a mature stroma in close-up showing a reticulately cracked surface around an ostiole; G: Stromatal surface of an immature stroma in close-up showing a continuous yellowish superficial layer; H: Stromatal surface of a mature stroma in close-up showing a brown reticulately cracked superficial layer and black discoid ostioles; I: Asci in 1% SDS, note a four-spored ascus with larger ascospores on the right; J: Ascospore with obtuse ends in latero-ventral view showing a long germ slit, in 1% SDS; K: Ascospores with more narrowly rounded ends, showing a long germ slit, in 1% SDS; L, M: Stromatal surface in vertical section showing variously shaped immature and mature perithecia fully immersed beneath a thick black crust. Scale bars: A-D = 10 mm; E, K = 10 µm; F = 0.2 mm; G, H, L, M = 0.5 mm; I = 50 µm; J = 5 µm.

walled, remotely septate, sparsely guttulate, 6–8 µm wide at base, tapering to 1.5–2 µm wide above asci, discretely embedded in mucilaginous material. **Ascospores** (11.7–)12.9–14.6(–16.4) × (4.6–)4.9–5.8(–6.2) µm, Q = (2.4–)2.6–3.4(–3.6), N = 180 (Me = 13.7 × 5.2 µm, Qe = 2.9), ellipsoid-inequilateral with narrowly to broadly rounded ends, at times slightly ventrally concave, unicellular, dark brown, with a straight, longitudinally oriented germ slit almost spore-length, lacking secondary appendages or mucilaginous sheath; epispore smooth.

Asexual morph on the natural substrate not seen.

Known distribution: India (holotype), Guyana, México (Chiapas), Trinidad (Dennis, 1956), Martinique (this paper), Taiwan (Hsieh *et al.*, 2010).

Specimens examined: French West Indies: Martinique: La Trinité, (Caravelle peninsula), Balata, xerophilic coastal forest, on a dead corticated branch, 23 Aug. 2005, *leg.* P.-A. Moreau, CLL 5145 (LIP); La Trinité, Pointe Jean-Claude, coastal meso- to xerophilic forest, on a dead fallen trunk, 24 Aug. 2011, *leg.* C. Lechat, CLLMAR 11087 (LIP); La Trinité, Pointe Rouge, coastal meso- to xerophilic forest, on a dead corticated fallen trunk, 22 Aug. 2010, *leg.* C. Lechat, MJF 10035 (LIP; HAST 144026); *ibid.*, on a dead fallen trunk, 29 Aug. 2010, *leg.* J. Fournier, MJF 10215 (immature) (LIP); *ibid.*, on corticated wood, 20 Aug. 2011, *leg.* C. Lechat, CLLMAR 11052 (LIP); *ibid.*, on a dead fallen trunk, 11 Aug. 2013, *leg.* J. Fournier, MJF 13135 (LIP); *ibid.*, on a dead rotten fallen trunk, 1 Aug. 2016, *leg.* J. Fournier, MJF 16064 (LIP); La Trinité, (Caravelle peninsula), Tartane, Pointe Bateau, coastal meso- to xerophilic forest, on a dead fallen trunk, 26 Aug. 2010, *leg.* J. Fournier, MJF 10132 (LIP); *ibid.*, on a dead rotten fallen trunk, 26 Aug. 2010, *leg.* J. Fournier, MJF 10142 (LIP); *ibid.*, on dead heavily rotten wood, 18 Aug. 2011, *leg.* J.-P. Fiard & O. Roze, CLLMAR 11025 (immature) (LIP).

Comments: *Xylaria regalis* is an outstanding but poorly documented species characterized by massive, upright, irregularly-shaped stromata with a finely cracked copper brown surface roughened by large discoid ostioles, combined with dark brown, ellipsoid-inequilateral ascospores 13.7 × 5.2 µm in average with a long straight germ slit. As noted by Cooke (1883) in the protologue, it is "closely allied to *X.* '*poiteani*' Lév., from which it differs in its rougher exterior and smaller sporidia". According to Rogers (1984), young stromata of *X. poitei* (Lév.) Fr. have a whitish and rather smooth surface and ascospores are 14–18 × 5.5–7.5 µm. Having slightly larger ascospores therefore appears to be the main difference separating *X. poitei* from *X. regalis*. The epithets poitei, poiteana and poiteani found in literature refer to the same taxon, which is confusing and would require to be corrected and stabilized.

Xylaria regalis is likewise morphologically similar to *X. guyanensis* (Mont.) Fr., *X. papulis* C.G. Lloyd and *X. papyrifera* (Link) Fr., from which it is distinguished by differences in stromatal surface colour and cracking pattern, as well as ascospore shape and dimensions (Dennis, 1956; Ju & Rogers, 1999; San Martín & Rogers, 1989). Two specimens of *X. regalis* from India and Taiwan included in the phylogenetic study by Hsieh *et al.* (2010) were shown to have closer affinities with *X. allantoidea* than with other members of the *X. cubensis* aggregate. Molecular data would be helpful to likewise elucidate the status of *X. regalis* against the four abovementioned species and other species in the *X. cubensis* aggregate.

It is noteworthy that the ten collections made in Martinique all come from a restricted area of coastal meso- to xerophilic forest on the Caribbean (east) side next to the Caravelle peninsula and were made on rotting fallen trunks, which strongly suggests specific ecological requirements not encountered in the other parts of the island investigated during this inventorial survey.

Xylaria schweinitzii Berk. & M.A. Curtis, *Journal of the Academy of Natural Sciences Philadelphia*, 2: 284 (1853). Plates 15–16, Table 10.

Stromata usually in small groups, superficial, separate, rarely connate at base, typically with a subglobose to clavate fertile head and a sharply defined stipe, but variable in shape, ranging from irregularly ellipsoid to fusiform or subcylindrical, frequently flattened, straight to curved, with obtuse fertile apices, subsessile to long-stipitate, 10–55 mm in total height, the fertile head 6–24 mm high × 4–20(–25) mm diam, at times longitudinally split when dry; surface cerebriform at dry state, with perithecial contours unexposed, blackish brown to dull black, with a thin, brownish grey to light brown, slightly fibrous superficial layer cracked into small, long-persistent polygonal scales 80–250(–350) µm in greatest dimension; the stipes 3–37 mm high × 1.5–4.5 mm diam, blackish brown, straight to contorted, finely tomentose; subsurface leathery to slightly carbonaceous, 70–80(–120) µm thick; interior white to cream, solid, spongy to woody at dry state, often becoming hollow or lacunose upon drying. **Perithecia** subglobose 0.6–0.85 mm diam, laterally flattened when in contact. **Ostioles** discoid, flush with the surface to slightly convex, not prominent over the scaly superficial layer, black, 100–170 µm diam, porate, frequently surrounded by a more or less conspicuous ring of white substance.

Asci cylindrical, with (4–6–)8 slightly overlapping uniseriately arranged ascospores, the spore-bearing parts 122–155 × 10–12 µm, the stipes 72–95 µm long, with apical apparatus tubular to slightly urn-shaped, apically flattened with a lateral rim, basally attenuated, 5.3–6.8 × 3.5–4.3 µm (Me = 6 × 3.9 µm, N = 50), strongly bluing in Melzer's reagent. **Paraphyses** copious, hyphal, thin-walled, 9–11 µm wide at base, tapering to 1.5–2 µm wide above asci, sparsely guttulate, discretely embedded in mucilaginous material; amorphous, colourless to yellowish granules present at the base of the hymenium in all collections studied, dissolving in 10% KOH without releasing pigments. **Ascospores** (18.6–)19.9–26.8(–29) × (5.5–)6–8.3(–8.7) µm, Q = (2.5–)2.8–3.9(–4.3), N = 660 (Me = 23 × 7.1 µm, Qe = 3.2), fusiform-inequilateral to navicular in side view, slightly ventrally concave, with narrowly rounded to subacute, often slightly pinched ends, medium to dark brown, unicellular, with a conspicuous, oblique, occasionally slightly sigmoid germ slit 8–10 µm long on the flattened side; lacking appendages or mucilaginous sheath; epispore smooth.

Table 9 – Ascospore dimensions in three randomly selected collections of *X. regalis* from Martinique, showing a narrow range of intraspecific variations, compared with those reported in literature. Extreme values in parentheses.

Collections numbers	Ascospore measurements	Q = quotient l/w N = number of measurements	Mean values
CLLMAR 11052	(11.7–)13–14.6(–15) × (4.6–)4.9–5.4(–5.8) µm	Q = (2.3–)2.5–2.8(–3), N = 60	Me = 13.7 × 5.1 µm, Qe = 2.7
MJF 10035	(12.2–)12.9–14.5(–15.9) × (4.7–)5–5.6(–5.8) µm	Q = (2.3–)2.4–2.8(–2.9), N = 60	Me = 13.7 × 5.3 µm, Qe = 2.6
MJF 10142	(12.5–)12.9–14.5(–16.4) × (4.6–)4.9–5.8(–6.2) µm	Q = (2.2–)2.4–2.9(–3.1), N = 60	Me = 13.7 × 5.3 µm, Qe = 2.6
Cumulated values	(11.7–)12.9–14.6(–16.4) × (4.6–)4.9–5.8(–6.2) µm	Q = (2.4–)2.6–3.4(–3.6), N = 180	Me = 13.7 × 5.2 µm, Qe = 2.6
Cooke (1883)	12 × 4 µm	–	12 × 4 µm
Dennis (1956)	12–15 × 5.5–6 µm	–	Me = 13.5 × 5.8 µm, Qe = 2.3

Plate 15 – *Xylaria schweinitzii*

A: MJF 13360; B, D, E, H: CLL 2222; C: CLL 5391; F, G: MJF 15050; I, J: MJF 07058. A: Habit of turgescent stromata *in situ*; B, E, J: Variously shaped and stipitate dry stromata showing a cerebriform surface; C: Longitudinally split dry stroma with inrolled margins; D: Variously shaped dry stromata from the same collection; F, G: Stromatal surface in close-up showing small brownish superficial scales and discoid ostioles partly surrounded with white substance; H: Stroma in vertical section in close-up showing crowded perithecia immersed under a thin black crust and embedded in solid white tissue; I: Stroma in vertical section showing a solid off-white interior. Scale bars: A-E, I, J = 10 mm; F, H = 0.5 mm; G= 0.2 mm.

Asexual morph on the natural substrate not seen. Rogers & Callan (1986) and Van der Gucht (1996) described the cultures on OMA and the asexual morph consisting of typically loosely palisadic conidiophores and conidiogenous cells.

Known distribution: Pantropical (Rogers & Callan, 1986; Rogers *et al*., 1988; San Martín & Rogers, 1989; Van der Gucht, 1995; Ju & Rogers, 1999; Carmona *et al*., 2009; Guzmán & Piepenbring, 2011; Rogers & Ju, 2012).

Specimens examined: French West Indies: Guadeloupe: Basse-Terre, Capesterre-Belle-Eau, Grand-Étang, hygrophilic rainforest, on a dead corticated branch, 6 Sept. 2005, *leg.* C. Lechat, CLL 5391 (LIP; HAST 144027); *ibid.*, on dead wood, 6 Sept. 2005, *leg.* C. Lechat, CLL 5394 (LIP); Basse-Terre, Capesterre-Belle-Eau, third Carbet waterfall, hygrophilic rainforest, on a dead corticated branch, 23 Nov. 2006, *leg.* C. Lechat, CLL 6036-2 (LIP); *ibid.*, on bamboo, 23 Nov. 2006, *leg.* C. Lechat, CLL 6042 (LIP); *ibid.*, on dead wood, 23 Nov. 2006, *leg.* C. Lechat, CLL 6043 (LIP); *ibid.*, on dead wood, 23 Nov. 2006, *leg.* C. Lechat, CLL 6044 (LIP); Basse-Terre, Goyave, trail to Moreau waterfall, hygrophilic rainforest, on a dead corticated branch, 10 Sept. 2003, *leg.* C. Lechat, CLL 1013 (LIP); Basse-Terre, Petit-Bourg, Bois Sergent, mesophilic rainforest, on dead wood, 16 Aug. 2008, *leg.* C. Lechat, CLL 8237 (LIP); *ibid.*, on dead wood, 16 Aug. 2008, *leg.*

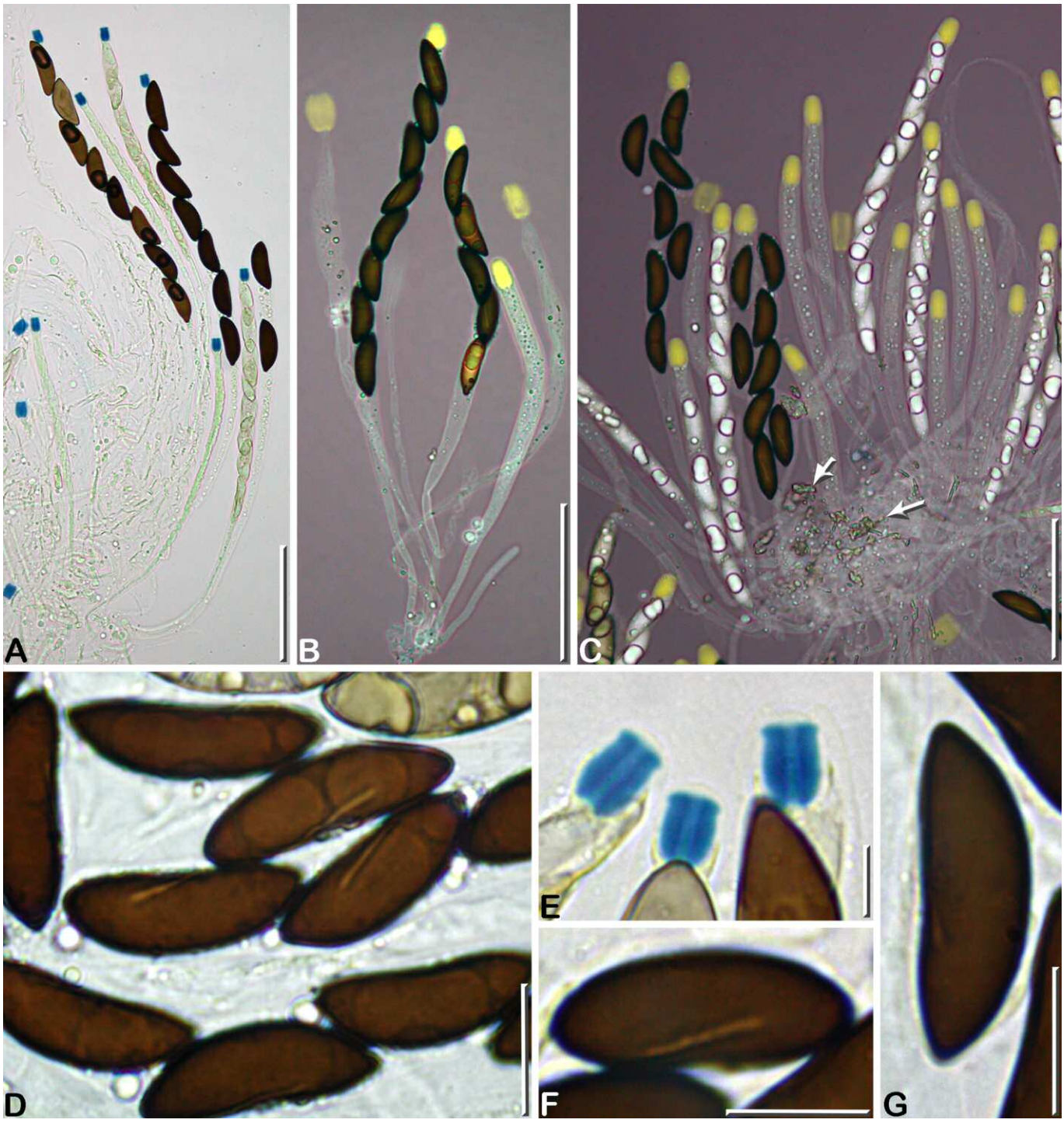

Plate 16 – *Xylaria schweinitzii*

A-C: MJF 16183; D: CLL 2222; E-G: MJF 16174. A: Long-stipitate immature and mature asci, in Melzer's reagent; B: Eight- and five-spored asci, in black Pelikan® ink; C: Few-spored mature asci and immature asci with amorphous material at base of the hymenium (arrows), in black Pelikan® ink; D: Ascospores in 1% SDS, some in latero-ventral view showing a germ slit; E: Ascal apical apparati in Melzer's reagent; F: Ascospore with obtuse ends showing a ventral germ slit, in Melzer's reagent; G: Ascospore in side view showing acute ends, in Melzer's reagent. Scale bars: A-C = 50 µm; D, F, G = 10 µm; E = 5 µm.

C. Lechat, CLL 8239 (LIP); *ibid.*, on dead wood, 16 Aug. 2008, *leg.* C. Lechat, CLL 8242 (LIP); Basse-Terre, Petit Bourg, Déjeuner, Desbordes forest, 3 Sept. 2005, *leg.* C. Lechat, CLL 5330 (LIP); Basse-Terre, Petit-Bourg, Natural Park of Guadeloupe, Maison de la Forêt, hygrophilic rainforest, on dead decorticated wood, 24 Nov. 2006, *leg.* C. Lechat, CLL 6049 (LIP); Basse-Terre, Petit Bourg, Rivière Moustique, prise d'eau de Trianon, hygrophilic rainforest, on a dead corticated branch, 5 Sept. 2005, *leg.* C. Lechat, CLL 2366 (LIP); Basse-Terre, Saint-Claude, Matouba, Victor Hughes track, hygrophilic rainforest, on a dead corticated branch, 15 Aug. 2010, *leg.* R. Courtecuisse, CLLGUAD 032; *ibid.*, on a dead corticated branch, 15 Aug. 2010, *leg.* R. Courtecuisse, CLLGUAD 033; Basse-Terre, Sainte-Rose, Sofaïa, path to Saut des Trois Cornes, hygrophilic rainforest, dead corticated branch, 3 Sept. 2004, *leg.* C. Lechat, CLL 2302 (LIP); *ibid.*, on dead wood, 1 Sept. 2005, *leg.* C. Lechat, CLL 5296 (LIP; HAST 144028); *ibid.*, dead wood, 1 Sept. 2005, *leg.* C. Lechat, CLL 5307 (LIP; HAST 144029); Grande-Terre, Les Abymes, Le Chazeau, mesophilic rainforest, on a dead corticated branch, 3 Sept. 2004, *leg.* C. Lechat, CLL 2361 (LIP). Martinique: Case-Pilote, Crête Jean-Louis, hygrophilic rainforest, dead branch of *Ficus* sp. (*Moraceae*), 4 Sept. 2003, *leg.* C. Lechat, CLL 0793 (LIP); *ibid.*, on dead wood, 21 Aug. 2005, *leg.* C. Lechat, CLL 5097 (LIP; HAST 144030); Case-Pilote, Fond Boucher, mesophilic rainforest, on dead wood, 2 Dec. 2006, *leg.* C. Lechat, CLL 6132; Case-Pilote, Morne Rose, mesophilic rainforest, on a dead trunk, 1 Sept. 2010, *leg.* J. Fournier, MJF 10323 (LIP); *ibid.*, on a dead corticated branch, 1 Sept. 2010, *leg.* R. Courtecuisse, MJF 10326 (LIP); Case-Pilote, Savane Saint-Cyr, trail to Plateau Concorde, 600–650 m, hygrophilic rainforest, on a dead corticated branch, 27 Aug. 2010, *leg.* J. Fournier, MJF 10161 (LIP); *ibid.*, on a dead corticated branch, 27 Aug. 2010, *leg.* J. Fournier, MJF 10164 (LIP) (depauperate); Fonds-Saint-Denis, road of Rivière Blanche, hygrophilic rainforest, on a dead corticated branch, 16 Aug. 2011, *leg.* R. Courtecuisse, MJF 15126 (LIP); Fort-de-France, Absalon, track to Plateau Michel, 400–500 m, hygrophilic rainforest, on a dead corticated branch, 7 Aug. 2013, *leg.* J. Fournier, MJF 13042 (LIP); *ibid.*, on dead wood, 7 Aug. 2013, *leg.* J. Fournier, MJF 13049 (LIP); *ibid.*, on dead wood, 15 Aug. 2013, *leg.* J. Fournier, MJF 13251 (LIP); *ibid.*, on a dead trunk, 7 Aug. 2016, *leg.* J. Fournier, MJF 16150 (LIP); Fort-de-France, Alma recreation area, banks of Rivière Blanche, hygrophilic rainforest, on a dead partly buried trunk, 3 Aug. 2016, *leg.* J. Fournier, MJF 16100 (LIP); Gros-Morne, Rivière Rouge, Pierre Denis, hygrophilic rainforest, on dead wood, 29 Aug. 2004, *leg.* C. Lechat, CLL 2222 (LIP); *ibid.*, on dead wood, 1 Sept. 2008, *leg.* C. Lechat, CLL 8403 (LIP); Le Lorrain, Rivière Pirogue, Crassous forest, mesophilic rainforest, on a dead woody fruit of Mahogany (*Swietenia macrophylla*, *Meliaceae*), 26 Aug. 2004, *leg.* C. Lechat, CLL 2129 (LIP); *ibid.*, on a dead woody fruit of Mahogany (*Swietenia macrophylla*, *Meliaceae*), 26 Aug. 2004, *leg.* C. Lechat, CLL 2131 (LIP) (immatue); *ibid.*, on dead wood, 26 Aug. 2004, *leg.* C. Lechat, CLL 2144 (LIP); *ibid.*, on dead wood, 6 Dec. 2005, *leg.* C. Lechat, CLL 5578 (LIP); *ibid.*, on a dead corticated branch of *Sloanea* sp. (*Elaeocarpaceae*), 11 Jun. 2014, *leg.* J. Fournier, MJF 14125 (LIP); Le Marigot, right bank of Lorrain River, lowland rainforest, on dead wood, 8 Jun. 2014, *leg.* J. Fournier, MJF 14092 (LIP); Le Morne-Rouge, Domaine d'Émeraude, hygrophilic rainforest, on dead wood, 9 Aug. 2013, *leg.* R. Courtecuisse, MJF 13093 (LIP); *ibid.*, on rotten wood, 9 Aug. 2013, *leg.* O. Roze, MJF 13104 (LIP); Le Morne-Rouge, La Propreté forest trail, hygrophilic rainforest, on a dead corticated branch, 24 Aug. 2007, *leg.* R. Courtecuisse, MJF 07053 (LIP); *ibid.*, on dead wood, 24 Aug. 2007, *leg.* C. Lechat, MJF 07058 (LIP); *ibid.*, on dead wood, 24 Aug. 2007, *leg.* J. Fournier, MJF 07063 (LIP); *ibid.*, on dead wood, 24 Aug. 2007, *leg.* J. Fournier, MJF 07073 (LIP); *ibid.*, on dead wood, 24 Aug. 2007, *leg.* J. Fournier, MJF 07088 (LIP); *ibid.*, on dead wood, 29 Aug. 2007, *leg.* C. Lechat, MJF 07186 (LIP); *ibid.*, on a dead corticated branch, 29 Aug. 2007, *leg.* J. Fournier, MJF 07190 (LIP); *ibid.*, on a dead corticated branch, 29 Aug. 2007, *leg.* J. Fournier, MJF 07194 (LIP); *ibid.*, on a dead corticated branch, 29 Aug. 2007, *leg.* J. Fournier, MJF 07206 (LIP); *ibid.*, on a dead corticated trunk, 6 Jun. 2014, *leg.* J. Fournier, MJF 14060 (LIP); *ibid.*, on a dead corticated branch, 6 Jun. 2014, *leg.* J. Fournier, MJF 14074 (LIP); *ibid.*, on a dead corticated branch, 23 Jun. 2015, *leg.* R. Courtecuisse, MJF 15189 (immature) (LIP); *ibid.*, on a dead trunk, 9 Aug. 2016, *leg.* J. Fournier, MJF 16174 (LIP); *ibid.*, on a dead standing trunk, 9 Aug. 2016, *leg.* J. Fournier, MJF 16183 (LIP); Le Morne-Vert, Trace de Caplet, hygrophilic rainforest, on a dead corticated branch, 31 Aug. 2008, *leg.* C. Lechat, CLL 8387 (LIP); Le Prêcheur, Anse Couleuvre, coastal mesophilic rainforest, on a dead corticated branch, 21 Aug. 2010, *leg.* J. Fournier, MJF

Table 10 – Ascospore dimensions in eleven randomly selected collections of *X. schweinitzii* from Guadeloupe and Martinique, showing the range of intraspecific variations, compared with those reported in literature. Extreme values in parentheses.

Collections numbers	Ascospore measurements	Q = quotient l/w N = number of measurements	Mean values
CLL 0793	(21.1–)22.9–26.6(–27.8) × (6.5–)6.9–8(–8.5) µm	Q = (2.8–)3.1–3.6(–4.1), N = 60	Me = 24.8 × 7.5 µm, Qe = 3.3
CLL 2129	(19.7–)20.5–24.4(–25.9) × (6.3–)6.7–7.5(–7.8) µm	Q = (2.7–)2.8–3.4(–3.6), N = 60	Me = 22.3 × 7.1 µm, Qe = 3.1
CLL 2222	(19–)19.9–23.4(–25.1) × (5.5–)6–6.9(–7) µm	Q = (2.8–)3.1–3.7(–4.2), N = 60	Me = 21.7 × 6.4 µm, Qe = 3.4
CLL 2299	(20–)21.2–24.6(–27.9) × (6.3–)6.7–7.6(–7.9) µm	Q = (2.8–)2.9–3.7(–4.2), N = 60	Me = 22.9 × 7.1 µm, Qe = 3.3
CLL 5296	(18.6–)20.3–23.8(–26.3) × (5.7–)6.1–7.2(–7.6) µm	Q = (2.6–)2.9–3.7(–4.1), N = 60	Me = 21.7 × 6.7 µm, Qe = 3.3
CLL 5330	(20.4–)21.9–26.5(–28.5) × (6.7–)7–8.3(–8.7) µm	Q = (2.6–)2.8–3.6(–3.9), N = 60	Me = 24.3 × 7.6 µm, Qe = 3.2
CLL 5391	(19.7–)20.8–24.3(–29) × (6.2–)6.6–7.6(–8) µm	Q = (2.6–)2.8–3.7(–4.2), N = 60	Me = 22.6 × 7.1 µm, Qe = 3.2
CLL 8239	20.6–)21.4–26.8(–28.9) × (6.3–)6.9–8(–8.7) µm	Q = (2.5–)2.9–3.7(–4.1), N = 60	Me = 24.3 × 7.4 µm, Qe = 3.3
CLL 8387	(20.5–)22.3–26.4(–28.8) × (6.1–)6.5–7.5(–7.9) µm	Q = (2.8–)3.1–3.9(–4.3), N = 60	Me = 24.3 × 7 µm, Qe = 3.5
MJF 13186	(19.4–)20.9–24(–25.4) × (6.5–)6.8–7.8(–8.5) µm	Q = (2.6–)2.8–3.4(–3.8), N = 60	Me = 22.3 × 7.3 µm, Qe = 3.1
MJF 13193	(19.4–)20.7–23.8(–24.9) × (6.2–)6.6–7.4(–8.7) µm	Q = (2.6–)2.9–3.5(–3.7), N = 60	Me = 22.2 × 7 µm, Qe = 3.2
Cumulated values	(18.6–)19.9–26.8(–29) × (5.5–)6–8.3(–8.7) µm	Q = (2.5–)2.8–3.9(–4.3), N = 660	Me = 23 × 7.1 µm, Qe = 3.2
Ju & Rogers (1999) Taiwan	20–25(–27) × 7–9 µm	–	Me = 22.5 × 8 µm
Van der Gucht (1995) Papua New Guinea	(20–)21–30(–31.5) × (6–)6.5–8(–9) µm	–	Me = 24.6 × 7.3 µm
San Martín & Rogers (1989) México	21–26 × (6–)6.5–8 µm	–	Me = 23.5 × 7.3 µm
Rogers *et al.* (1988) Venezuela	23.5–31 × 6.5–7.5 µm	–	Me = 27.2 × 7 µm

10023 (LIP); *ibid.*, on dead wood, 6 Aug. 2013, *leg.* J. Fournier, MJF 13030 (LIP); Macouba, Trou Navet, hygrophilic rainforest, on a dead corticated branch, 13 Aug. 2013, *leg.* J. Fournier, MJF 13181-2 (LIP); *ibid.*, on a dead corticated branch, 13 Aug. 2013, *leg.* J. Fournier, MJF 13186 (LIP); *ibid.*, on a dead woody fruit of *Sterculia caribaea* (*Malvaceae*), 13 Aug. 2013, *leg.* J. Fournier, MJF 13193 (LIP); *ibid.*, on a dead corticated branch, 13 Aug. 2013, *leg.* J. Fournier, MJF 13196 (LIP); Le Saint-Esprit, Bois La Charles, mesophilic rainforest, on a dead corticated branch, 25 Aug. 2004, *leg.* C. Lechat, CLL 2100 (LIP); Saint-Joseph, Fond Fougères, hygrophilic rainforest, on a dead corticated branch, 22 Aug. 2013, *leg.* J. Fournier & C. Lechat, MJF 13360 (LIP); Sainte-Marie, Pérou forest, 430–450 m, hygrophilic rainforest, on dead wood, 13 Jun. 2015, *leg.* G. Gruhn, MJF 15050 (LIP); Schoelcher, Case Navire River, mesophilic rainforest, on a dead corticated branch, 28 Aug. 2010, *leg.* C. Lechat, MJF 10196 (LIP).

Comments: *Xylaria schweinitzii* is one of the most commonly encountered *Xylaria* species in the tropics, it shows a wide range of morphological variations and its distinction from related species may be challenging. Typical *X. schweinitzii* is easily recognized by its upright stromata with a fertile subglobose to clavate fertile head on a sharply defined stipe and dark brown, fusiform-inequilateral ascospores 23 × 7.1 µm in average with a short oblique germ slit. However, its high variability in stromatal habit may lead to confusion with some closely related tropical species of the *X. polymorpha* aggregate like *X. moelleroclavus*, *X. scruposa* and *X. globosa*. *Xylaria moelleroclavus* and *X. scruposa* differ from *X. schweinitzii* by significantly smaller ascospores 18.8 × 6.4 µm in average but their wide size ranges may slightly overlap. The superficial stromatal layer of *X. moelleroclavus* differs from that of *X. schweinitzii* in being tightly appressed, not fibrous, and longitudinally striped; that of *X. scruposa* is similar to that of *X. schweinitzii* but is thicker, frequently tomentose and cracks into larger scales; moreover, the ostioles of *X. scruposa* are wider and more prominent. Stipitate stromata of *X. globosa* may resemble those of *X. schweinitzii* but their coarsely warted surface and their prominent ostioles 170–250 µm diam are good differential characters. Moreover, ascospores of *X. globosa* are slightly larger, 25 × 7.9 µm in average, and possess a more slanted germ slit (Fournier *et al*., 2018b; this paper).

Xylaria peltiformis J. Fourn. & Lechat is very similar to *X. schweinitzii* by its stromata with small superficial scales and barely prominent ostioles, and its similarly shaped ascospores 23.6 × 8.4 µm in average; the distinct penzigioid, peltate to flat-topped stromata of *X. peltiformis* readily distinguish this species from *X. schweinitzii* (Fournier *et al.*, 2018b).

Dennis (1956; 1958) included *X. schweinitzii* in his wide concept of *X. polymorpha* (Pers.) Grev., which accounts for numerous tropical records of *X. polymorpha* that most likely represent *X. schweinitzii*. Besides its temperate distribution, *X. polymorpha* differs from *X. schweinitzii* by a more coarsely cracked superficial layer and more prominent hemispherical ostioles; microscopically, its ascospores usually feature a longitudinally oriented to barely slanted germ slit.

A further diagnostic character of *X. schweinitzii* appears to be the presence of yellowish granules at the base of the hymenium (Plate 16, fig. c) that we consistently observed in all the collections studied, including material from French Guiana and Mayotte; this feature was not observed in the above related species during this study.

Several collections showing stromata with a thicker, slightly carbonaceous subsurface and splitting longitudinally upon drying were encountered during this study. This deviating features proved uncorrelated with other morphological characters and thus, for the time being, are regarded as fortuitous and taxonomically not significant.

Like Van der Gucht (1995), we recorded the presence of *X. schweinitzii* in hygrophilic and mesophilic forests as well. It is noteworthy that *X. schweinitzii* was once collected on bamboo and three on woody fruits during this survey.

Xylaria scruposa (Fr.) Fr., *Nova Acta Regiae Societatis Scientiarum Upsaliensis*, 1: 127 (1851). Plates 17–18, Table 11.

Stromata upright, simple, occasionally forked or connate at base, 12–95 mm in total height, the fertile head 8–72 mm high × (3–)4–14 mm wide, highly variable, cylindric-fusiform to lanceolate, frequently flattened, straight to often curved or contorted, apically tapering to broadly rounded fertile or acute sterile, occasionally white apices, with perithecial contours not to faintly exposed; white apices of mature stromata appear to result from the erosion of the superficial layers, not in relation with a conidiogenesis; the stipes usually sharply-defined, 4–52 mm high × 2–6 mm diam, blackish brown, straight to strongly curved, densely tomentose, slightly swollen at base; surface greyish brown to blackish brown, roughened, with a fugacious outermost layer comprising a superficial greyish brown fibrous tissue cracked into small scales and tufts of reddish brown tomentum, leaving small polygonal brown scales adherent to the subsurface when worn off; densely tomentose stromata sometimes retain a thick layer of released ascospores and appear black; subsurface a thin black leathery crust 40–50 µm thick; interior whitish to cream-coloured, pithy, solid, not turning hollow upon drying, frequently with a narrow blackish core in lower half. **Perithecia** immersed, subglobose to laterally compressed, 0.5–0.75 mm diam. **Ostioles** papillate on a conspicuous raised-discoid base 170–250 µm diam, black, frequently overlain by white substance or surrounded by a conspicuous white ring.

Asci cylindrical, with (4–6–)8 slightly overlapping uniseriately arranged ascospores, the spore-bearing parts 120–170 × 8.5–10 µm, the stipes 70–85 µm long, with apical apparatus tubular to slightly urn-shaped, apically flattened with a faint lateral rim, basally attenuated, 4.7–5.9 × 3.7–4.4 µm (Me = 5.4 × 4.1 µm, N = 50), strongly bluing in Melzer's reagent. **Paraphyses** copious, hyphal, thin-walled, 6–7 µm wide at base, tapering to 1.5–2 µm wide above asci, sparsely guttulate, discretely embedded in mucilaginous material. **Ascospores** (14.2–)15.7–24.1(–28.1) × (4.9–)5.4–8.1(–9.1) µm, Q = (2.3–)2.5–3.6(–4.5), N = 720 (Me = 19.4 × 6.5 µm, Qe = 3), ellipsoid-inequilateral to navicular with narrowly rounded to slightly pinched ends, at times slightly ventrally concave, dark brown, unicellular, with a narrow, obliquely oriented, straight to most often slightly sigmoid germ slit ca. 1/2 spore-length on the ventral side; lacking appendages or mucilaginous sheath; epispore smooth.

Asexual morph on the natural substrate not seen. Cultural characteristics were described by Rogers *et al*. (1987; 1988).

Known distribution: Pantropical (Dennis, 1956; 1958; 1961; Rogers & Callan, 1986; Rogers *et al*., 1987; 1988; San Martín & Rogers, 1989; Van der Gucht, 1995; Ju & Rogers, 1999; Rogers & Ju, 2012).

Specimens with robust stromata examined: French West Indies: Martinique: La Trinité (Caravelle peninsula), Tartane, Pointe Bateau, coastal meso- to xerophilic forest, on dead wood, 24 Aug. 2010, *leg.* C. Lechat, MJF 10125 (LIP); Le Prêcheur, Anse Couleuvre, coastal mesophilic rainforest, on dead wood, 19 Aug. 2005, *leg.* C. Lechat, CLL 5016 (LIP); *ibid.*, on dead wood, 25 Aug. 2008, *leg.* C. Lechat, CLL 8308 (LIP); *ibid.*, on dead wood, 24 Aug. 2010, *leg.* C. Lechat, MJF 10092 (depauperate) (LIP); *ibid.*, on dead wood, 19 Aug. 2011, *leg.* C. Lechat, CLLMAR 11041 (LIP); Le Prêcheur, Anse Lévrier, coastal mesophilic rainforest, on a dead corticated branch, 3 Sept. 2003, *leg.* C. Lechat, CLL 0708 (LIP); Les Anses-d'Arlet, Anse Noire, coastal mesophilic forest, on dead wood, 30 Aug. 2005, *leg.* C. Lechat, CLL 5271 (LIP); Sainte-Marie, La Philippe, Trou Mulet, coastal mesophilic rainforest, on dead corticated wood, 27 Aug. 2008, *leg.* C. Lechat, CLL 8332 (LIP); *ibid.*, on a dead trunk, 14 Aug. 2013, leg J. Fournier, MJF 13213 (LIP); *ibid.*, on a dead trunk, 21 Aug. 2013, leg J. Fournier, MJF 13348 (LIP).

Comments: According to Dennis (1956; 1958), the type of *Sphaeria scruposa* Fr. is immature and sterile and the concept of *X. scruposa*

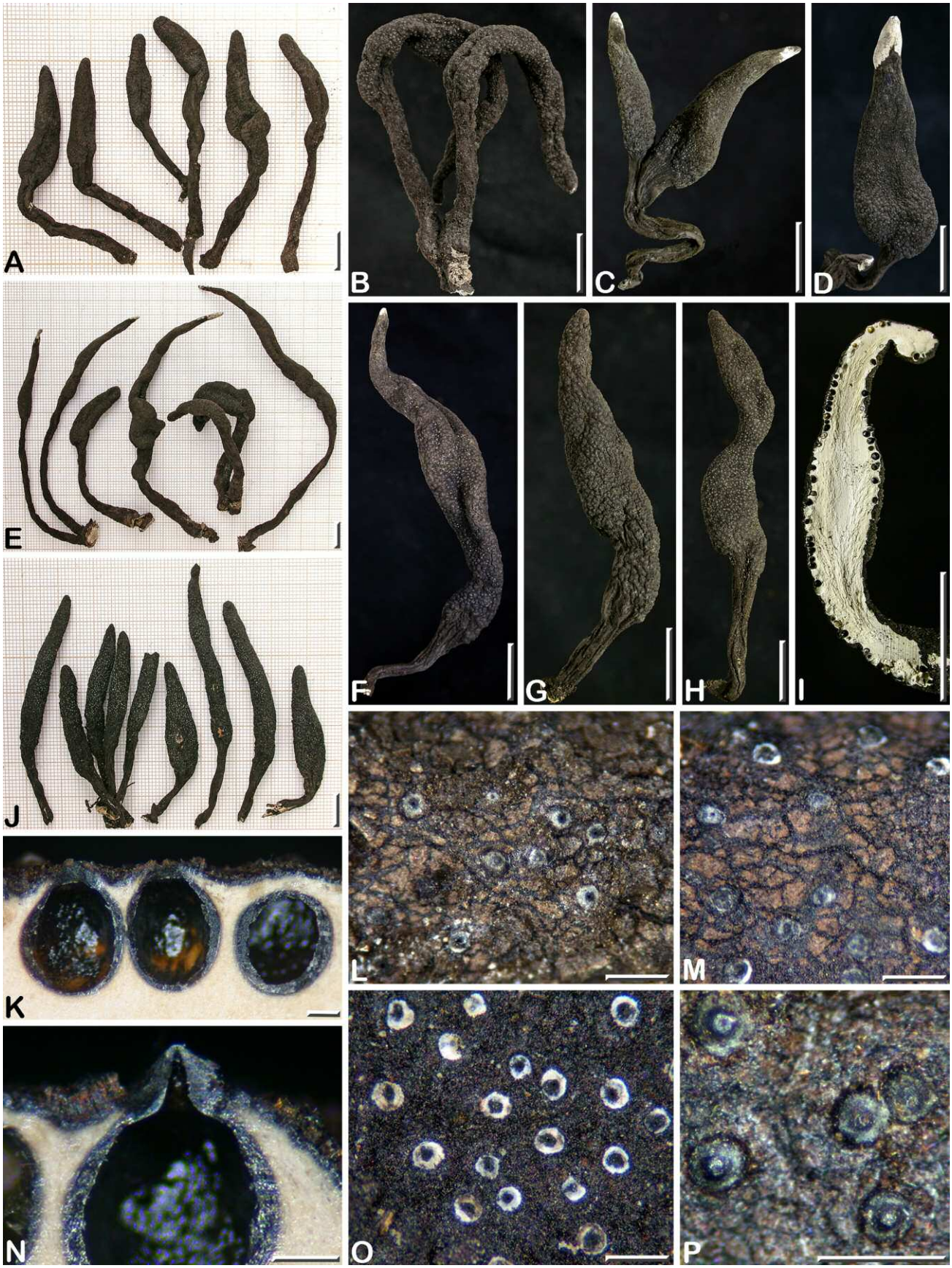

Plate 17 – *Xylaria scruposa*

A: CLL 8308; B, E, I, K-M, N, P: CLL 8382; C, D, F: CLL 0708; G, H : MJF 10125; J, O: MJF 13213. A, E, J: Variously shaped stromata showing morphological variations within the same collection; B-D, F-H: Variously shaped robust stromata (note the white apices in C, D, F); I: Stroma in vertical section showing immersed perithecia and a solid interior; K: Stroma in longitudinal section in close-up showing perithecia immersed under a thin black crust; L: Stromatal surface in close-up showing a dark brown scaly and tomentose coating obscuring the ostioles; M: Stromatal surface in close-up showing brown scales adherent to the underlying black crust; N: Apex of a perithecium in vertical section showing a thin black crust pierced by the papillate ostiole and overlain by reddish brown fibrous tissue; O: Close-up on stromatal surface obscured by ascospores deposits trapped in superficial tomentum, showing ostioles surrounded by conspicuous white rings; P: Raised-discoid ostioles in close-up. Scale bars: A-J = 10 mm; K, N = 0.2 mm; L, M, O, P = 0.5 mm.

followed by most mycologists is the interpretation made by Montagne (1840), as *Hypoxylon scruposum* (Fr.) Mont. At the same time *Xylaria scruposa* is widespread in the tropics, commonly encountered and highly variable in stromatal morphology, which accounted for numerous putative synonyms (Dennis, 1958), raising nomenclatural issues and uncertainty around this name. In the currently accepted sense, *X. scruposa* is a member of the *X. polymorpha* aggregate (Hsieh *et al.*, 2010) characterized by highly variable upright stromata with a thin leathery crust coarsely roughened by small fibrous scales, tomentum and large raised-discoid ostioles, on short to long, tomentose, usually sharply-defined stipes; microscopically, its ascospores 19.4 × 6.5 µm in average with acute to pinched ends and a slightly sigmoid germ slit set it apart from most tropical species of the *X. polymorpha* aggregate.

Xylaria moelleroclavus was segregated from *X. scruposa*, with which it shares similar ascospores, based on a typical asexual morph, a different superficial coating and less prominent and smaller ostioles (Rogers *et al.*, 1997; this paper). *Xylaria globosa* and *X. schweinitzii*, both likewise members of the *X. polymorpha* aggregate, can usually be readily distinguished from *X. scruposa* by their significantly larger ascospores respectively 25 × 7.9 µm and 23 × 7.1 µm in average but the wide ranges of ascospore dimensions

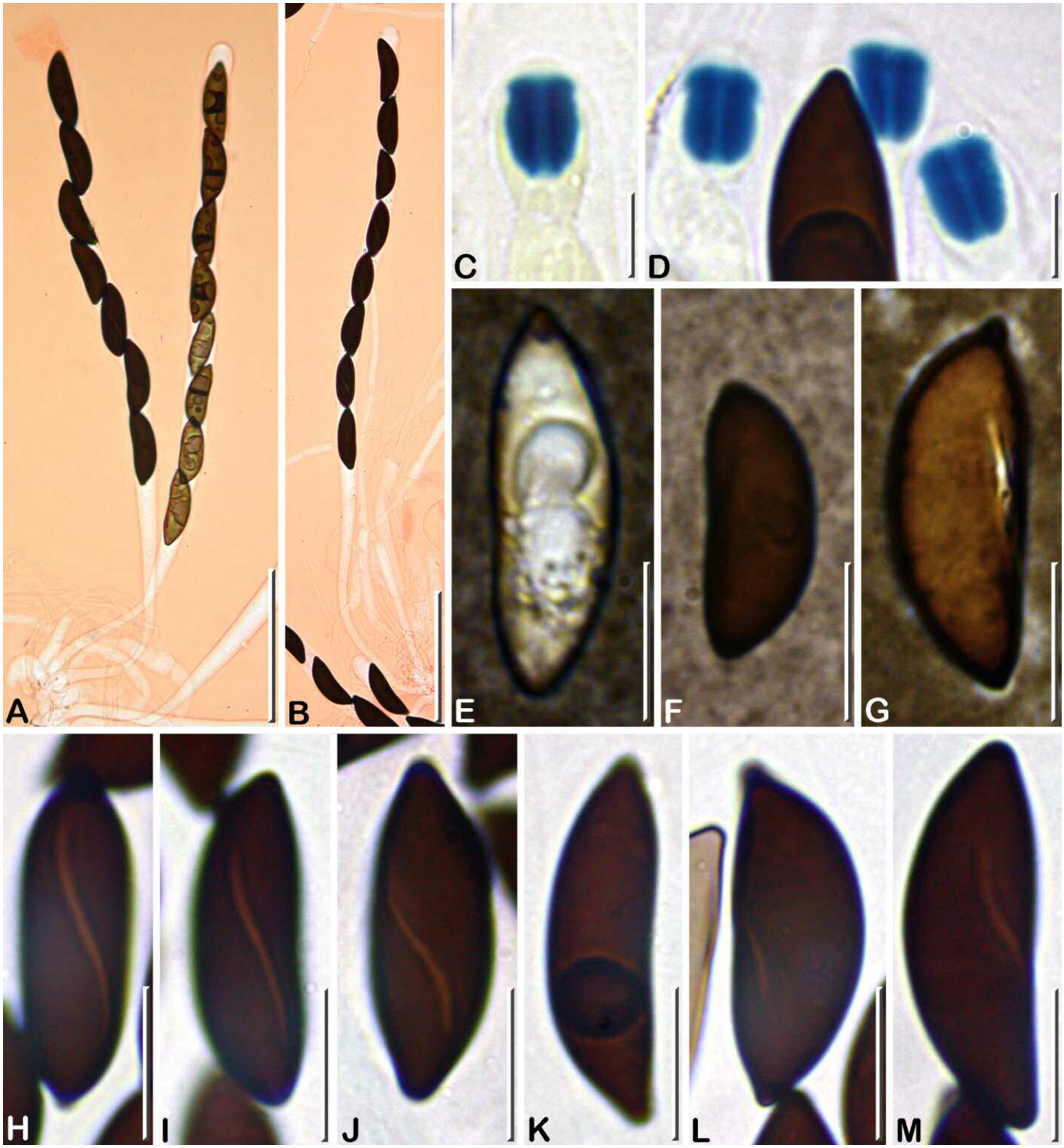

Plate 18 – *Xylaria scruposa*

A-C, H-M: CLL 0708; D: CLL 07052; E, G: CLL 8382; F: CLL 2133. A, B: Immature and mature asci, in Congo red in 1% SDS; C, D: Ascal apical apparati in Melzer's reagent; E: Immature colourless ascospore showing absence of appendage or mucilaginous sheath, in India ink; F, G: Mature pigmented ascospores showing absence (F) or remnants (G) of mucilaginous material; H-M: Variously shaped ascospores, some in ventral view showing a slightly sigmoid germ slit, in heated chloral-lactophenol. Scale bars: A, B = 50 µm; C, D = 5 µm; E-M = 10 µm.

Table 11 – Ascospore dimensions in twelve randomly selected collections of *X. scruposa* from Martinique, including one with robust stromata (CLL 0708), showing the wide range of intraspecific variations, compared with those reported in literature. Extreme values in parentheses.

Collections numbers	Ascospore measurements	Q = quotient l/w N = number of measurements	Mean values
CLL 0708	(18.7–)20.4–23.5(–25.3) × (6–)6.4–7.4(–8.1) µm	Q = (2.5–)2.9–3.5(–3.6), N = 60	Me = 21.8 × 7 µm, Qe = 3.1
CLL 0709	(16.6–)16.9–19.5(–20.6) × (5.1–)5.6–6.6(–7) µm	Q = (2.5–)2.7–3.3(–3.8), N = 60	Me = 18.3 × 6.1 µm, Qe = 3
CLL 0729	(17.6–)18.6–21.3(–23.5) × (6.1–)6.3–7.4(–7.9) µm	Q = (2.3–)2.6–3.3(–3.4), N = 60	Me = 20 × 6.9 µm, Qe = 2.9
CLL 2050	(15.2–)16.2–19(–20.8) × (5.4–)5.7–6.5(–6.8) µm	Q = (2.4–)2.7–3.2(–3.5), N = 60	Me = 17.4 × 6 µm, Qe = 2.9
CLL 2133	(14.7–)16.2–18.9(–19.7) × (5.7–)5.9–6.6(–7.1) µm	Q = (2.3–)2.5–3(–3.3), N = 60	Me = 17.3 × 6.3 µm, Qe = 2.8
CLL 5217	(15.7–)16.9–21.4(–22.9) × (5.5–)5.9–6.7(–7.4) µm	Q = (2.4–)2.6–3.5(–4), N = 60	Me = 19 × 6.4 µm, Qe = 3
CLL 5278	(17.9–)19.4–24.1(–28.1) × (5.8–)6.2–7.3(–8) µm	Q = (2.6–)2.9–3.6(–4.5), N = 60	Me = 21.9 × 6.8 µm, Qe = 3.2
CLL 5283	(15.5–)16.9–19.2(–21.1) × (5.2–)5.9–6.7(–7) µm	Q = (2.4–)2.6–3.1(–3.7), N = 60	Me = 18 × 6.3 µm, Qe = 2.8
CLL 8382	(18.8–)20.4–24(–25.9) × (6.4–)6.7–7.8(–8.2) µm	Q = (2.5–)2.8–3.4(–3.9), N = 60	Me = 22.4 × 7.2 µm, Qe = 3.1
MJF 07052	(19.6–)20.9–23.7(–24.8) × (6.4–)6.7–8.1(–9.1) µm	Q = (2.5–)2.7–3.5(–3.6), N = 60	Me = 22.3 × 7.4 µm, Qe = 3
MJF 10038	(15.1–)15.7–19.4(–21.3) × (4.9–)5.5–6.6(–6.9) µm	Q = (2.4–)2.6–3.3(–3.5), N = 60	Me = 17.6 × 6 µm, Qe = 2.9
MJF 10086	(14.2–)16.1–17.8(–19.1) × (5.1–)5.4–6.4(–7.2) µm	Q = (2.4–)2.6–3.2(–3.4), N = 60	Me = 17 × 5.9 µm, Qe = 2.9
Cumulated values	(14.2–)15.7–24.1(–28.1) × (4.9–)5.4–8.1(–9.1) µm	Q = (2.3–)2.5–3.6(–4.5), N = 720	Me = 19.4 × 6.5 µm, Qe = 3
Ju & Rogers (1999) Taiwan	18–21(–22) × 6–7 µm	–	Me = 19.5 × 6.5 µm, Qe = 3
Van der Gucht (1995) Papua New Guinea	(15.5–)16–21(–22.5) × (5–)5.5–7(7.5) µm	–	Me = 18.2 × 6.4 µm, Qe = 2.8
San Martin & Rogers (1989) México	18–21(–22) × 6–7 µm	–	Me = 19.5 × 6.5 µm, Qe = 3
Rogers *et al.* (1988) Venezuela	16–23.5 × (5–)6–7.5 µm	–	Me = 19.8 × 6.8 µm, Qe = 2.9

within these three taxa may overlap in some collections. *Xylaria globosa* is distinguished from *X. scruposa* by its thicker stromatal crust (80–100 µm thick vs 40–50 µm thick) and orange droplets on primordia giving an orange tinge to the internal tissue of the stipe. Unlike those of *X. scruposa*, the stromata of *X. schweinitzii* become cerebriform upon drying, are coated with fugacious thin scales and their ostioles are smaller and barely prominent (Fournier *et al.*, 2018b; this paper).

Out of seventy-seven collections referable to *X. scruposa* made during this survey, only the ten collections illustrated here feature stromata consistently exceeding 5 mm in width. A luxuriant growth related to occurrence on buried wood or on trunks may account for these unusually robust stromata but they may just reflect the high morphological variability of this species. Collections with stromata rarely exceeding 5 mm in width will be dealt with in a coming paper (part III) in which their collecting details will be given.

Xylaria telfairii (Berk.) Sacc., *Sylloge Fungorum*, 1: 320 (1882). Plates 19–20, Table 12.

Stromata clavate, fusoid or cylindrical, with obtuse fertile apices, straight to slightly curved, unbranched, 22–120 mm in total height × 6–24 mm diam, shrivelling upon drying and usually longitudinally split with inrolled margins, occasionally flattened; stipes most often ill-defined, 5–36 mm high, smooth, glabrous, tan to blackish, attached to the substrate by a narrow to enlarged base; surface pale yellow to tan, turning cinnamon, copper brown with age, without exposed perithecial contours, smooth; outermost coating bipartite, comprising a thin, superficial, yellow to cinnamon pellicle releasing respectively olivaceous yellow and vinaceous pigments in 10% KOH and NH_3 and an underlying granular white layer 40–80 µm thick; subsurface a thick carbonaceous crust (130–)170–250 µm thick; interior solid, pithy, whitish in young developing stromata, remaining between perithecia at maturity; interior of mature stromata differentiated into a thick subperithecial gelatinous layer delimiting an internal cavity filled with hyaline liquid; upon drying, this gelatinous layer becomes fibrous, orange brown and strongly retracts, involving the splitting of the stromatal crust; it is internally lined by a reddish brown to blackish pellicle. **Perithecia** subglobose to depressed-spherical, 0.6–0.9 mm diam, laterally flattened when in contact. **Ostioles** obtusely papillate, discoid to slightly convex, porate, black, 80–120 µm diam, immersed in the white superficial layer, opening usually flush with the surface or barely protruding, more conspicuous in bruised regions where this layer has worn off.

Asci cylindrical, with (4–6–)8 slightly overlapping uniseriately arranged ascospores, the spore-bearing parts 120–135 × 7.5–9 µm, the stipes 70–90 µm long, with apical apparatus short-cylindrical, slightly urn-shaped, apically flattened with an obtuse lateral rim, basally attenuated, 3.5–6 × 2.8–4.1 µm (Me = 4.7 × 3.5 µm, N = 100), strongly bluing in Melzer's reagent. **Paraphyses** copious, hyphal, thin-walled, 7–10 µm wide at base, tapering to 1.5–2 µm wide above asci, sparsely guttulate, discretely embedded in mucilaginous material. **Ascospores** (16.2–)16.9–22.8(–24.3) × (5.7–)6–8.6(–9.1) µm, Q = (2–)2.2–3.6(–3.8), N = 300 (Me = 19.6 × 6.9 µm, Qe = 2.8), ellipsoid-inequilateral to navicular with narrowly to broadly rounded, at times slightly pinched ends, rarely slightly ventrally concave, dark brown, unicellular, with a narrow, obliquely oriented, straight, rarely slightly sigmoid germ slit 7–9 µm long on the ventral side; lacking appendages or mucilaginous sheath; epispore smooth.

Asexual morph on the natural substrate not seen. Cultural characteristics described by Callan & Rogers (1990).

Known distribution: Pantropical (Dennis, 1974; Van der Gucht, 1995).

Specimens examined: French West Indies: Guadeloupe: Basse-Terre, Saint-Claude, Beausoleil, track to Plateau Dimba, hygrophilic rainforest, on a dead decorticated branch, 4 Aug. 2011, *leg.* C. Lechat, CLLGUAD 11007 (LIP); Basse-Terre, Sainte-Rose, Sofaïa, path to Saut des Trois Cornes, hygrophilic rainforest, on a dead corticated branch, Nov. 2005, *leg.* C. Lechat, CLL 5427 (LIP; HAST 144031). Martinique:

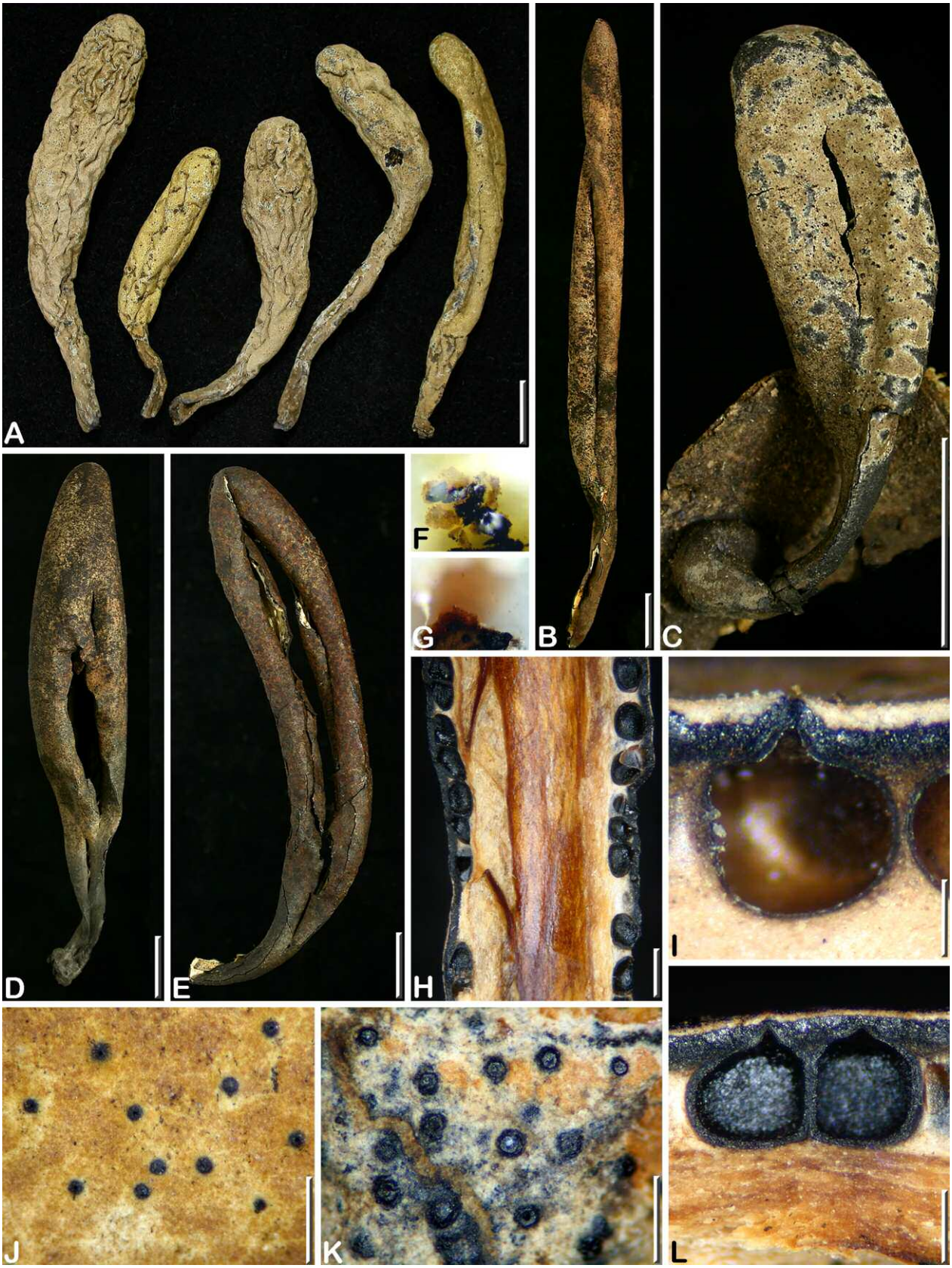

Plate 19 – *Xylaria telfairii*

A, F, G, I-K: CLL 5581; B, C: MJF 13252; D: MJF 13230; E: CLL 2224; H, L: MJF 16149. A: Shrivelled young stromata at dry state; B: Longitudinally split and hollow long-cylindrical mature stroma; C: Longitudinally split and hollow clavate mature stroma with black crust and white layer showing through a tan outermost pellicle in places; D: Longitudinally split and hollow fusiform mature stroma; E: Longitudinally split and hollow clavate somewhat overmature stroma; F, G: Pigments extracted from a superficial fragment of stroma, in 10% KOH and NH_3 respectively; H: Dry stroma in vertical section showing a reduced layer of whitish tissue embedding perithecia and a hollow interior inwardly coated by a reddish-brown pellicle; I: Immature perithecium in vertical section showing a papillate ostiole piercing the black crust but remaining immersed in the above white powdery layer; J: Stromatal surface in close-up showing a superficial yellow pellicle and black ostioles flush with the surface; K: Bruised stromatal surface in close-up showing black crust, prominent ostioles and white tissue showing through remnants of the superficial tan pellicle; L: Two adjacent perithecia immersed beneath a thick black crust coated with a thin white and tan superficial layer, embedded in whitish soft tissue and seated on a thick pale orange brown horny tissue. Scale bars: A-E = 10 mm; H: 1 mm; I = 0.2 mm; J-L = 0.5 mm.

Case-Pilote, Crête Duclos, trail to Plateau Concorde, hygrophilic rainforest, on a dead corticated trunk, 7 Dec. 2005, *leg.* C. Lechat, CLL 5581 (LIP); Fort-de-France, Absalon, track to Plateau Michel, 400–500 m, hygrophilic rainforest, on dead wood, 15 Aug. 2013, *leg.* C. Lechat, MJF 13230 (LIP); *ibid.*, on a dead corticated fallen trunk, 15 Aug. 2013, *leg.* C. Lechat & J. Fournier, MJF 13234; (LIP); *ibid.*, on bark, 15 Aug. 2013, *leg.* O. Roze, MJF 13252 (LIP); *ibid.*, on bark, 7 Aug. 2016, *leg.* P.-A. Moreau, MJF 16149 (LIP); Gros-Morne, Rivière Rouge, Pierre Denis, hygrophilic rainforest, on dead wood, 29 Aug. 2004, *leg.* C. Lechat, CLL 2224 (LIP).

Comments: *Xylaria telfairii* is a widespread pantropical species readily recognized in the field by its large, robust clavate to fusoid stromata with a smooth, yellow to tan or cinnamon surface. It also features a strong ecological preference for hygrophilic rainforests, where it often occurs in small groups on dead fallen trunks or big branches lying on the ground. Additional diagnostic features of *X. telfairii* are: its thick carbonaceous crust coated by a white granular layer and a superficial yellow to tan pellicle releasing pigments in 10% KOH and NH_3 linked to the presence of xylaral (Stadler *et al.*, 2008); its discoid, barely protruding ostioles; its gelatinous interior filled with liquid at fresh state (Guzmán & Piepenbring, 2011), strongly retracting upon drying, involving the collapse and longitudinal splitting of the stroma. Microscopically, its fusiform-inequilateral ascospores 16.9–22.8 × 6–8.6 µm with a short oblique germ slit resemble those of *X. moelleroclavus* and *X. scruposa*, from which *X. telfairii* differs by stromatal morphology, and exhibit a wide range of variations in shape and dimensions illustrated in Plate 18 and Table 9. Ascal apical apparati appear likewise variable in dimensions but this is not correlated with ascospore dimensions (Table 9). We observed that the thickness of the carbonaceous crust and that of the white granular layer coating it appear to strongly vary with age of the stroma. In young stromata, the white layer is relatively thick while the black crust is relatively thin compared with mature stromata (Plate 17).

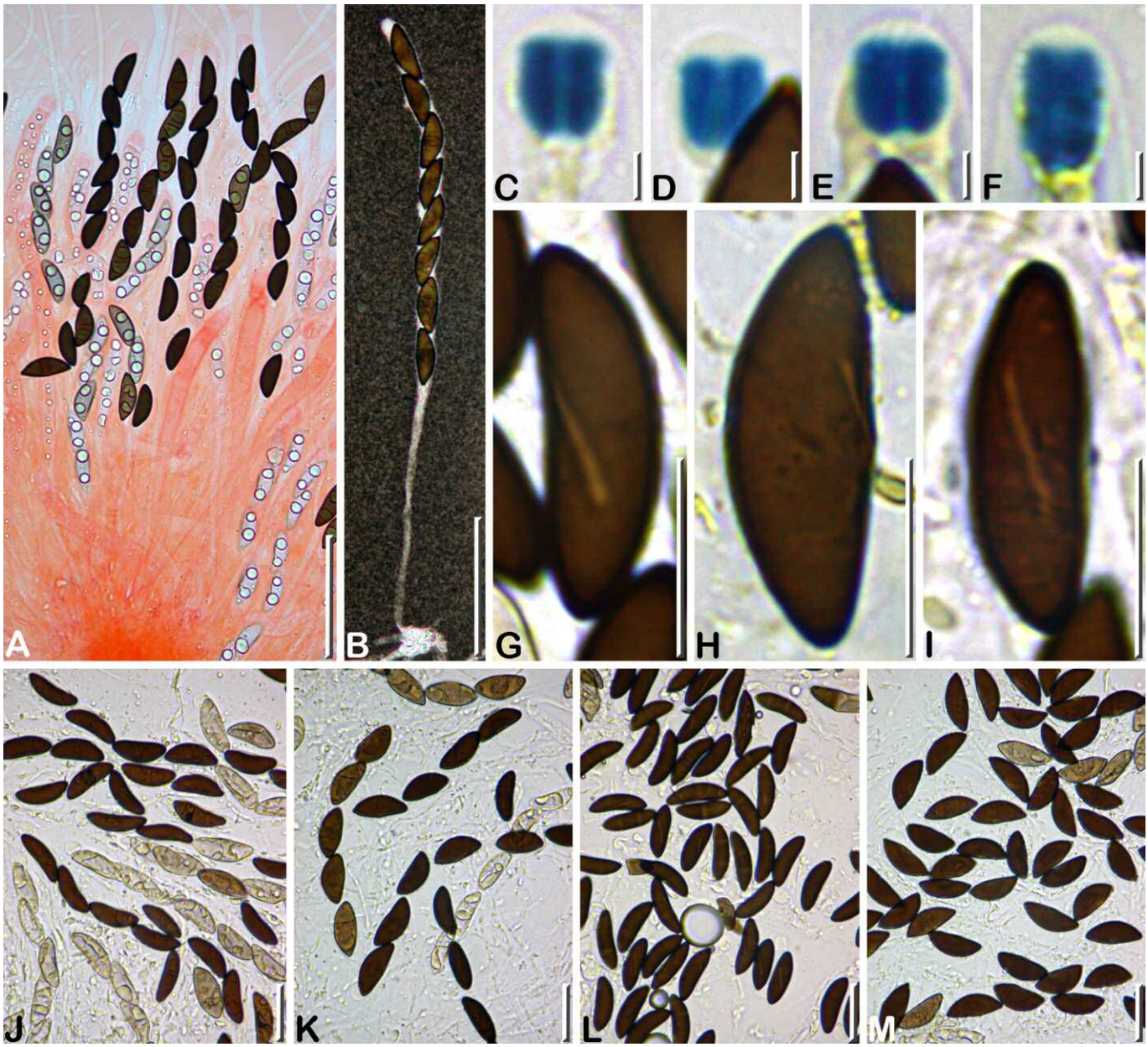

Plate 20 – *Xylaria telfairii*

A-D, G: MJF 16149; E, I, J: CLL 2224; F, H, L: MJF 13234; K: MJF 13230; M: MJF 13252. A: Mature and immature asci and paraphyses tips, in Congo red in 1% SDS; B: Mature ascus, in India ink; C-F: Ascal apical apparati, in Melzer's reagent; G: Ascospore in latero-ventral view showing an obliquely oriented germ slit, in 1% SDS; H: Large ascospore in side view with germ slit barely visible, in 1% SDS; I: Ascospore in ventral view showing an obliquely oriented germ slit, in 1% SDS; J-M: Variously shaped ascospores from four different collections, in 1% SDS. Scale bars: A, B = 50 µm; C-F = 2 µm; G-I = 10 µm; J-M = 20 µm.

Table 12 – Ascospore and ascus apical apparatus dimensions in five collections of *X. telfairii* from Martinique, showing a wide range of intraspecific variations, compared with those reported in literature. Extreme values in parentheses.

Collections numbers	Ascospore measurements	Q = quotient l/w N = number of measurements	Mean values of ascospores	Apical apparatus dimensions and mean values
CLL 2224	(16.2–)16.9–21.1(–22.4) × (5.9–)6.1–7.2(–7.4) µm	Q = (2.4–)2.6–3.3(–3.6), N = 60	Me = 18.8 × 6.5 µm, Qe = 2.9	3.6–4.2 × 2.8–3.8 µm Me = 3.9 × 3.3 µm, N = 20
MJF 13230	(16.7–)18–20.6(–22.5) × (5.9–)6.6–8.6(–9.1) µm	Q = (2–)2.2–2.9(–3.3), N = 60	Me = 19.3 × 7.7 µm, Qe = 2.5	4.7–5.5 × 3.3–4.1 µm Me = 5.2 × 3.7 µm, N = 20
MJF 13234	(18.5–)19.2–22.8(–24.3) × (5.7–)6–6.9(–7.2) µm	Q = (2.8–)3–3.6(–3.8), N = 60	Me = 20.9 × 6.4 µm, Qe = 3.3	4.7–5.6 × 3.3–3.9 µm Me = 5 × 3.6 µm, N = 20
MJF 13252	(16.2–)17.7–20.1(–21.5) × (6.4–)7–8.3(–8.7) µm	Q = (2.1–)2.2–2.7(–2.9), N = 60	Me = 18.7 × 7.6 µm, Qe = 2.5	4.8–6 × 3.3–4 µm Me = 5.4 × 3.6 µm, N = 20
MJF 16149	(17.8–)18.9–21.9(–22.6) × (5.8–)6.1–6.8(–7.2) µm	Q = (2.8–)2.9–3.4(–3.8), N = 60	Me = 20.3 × 6.4 µm, Qe = 3.2	3.5–4.2 × 2.8–3.4 µm Me = 3.9 × 3.1 µm, N = 20
Cumulated values	(16.2–)16.9–22.8(–24.3) × (5.7–)6–8.6(–9.1) µm	Q = (2–)2.2–3.6(–3.8), N = 300	Me = 19.6 × 6.9 µm, Qe = 2.8	3.5–6 × 2.8–4.1 µm Me = 4.7 × 3.5 µm, N = 100
Dennis (1956)	(15–)16–22(–25) × 6–8 µm	–	Me = 19 × 7 µm, Qe = 2.7	–
Rogers *et al.* (1988)	(13–)17.5–25 × 6–7.5 µm	–	Me = 21 × 6.8 µm, Qe = 3.1	4.5 × 3 µm
San Martín & Rogers (1989)	(17–)18–21(–22) × (5.5–)6–7 µm	–	Me = 19.5 × 6.5 µm, Qe = 3	–
Van der Gucht (1995)	(17.5–)18.5–21(–22.5) × 5.5–7.5 µm	–	Me = 20.1 × 6.6 µm, Qe = 3	5 × 4 µm
Callan & Rogers (1990)	(19.5–)20–22(–22.5) × 6–7 µm	–	Me = 21 × 6.5 µm, Qe = 3.2	7–10 × 4 µm

Some confusion exists about the identity of *X. enterogena* Mont., a name usually given to small forms of *X. telfairii* with a paler surface and possibly smaller ascospores (Rogers *et al*., 1988). For Dennis (1956) most collections of *X. enterogena* represent immature *X. telfairii*. Because of similar ascospore size ranges in both taxa, Læssøe (unpublished notes) regards *X. enterogena* as merely a variety of *X. telfairii*. *Xylaria enterogena*, like *X. telfairii*, is very common in Amazonian forests, especially in French Guiana where the type collection comes from, and is usually readily distinguished in the field from *X. telfairii* by its small narrowly clavate stromata (Læssøe, unpublished notes; JF, pers. observ.). Mature fertile stromata referable to *X. enterogena* can be found, refuting Dennis' assumption of just being immature state of *X. telfairii*. Moreover, these mature fertile stromata keep a solid interior which is not gelatinous or filled with liquid. This character supports the distinctiveness of *X. enterogena* as a taxon different from *X. telfairii*. Material from Guadeloupe and Martinique referable to *X. enterogena* was not encountered during this survey.

Two collections of *X. telfairii* from Martinique and Taiwan and one of *X. enterogena* from French Guiana were included in the multigene phylogenetic study carried out by Hsieh *et al.* (2010), showing a strong similarity between the two geographically distant collections of *X. telfairii*, whereas *X. enterogena* appears on a separate branch. These preliminary results suggest that despite its variable morphology, *X. telfairii* is a good, widespread species and that *X. enterogena* is a distinct species, but a wider sampling is needed to obtain more conclusive results.

Small stromata of *X. telfairii* may be confused in the field with those of *X. olobapha* owing to their glabrous and concolourous stipes. The smooth surface lacking strips or scales and the hollow interior of *X. telfairii* help distinguish it from *X. olobapha*; the ascospores of *X. telfairii*, though in the same size range as those of *X. olobapha* are readily distinguished by their oblique germ slit (see comments on *X. olobapha*, this paper).

Xylaria tuberoides Rehm, *Hedwigia*, 40: 146 (1901). Plate 21, Table 13.

Stromata scattered or in small groups on host surface, subglobose to obovate, on a short central to eccentric stipe, occasionally sessile and depressed-spherical, 4–30 mm in total height × 5–18 mm diam, stipes when present usually well-defined, 2–12 mm high × 2–4 mm diam, smooth, blackish brown to black, slightly swollen at base, easily broken; surface silvery grey to dark greyish brown or blackish, dull to slightly shiny, without exposed perithecial contours, smooth, appearing under the stereomicroscope as finely roughened by a minute network of low reticulate crests surrounding fugacious pale grey scales; subsurface a thick carbonaceous crust 170–200 µm thick; interior solid, whitish, with conspicuous vinaceous tones at fresh state, soon disintegrating upon drying into radially oriented fibrous strands and becoming partly hollow, usually discolouring with time. **Perithecia** subglobose 0.5–0.9 mm diam, laterally flattened when in contact, embedded in white to grey layer of soft tissue. **Ostioles** inconspicuous, finely papillate, 30–40 µm wide at base, black, surrounded by a blackish halo 100–200 µm wide with ill-defined contours.

Asci cylindrical, with (6–)8 slightly overlapping uniseriately arranged ascospores, the spore-bearing parts 157–180 × 8.5–10 µm, the stipes 82–144 µm long, with apical apparatus short-cylindrical to slightly tubular, apically flattened with an obtuse to sharp lateral rim, basally slightly attenuated, 3.6–5.7 × 2.4–3.7 (Me = 4.6 × 3.1 µm, N = 80), strongly bluing in Melzer's reagent. **Paraphyses** copious, hyphal, thin-walled, 3–4 µm wide at base, tapering to 1.5–2 µm wide above asci, sparsely guttulate, embedded in mucilaginous material. **Ascospores** (21.5–)23–28.9(–30.3) × (5.6–)6–7.4(–7.8) µm, Q = (3.2–)3.3–4.4(–5), N = 240 (Me = 25.8 × 6.8, Qe = 3.8), narrowly fusoid-inequilateral to navicular with narrowly to broadly rounded ends, dark brown to blackish brown, unicellular, with a narrow, longitudinally oriented, straight germ slit 8–12.5 µm long on the ventral side; lacking appendages or mucilaginous sheath; epispore smooth.

Asexual morph on the natural substrate not seen. Cultural characteristics described by Callan & Rogers (1990).

Plate 21 – *Xylaria tuberoides*

A, E: MJF 07116; B, F, L: CLL 2146; C: MJF 13092; D, H, N-Q: CLL 0841; G: MJF 13072; I-K: MJF13072; M: CLLMAR 11065. A: Sessile stroma on the natural substrate, in side view; B, C: Shortly-stipitate stromata in side view; D: Stroma in vertical section (broken) showing a partly hollow fibrous interior; E, G: Stromatal surface in close-up showing a finely cracked pattern around minute pale grey scales and black, barely papillate ostioles; F: Stroma in vertical section (broken) in close-up showing perithecia fully immersed beneath a black carbonaceous crust and embedded in white soft tissue; H: Variously shaped ascospores in side view, in 1% SDS; I-K: Long-stipitate mature asci, in Congo red and 3% KOH; L, M: Ascal apical apparati, in Melzer's reagent; N: Paraphyses embedded in mucilaginous material, in India ink; O: Immature ascospore in ventral view showing a conspicuous germ slit and absence of appendage or mucilaginous sheath, in India ink; P: Mature ascospore in side view, in India ink; Q: Mature ascospore in ventral view showing a thin germ slit, in 1% SDS. Scale bars: A-D = 5 mm; E-G = 0.5 mm; H, N-Q = 10 µm; I-K = 50 µm; L, M = 5 µm.

Table 13 – Ascospore and ascus apical apparatus dimensions in four collections of *X. tuberoides* from Martinique, compared with those reported in literature. Extreme values in parentheses.

Collections numbers	Ascospore measurements	Q = quotient l/w N = number of measurements	Mean values of ascospores	Apical apparatus dimensions and mean values
CLL 0841	(23.1–)23.9–26.8(–27.6) × (6.3–)6.6–7.6 µm	Q = (3.2–)3.3–3.8(–4.3) ; N = 60	Me = 25.3 × 7.1 µm, Qe = 3.6	4.4–5.4 × 2.9–3.5 µm Me = 4.9 × 3.2 µm, N = 20
CLL 2146	(21.5–)23–26.5(–29) × (5.7–)6–6.8(–7.1) µm	Q = (3.2–)3.5–4.2(–4.9) ; N = 60	Me = 24.8 × 6.4 µm, Qe = 3.9	3.6–4.2 × 2.4–2.8 µm Me = 3.9 × 2.6 µm, N = 20
CLL 11065	(23.6–)24.1–27.7(–28.9) × (5.6–)6.4–7.3(–7.6) µm	Q = (3.2–)3.4–4.2(–4.9) ; N = 60	Me = 25.9 × 6.8 µm, Qe = 3.8	5.2–5.7 × 3.1–3.7 µm Me = 5.4 × 3.3 µm, N = 20
MJF 13070	(24.8–)25.4–28.9(–30.3) × (6–)6.4–7.4(–7.8) µm	Q = (3.3–)3.6–4.4(–5) N = 60	Me = 27.2 × 6.9 µm, Qe = 4	4.1–4.6 × 2.8–3.4 µm Me = 4.3 × 3.2 µm, N = 20
Cumulated values	(21.5–)23–28.9(–30.3) × (5.6–)6–7.4(–7.8) µm	Q = (3.2–)3.3–4.4(–5) N = 240	Me = 25.8 × 6.8, Qe = 3.8	3.6–5.7 × 2.4–3.7 µm Me = 4.6 × 3.1 µm, N = 80
Dennis (1956) as *X. obovata*	20–26 × 6–8.5 µm	–	Me = 23 × 7.3 µm, Qe = 3.2	–
Rogers *et al*. (1988) as *X. obovata*	23.5–29.5 × (6–)6.5–7.5 µm	–	Me = 26.5 × 7 µm, Qe = 3.8	–
Callan & Rogers (1990) as *X. obovata*	(24–)26–30(–31) × (6.5–)7–8 µm	–	Me = 28 × 7.5 µm, Qe = 3.7	4.5 × 4.5 µm

Known distribution: Pantropical: Reported from the Caribbean (Dennis, 1956; Callan & Rogers, 1990; this paper), French Guiana, Gabon, Mayotte, Panama (JF, unpublished records), Taiwan (Ju & Rogers, 1999), Venezuela (Dennis, 1970; Rogers *et al*., 1988).

Specimens examined: French West Indies: Martinique: Case-Pilote, Morne Rose, mesophilic rainforest, on a dead corticated branch, 8 Aug. 2013, *leg.* J. Fournier, MJF 13070 (LIP); *ibid.*, on a dead corticated branch, 8 Aug. 2013, *leg.* J. Fournier, MJF 13072 (LIP); Case-Pilote, Plateau Concorde, hygrophilic rainforest, on a dead corticated trunk, 21 Aug. 2011, *leg.* C. Lechat, CLLMAR 11065 (LIP); Case-Pilote, Plateau Perdrix, hygrophilic rainforest, on bark, 5 Sept. 2003, *leg.* C. Lechat, CLL 0876 (LIP); *ibid.*, on a dead corticated branch, 5 Sept. 2003, *leg.* R. Courtecuisse, CLL 0879 (LIP); Case-Pilote, Savane Saint-Cyr, trail to Plateau Concorde, hygrophilic rainforest, on a dead corticated trunk, 27 Aug. 2010, *leg.* J. Fournier, MJF 10157 (LIP); Fort-de-France, Absalon, track to Plateau Michel, 400–500 m, hygrophilic rainforest, on a dead corticated branch, 7 Aug. 2016, *leg.* J. Fournier, MJF 16170 (LIP); Le Lorrain, Rivière Pirogue, Crassous forest, mesophilic rainforest, on a dead corticated branch, 26 Aug. 2004, *leg.* C. Lechat, CLL 2146 (LIP; HAST 144032); Le Morne-Rouge, Domaine d'Émeraude, hygrophilic rainforest, on a dead corticated branch, 9 Aug. 2013, leg J. Fournier, MJF 13092 (LIP); Saint-Joseph, Coeur-Bouliki forest, hygrophilic rainforest, on a large dead corticated branch in a Mahogany (*Swietenia macrophylla*, *Meliaceae*) plantation, 26 Aug. 2007, *leg.* J. Fournier, MJF 07116 (LIP); Saint-Joseph, Rivière Blanche, hygrophilic rainforest, on bark of *Tovomita plumieri* (*Clusiaceae*), 4 Sept. 2003, *leg.* C. Lechat, CLL 0841 (LIP).

Comments: *Xylaria tuberoides* is a distinctive species characterized by shortly stipitate, subglobose, carbonaceous stromata with a smooth dark grey surface and inconspicuous ostioles. Its loosely fibrous interior with vinaceous tones and its dark brown narrowly fusoid-inequilateral ascospores 23–28.9 × 6–7.4 µm with a short, straight, longitudinally oriented germ slit further distinguish it from other species.

Xylaria tuberoides is usually stipitate but it can occasionally feature sessile, depressed-spherical stromata resembling those of *X. alboareolata* Y.-M. Ju & J.D. Rogers, a penzigioid species dealt with in part I (Fournier *et al*., 2018b). The latter can be distinguished by the presence of persistent white scales and minute black granulations on surface, and more coarsely papillate ostioles; its larger ascospores 28.2–33.1× 8.7–10.2 µm bearing bipolar secondary mucilaginous appendages unambiguously distinguish it from those of *X. tuberoides*.

Dennis (1956) assumed that *X. tuberoides* [as *X. obovata* (Berk.) Berk.] "is linked with the *X. polymorpha* complex", an assumption refuted by Callan & Rogers (1990) based on cultural characteristics. The phylogenetic survey by Hsieh *et al*. (2010) likewise showed that *X. tuberoides* is not nested in the PO clade but appears on a separate branch in the HY clade in the vicinity of *X. cranioides* (Sacc. & Paol.) Dennis, next to the members of the genus *Kretzschmaria* Fr.

Until Lodge *et al.* (2008) have clarified the taxonomic status of *X. tuberoides*, this fungus was regarded as *X. obovata* (Berk.) Berk., following Dennis' interpretation (1956). According to Lodge *et al*. (2008), *X. obovata* is rather a synonym of *X. schweinitzii*, but it might represent a variant of this species (Ju, pers. comm., 2018). Further putative synonyms of *X. tuberoides* might be *X. collabens* (Mont.) Mont. (1855), *X. reniformis* Starb. (1901), *Penzigia actinomorpha* Möller (1901) and *X. duchassaingii* Rehm (1889) from Guadeloupe (Ju, pers. comm., 2018), making the status of *X. tuberoides* possibly subject of a revision in the future.

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