

The genera *Kretzschmariella* and *Nemania* (Xylariaceae) in Guadeloupe and Martinique (French West Indies)

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Abstract: This survey deals with the *Nemania* taxa collected in the French West Indies in the course of an ongoing inventorial work on the mycobiota of these islands initiated in 2003. Based on the evaluation and comparison of their morphological characters, sixteen taxa are described, illustrated and discussed, including seven known taxa, viz.: *N. beaumontii*, *N. bipapillata*, *N. caries*, *N. chestersii* var. *microspora*, *N. diffusa*, *N. immersidiscus* and *N. subaenea*. Nine new taxa are proposed, including *N. albofarcta*, *N. colubrina*, *N. discostoma*, *N. flavoviridis*, *N. nivea*, *N. obscura*, *N. roseoilacina* and *N. sericata*, and the new combination *N. sublutea* for a taxon formerly placed in *Hypoxylon*. The monotypic genus *Kretzschmariella*, represented by *K. culmorum*, is included for its morphological resemblance and possible confusion with *Nemania*. With the exception of *K. culmorum* and *N. bipapillata* which were already reported from the Caribbean, all other taxa are new to this region. A dichotomous identification key and a synoptic figure plate of stromata are presented.

Keywords: Ascomycota, pyrenomycetes, saproxylic fungi, taxonomy, tropical mycology, Xylariales, Xylarioideae.

Résumé : cette étude porte sur les taxons de *Nemania* récoltés lors de missions d'inventaire de la fonge des Antilles françaises commencées en 2003. En se fondant sur l'évaluation et la comparaison de leurs caractères morphologiques, seize taxons sont décrits, illustrés et commentés, comprenant d'une part sept taxons connus, à savoir *N. beaumontii*, *N. bipapillata*, *N. caries*, *N. chestersii* var. *microspora*, *N. diffusa*, *N. immersidiscus* et *N. subaenea*. D'autre part, neuf taxons nouveaux sont proposés, comprenant *N. albofarcta*, *N. colubrina*, *N. discostoma*, *N. flavoviridis*, *N. nivea*, *N. obscura*, *N. roseoilacina* et *N. sericata*, et la nouvelle combinaison *N. sublutea* est proposée pour un taxon placé auparavant dans *Hypoxylon*. Le genre monotypique *Kretzschmariella*, représenté par *K. culmorum*, est inclus pour sa ressemblance et sa possible confusion avec *Nemania*. À l'exception de *K. culmorum* et *N. bipapillata* qui étaient déjà signalés des Caraïbes, tous les autres taxons sont nouveaux pour la région. 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 survey of the genus *Nemania* S.F. Gray in the French Caribbean islands of Guadeloupe and Martinique is the continuation of similar taxonomic studies carried out on the xylariaceous genera *Hypoxylon* Bull., *Annulohypoxylon* Y.-M. Ju, J.D. Rogers & H.-M. Hsieh, *Biscogniauxia* Kuntze and *Rosellinia* De Not. in the same region (FOURNIER *et al.*, 2015; 2016; 2017a; 2017b). The reader is referred to the first publication for details on the framework within which this work was carried out, and for the salient ecological features characterizing these two islands.

The purpose of these surveys is to describe and illustrate the xylariaceous ascomycetes collected during the repeated field trips to these islands initiated in 2003 (COURTECUISSÉ, 2006). Our previous publications showed that *Xylariaceae* Tul. & C. Tul. are particularly well represented in Guadeloupe and Martinique, with a high proportion of rarely recorded and undescribed taxa, with several potentially new taxa still under investigation, awaiting new collections. The results on *Nemania* in the French West Indies that we present herein include sixteen taxa, among which eight are new taxa and one is a new combination, making *Nemania* currently the xylariaceous genus with the highest proportion of undescribed taxa. *Kretzschmariella* Viégas, represented by *K. culmorum*, is a monotypic xylariaceous genus phylogenetically distant from *Nemania* (JOHNSTON *et al.*, 2016) but resembling *Nemania* in external morphology. It is included here because of a possible confusion with *Nemania*, from which it primarily differs by non-papillate ostioles and a different asexual morph (JU & ROGERS, 1994).

Since the redefinition of *Nemania* and its segregation from *Hypoxylon* by POUZAR (1985a; 1985b) based on morphological characters of both sexual and asexual morphs, the genus concept was widely accepted and several subsequent contributions expanded the number of known species to about 50 known taxa and provided data on their distribution (VAN DER GUCHT, 1995; VAN DER GUCHT *et al.*, 1995; GRANMO *et al.*, 1999; SMITH & HYDE, 2001; ROGERS & JU, 2002; 2012; JU & ROGERS, 1999; 2002; JU *et al.*, 2005; ROGERS *et al.*, 2006; 2008; TANG

et al., 2007). The genus *Nemania* worldwide was monographed by JU & ROGERS (2002) and the reader is referred to this publication for further information on the taxonomic and nomenclatural history of the genus. The taxonomic concepts that we followed throughout the present survey are those established by these authors, including those added in their more recent publications.

Nemania belongs to the *Xylariaceae* based on its ascomata embedded in a stroma, unitunicate asci with an amyloid apical apparatus, brown unicellular ascospores with a germ slit and hyphomycetous asexual morph with holoblastic conidiogenesis. It is accommodated in the subfamily *Xylarioideae* because of its geniculosporium-like asexual morph. The phylogenetic affinities of *Nemania* with *Xylarioideae* were demonstrated by HSIEH *et al.* (2010) who showed that it clusters with *Entoleuca* Syd., *Euepixylon* Füsting and *Rosellinia* in a subclade within *Xylaria sensu lato*. Congruent results were recently published in a large scale multilocus phylogenetic overview of the *Xylariaceae* (U'REN *et al.*, 2016), confirming that *Nemania* has closer affinities with *Rosellinia* than with *Kretzschmaria* Fr. and *Xylaria* Hill ex Schrank.

Morphologically, *Nemania* is characterized by carbonaceous, superficial, multiperitheciate, effused-pulvinate stromata with papillate ostioles and variable presence of soft, whitish, brownish, grey or yellow internal tissue. It is usually distinguished from *Rosellinia* by multiperitheciate stromata not associated with a subiculum and perithecia firmly attached to the stromatal cavity, but the distinction between some *Nemania* spp. associated with a white or cream-coloured superficial coating and *Rosellinia* spp. of the *R. mammoidea* group as defined by PETRINI & PETRINI (2005) and PETRINI (2013) may be proven equivocal (see also FOURNIER *et al.*, 2017b).

The plentiful material of *Nemania* and *Kretzschmariella* collected during our forays was studied according to the morphological taxonomic concepts defined by JU & ROGERS (2002). This led to the identification of sixteen taxa including seven known taxa, viz.: *N. beaumontii* (Berk. & M.A. Curtis) Y.-M. Ju & J.D. Rogers, *N. bipapillata* (Berk. & M.A. Curtis) Pouzar, *N. caries* (Schwein.) Y.-M. Ju & J.D. Rogers, *N. chestersii* (J.D. Rogers & Whalley) Pouzar var. *microspora* (J.D. Rogers & Samuels) Y.-M. Ju & J.D. Rogers, *N. diffusa* (Sowerby)

Dichotomous key to *Kretzschmariella* and *Nemania* taxa known from French West Indies

1. Stromata on bamboo 2
 1. Stromata on dicot wood 3
2. Stromata mostly uniperitheciate, conical, with papillate ostioles *N. sericata* sp. nov.
 2. Stromata multiperitheciate, effused-pulvinate, with umbilicate ostioles *K. culmorum*
3. Stromata with black carbonaceous tissue limited to a superficial crust 4
 3. Stromata with black carbonaceous tissue also present around the perithecia 8
4. Ascospores 13–18 × 5.5–8 µm 5
 4. Ascospores smaller, 9.4–11 × 4.1–4.7 µm 6
5. Stromata multiperitheciate, effused-pulvinate; ascospores pale to medium brown with a short germ slit on the dorsal side, 14–18.1 × 5.5–6.8 µm *N. subaenea*
 5. Stromata mostly uniperitheciate, conical; ascospores dark brown with a long germ slit on the ventral side, 13–15.5 × 6.4–7.9 µm *N. sericata* sp. nov.
6. Ascospores dark brown with a conspicuous germ slit spore-length *N. flavoviridis* sp. nov.
 6. Ascospores pale brown with a short inconspicuous germ slit 7
7. Ascospores equilateral with broadly rounded ends *N. caries*
 7. Ascospores inequilateral with narrowly rounded ends *N. colubrina* sp. nov.
8. Stromata with strongly exposed perithecial contours, occasionally perithecioid; ascospores pale to medium brown 9
 8. Stromata with inconspicuous to weakly exposed perithecial contours; ascospores medium to dark brown 10
9. Ascospores smooth, 8.4–10.2 × 3.6–4.1 µm *N. beaumontii*
 9. Ascospores longitudinally striate, 11.2–12.9 × 4.1–4.8 µm *N. chestersii* var. *microspora*
10. Ostioles encircled with a disc 11
 10. Ostioles not encircled with a disc 14
11. Mature stromata with abundant soft whitish tissue between perithecia; ascospores medium brown, 8.5–9.9 × 3.1–3.7 µm, with a germ slit less than spore-length *N. albofarcta* sp. nov.
 11. Mature stromata carbonaceous between the perithecia; ascospores dark brown, with a germ slit spore-length 12
12. Ostioles sunken in a discoid depression 0.08–0.12 mm diam *N. immersidiscus*
 12. Ostioles at the centre of a slightly raised disc 13
13. Ostiolar disc 0.25–0.30 mm diam; ascospores strongly inequilateral *N. bipapillata*
 13. Ostiolar disc 0.10–0.17 mm diam; ascospores slightly inequilateral *N. discostoma* sp. nov.
14. Stromata entirely carbonaceous, lacking soft tissue between or beneath the perithecia at maturity 15
 14. Stromata partly carbonaceous, with some white or yellow soft tissue between or beneath the perithecia at maturity 17
15. Stromatal surface with shades of purple *N. roseolilacina* sp. nov.
 15. Stromatal surface grey to black, without shades of purple 16
16. Stromata superficial, surface grey to blackish grey, usually with shades of brown; ostioles papillate; ascospores 9.1–12.2 × 4.3–6.2 µm *N. diffusa*
 16. Stromata erumpent, surface black; ostioles inconspicuous; ascospores 8.2–9.4 × 4.5–5.3 µm *N. obscura* sp. nov.
17. Stromatal surface grey to dark grey with shades of yellow or olivaceous yellow before complete maturity 18
 17. Stromatal surface white or black, lacking shades of yellow before maturity 19
18. Yellow to olivaceous yellow soft tissue beneath the perithecia *N. sublutea* comb. nov.
 18. White soft tissue present between or beneath the perithecia *N. flavoviridis* sp. nov.
19. Stromatal surface white, even; ostioles faintly papillate; white soft tissue between the perithecia *N. nivea* sp. nov.
 19. Stromatal surface black; ostioles frequently on a raised-discoid base; white soft tissue usually present beneath the perithecia *N. discostoma* sp. nov.

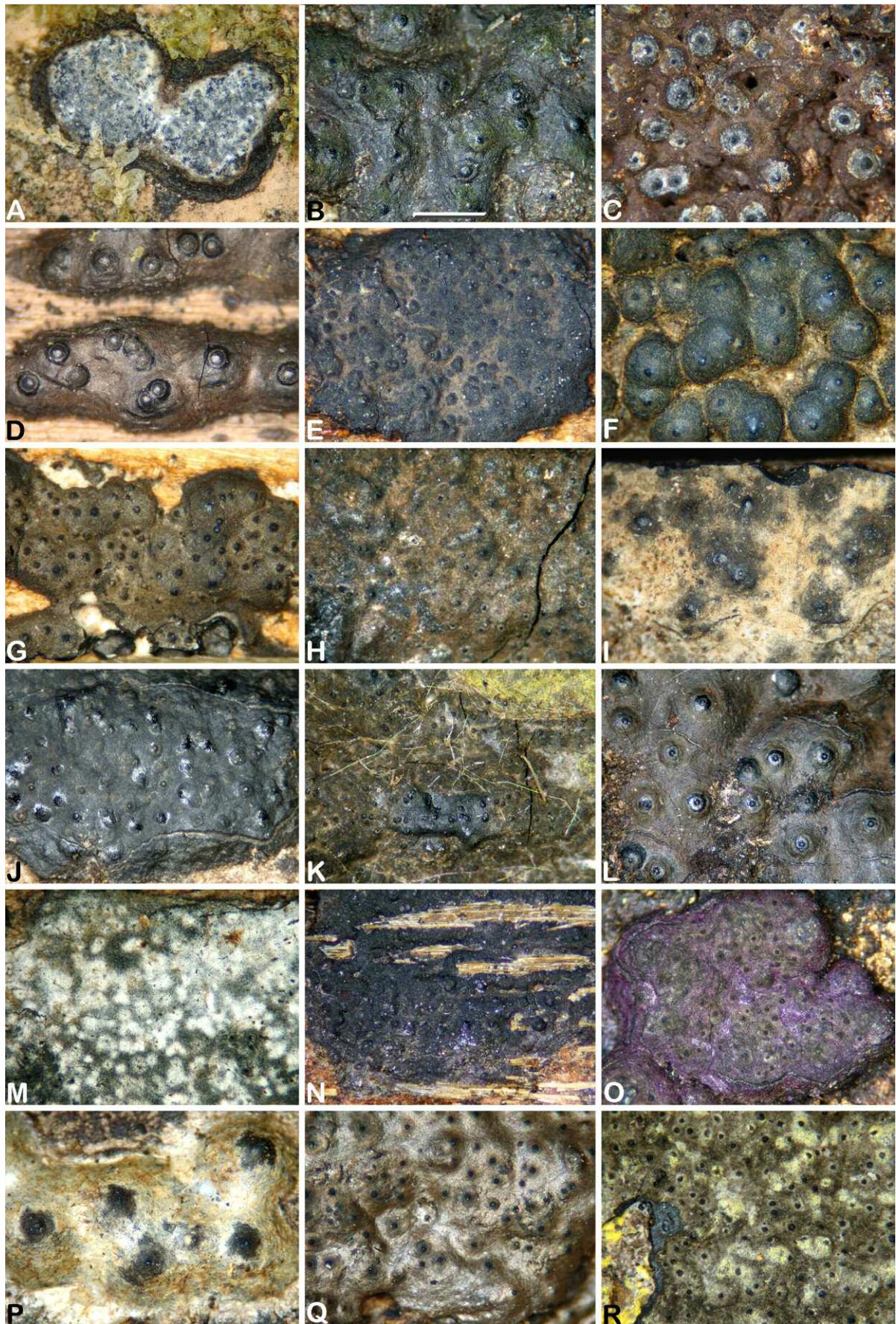


Plate 1 – Comparison at the same scale of stromata of *Kretzschmariella* and *Nemanina* taxa known from Guadeloupe and Martinique

A: *K. culmorum* MJF 13101; B: *N. albofarcta* MJF 14087 (holotype); C: *N. beaumontii* MJF CLL 2075; D: *N. bipapillata* CLL 2234; E: *N. caries* MJF 07259; F: *N. chestersii* var. *microspora* CLL 2081; G: *N. colubrina* MJF 10022 (holotype); H: *N. diffusa* MJF 10156; I: *N. cf. diffusa* CLL 6125; J: *N. discostoma* MJF 15057 (paratype); K: *N. flavoviridis* MJF 15100 (holotype); L: *N. immersidiscus* MJF 14119; M: *N. nivea* MJF 16054 (holotype); N: *N. obscura* CLL 0971 (holotype); O: *N. roseolilacina* MJF 07043 (holotype); P: *N. sericata* MJF07243 (holotype); Q: *N. subaenea* MJF 14110; R: *N. sublutea* CLL 8341. Scale bar (B) = 1 mm.

Gray, *N. immersidiscus* Van der Gucht, Y.-M. Ju & J.D. Rogers and *N. subaenea* Y.-M. Ju & J.D. Rogers. Eight new taxa are proposed to accommodate collections that could not be equated to known taxa, viz.: *N. albofarcta* J. Fourn. & Lechat, *N. colubrina* J. Fourn. & Lechat, *N. discostoma* J. Fourn. & Lechat, *N. flavoviridis* J. Fourn. & Lechat, *N. nivea* J. Fourn. & Lechat, *N. obscura* J. Fourn. & Lechat, *N. roseo-lilacina* J. Fourn. & Lechat and *N. sericata* J. Fourn. & Lechat. Six collections from Martinique and one from US Virgin Islands proved conspecific with a taxon formerly placed in *Hypoxylon*, as *H. subluteum* Ellis & Everh. After examination of the type specimen from Louisiana (USA), we propose its new combination with *Nemania*. The distinctive features of all these collections and their differences with known taxa are illustrated and commented. Deviating collections of *N. diffusa*, *N. nivea* and *N. sublutea*, possibly representing new taxa but insufficiently documented, are illustrated and discussed along with the typical species. We constructed a dichotomous identification key to the *Nemania* taxa dealt with in this survey, including *Kretzschmariella culmorum*. A synoptic figure plate is presented for comparing the stromata of all taxa at the same scale.

The first records of *Xylariaceae* from Guadeloupe and Martinique date back to ROUSSEL (1870) and DUSS (1903) but as exposed by FOURNIER *et al.* (2017a), the material cited by the former does not suggest affinities with *Nemania*, and that cited by the latter cannot be accessed and studied according to modern taxonomic concepts. With the exception of *K. culmorum* (Ju & ROGERS, 1994) and *N. bipapillata* (MILLER, 1961, as *Hypoxylon subannulatum* Henn. & E. Nyman) which were already reported from the Caribbean, all other taxa are new to this region.

Materials and methods

The observations were carried out on dry material rehydrated in water or 1% SDS. Measurements of asci and ascospores were made in water and ascospores measurements processed with the free software Piximetre 5.2 (<http://ach.log.free.fr/Piximetre/>). In the formula given by this software the values in brackets represent the extreme values (20%) that are not taken into account for the calculation, N represents the number of ascospores measured, Q the quotient length/width, Me the mean values of length \times width and Qe the mean value of quotient length/width. The amyloid reaction of the ascus apical apparatus was tested by adding a drop of Melzer's reagent to a water mount of perithecial contents. Microscopic observation of the asci and the paraphyses was carried out after 1 min in 1% SDS and mounting in diluted blue Pelikan® ink, black Pelikan® ink, 3% KOH, Congo red with 3% KOH or Melzer's reagent. Inconspicuous germ slits of ascospores were observed in heated chloral-lactophenol or preferably in PVA-lactophenol after 48h of incubation. Measurements of stromata, asci and ascus apical apparatus are recorded as height \times width. Terminology and observation procedures follow JU & ROGERS (2002). Nomenclature follows MycoBank. Colours are coded according to Rayner's mycological chart (RAYNER, 1970) and OAC colour chart (<http://www.onlineauctioncolorchart.com/>), as oacxxx. The material is deposited in LIP (University of Lille, France) and some collections (including isotypes) likewise in HAST (Academia Sinica, Taipei, Taiwan).

Photomicrographs were taken with a Nikon Coolpix 995 digital camera either directly mounted on a stand or, for higher magnifications, through the eyepiece of an Olympus SZ60 stereomicroscope, by the means of a 30 mm diameter adapter. Photomicrographs were taken with the same camera mounted on the trinocular port of a Leitz Orthoplan microscope. The digitized photographs were processed with Adobe Photoshop Elements 10 and the figures assembled with the same software.

Taxonomy

Kretzschmariella culmorum (Cooke) Y.-M. Ju & J.D. Rogers, *Mycotaxon*, 51: 242 (1994). Plate 2.

Stromata effused-pulvinate, superficial, orbicular to ellipsoid, 1–4.5 mm long \times 1–4 mm wide \times 0.25–0.35 mm thick, multiperitheciate, scattered, separate to confluent into larger compound stromata up to 20 mm long; surface grey to blackish grey, with unexposed perithecial contours, with sloping margins occasionally densely covered with minute black carbonaceous granules, sometimes also scattered on top; stromatal base of immature and young stromata surrounded by a thin silvery grey ring becoming blackish at maturity or vanishing; subsurface a thin carbonaceous crust 40–50 μ m thick not extending downwards around the perithecia; interperithecial tissue white to greyish white or cream-coloured, soft, loosely fibrous; subperithecial tissue inconspicuous to absent. **Perithecia** subglobose to depressed-spherical, 0.2–0.35 mm diam. **Ostioles** umbilicate, most often inconspicuous.

Asci cylindrical, with (6–)8 overlapping obliquely uniseriately arranged ascospores, the spore-bearing parts 87–96 \times 10–12 μ m, the stipes 10–23 μ m long, with apical apparatus 2.2–2.9 \times 3.7–4.5 μ m (Me = 2.5 \times 4 μ m, N = 25), flattened diamond-shaped with a marked lateral rim and an attenuated base, bluing in Melzer's reagent. **Paraphyses** thin-walled, remotely septate, 3.5–5 μ m wide at base, tapering above asci. **Ascospores** (12.1–)12.9–15(–15.8) \times (5.7–)6.1–7.4(–7.8) μ m, Q = (1.8–)1.9–2.3(–2.5), N = 60 (Me = 13.9 \times 6.7 μ m; Qe = 2.1), ellipsoid slightly inequilateral, frequently heteropolar with lower end more narrowly rounded to subacute, unicellular, olivaceous brown at fresh state, brown to dark brown in dry material, with a conspicuous, straight, central, almost spore-length germ slit on the ventral side; epispore smooth; thin appressed mucilaginous sheath present on fresh ascospores, drawn into a secondary mucilaginous appendage occasionally present at lower end, rarely at both ends, visible in India ink, slightly stained by blue ink.

Asexual morph on the natural substrate not seen.

Specimens examined: FRENCH WEST INDIES: MARTINIQUE: Case-Pilote, Savane Saint-Cyr, track to Plateau Concorde, hygrophilic rainforest, on dead bamboo culm, associated with *Astrocystis sublimbata*, 25 Aug. 2007, *leg.* J. Fournier, *det.* Y.-M. Ju, MJF 07089 (LIP); Fort-de-France, Fontaine Didier, hygrophilic rainforest, on dead bamboo culm, associated with *Astrocystis sublimbata*, 19 Aug. 2013, *leg.* J. Fournier, MJF 13322 (LIP); Le Lorrain, Rivière Pirogue, hygrophilic rainforest, on dead bamboo culm, 4 Jun. 2014, *leg.* C. Lechat, MJF 14029 (LIP); Le Morne-Rouge, Domaine d'Emeraude, hygrophilic rainforest, on dead bamboo culm, 9 Aug. 2013, *leg.* J. Fournier, MJF 13101 (LIP); Le Morne-Rouge, La Propreté, forest trail, hygrophilic rainforest, on dead bamboo culm, 29 Aug. 2007, *leg.* J. Fournier, MJF 07182 (LIP) (HAST 142494); Le Prêcheur, Anse Coulevre, coastal mesophilic rainforest, banks of the River Coulevre, on dead bamboo culm, 27 Aug. 2007, *leg.* C. Lechat, MJF 07142 (LIP) (depauperate); *ibid.*, on dead bamboo culm, associated with *Astrocystis sublimbata* and *Diatrype phaselina*, 11 Aug. 2016, *leg.* J. Fournier, MJF 16210 (LIP); Schoelcher, banks of Case Navire River, mesophilic rainforest, on dead bamboo culm, 5 Aug. 2013, *leg.* J. Fournier, MJF 13005 (LIP).

Known distribution: Neotropical: Brazil, Grenada, Guadeloupe, Paraguay, USA (Georgia) (JU & ROGERS, 1994) and Martinique (this paper).

Comments: *Kretzschmariella culmorum* is a neotropical bambusicolous xylariaceous ascomycete characterized by small grey to blackish effused-pulvinate stromata with a thin superficial carbonaceous crust and soft whitish interperithecial tissue. It is not uncommon in Martinique, preferably in hygrophilic rainforest, and can be easily recognized in the field by its small orbicular to ellipsoid grey

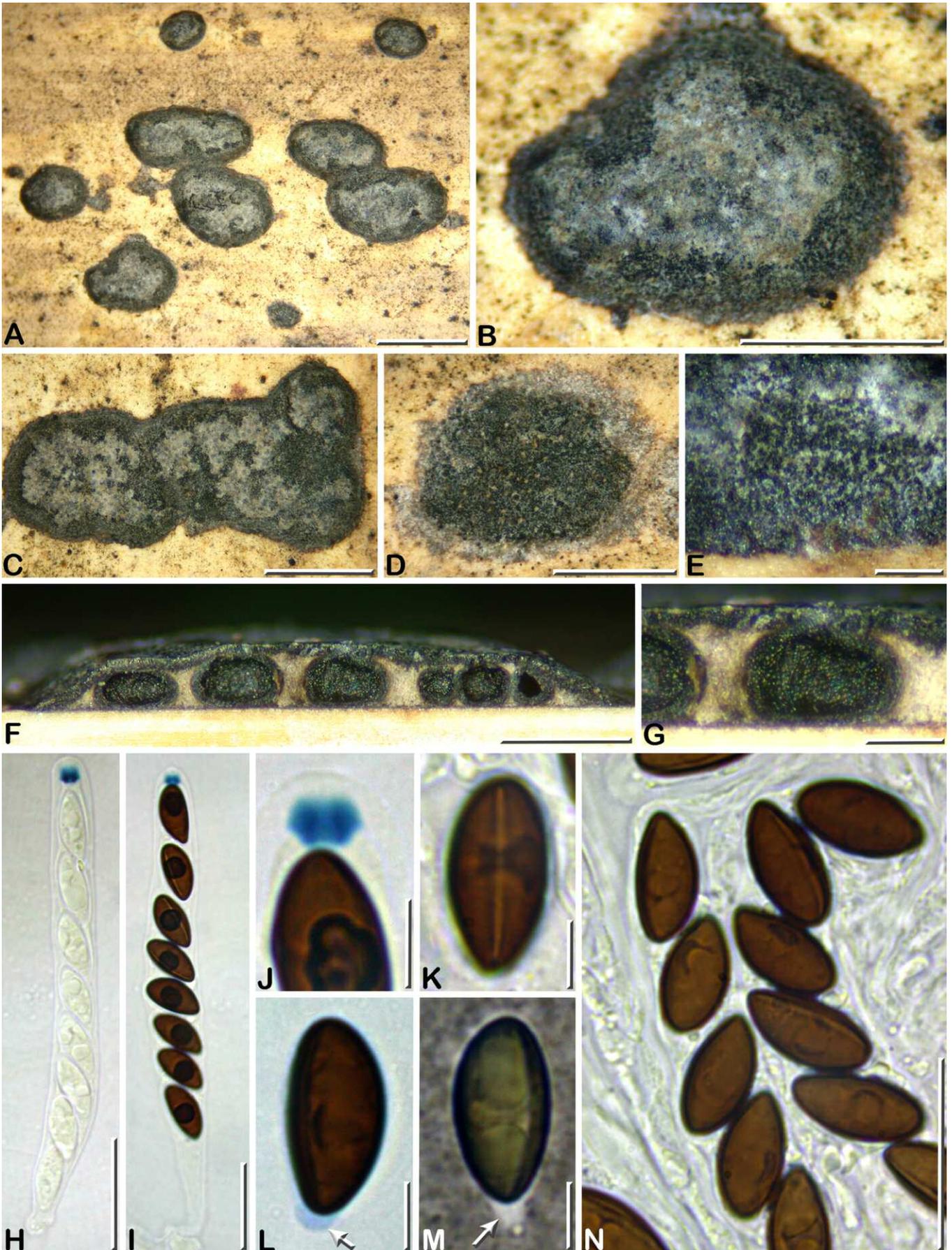


Plate 2 – *Kretzschmariella culmorum*

MJF 07089. A, C: Separate to coalescent stromata on host surface; B: Stroma in close-up showing a grey flattened top with inconspicuous umbilicate ostioles and sloping margins incrustated with black granules; D: Immature flattened stroma surrounded by a halo of greyish hyphal tissue; E: Close-up on stromatal margin showing dense black granules; F, G: Stroma in vertical section showing a thin black carbonaceous crust above the perithecia and whitish soft tissue between them; H, I: Immature and mature asci, in Melzer's reagent; J: Ascical apical apparatus in Melzer's reagent; K: Ascospore in ventral view showing a germ slit, in 1% SDS; L, M: Ascospores showing a basal secondary appendage (arrows), in blue Pelikan® ink diluted in 1% SDS and India ink respectively; N: Ascospores in 1% SDS. Scale bars: A, C = 2 mm; B, D = 1 mm; E, G = 0.2 mm; F = 0.5 mm; H, I, N = 20 µm; J–M = 5 µm.

stromata. It is included in this survey of *Nemania* for its overall morphological resemblance with members of this genus, from which it primarily differs by non-papillate ostioles. JU & ROGERS (1994) demonstrated the distinctiveness of this taxon producing in culture long cylindrical multiseptate conidia, a feature unknown in other xylariaceous genera, which led them to reinstate the genus *Kretzschmariella* to accommodate this fungus formerly placed in *Hypoxylon* (as *H. culmorum* Cooke). *Kretzschmariella culmorum* was recently included in a phylogenetic study by JOHNSTON *et al.* (2016) demonstrating its affinities with *Astrocystis mirabilis* Berk. & Broome within the PO clade of *Xylaria* as defined by HSIEH *et al.* (2010), thus distant from the *Nemania-Rosellinia* clade.

Kretzschmariella culmorum occurs on recently dead, not rotten culms of bamboo where it is often associated with *Astrocystis sublimbata* (Durieu & Mont.) G.C. Hughes, a bambusicolous xylariaceous fungus likewise featuring superficial stromata with a discoid base (LÆSSØE & SPOONER, 1994). *Astrocystis sublimbata* primarily differs from *K. culmorum* by uniperitheciate stromata.

Two species currently placed in *Nemania* are known to occur on bamboo, viz. *N. minutula* (Penz. & Sacc.) Y.-M. Ju & J.D. Rogers and *N. nummularioides* (Rehm) Y.-M. Ju & J.D. Rogers. The former differs from *K. culmorum* by black stromata with faintly papillate ostioles, smaller perithecia 0.1–0.2 mm diam and smaller ascospores 10.5–13 × 4–5 µm, while the latter, resembling *K. culmorum* by mouse grey stromata, differs by a reticulate-cracked stromatal surface and larger navicular ascospores 19.5–25.5 × 9–10.5 µm (JU & ROGERS, 1994, 2002).

The presence of minute black granules on the stromatal surface was not reported by JU & ROGERS (1994). The examination of various material showed that they may vary from inconspicuous to abundant like in the collection MJF 07089 illustrated above. This character is likely related to environmental conditions and therefore appears to lack strong taxonomic value.

Nemania albofarcta J. Fourn. & Lechat, *sp. nov.* – MycoBank MB823699. Plate 3.

Diagnosis: Differs from all known species of *Nemania* by the combination of abundant, soft, whitish tissue between the perithecia, coarsely papillate ostioles often with a discoid base and pale to medium brown, narrowly ellipsoid ascospores averaging 9.1 × 3.4 µm with a germ slit ½ to ⅔ spore-length on the ventral side.

Holotype: FRENCH WEST INDIES: MARTINIQUE: Le Marigot, Habitation Denel, Pérou forest, track to Morne Bellevue, meso- to hygrophilic rainforest, on dead blackened rotten wood, 7 Jun. 2014, *leg.* J. Fournier, MJF14087 (LIP). Isotype: HAST 142495.

Etymology: From Latin *albus* = white and *farctus* = stuffed, for the abundant soft whitish stromatal tissue between the perithecia.

Stromata superficial, irregularly effused-pulvinate, confluent, 4–12 mm long × 2.5–11 mm wide × 0.65–0.85 mm thick, with unexposed perithecial contours and sloping margins; surface uneven with wrinkles and irregular depressions delimiting small groups of perithecia, dull black; black carbonaceous tissue forming a superficial crust 40–90 µm thick immediately beneath surface and surrounding each perithecium; abundant whitish to cream-coloured fibrous soft tissue between the perithecia; the tissue beneath the perithecial layer inconspicuous, greyish brown in places, the underlying wood blackened. **Perithecia** subglobose to depressed spherical, 0.45–0.6 × 0.45–0.65 mm. **Ostioles** conspicuous, shiny black, broadly conic-papillate or more finely papillate at the centre of a slightly raised discoid base 120–200 µm diam.

Asci cylindrical, with (6–)8 uniseriately arranged ascospores, the spore-bearing parts 65–76 × 5–5.5 µm, with fragile stipes 45–60 µm long, with apical apparatus short-cylindrical to slightly trapezoid, 1.4–1.7 × 1.2–1.4 µm (Me = 1.5 × 1.3 µm, N = 20), bluing in Melzer's reagent. **Paraphyses** copious, thin-walled, septate, 3–5 µm wide at

base, filiform above asci. **Ascospores** (8–)8.5–9.9(–10.4) × (2.8–)3.1–3.7(–4) µm, Q = (2.3–)2.4–2.9(–3.3), N = 120 (Me = 9.1 × 3.4 µm; Qe = 2.7), narrowly ellipsoid-inequilateral with narrowly rounded ends, slightly ventrally concave, unicellular, olivaceous brown to light brown, with a blurred, straight to slightly twisted germ slit ½ to ⅔ spore-length on the flattened side; episore smooth.

Asexual morph on the natural substrate not seen.

Paratype: MARTINIQUE: Saint-Joseph, Plateau Perdrix, hygrophilic rainforest, on dead blackened rotten bark, 5 Sept. 2003, *leg.* C. Lechat, CLL 0887 (LIP).

Known distribution: Martinique.

Comments: The *Nemania* described above is characterized by carbonaceous stromata with an abundant soft whitish tissue surrounding the perithecia but not extending basally, coarsely papillate ostioles, frequently with a raised-discoid base and light brown, narrowly ellipsoid-inequilateral ascospores averaging 9.1 × 3.4 µm with a less than spore-length germ slit on the ventral side. This combination of features does not fit any known tropical species, the best match in the key proposed by JU & ROGERS (2002) being the north temperate taxon *N. serpens* var. *colliculosa* (Schwein.) Y.-M. Ju & J.D. Rogers [synonym *N. colliculosa* (Schwein.) GRANMO *et al.*, 1999]. The stromatal whitish tissue is much less developed in *N. serpens* var. *colliculosa* than in the material from Martinique and the ostioles are less prominent and never on a raised-discoid base; moreover, the ascospores of *N. serpens* var. *colliculosa* are more broadly ellipsoid, not ventrally concave and are significantly larger 10–14 × 4.5–6 µm vs. 8.5–9.9 × 3.1–3.7 µm. For these reasons setting the two collections from Martinique apart, the new species *N. albofarcta* is proposed to accommodate them.

The occasional presence of raised-discoid ostioles may be misleading in evoking *N. bipapillata* and *N. immersidiscus* but both are readily distinguished by their larger, dark brown ascospores with a conspicuous germ slit almost spore-length. Moreover, the stromata of *N. immersidiscus* likewise feature some white soft tissue around or beneath the perithecia but never as abundant as in *N. albofarcta*. The new species *N. discostoma*, likewise featuring stromata with internal white soft tissue and ostioles with a raised-discoid base, is distinguished from *N. albofarcta* by its dark brown almost equilateral ascospores with a germ slit spore-length (this paper).

Nemania beaumontii (Berk. & M.A. Curtis) Y.-M. Ju & J.D. Rogers, *Nova Hedwigia*, 74 (1–2): 88 (2002). Plate 4.

Stromata irregularly effused over several centimeters, 0.65–0.9 mm thick, with strongly exposed perithecial contours to perithecioid; outermost coating reddish brown, pruinose, not releasing pigments in KOH, gradually vanishing; subsurface dull brownish black, a carbonaceous crust 70–85 µm thick encasing entirely each perithecium, spreading around the base of perithecioid stromata and uniting them, the tissue between perithecia carbonaceous, black; subperithecial tissue reduced to a thin layer of black tissue. **Perithecia** subglobose to ovoid, 0.4–0.65 mm diam. **Ostioles** conic-papillate, black, typically surrounded by a conspicuous cream-coloured to white powdery disc 0.17–0.35 mm diam, absent at overmature state.

Asci cylindrical, with (6–)8 slightly overlapping uniseriately arranged ascospores, the spore-bearing parts 63–77 × 4.5–5 µm, the stipes 90–135 µm long, with apical apparatus 1.8–2.1 × 1.5–1.9 µm (Me = 2 × 1.7 µm, N = 25), short-cylindrical, bluing in Melzer's reagent. **Paraphyses** copious, thin-walled, remotely septate, 4–5 µm wide at base, tapering above asci. **Ascospores** (7.8–)8.4–10.2(–10.7) × (3.3–)3.6–4.1(–4.2) µm, Q = (2–)2.1–2.6(–3.1), N = 120 (Me = 9.2 × 3.9 µm; Qe = 2.4), ellipsoid slightly inequilateral to subballantoid, with broadly rounded ends, unicellular, greyish olivaceous at fresh state,

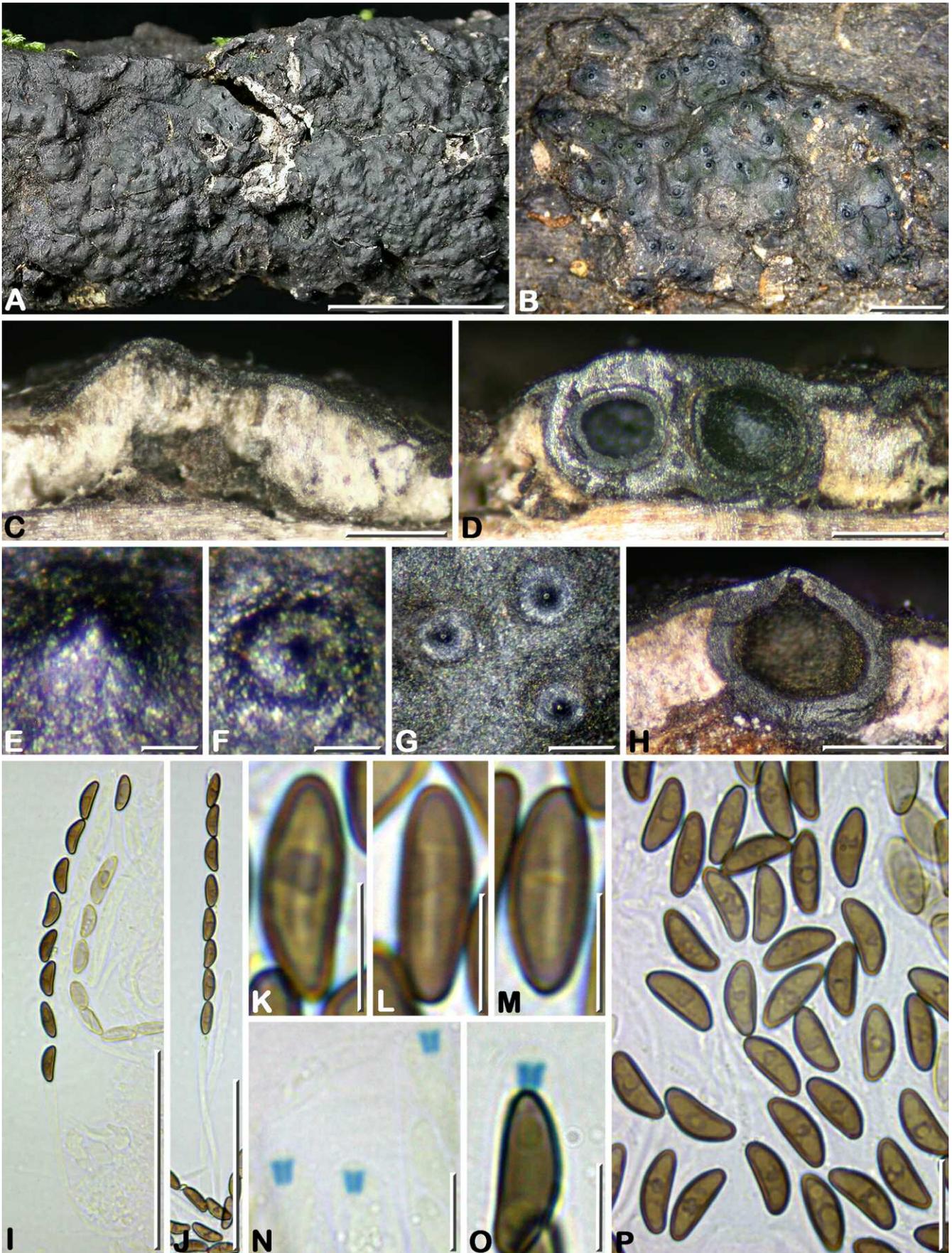


Plate 3 – *Nemanialbofarcta*

A: CLL 0887 (Paratype); B-P: MJF 14087 (Holotype). A: Effused-pulvinate stroma in top view with uneven surface, showing white internal tissue through a crack; B: Stroma in top view showing uneven surface and conspicuous papillate ostioles; C: Sterile part of a stroma in vertical section showing the outer carbonaceous crust and abundant whitish soft internal tissue; D, H: Stromata in vertical section showing perithecia encased in carbonaceous tissue and abundant soft whitish tissue surrounding them; E: Coarsely papillate ostiole in close-up; F, G: Close-up on papillate ostioles surrounded by a disc; I, J: Mature asci, in 3% KOH and 1% SDS respectively; K-M: Ascospores in ventral view showing a germ slit, in 1% SDS (K) and PVA-lactophenol (L, M); N, O: Ascospores showing apical apparatus, in Melzer's reagent; P: Ascospores in 1% SDS. Scale bars: A = 10 mm; B = 2 mm; C, D, H = 0.5 mm; E, F = 100 µm; G = 200 µm; I, J = 50 µm; K-O = 5 µm; P = 10 µm.

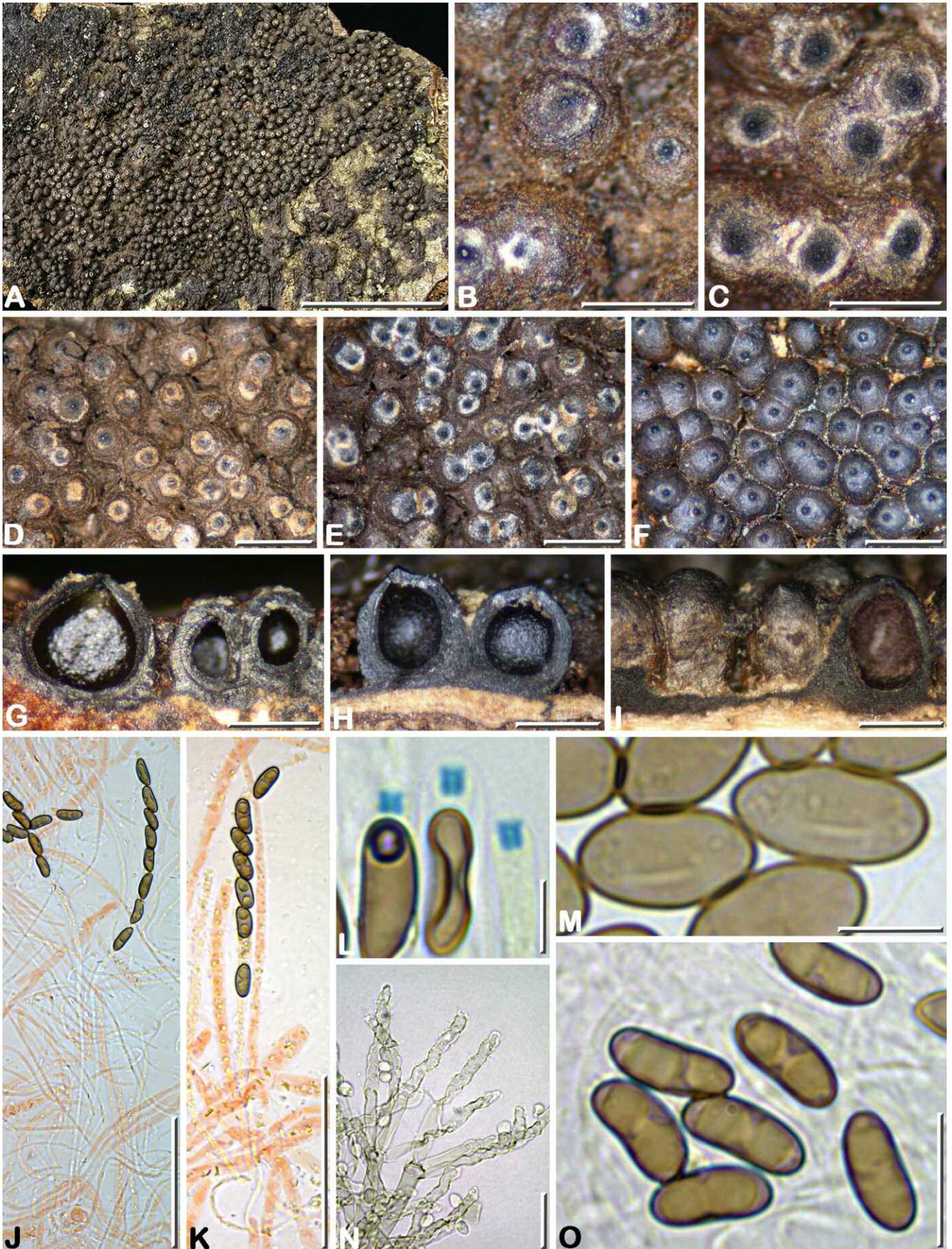


Plate 4 – *Nemanium beaumontii*

A, B, D, G, J-L, M, O: CLL 2039; C, E, H, N: CLL 2075; F, I: MJF 13334. A: Effused stromata on host surface; B, C: Close-up on stromatal surface showing black papillate ostioles surrounded by white powdery discs; D, E: Reddish brown stromatal surface and cream to white ostiolar discs of two mature stromata; F: Overmature stroma lacking outermost coating and pale ostiolar discs; G-I: Stromata in vertical section showing a black carbonaceous crust around the perithecia; J, K: Long-stipitate mature asci and paraphyses, in Congo red with 3% KOH; L: Ascilar apical apparatus in Melzer's reagent; M: Two ascospores (laterally swollen) in ventral view showing a short germ slit, in PVA-lactophenol; N: Conidiogenous cells and conidia of the supposed geniculosporium-like asexual morph, in 3% KOH; K: Ascospores in 1% SDS. Scale bars: A = 10 mm; B, C, G-I = 0.5 mm; D-F = 1 mm; J, K = 50 μ m; L, M = 5 μ m; N, O = 10 μ m.

turning light brown after desiccation, with a very inconspicuous, straight, central germ slit 3.5–4 µm long on the ventral side, usually not detected in water mounts, best seen after incubation in PVA-lactophenol; epispore smooth.

Supposed **asexual morph** on the natural substrate occurring as greyish tufts of conidiophores with geniculosporium-like conodigenous structure emerging from the ostiole of some old ascomata.

Specimens examined: FRENCH WEST INDIES: MARTINIQUE: Le Saint-Esprit, Bois La Charles, mesophilic rainforest, on a dead corticated log, 24 Aug. 2004, *leg.* C. Lechat, CLL 2039 (LIP) (HAST 142496); *ibid.*, CLL 2075 (LIP); *ibid.*, on dead decorticated and corticated wood, 20 Aug. 2013, *leg.* J. Fournier, MJF 13334 (LIP) (depauperate).

Known distribution: Brazil (JU & ROGERS, 2002), Martinique (this paper) and USA (Alabama) (JU & ROGERS, 2002).

Comments: *Nemania beaumontii* is characterized by effused, weakly carbonaceous stromata with strongly exposed perithecial contours and a reddish brown outermost coating, conic-papillate ostioles encircled with a faintly discoid area, combined with light brown suballantoid ascospores 8–10 × 3.5–4.5 µm with broadly rounded ends, with a short inconspicuous germ slit on the ventral side (JU & ROGERS, 2002). The three collections illustrated above match well with this combination of morphological characters and undoubtedly represent typical *N. beaumontii*.

Nemania beaumontii is known from a few collections and the plentiful mature material that we collected enables us to recognize the range of its morphological variations, including the frequently perithecioid stromata and the thick powdery discs encircling the ostioles. The “slightly flattened area” around some ostioles described by JU & ROGERS (2002) is likely related to the presence of this discoid structure that wears off with age. MILLER (1961) probably noticed the presence of somehow discoid structures around the ostioles since he identified a collection from Brazil as *Hypoxylon truncatum* (currently a member of *Annulohypoxylon*). However, the examination of the overmature, depauperate collection MJF 13334 showed that the white powdery disc present at young and mature state is superficial and does not involve the carbonaceous wall of the stroma, unlike the typical ostiolar disc encountered in *Annulohypoxylon* that results from a loss of carbonaceous material around the ostiole.

Nemania ravenelii (Rehm) Y.-M. Ju & J.D. Rogers, known from the USA, is similar to *N. beaumontii* in stromatal and ascospore morphology but is distinguished by larger ascospores 11–14 × 5.5–6.5 µm.

Light brown ascospores less than 10 µm long with a short inconspicuous germ slit on the ventral side are likewise encountered in *N. effusa* (Nitschke) Pouzar, a north temperate taxon with a strong host preference for *Salix* spp. (MILLER, 1961; GRANMO *et al.*, 1999; FOURNIER & MAGNI, 2002). Unlike *N. beaumontii*, the stromata of *N. effusa* feature less prominently exposed perithecial contours and lack ostiolar discs and they have a thick subperithecial layer of white soft tissue; moreover their ascospores are smaller than those of *N. beaumontii*, averaging 7.9 × 3.4 µm vs. 9.2 × 3.9 µm, and lack the suballantoid shape encountered in *N. beaumontii*.

Nemania bipapillata (Berk. & M.A. Curtis) Pouzar, *Česká Mykologie*, 39 (1): 24 (1985). Plate 5.

Stromata pulvinate, few-peritheciate to rarely perithecioid, irregularly ellipsoid to elongated, confluent, 0.8–9 mm long × 0.8–2.3 mm wide × 0.65–1 mm thick, with inconspicuous to strongly exposed perithecial contours and abrupt, often horizontally cracked margins, at times surrounded by white sterile tissue forming a thin layer on host surface, worn off at maturity; stromatal surface first orange brown, turning brownish black and slightly shiny at maturity; carbonaceous crust 100–120 µm thick immediately beneath surface, extending downwards and encasing each perithecium; loosely fi-

brous whitish tissue sometimes present at margins in immature stromata, absent in mature stromata, the interperithecial tissue blackish, carbonaceous; subperithecial tissue inconspicuous, reduced to a thin black layer, the underlying wood moderately blackened. **Perithecia** subglobose to depressed-spherical, 0.4–0.7 × 0.4–0.85 mm. **Ostioles** obtusely dome-shaped, shiny black, 0.17–0.20 mm diam, delimited by a furrow from their black raised-discoid base 0.25–0.30 mm diam.

Asci cylindrical, with eight slightly overlapping uniseriately arranged ascospores, the spore-bearing parts 90–95 × 6–7.5 µm, the stipes 100–124 µm long, fragile, with apical apparatus tubular with a faint upper rim, 2.3–3 × 1.7–2.1 µm (Me = 2.7 × 1.9 µm, N = 50), bluing in Melzer’s reagent. **Paraphyses** copious, thin-walled, septate, 2–3 µm wide at base, filiform above asci. **Ascospores** (10.3–) 10.7–12.3(–13.4) × (4.4–)4.8–5.5(–5.9) µm, Q = (1.9–)2–2.4(–2.8), N = 120 (Me = 11.6 × 5.1 µm; Qe = 2.3), ellipsoid strongly inequilateral with broadly to narrowly rounded ends, unicellular, brown to blackish brown, with a conspicuous, straight, central germ slit spore-length to slightly less than spore-length on the ventral side; epispore smooth.

Asexual morph on the natural substrate not seen, geniculosporium-like in culture on PDYA according to JU & ROGERS (1999).

Specimens examined: FRENCH WEST INDIES: MARTINIQUE: Le Lorrain, Morne du Lorrain, mesophilic rainforest, on a dead corticated branch, 30 Aug. 2004, *leg.* C. Lechat, CLL 2234 (LIP); Fort-de-France, Absalon, track to Plateau Michel, hygrophilic rainforest, on a dead decorticated branchlet, 5 Jun. 2014, *leg.* J. Fournier, MJF 14043.

Known distribution: Pantropical (JU & ROGERS, 2002).

Comments: The name *N. bipapillata* has been misused in the past (POUZAR, 1985b; PETRINI & ROGERS, 1986) for material currently regarded as *N. diffusa* and we follow JU & ROGERS (1999; 2002) in their interpretation of this taxon. *Nemania bipapillata* is characterized by few-peritheciate, often confluent pulvinate stromata with a carbonaceous interior and raised-ostiolar discs, combined with long stipitate asci and dark brown ellipsoid-inequilateral ascospores with a long germ slit on the ventral side. The two collections illustrated above match well with this definition, just deviating by the presence of discrete loosely fibrous internal tissue in immature stromata and smaller perithecia. The diagnostic feature of *N. bipapillata* is the configuration of its ostiolar discs comprising a raised annulus 0.25–0.30 mm in outer diameter encircling an obtusely dome-shaped, shiny black ostiolar papilla 0.17–0.20 mm diam delimited by a narrow furrow. This unique ostiolar configuration is the main difference with the very similar *N. immersidiscus* in which the finely papillate ostiole is sunken in a shallow discoid depression 0.08–0.12 mm diam (VAN DER GUCHT *et al.*, 1995; JU & ROGERS, 2002; this paper). Distinguishing both species may be challenging and needs a careful examination of a significant number of ostiolar discs under a stereomicroscope as the ostiolar discs are not always typical. During our survey, most of collections first assigned to *N. bipapillata* proved to better fit in *N. immersidiscus* after a closer scrutiny.

Nemania bipapillata is the only *Nemania* species we collected that was already reported from the Caribbean (Grenada) by MILLER (1961) as *Hypoxylon subannulatum*.

Nemania caries (Schwein.) Y.-M. Ju & J.D. Rogers, *Nova Hedwigia*, 74(1–2): 90 (2002). Plate 6.

Stromata effused, confluent into irregularly elongated compound stromata up to 30–35 mm long × 4–6 mm wide × 0.45–0.55 mm thick, with inconspicuous perithecial contours and sloping margins; surface greyish black to dull black, incrustated with superficial but persistent shiny black spherical granules ca. 10 µm diam; carbonaceous crust immediately beneath surface, 80–100 µm thick,

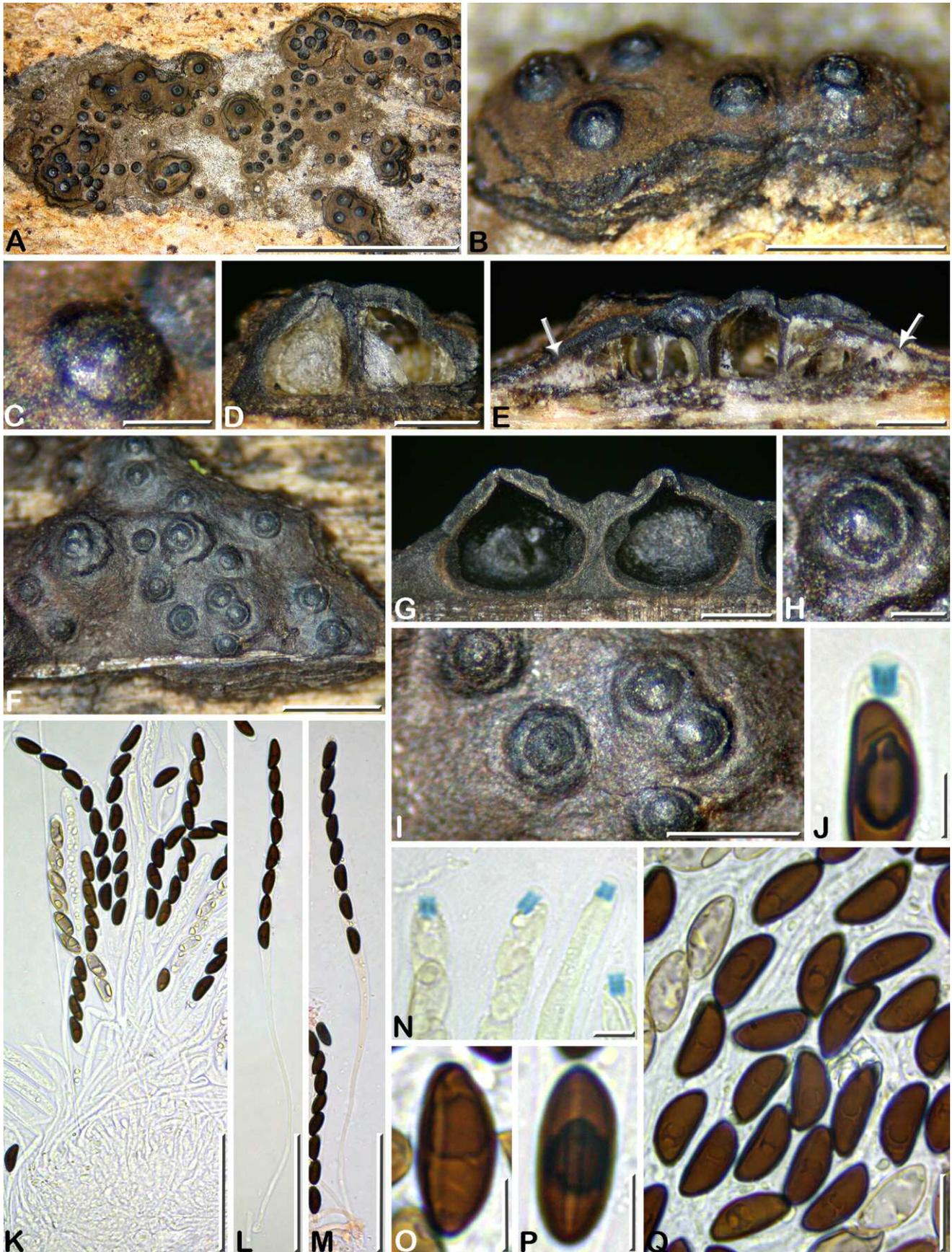


Plate 5 – *Nemanja bipapillata*

A-E, J, L, O, Q: CLL 2234; F-I, K, M, N, P: MJF 14043. A: Barely mature pulvinate stromata associated with flattened primordia and thin whitish hyphal mat at their periphery; B: Barely mature stroma in oblique lateral view showing a reddish brown coating, an abrupt horizontally cracked margin and black raised-discoid ostioles; C, H, I: Ostiolar discs in close-up; D, E: Immature stromata in vertical section showing a thick carbonaceous crust and some white loosely fibrous tissue at margins (E, arrows); F: Mature stroma in top view showing a brownish black surface with variously exposed perithecial contours and black raised-discoid ostioles; G: Mature stroma in vertical section showing the entirely black and carbonaceous interior; J, N: Ascular apical apparatus of mature and immature asci, in Melzer's reagent; K, L: Long-stipitate asci, in 1% SDS; M: Long-stipitate ascus, in Congo red with 3% KOH; O, P: Ascospores in ventral view showing a germ slit, in 1% SDS and Melzer's reagent respectively; Q: Ascospores in 1% SDS. Scale bars: A = 5 mm; B, F = 1 mm; C, H = 0.2 mm; D, E, G, I = 0.5 mm; K-M = 50 μ m; J, N-P = 5 μ m; Q = 10 μ m.

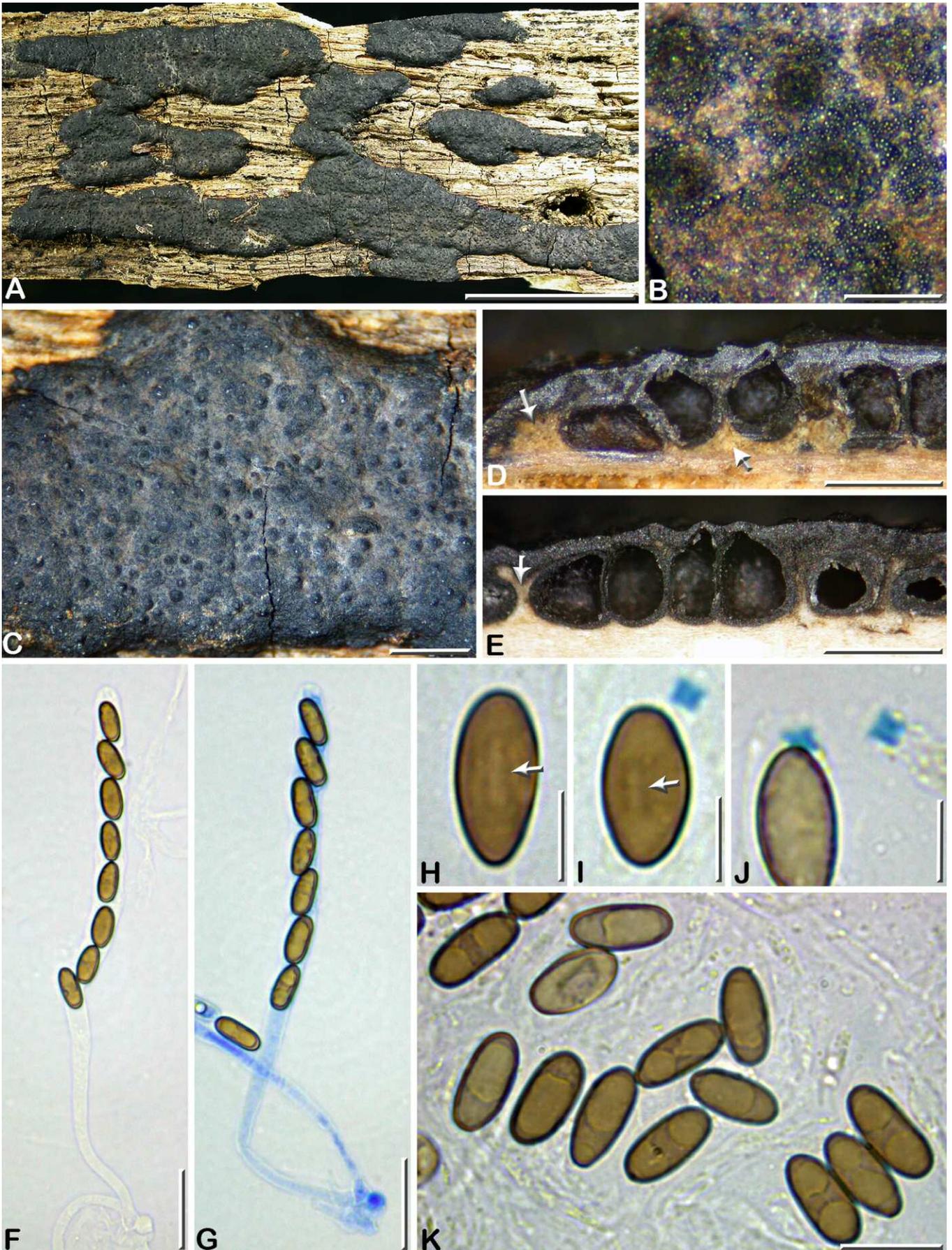


Plate 6 – *Nemanja caries*

MJF 07259. A: Various shaped effused stromata on host surface; B: Close-up on stromatal surface showing papillate ostioles surrounded by shiny black granulations; C: Enlarged portion of a stroma showing prominent rounded papillate ostioles; D, E: Stromata in vertical section showing a carbonaceous crust above the perithecia and white to brownish soft tissue between the perithecia, more conspicuous at margins (arrows); F, G: Mature asci, in 1% SDS and diluted blue Pelikan® ink respectively; H: Ascospore showing a short blurred germ slit (arrow), in Melzer's reagent; I, J: Ascospore apical apparatus in Melzer's reagent, with one ascospore showing a short germ slit (arrow); K: Ascospores in 1% SDS. Scale bars: A = 10 mm; B = 0.2 mm; C = 1 mm; D, E = 0.5 mm; F, G = 20 µm; H-J = 5 µm; K = 10 µm.

the tissue between perithecia soft, whitish to brownish, subperithecial tissue absent. **Perithecia** subglobose to laterally flattened, depressed-spherical toward margins, 0.3–0.65 mm diam. **Ostioles** papillate, black, obtusely conical to hemispherical.

Asci cylindrical, with (6–)8 slightly overlapping uniseriately arranged ascospores, the spore-bearing parts 65–77 × 5–6 µm, the stipes 40–50 µm long, with apical apparatus 1.7–2 × 1.4–1.8 µm (Me = 1.9 × 1.6 µm; N = 20), short-cylindrical with a sharp upper rim, bluing in Melzer's reagent. **Paraphyses** copious, thin-walled, septate, 5–8 µm wide at base, tapering above asci. **Ascospores** (9.1–)9.4–11 (–11.3) × (3.9–)4–4.5(–4.8) µm, Q = (2–)2.2–2.7(–2.9), N = 60 (Me = 10.2 × 4.3 µm; Qe = 2.4), ellipsoid-equalateral to oblong with broadly rounded ends, unicellular, greyish olivaceous at fresh state, turning light to medium brown after desiccation, with an inconspicuous, straight, central germ slit much less than spore-length, usually hardly detected in water mounts, best seen in Melzer's reagent; epispore smooth.

Asexual morph on the natural substrate not seen, geniculosporium-like in culture on PDA according to ROGERS (1985), as *Hypoxylon caries*.

Specimen examined: FRENCH WEST INDIES: MARTINIQUE: Le Prêcheur, Anse Couleuvre, mesophilic coastal rainforest, on dead decorticated rotten wood, 2 Sept. 2007, leg. J. Fournier, MJF 07259 (LIP) (HAST 142497).

Known distribution: Hawaii (ROGERS & JU, 2012), Martinique (this paper), Paraguay, USA (JU & ROGERS, 2002).

Comments: *Nemania caries* is characterized by thin effused carbonaceous stromata with soft tissue between perithecia and rounded papillate ostioles; it is diagnosed by its equalateral, often oblong, light brown ascospores 10–13 × 4–5 µm with an inconspicuous short germ slit (JU & ROGERS, 2002). It is known from a few collections from North America, and one from Paraguay (JU & ROGERS, 2002). Our collection from Martinique fits well this definition and represents the first record of this species in the Caribbean. The presence of minute shiny black granules on stromatal surface has not been reported previously and might represent a further diagnostic character. The presence of such granulations on stromatal surface is not uncommon within *Xylaria* but is so far unknown from other *Nemania* taxa.

The most resembling species is *N. colubrina* which likewise features medium brown ascospores in the same size range, with an inconspicuous short germ slit (this paper). *Nemania colubrina* differs from *N. caries* by a thinner stromatal crust 40–50 µm thick and differently shaped, ellipsoid-inequalateral ascospores with narrowly rounded ends.

Nemania chestersii (J.D. Rogers & Whalley) Pouzar **var. *microspora*** (J.D. Rogers & Samuels) Y.-M. Ju & J.D. Rogers, *Nova Hedwigia*, 74 (1–2): 91 (2002). Plate 7.

Stroma irregularly effused, 0.8–2.2 mm diam × 0.6–0.9 mm thick, perithecioid but in contact and united at base by black carbonaceous tissue, with perithecial contours strongly exposed, associated with a yellowish to tan cottony tissue present at margins and at the bottom of depressions between perithecial contours; surface dull black, matt, in places with tan hyphal remnants still attached to the stromatal wall; carbonaceous crust immediately beneath surface, 80–120 µm thick, entirely carbonaceous around the perithecia, subperithecial tissue inconspicuous, whitish, soft, present in places, delimited by a thin underlying black layer. **Perithecia** subglobose, depressed-spherical or obovoid, 0.4–0.6 mm diam. **Ostioles** papillate, black, conspicuous, obtusely conical.

Asci cylindrical, with (6–)8 slightly overlapping uniseriately arranged ascospores, the spore-bearing parts 92–105 × 5.5–6.5 µm,

the stipes 58–68 µm long, with apical apparatus 1.7–2.2 × 1.5–1.8 µm (Me = 1.9 × 1.6 µm, N = 25), short-cylindrical to slightly urn-shaped, with a sharp upper rim, bluing in Melzer's reagent. **Paraphyses** copious, thin-walled, septate, 4–7 µm wide at base, tapering above asci. **Ascospores** (10.8–)11.2–12.9(–13.5) × (3.8–)4.1–4.8(–4.9) µm, Q = (2.3–)2.4–2.9(–3.5), N = 60 (Me = 12.1 × 4.5 µm; Qe = 2.7), narrowly ellipsoid, inequalateral, at times slightly ventrally concave, with narrowly to broadly rounded upper end and frequently truncate lower end, olivaceous brown at fresh state, turning medium brown after desiccation, with an inconspicuous, straight, central germ slit much less than spore-length on the most convex side, hardly detected in water mounts, best seen in PVA-lactophenol; epispore with parallel longitudinal striations, visible at × 1000 magnification; a fugacious hyaline cellular appendage sometimes present on immature hyaline ascospores, absent on mature ascospores.

Asexual morph on the natural substrate not seen, geniculosporium-like in culture on SME according to ROGERS & SAMUELS (1985).

Specimen examined: FRENCH WEST INDIES: MARTINIQUE: Le Saint-Espirit, Bois La Charles, mesophilic rainforest, on lower side of a rotten *Ganoderma* sp. (*Polyporales*), 24 Aug. 2004, leg. C. Lechat, CLL 2081 (LIP) (HAST 142498).

Known distribution: Brazil (ROGERS & SAMUELS, 1985, as *Hypoxylon chestersii* var. *microsporum* J.D. Rogers & Samuels), Martinique (this paper).

Comments: The typical variety *N. chestersii*, widespread in Europe, was segregated based on its ascospores 14–17 × 6–7 µm with longitudinally striate epispore, a unique character distinguishing it from all other known species of *Nemania* (ROGERS & WHALLEY, 1978; JU & ROGERS, 2002). *Nemania chestersii* var. *microspora* was previously known only from two collections from Brazil (ROGERS & SAMUELS, 1985; JU & ROGERS, 2002) before being collected in Martinique. It was described as differing from the typical variety by smaller ascospores 11.5–14 × 4.5–6 µm, a size range in which stands the material from Martinique. However, the stromata illustrated here further deviates from those of typical *N. chestersii* in being perithecioid and associated with yellowish subicular hyphae and its ascospores bear an inconspicuous short germ slit, whereas ascospores of *N. chestersii* were described as lacking a germ slit. However, when ascospores of *N. chestersii* are observed after 48 h incubation in PVA-lactophenol, a similar short germ slit on the most convex side can likewise be detected on some ascospores (FOURNIER & MAGNI, 2002). Aside from the distinctive epispore ornamentation, ascospores of *N. chestersii* var. *microspora* are frequently truncate at lower end, a feature shared by *N. chestersii*, in relation with the presence of fugacious cellular appendages usually disappeared at maturity. A further variety, *N. chestersii* var. *submicrospora* J.D. Rogers, Y.-M. Ju & I. López, known from Costa Rica, is distinguished by smaller ascospores 10–11 × 4.5–5 µm (Ju *et al.*, 2005) and the stroma illustrated by these authors is reminiscent of our collection in having strongly exposed perithecial contours.

The ascospores of the three varieties of *N. chestersii* form a continuum as to their dimensions, and the size range of the collection from Martinique fits well that of the variety *microspora*. Interestingly, one of the two collections from Brazil on which *N. chestersii* var. *microspora* is based was like ours on an old polypore.

Nemania colubrina J. Fourn. & Lechat, *sp. nov.* – MycoBank MB823705. Plate 8.

Diagnosis: Differs from the most resembling species *N. serpens* var. *colliculosa* by its tropical ecology and by thinner stromata 0.4–0.5 mm thick with an olivaceous grey surface, more coarsely papillate ostioles and slightly smaller ascospores averaging 10.2 × 4.3 µm.

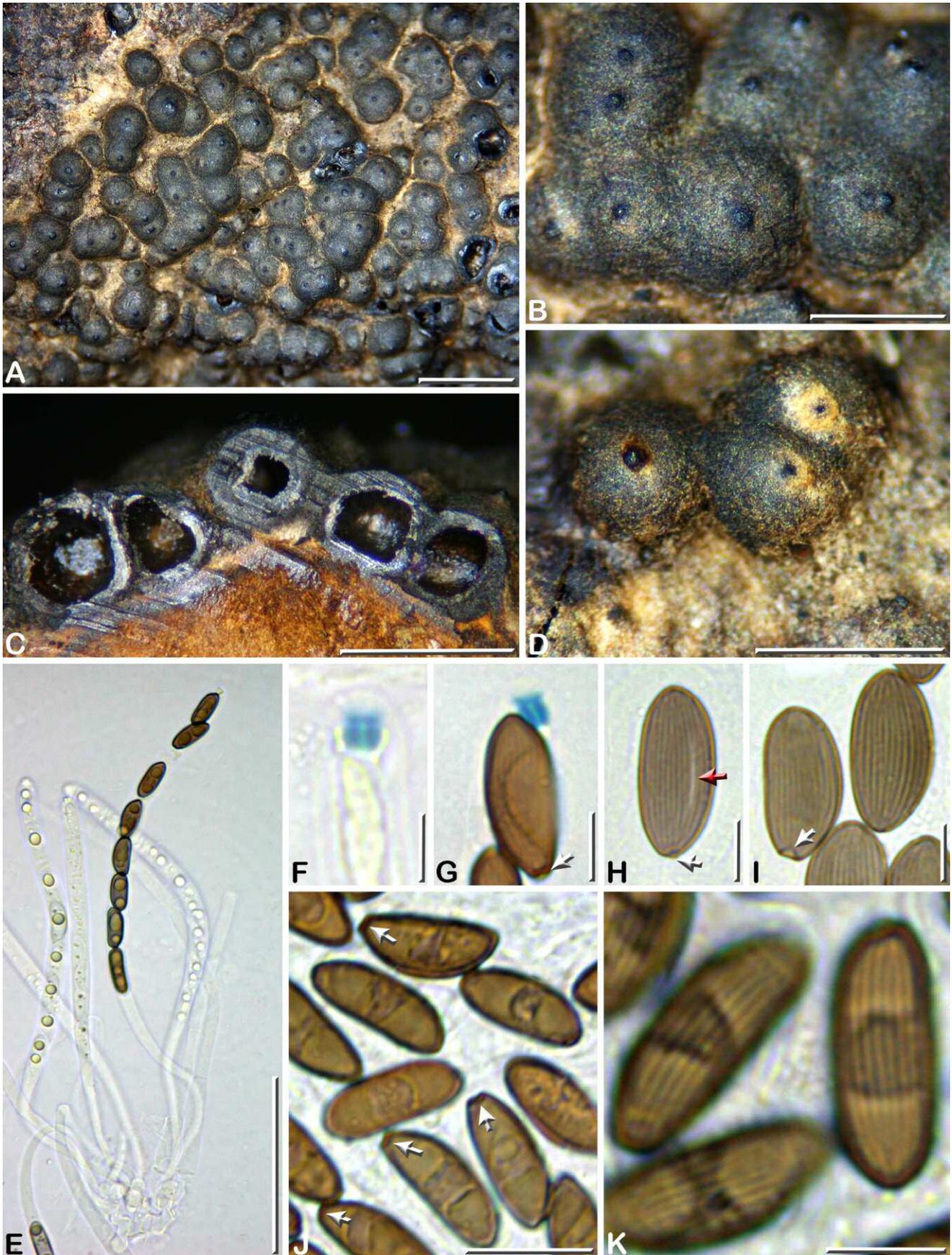


Plate 7 – *Nemania chestersii* var. *microspora*

CLL 2081. A: Stroma effused on host surface, showing strongly exposed perithecial contours emerging from a tan hyphal coating remaining at margins and at the bottom of depressions; B: Close-up on stromatal surface showing papillate ostioles; C: Stroma in vertical section showing a carbonaceous crust around the perithecia and some white soft tissue delimited by a thin black layer at base; D: Perithecioid stromata with tan hyphal tissue spreading at base and present as remnants on stromatal wall; E: Mature ascus and immature asci, in 3% KOH; F: Slightly urn-shaped apical apparatus of an immature ascus, in Melzer's reagent; G: Deformed apical apparatus of a mature ascus, showing an ascospore with truncate lower end (arrow), in Melzer's reagent; H: Ascospore in dorsal view showing a short germ slit (red arrow), striate episporium and truncate lower end (white arrow), in PVA-lactophenol; I: Ascospores showing a striate episporium and a truncate lower end (white arrow), in PVA-lactophenol; J: Ascospores in 1% SDS, some showing a truncate lower end (white arrows); K: Ascospores in 1% SDS showing a striate episporium. Scale bars: A = 2 mm; B-D = 1 mm; E = 50 μ m; F-I, K = 5 μ m; J = 10 μ m.

Holotype: FRENCH WEST INDIES: MARTINIQUE: Le Prêcheur, Anse Couleuvre, mesophilic coastal rainforest, on dead decorticated rotten wood, 21 Aug. 2010, *leg.* J. Fournier, MJF 10022 (LIP). Isotype: HAST 142499.

Etymology: From Latin *colubra* = snake, for the name of the Couleuvre River on banks of which the fungus was collected and for the bronze-coloured and mottled stromatal surface evoking the skin of a snake.

Stromata effused-elongated, 3–15 mm long × 2–4 mm wide × 0.4–0.5 mm thick, with inconspicuous perithecial contours but furrowed by sparse deep wrinkles; surface olivaceous grey to blackish grey; outer crust weakly carbonaceous, 40–50 µm thick; interior white, loosely fibrous to cottony. **Perithecia** subglobose to depressed-spherical, 0.35–0.4 mm high × 0.35–0.6 mm diam, directly seated on the substrate. **Ostioles** coarsely rounded-papillate, black, ca. 80 µm diam at base.

Asci cylindrical, with (6–)8 overlapping uniseriately arranged ascospores, the spore-bearing parts 60–68 × 6–6.5 µm, the stipes 38–48 µm long, with apical apparatus 1.7–2 × 1.5–1.9 µm (Me = 1.9 × 1.7 µm; N = 20), short-cylindrical to slightly tubular, with a sharp upper rim, bluing in Melzer's reagent. **Paraphyses** copious, thin-walled, septate, 4–8 µm wide at base, tapering above asci. **Ascospores** (9–)9.4–11(–11.6) × (3.7–)4.1–4.7(–4.8) µm, Q = (2.1–)2.2–2.7(–2.9), N = 60 (Me = 10.2 × 4.3 µm; Qe = 2.4), ellipsoid-inequilateral with often narrowly rounded ends, unicellular, dark olivaceous at fresh state, turning medium brown after desiccation, with an inconspicuous, straight, slightly eccentric germ slit much less than spore-length on the least convex side; epispore smooth.

Supposed **asexual morph** on the natural substrate occurring next to a stroma, felty, brownish grey with white margins, with geniculosporium-like conidiogenous structure.

Known distribution: Martinique, known only from the type collection.

Comments: *Nemania colubrina* appears to be a tropical counterpart of *N. serpens* var. *colliculosa* (Schwein.) Y.-M. Ju & J.D. Rogers [synonym *N. colliculosa* (Schwein.) Granmo], with which it shares thinly effused, weakly carbonaceous stromata with a white, fibrous interior and medium brown ellipsoid ascospores with an inconspicuous short germ slit on the least convex side. *Nemania colubrina* is distinguished from *N. serpens* var. *colliculosa* by an olivaceous tone on stromatal surface, more coarsely papillate ostioles and smaller ascospores averaging 10.2 × 4.3 µm vs. 12 × 5.2 µm (Ju & ROGERS, 2002) and 11.7 × 5.1 µm (GRANMO *et al.*, 1999). The range of intraspecific morphological variations of *N. colubrina* cannot be inferred from this single collection but its tropical origin also leads us to regard it as a taxon different from *N. serpens* var. *colliculosa*.

We also considered *N. prava* Granmo, Læssøe & T. Schumach. and *N. serpens* var. *hydnicola* (Schwein.) Y.-M. Ju & J.D. Rogers [synonym *N. reticulata* (P. Karst.) Granmo], both north temperate species, for their resemblance with *N. serpens* var. *colliculosa*. The former, described by GRANMO *et al.* (1999), was regarded as a synonym of *N. serpens* var. *colliculosa* by Ju & ROGERS (2002) and its larger perithecia up to 0.68 mm diam further set it part from *N. colubrina*. The latter differs from *N. serpens* var. *colliculosa* by slightly smaller ascospores with more acute ends and an usually fungicolous habitat on polypores (GRANMO *et al.*, 1999; FOURNIER & MAGNI, 2002; Ju & ROGERS, 2002; CALLAN, 2008). The finely papillate ostioles reported by GRANMO *et al.* (1999) for *N. reticulata* and the black tissue surrounding the perithecia illustrated by FOURNIER & MAGNI (2002) for *N. serpens* var. *hydnicola* likewise support the distinctiveness of *N. colubrina*.

Nemania diffusa (Sowerby) Gray, *A natural arrangement of British plants*, 1: 517 (1821). Plates 9–11. Tables 1–3.

Stromata effused-pulvinate, superficial on bark or rotten wood, orbicular to ellipsoid or irregularly lobed, 2.5–28 mm long × 1.5–12 mm wide × 0.5–0.9 mm thick, occasionally confluent into larger compound stromata, with steep to sloping margins; perithecial contours lacking to faintly exposed; surface dark grey to blackish grey, sometimes with shades of brown, rarely entirely black, with a fugacious white pruinose coating sometimes present on developing stromata and leaving white remnants in stromatal depressions at maturity; carbonaceous crust immediately beneath surface, 100–120 µm thick; interior black, entirely carbonaceous around the perithecia, rarely with some soft brownish grey tissue between groups of perithecia; subperithecial tissue inconspicuous, the underlying wood occasionally blackened. **Perithecia** subglobose, obovoid or tubular, rarely depressed-spherical at margins, 0.45–0.7 × 0.25–0.55 mm. **Ostioles** finely conic-papillate, black.

Asci cylindrical, with (6–)8 slightly overlapping uniseriately arranged ascospores, the spore-bearing parts 70–81 × 6–7 µm, the stipes (35–)67–90 µm long, with apical apparatus 2.1–3.1 × 1.8–2.2 µm (Me = 2.5 × 2 µm; N = 200), short-cylindrical to slightly tubular, with a sharp upper rim, bluing in Melzer's reagent. **Paraphyses** copious, thin-walled, septate, 4–5 µm wide at base, tapering above asci. **Ascospores** (8.4–)9.1–12.2(–13.2) × (3.9–)4.3–6.2(–6.6) µm, Q = (1.7–)1.9–2.4(–2.7), N = 960 (Me = 10.3 × 4.9 µm, Qe = 2.1), ellipsoid-inequilateral with narrowly to less frequently broadly rounded ends, unicellular, brown to dark brown, with a conspicuous, straight germ slit slightly less than spore-length to almost spore-length, on the flattened side; epispore smooth.

Asexual morph on the natural substrate not seen.

Specimens examined: FRENCH WEST INDIES: GUADELOUPE: Basse-Terre: Capesterre-Belle-Eau, Grand-Étang, hygrophilic rainforest, on bark, 6 Sept. 2005, *leg.* C. Lechat, CLL 5374 (LIP); *ibid.*, soc. *N. immersidiscus*, CLL 5378A (LIP); Petit-Bourg, forest track of Jules, hygrophilic rainforest, on a dead corticated twig, associated with *Xylaria muscula* Lloyd, 1 Sept. 2004, *leg.* C. Lechat, CLL 2265-2 (LIP) (depauperate). MARTINIQUE: Case-Pilote, Crête Jean-Louis, hygrophilic rainforest, 600–650 m, on a dead corticated branch, Sept. 2003, *leg.* C. Lechat, CLL 0796 (LIP); Case-Pilote, Morne Rose, mesophilic rainforest, on decorticated wood, 8 Aug. 2013, *leg.* J. Fournier, MJF 13081 (LIP); *ibid.*, on decorticated wood, MJF 13087 (LIP); Case-Pilote, Savane Saint-Cyr, track to Plateau Concorde, hygrophilic rainforest, 600–650 m, on a dead corticated branch, 25 Aug. 2007, *leg.* J. Fournier, MJF 07096 (LIP); Case-Pilote, Plateau Concorde, hygrophilic rainforest, 600–650 m, on a dead corticated branch, 27 Aug. 2010, MJF 10156 (LIP); Fort-de-France, Absalon, track to Plateau Michel, hygrophilic rainforest, on a dead corticated trunk, 5 Jun. 2014, *leg.* J. Fournier, MJF 14040 (LIP); *ibid.*, on a dead corticated branch, 7 Aug. 2016, *leg.* J. Fournier, MJF 16171 (LIP); La Trinité, Tartane, Pointe-Rouge, coastal meso- to xerophilic forest, on a dead corticated trunk, 21 Aug. 2007, *leg.* J. Fournier, MJF 07009 (LIP); *ibid.*, MJF 07011 (LIP); Le Diamant, Morne Blanc, trail from Ancinel to Morne du Riz through Morne-Fournerey, meso- to xerophilic forest, on a dead decorticated branch, 18 Aug. 2013, *leg.* J. Fournier, MJF 13307 (LIP); Le Marin, mesophilic rainforest, on a dead corticated branch, 1 Dec. 2006, *leg.* C. Lechat, CLL 6125 (LIP); Le Morne-Rouge, La Propreté, forest trail, hygrophilic rainforest, on a dead corticated trunk, 29 Aug. 2007, *leg.* J. Fournier, MJF 07201 (LIP); Le Prêcheur, Anse Couleuvre, coastal mesophilic rainforest, on a dead corticated branch, 5 Dec. 2005, *leg.* C. Lechat, CLL 5541 (LIP); *ibid.*, on *Cocos nucifera*, 24 Aug. 2010, *leg.* J. Fournier, MJF 10097 (LIP) (barely mature); Le Saint-Esprit, Bois La Charles, mesophilic rainforest, on a dead decorticated branch, 24 Aug. 2004, *leg.* C. Lechat, CLL 2057 (LIP) (depauperate); *ibid.*, 30 Aug. 2010, *leg.* J. Fournier, MJF 10258 (LIP); Saint-Joseph, Plateau Perdrix, hygrophilic rainforest, on bark, 5 Sept. 2003, *leg.* C. Lechat, CLL 0907 (LIP); *ibid.*, CLL 0908; Sainte-Marie, La Philippe, coastal mesophilic

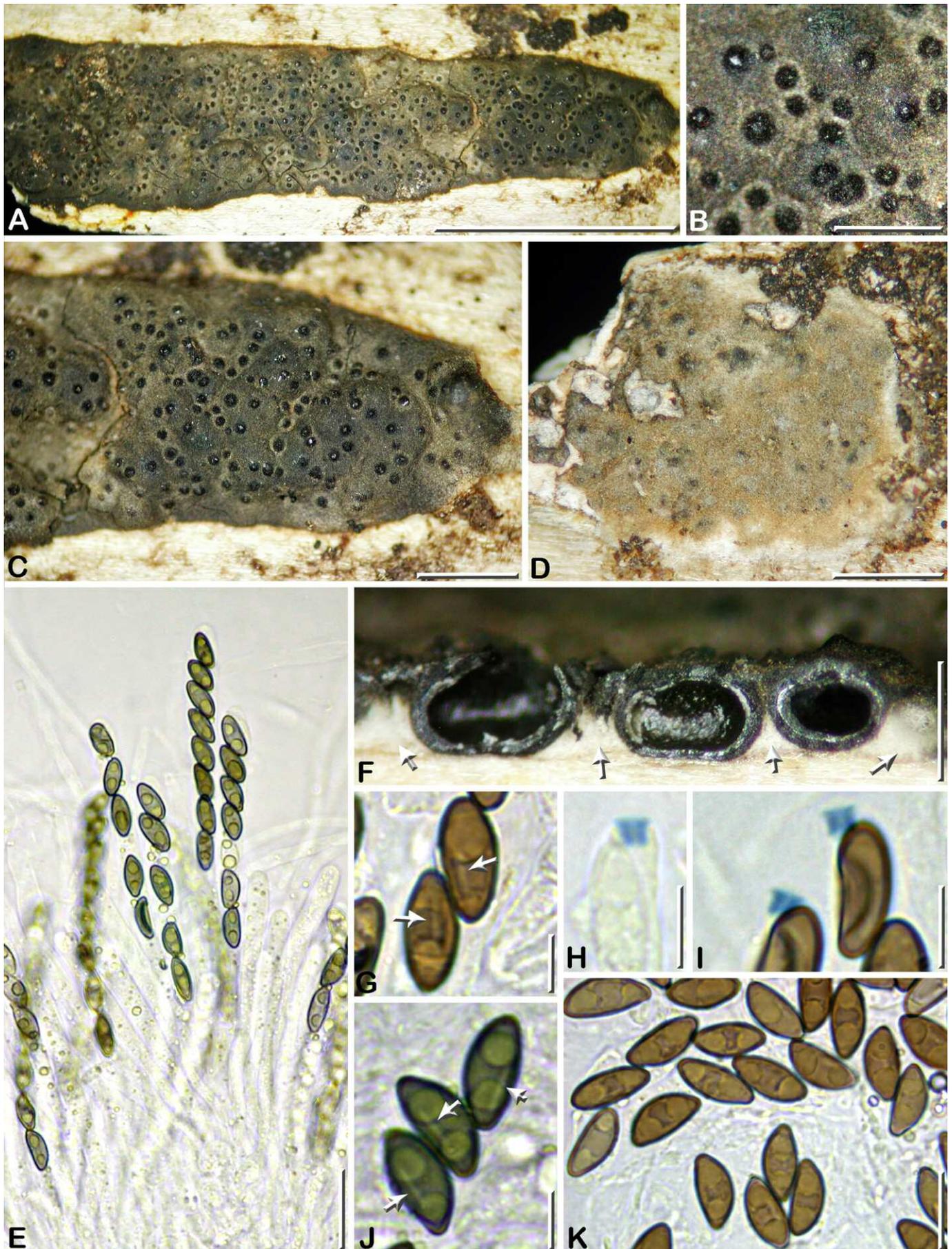


Plate 8 – *Nemanja colubrina*

MJF 10022 (Holotype). A: Stroma on host surface; B, C: Stromatal surface in close-up showing obtusely papillate ostioles; D: Supposed asexual morph growing next to a stroma; E: Asci and paraphyses, in 1% SDS; F: Stromata in vertical section showing perithecia under a thin carbonaceous crust, half-embedded in a white cottony tissue (arrows); G, J, K: Ascospores in ventral view showing a germ slit (arrows), at dry and fresh state respectively; H, I: Ascospores in ventral view showing the apical apparatus in Melzer's reagent, from immature and mature asci respectively; Ascospores in 1% SDS. Scale bars: A = 5 mm; B, F = 0.5 mm; C, D = 1 mm; E = 20 μ m; G-J = 5 μ m; K = 10 μ m.

Table 1 – Ascospore dimensions in sixteen collections of *N. diffusa* from Guadeloupe and Martinique, showing the range of intraspecific variations

Collections numbers	Ascospore measurements with extreme values in parentheses	Q = quotient l/w N = number of measurements	Mean values
CLL 0796	(10.1–)10.7–12.2(–13.2) × (4.9–)5–5.7(–6) μm	Q = (1.9–)1.95–2.3(–2.5) N = 60	Me = 11.5 × 5.4 μm Qe = 2.1
CLL0907	(9–)9.7–10.7(–11.3) × (4.1–)4.4–5.1(–5.6) μm	Q = (1.8–)1.9–2.3(–2.6) N = 60	Me = 10.2 × 4.8 μm Qe = 2.1
CLL 0908	(9.6–)10–11.2(–11.8) × (4.5–)4.7–5.3(–5.7) μm	Q = (1.8–)2–2.3 (–2.5) N = 60	Me = 10.6 × 5 μm Qe = 2.1
CLL 2057	(8.7–)9.4–11(–11.3) × (4–)4.4–5(–5.5) μm	Q = (1.9–)2–2.3(–2.4) N = 60	Me = 10.1 × 4.7 μm Qe = 2.1
CLL 5374	(9.3–) 9.5–10.8 (–11.4) × (4.2–) 4.4–5.4 (–5.8) μm	Q = (1.8–) 1.9–2.3 (–2.4) N = 60	Me = 10.2 × 4.9 μm Qe = 2.1
CLL 5378A	(8.7–)9.4–10.5(–11.3) × (4.2–)4.5–5.2(–5.7) μm	Q = (1.8–)1.9–2.2(–2.5) N = 60	Me = 10 × 4.8 μm Qe = 2.1
CLL 5541	(9.3–)9.5–10.8(–11.4) × (4.2–)4.4–5.4(–5.8) μm	Q = (1.8–)1.9–2.3(–2.4) N = 60	Me = 10.2 × 4.9 μm Qe = 2.1
MJF 07009	(8.8–)9.7–10.7(–11.7) × (4.2–)4.4–5.1(–5.3) μm	Q = (1.8–)2–2.3(–2.4) N = 60	Me = 10.2 × 4.8 μm Qe = 2.1
MJF 07011	(8.4–)9.1–10.7(–11.6) × (3.9–)4.4–5.2(–5.6) μm	Q = (1.7–)1.9–2.3(–2.5) N = 60	Me = 9.9 × 4.8 μm Qe = 2.1
MJF 07096	(8.8–)9.3–10.6(–10.8) × (4.2–)4.5–5.4(–5.7) μm	Q = (1.7–)1.8–2.2(–2.5) N = 60	Me = 9.8 × 4.9 μm Qe = 2
MJF 10156	(9.5–)9.7–11.5(–12.1) × (4.2–)4.3–5.4(–5.9) μm	Q = (1.8–)2–2.3(–2.5) N = 60	Me = 10.6 × 4.9 μm Qe = 2.1
MJF 10258	(9.7–)10.6–12.1(–12.6) × (4.9–)5.2–6.2(–6.6) μm	Q = (1.6–)1.8–2.2(–2.3) N = 60	Me = 11.4 × 5.7 μm Qe = 2
MJF 13081	(8.5–)9.2–10.4(–11.4) × (3.9–)4.3–4.9(–5.1) μm	Q = (1.8–)1.9–2.3(–2.7) N = 60	Me = 9.8 × 4.6 μm Qe = 2.1
MJF 13307	(9.4–)9.9–11.2(–11.8) × (4.3–)4.5–5.1(–5.5) μm	Q = (1.9–)2.1–2.4(–2.5) N = 60	Me = 10.4 × 4.7 μm Qe = 2.2
MJF 14040	(9.4–)9.9–11(–11.5) × (4.1–)4.6–5.1(–5.4) μm	Q = (1.9–)2–2.3(–2.7) N = 60	Me = 10.4 × 4.8 μm Qe = 2.2
MJF 16171	(8.6–)9.3–10.3(–11.5) × (3.9–)4.3–4.9(–5.2) μm	Q = (1.8–)2–2.3(–2.5) N = 60	Me = 9.8 × 4.6 μm Qe = 2.2
Cumulated values	(8.4–)9.1–12.2(–13.2) × (3.9–)4.3–6.2(–6.6) μm	Q = (1.7–)1.9–2.4(–2.7) N = 960	Me = 10.3 × 4.9 μm Qe = 2.1

rainforest, on decorticated rotten wood, 31 Aug. 2010, *leg.* J. Fournier, MJF 10288 (LIP); Schoelcher, Fond Lahaye, banks of Fond Lahaye River, mesophilic rainforest, on a dead corticated branch, 12 Aug. 2013, *leg.* J. Fournier, MJF 13159 (LIP) (HAST 142500). METROPOLITAN FRANCE: ARIÈGE: Ganac, valley of Ganac stream, ca. 580 m, on a dead stump of *Castanea sativa*, 5 Jul. 2000, *leg.* J. Fournier, JF 00108; Rimont, Las Muros, ca. 450 m, on rotten wood of *Quercus*, 11 Jun. 1996, *leg.* J. Fournier, JF 96115; Rimont, Grand Bois, beech forest, ca. 800 m, on a dead corticated branch of *Fagus sylvatica*, 20 Sept. 2002, *leg.* J. Fournier, JF 02172; Rimont, Peyrau, ca. 410 m, on a dead corticated branch of *Fraxinus excelsior*, 30 Dec. 2016, *leg.* J. Fournier, JF 16097. PYRÉNÉES-ATLANTIQUES: ca. 5 km east of Louvie-Juzon along D 35 road, ca. 500 m, on dead corticated stem of *Corylus avellana*, 8 Oct. 2010, *leg.* J. Fournier, JF 10182.

Known distribution: Worldwide (JU & ROGERS, 2002).

Comments: The collections listed and illustrated above match well *N. diffusa* as conceived by JU & ROGERS (2002) in featuring e-fused-pulvinate carbonaceous stromata with inconspicuous perithecial mounds and dark brown inequilateral ascospores 9.5–13.5 × (4.5–) 5–6 μm with narrowly rounded ends and a long germ slit on the flattened side. However, substantial variations may occur within this broad concept as to the surface colour, the morphology of ostioles, the presence and colour of soft interperithecial of subperithecial tissue and some differences in ascospores dimensions and morphology.

Certain FWI collections may be related to *N. diffusa* but are recognized as distinct species herein. Four collections featuring ostioles on a small raised-discoid base and occasional presence of soft white tissue beneath the perithecia are assigned to the new species *N. dis-*

costoma (this paper). One collection with greenish yellow outermost coating and strongly carbonaceous crust combined with conspicuous white soft interperithecial tissue is segregated from typical *N. diffusa* and recognized as the new species *N. flavoviridis* (this paper). Two collections characterized by a persistent white stromatal surface and the presence of white interperithecial soft tissue are assigned to the new species *N. nivea* (this paper). A collection featuring erumpent black stromata with inconspicuous ostioles, a roughened surface and smaller and differently shaped ascospores is segregated and assigned to the new species *N. obscura* (this paper). Six collections related to *N. diffusa* but differing by a purplish stromatal surface are assigned to a new species, *N. roseolilacina* (this paper). Finally, six collections with a fugacious yellow outermost coating and a thin layer of yellow soft tissue beneath the perithecial layer are assigned to a taxon formerly placed in *Hypoxyylon* and combined herein with *Nemania* as *N. sublutea* (this paper).

Three collections illustrated in Plate 11 somehow deviate from typical *N. diffusa* and are tentatively referred to as *N. cf. diffusa* until more material becomes available and the concept of *N. diffusa* possibly redefined in a narrower sense. The collection MJF 13087 is characterized by white sterile tissue surrounding black mature stromata with coarsely papillate ostioles and slightly smaller ascospores averaging 9.8 × 4.8 μm (Table 2). The collection MJF 13159 deviates from *N. diffusa* in having white developing stromata but the white coating does not persist until full maturity like in *N. nivea*, from which it also differs by the lack of soft whitish interperithecial tissue. The collection CLL 6125 differs from *N. diffusa* by a persistent cream-coloured outermost coating, coarsely papillate ostioles and the presence of soft brownish grey tissue between the perithecia; moreover its ascospores averaging 12.2 × 5.5 μm appear significantly larger than those recorded for the collections from Guadeloupe and

Table 2 – Ascospore dimensions in three collections from Martinique, related to but possibly different from *N. diffusa*.

Collections numbers	Ascospore measurements with extreme values in parentheses	Q = quotient l/w N = number of measurements	Mean values
MJF 13087	(8.6)9.1–10.6(–11.4) × (4–)4.4–5.2(–5.6) μm	Q = (1.7–)1.9–2.3(–2.5) N = 60	Me = 9.8 × 4.8 μm Qe = 2.1
MJF 13159	(8.8–)9.3–10.8(–11.3) × (4.6–)4.8–5.6(–5.9) μm	Q = (1.7–)1.8–2.1(–2.4) N = 60	Me = 10 × 5.2 μm Qe = 1.9
CLL 6125	(11–)11.7–12.9(–13.7) × (4.7–)5.1–6(–6.3) μm	Q = 2–2.4(–2.9) N = 60	Me = 12.2 × 5.5 μm Qe = 2.2

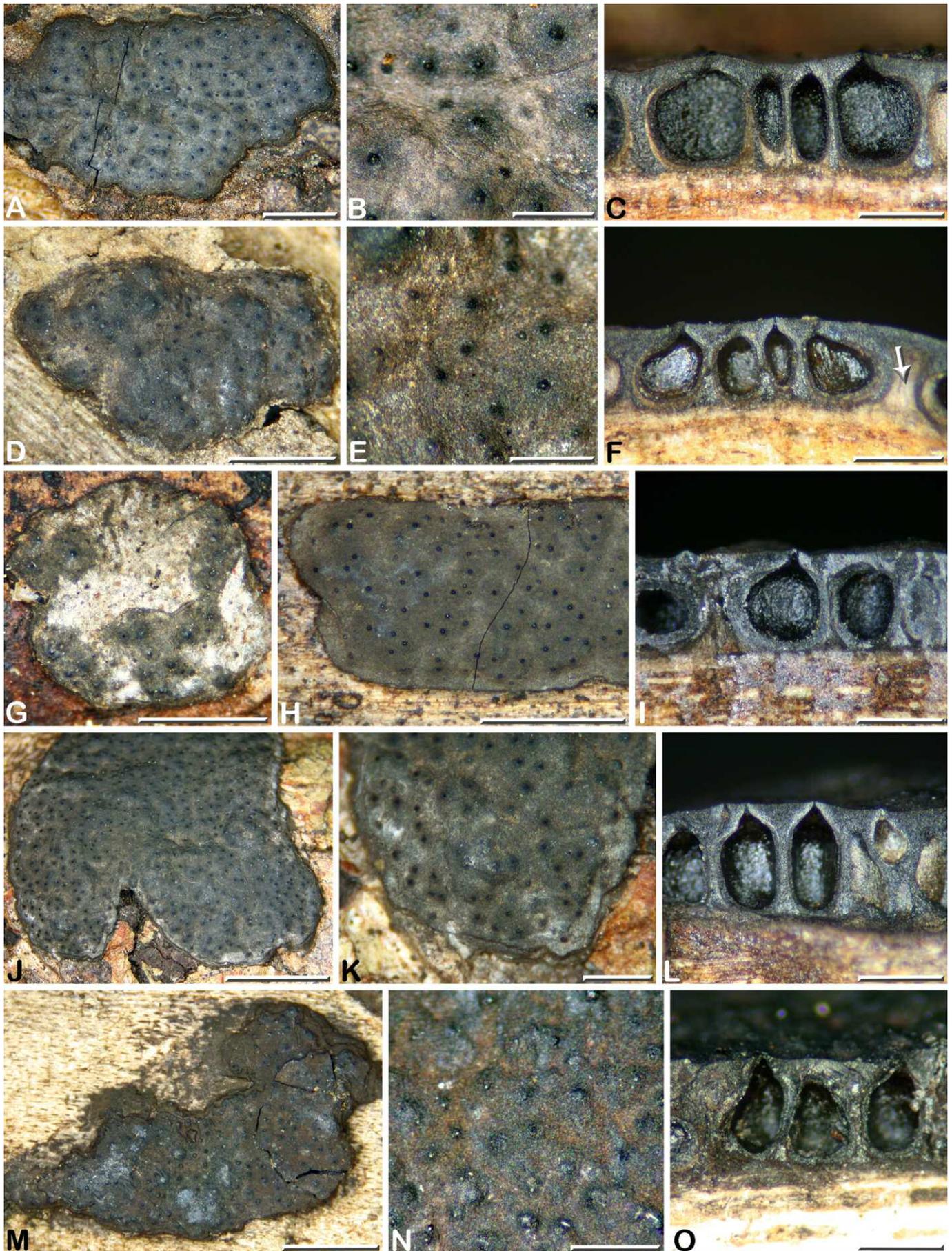


Plate 9 – *Nemania diffusa*

A-C: CLL 5378; D-F: MJF 07011; G-I: MJF 10258; J-L: MJF 13307; M-O: MJF 13081. A, D, J, M: Mature stromata in surface view; G: Mature stroma in surface view with remnants of white coating; B, E, H, K, N: Stromatal surface in close-up showing papillate ostioles; C, F, I, L, O: Stromata in vertical section showing variously shaped perithecia encased in carbonaceous tissue and lacking whitish soft interperithecial tissue, except traces in F (arrow). Scale bars: A, D, G, H, J, M = 2 mm; B, C, E, F, I, K, L, N, O = 0.2 mm.

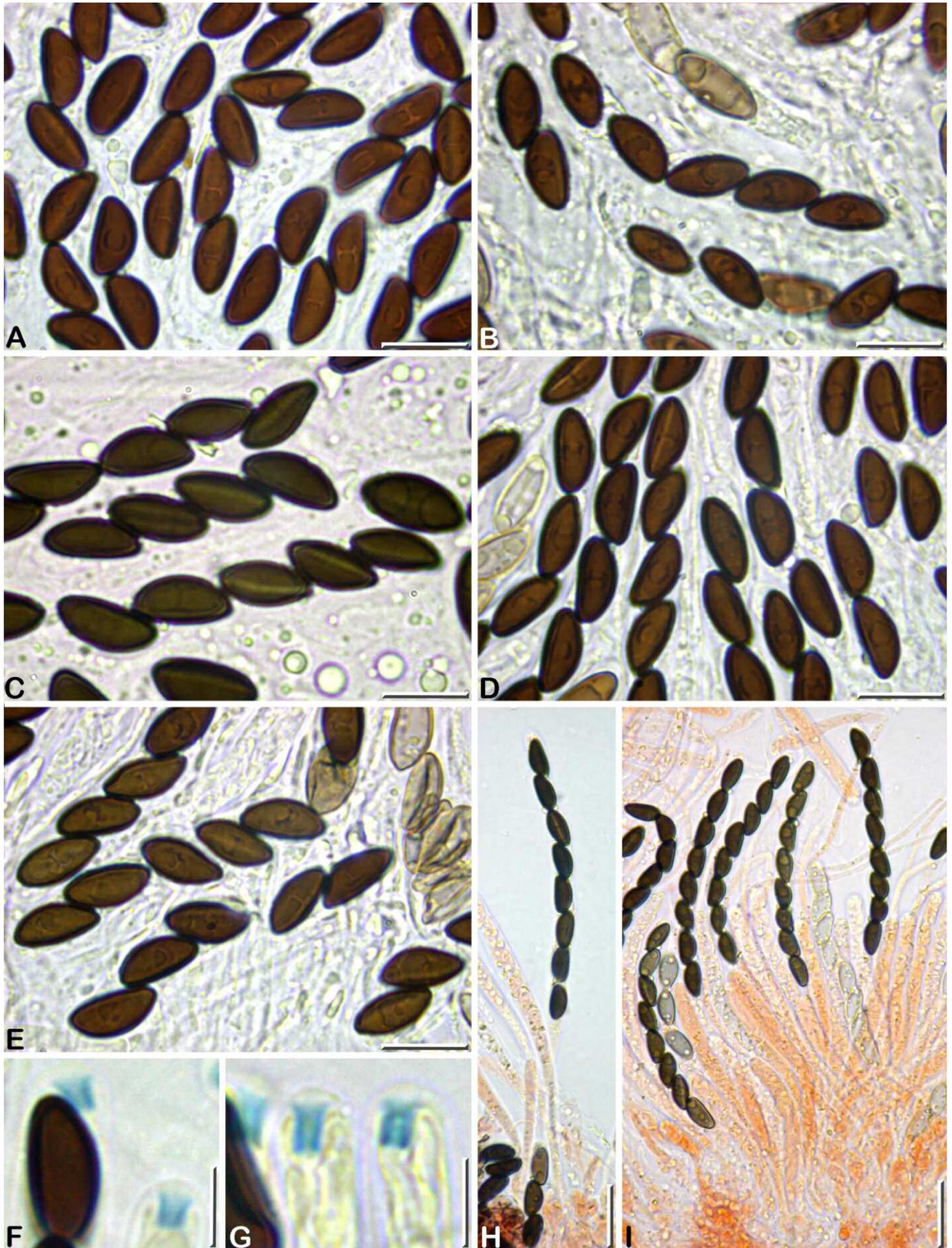


Plate 10 – *Nemaniam diffusa*

A: CLL 5378; B: MJF 07011; C: MJF 10258; D, F, H: MJF 13307; E: MJF 13081; G: MJF 10156; I: MJF 16171. A-E: Ascospores in 1% SDS, some showing a germ slit; F, G: Ascospore apical apparatus, in Melzer's reagent; H, I: Mature and immature asci, in Congo red and 3% KOH. Scale bars: A-E = 10 μm ; F, G = 5 μm ; H, I = 20 μm .

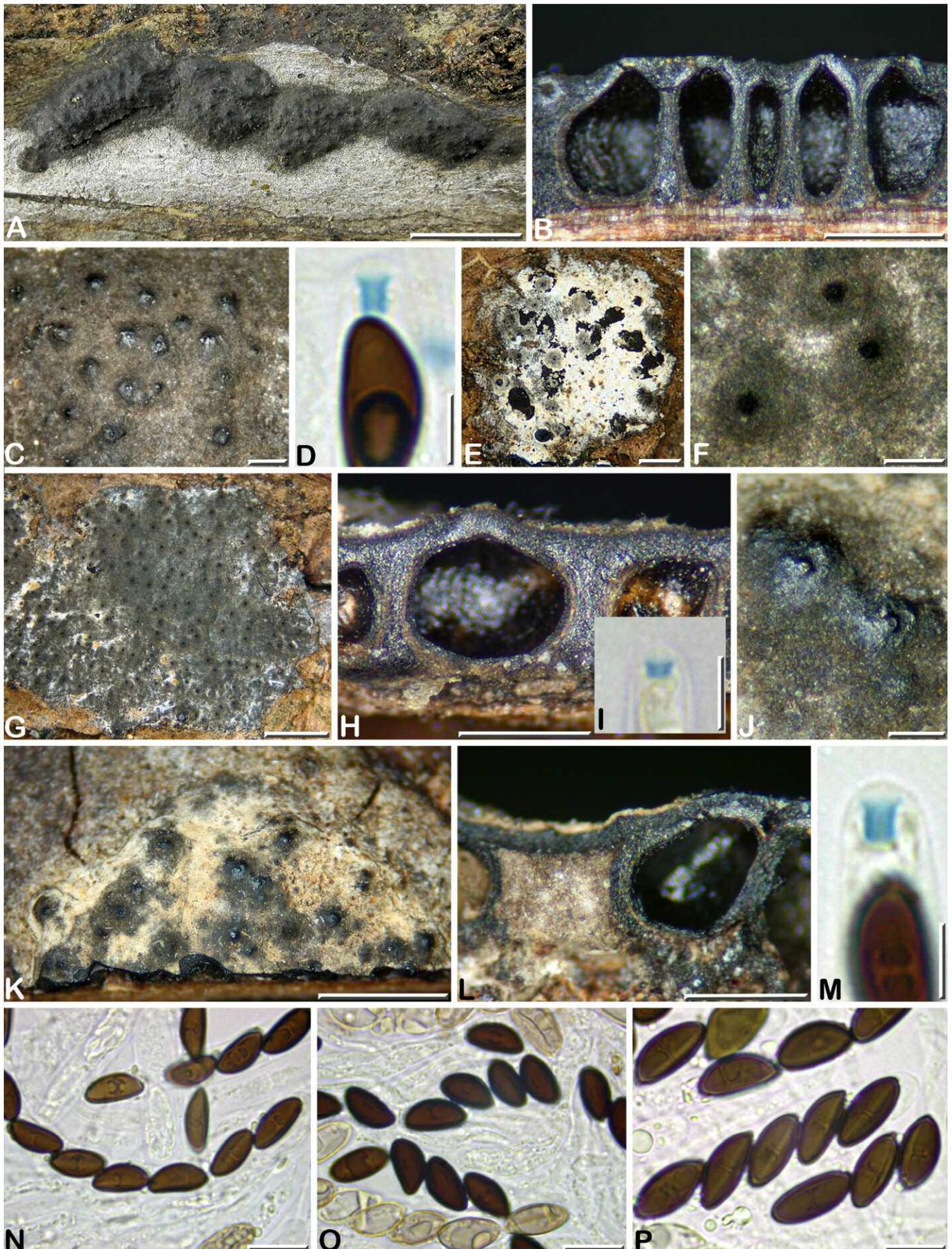


Plate 11 – *Nemanium cf. diffusa*

A-D, N: MJF 13087; E-I, O: MJF 13159; J-M, P: CLL 6125. A, E, G, K: Mature stromata in surface view; B, H, L: Stromata in vertical section showing variously shaped perithecia encased in carbonaceous tissue (B, H) or with whitish soft interperithecial tissue (L); C, F, J: Stromatal surface in close-up showing variously papillate ostioles; D, I, M: Ascular apical apparatus, in Melzer's reagent, N-P: Ascospores in 1% SDS, some showing a germ slit. Scale bars: A = 5 μ m; B, C, H, L = 0.5 mm; D, I, M = 5 μ m; E = 1 mm; F, J = 0.2 mm; G, K = 2 mm; N-P = 10 μ m.



Plate 12 – *Nemaniam diffusa* (specimens from France)

A-C: JF 96115; D-F: JF 00108; G-I: JF 02172; J-L: JF 10182; M-O: JF 16097. A, D, G, J, M: Stromata in surface view; B, E, H, K, N: Stromata in vertical section; C, F, I, L, O: Ascospores in 1% SDS, those in O at fresh state. Scale bars: A, D, G, J, M = 5 mm; B, E, H, K, N = 0.5 mm; C, F, I, L, O = 10 μ m

Table 3 – Ascospore dimensions in five collections of *N. diffusa* from metropolitan France

Collections numbers	Ascospore measurements with extreme values in parentheses	Q = quotient l/w N = number of measurements	Mean values
JF 96115	(8.9–)9.4–10.7(–11.1) × (4.4–)4.7–5.4(–5.6) µm	Q = (1.7–)1.8–2.1(–2.3) N = 60	Me = 9.9 × 5 µm Qe = 2
JF 00108	(9.4–)10.2–11.4(–12.3) × (4.5–)4.7–5.4(–5.6) µm	Q = (1.9–)1.94–2.4(–2.6) N = 60	Me = 10.8 × 5.1 µm Qe = 2.1
JF 02172	(9.5–)10.4–11.7(–12.5) × (4.6–)4.9–5.8(–6.3) µm	Q = (1.8–)1.9–2.3(–2.5) N = 60	Me = 11.1 × 5.3 µm Qe = 2.1
JF 10182	(9.9–)10.6–12.3(–12.6) × (4.6–)4.9–5.5(–5.8) µm	Q = (1.9–)2–2.4(–2.6) N = 60	Me = 11.4 × 5.2 µm Qe = 2.2
JF 16097	(9.8–)10.2–12(–13.2) × (4.4–)4.6–5.4(–6) µm	Q = (1.8–)2.1–2.4(–2.7) N = 60	Me = 11.3 × 5 µm Qe = 2.3
Cumulated values	(8.9–)9.4–12.3(–13.2) × (4.4–)4.6–5.8(–6.3) µm	Q = (1.7–)1.8–2.4(–2.7) N = 300	Me = 10.9 × 5.1 µm Qe = 2.2

Martinique that we consider to be typical *N. diffusa*. Unfortunately the material consists of only one fragmentary stroma, which prevents us to consider it further as a different species.

A further concern about the interpretation of *N. diffusa* is that it is based on material collected in UK (*Sphaeria diffusa* Sowerby, 1803), not in the tropics. Cultures from material collected in temperate regions (Europe, North America) do not differ from those originating from tropical regions (Y.-M. Ju, pers. comm.), which lead JU & ROGERS (2002) to regard *N. diffusa* as cosmopolitan. We illustrate in Plate 12 five randomly selected collections of *N. diffusa* from southwestern France, externally similar to the collections of what we consider typical *N. diffusa* from Guadeloupe and Martinique, though with a more brownish tone on stromatal surface. Four of them show the presence of brownish to brownish grey soft tissue between or beneath the perithecia, which is in agreement with observations by GRANMO *et al.* (1999) but deviates from what we observed in the Caribbean material. The remaining collection (JF 96115) is similar to the tropical material we studied in being entirely carbonaceous but its ascospores average slightly smaller and are more broadly ellipsoid than those of the other collections (Table 3).

The morphological characters defining *N. diffusa* appear difficult to handle, suggesting either a widespread, highly variable species or the possible involvement of several cryptic species. The taxonomic value of the morphological characters used to define and subdivide *N. diffusa sensu lato* should be assessed in the future by the analysis of molecular data, based on a wide sampling from temperate and tropical regions as well.

Nemania discostoma J. Fourn. & Lechat, *sp. nov.* – MycoBank MB823706. Plates 13–14. Table 4.

Diagnosis: Differs from the most resembling species *N. diffusa* as ascospore morphology by black stromata with major cracks on surface, weakly papillate ostioles typically with a raised-discoid base and perithecia occasionally seated on a thick layer of white soft tissue, and from other *Nemania* spp. with discoid ostioles by ascospore morphology.

Holotype: FRENCH WEST INDIES: MARTINIQUE: Fort-de-France, Absalon, track to Plateau Michel, hygrophilic rainforest, on a dead corticated branch ca. 2 cm diam, 5 Jun. 2014, *leg.* J. Fournier, MJF 14054 (LIP).

Etymology: From Greek δίσκος = disc and στόμα = mouth, ostiole, for the discoid base of ostioles.

Stromata superficial, gregarious, effused-pulvinate, orbicular to irregularly elongated, often coalescent, 0.8–4 mm diam, up to 15 mm long, 0.6–0.8(–1.2) mm thick, with abrupt to sloping margins, associated with white hyphal tissue spreading over host surface; surface dull black, with inconspicuous perithecial contours but roughened by deep cracks and wrinkles, hard-textured, with carbonaceous tissue forming a superficial crust 80–120 µm thick and surrounding each perithecium; the tissue beneath the perithecial layer whitish, soft, 40–300 µm thick, mixed with bark tissue in places, well-developed at margins, at times absent, apparently continuous with the white tissue surrounding developing stromata. **Perithecia** tubular 0.5 × 0.25 mm to subglobose 0.45–0.5 mm diam. **Ostioles** obtusely papillate, at times inconspicuous, black, on a raised-discoid base 100–170 µm diam overlain by a tan pellicle on developing stromata, the tan fading with age.

Asci cylindrical, with (4–6–)8 obliquely uniseriately arranged ascospores, the spore-bearing parts 62–78 × 7–8.5 µm, with fragile stipes 45–85 µm long, with apical apparatus slightly tubular, bluing in Melzer's reagent, 2.1–2.8 × 1.6–2.3 µm (Me = 2.5 × 2 µm, N = 40).

Paraphyses copious, thin-walled, septate, 4–8 µm wide at base, tapering above asci. **Ascospores** (9.2–)9.8–12.5(–13.3) × (4.4–)4.7–6.3(–6.6) µm, Q = (1.7–)1.9–2.3(–2.5), N = 240 (Me = 11.2 × 5.5 µm, Qe = 2), ellipsoid, slightly inequilateral to almost equilateral, with narrowly to broadly rounded ends, unicellular, brown to dark brown, with a fairly conspicuous, straight, almost spore-length germ slit on the least convex side; epispore smooth.

Asexual morph on the natural substrate not seen.

Paratypes: FRENCH WEST INDIES: MARTINIQUE: Fort-de-France, Absalon, track to Plateau Michel, hygrophilic rainforest, on a dead corticated branch ca. 1 cm diam, 5 Jun. 2014, *leg.* J. Fournier, MJF 14049 (LIP) (HAST 142501); Sainte-Luce, Montravail forest, relict hygrophilic rainforest, on a dead corticated trunk, 30 Jul. 2016, *leg.* J. Fournier, MJF 16035-2 (LIP) (largely immature); Sainte-Marie, Pérou forest, hygrophilic rainforest, 430–450 m, on a dead corticated branch of Mahogany (*Swietenia macrophylla* King, *Meliaceae*) ca. 2 cm diam, 13 Jun. 2015, *leg.* J. Fournier, MJF 15057 (LIP).

Known distribution: Martinique.

Comments: Based on its carbonaceous stromata and dark brown slightly inequilateral ascospores averaging 11 × 5.5 µm with a long germ slit on the ventral side, *N. discostoma* appears closely related to *N. diffusa*. *Nemania diffusa* is a geographically widespread species

Table 4 – Ascospore dimensions in four collections of *N. discostoma* showing the range of intraspecific variations

Collections numbers	Ascospore measurements with extreme values in parentheses	Q = quotient l/w N = number of measurements	Mean values
MJF 14049	(9.8–)9.9–11.2(–12.2) × (5.1–)5.3–6.1(–6.4) µm	Q = (1.7–)1.73–2.0(–2.1) N = 60	Me = 10.6 × 5.7 µm Qe = 1.9
MJF 14054	(9.7)11.0–12.5(–13.3) × (4.7–)5.2–6.3(–6.6) µm	Q = (1.8–)1.9–2.3(–2.5) N = 60	Me = 11.8 × 5.7 µm Qe = 2.1
MJF 15057	(9.2–)9.8–11.3(–12.3) × (4.4–)4.7–5.6(–5.9) µm	Q = (1.8–)1.9–2.2 (–2.3) N = 60	Me = 10.5 × 5.2 µm Qe = 2
MJF 16035-2	(10.3–)11.1–12.5(–12.9) × (4.7–)5.1–5.7(–5.9) µm	Q = 2–2.3(–2.5) N = 60	Me = 11.7 × 5.4 µm Qe = 2.2
Cumulated values	(9.2–)9.8–12.5(–13.3) × (4.4–)4.7–6.3(–6.6) µm	Q = (1.7–)1.9–2.3(–2.5) N = 240	Me = 11.2 × 5.5 µm Qe = 2

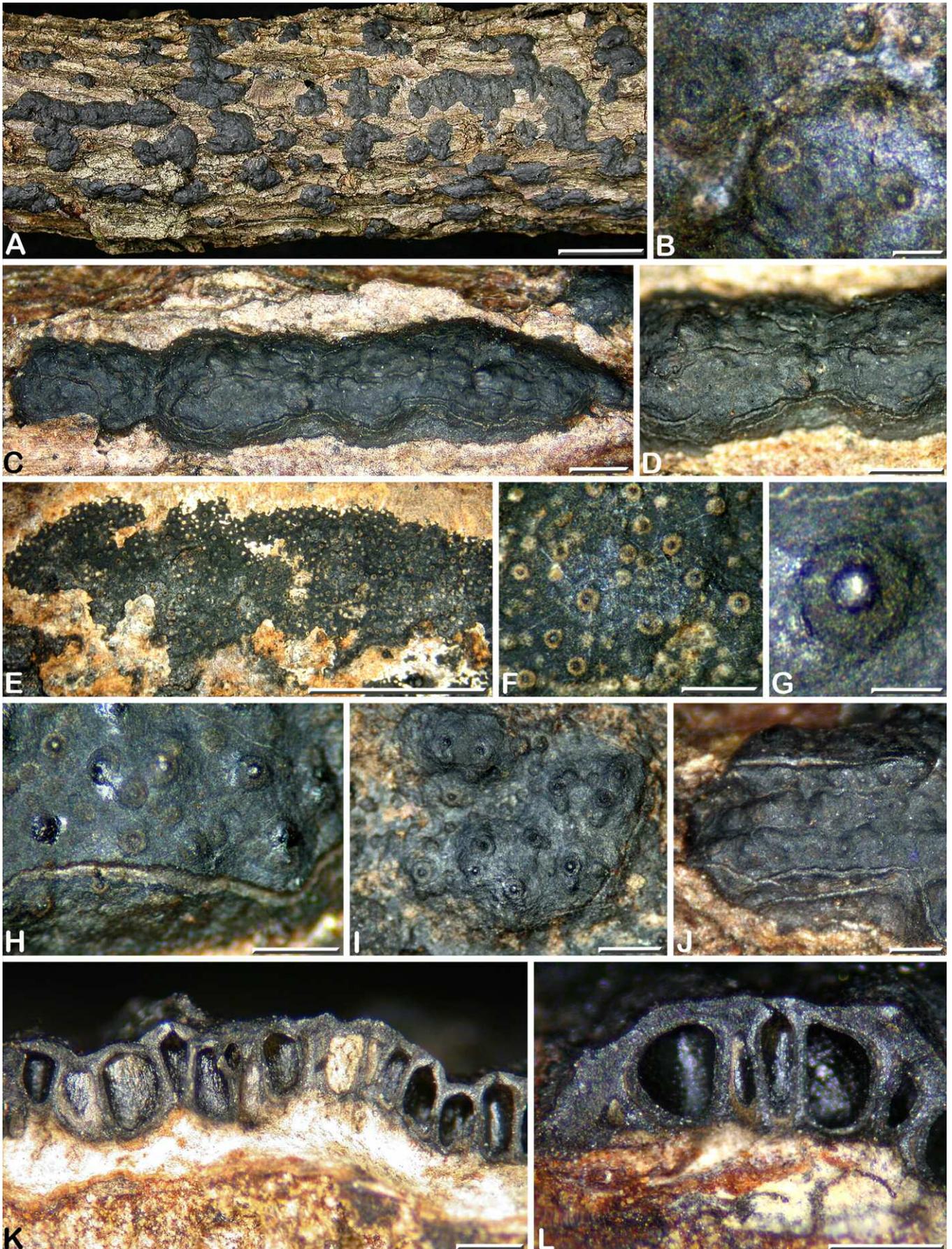


Plate 13 – *Nemanja discostoma*

A-D, J-L: MJF 14054 (Holotype); E-I: MJF 15057 (paratype). A: Habit of stromata on host surface; B: Stromatal surface in close-up showing finely papillate ostioles encircled by a tan disc; C: Mature stroma surrounded by whitish hyphal tissue at margin; D, J: Stromatal surface showing deep cracks on top and at side; E: Immature stroma associated with whitish hyphal tissue in places; F: Surface of immature stroma in close-up showing papillate ostioles encircled by a tan disc; G: Ostiole with a raised-discoid base; H: Stromatal surface showing discoid ostioles and a deep crack at margin; I: Small orbicular pulvinate stromata showing discoid ostioles; K, L: Stromata in vertical section showing variously shaped perithecia encased in carbonaceous tissue and seated on a thick to inconspicuous layer of whitish soft tissue. Scale bars: A = 10 mm; B = 0.2 mm; C, D = 1 mm; E = 5 mm; F, H-L = 0.5 mm; G = 0.1 mm.

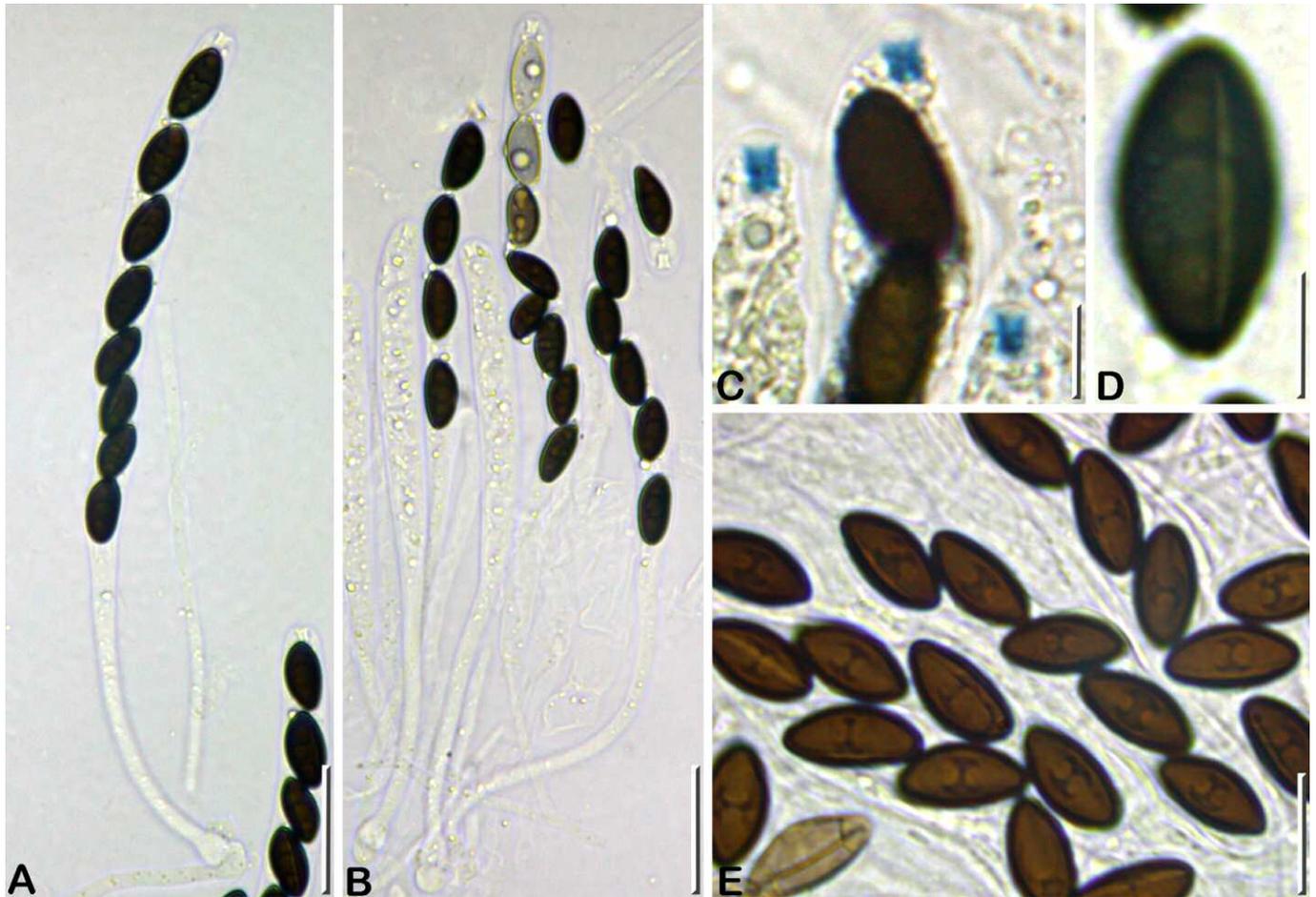


Plate 14 – *Nemaniam discostoma*

MJF 14054 (Holotype). A: Eight-spored mature ascus, in 3% KOH; B: Few-spored mature asci, in 3% KOH; C: Ascus apical apparatus in Melzer's reagent, from immature and mature asci; D: Ascospore in ventral view showing a germ slit, in 3% KOH; E: Ascospores in 1% SDS, some showing a germ slit. Scale bars: A, B = 20 µm; C, D = 5 µm; E = 10 µm.

exhibiting a wide range of morphological variations (GRANMO *et al.*, 1999; JU & ROGERS, 2002; this paper). However, its stromata lack the major cracks encountered in the material illustrated above; its ostioles are consistently conic-papillate and lack a discoid base; its perithecial layer is never seated on a thick whitish layer of soft tissue; and its ascospores are usually more strongly inequilateral.

Nemaniam discostoma is distinguished from those other *Nemaniam* species with discoid ostioles, viz., *N. albofarcta*, *N. bipapillata*, *N. circostoma* (Speg.) Y.-M. Ju & J.D. Rogers and *N. immersidiscus* by the diameter and configuration of the discs and ascospore morphology. It primarily differs from *N. albofarcta*, which is similar in ostiolar disc morphology and presence of white internal tissue, by dark brown ascospores with a long germ slit; *N. albofarcta* has pale brown, smaller ascospores with a germ slit much less than spore-length (this paper). *Nemaniam bipapillata* differs from *N. discostoma* in having ostioles with a larger discoid base 0.25–0.30 mm diam and strongly inequilateral ascospores. *Nemaniam circostoma* and *N. immersidiscus* differ from *N. discostoma* by their ostioles sunken in a shallow discoid depression 0.2–0.3 mm and 0.08–0.12 mm diam respectively; moreover both have strongly inequilateral ascospores, those of *N. circostoma* being substantially larger, 16–19 × 7–8 µm (JU & ROGERS, 2002).

It should be noted that the stromatal surface of *N. discostoma* frequently exhibits deep longitudinal cracks, which might be a further differential character if it shows consistently in additional material. As these cracks seem to occur preferably on thick stromata featuring a well-developed white basal tissue, they may be resulted from the alternate swelling and shrivelling of the basal tissue in relation to humidity or drought.

Nemaniam flavoviridis J. Fourn. & Lechat, *sp. nov.* – MycoBank MB823707. Plates 15–16.

Diagnosis: Differs from the known species of *Nemaniam* with a yellow surface by the combination of a carbonaceous crust 170–380 µm thick and perithecia surrounded with or seated on conspicuous, persistent white soft tissue.

Holotype: FRENCH WEST INDIES: MARTINIQUE: Fort-de-France, Absalon, track to Plateau Michel, hygrophilic rainforest, on a dead decorticated branch, 15 Jun. 2015, *leg.* J. Fournier, MJF 15100 (LIP).

Etymology: From Latin *flavus* = golden-yellow, and *viridis* = green, in reference to the yellow-green colour of immature stromata.

Stromata erumpent from effused patches of bright yellow mycelium on wood, becoming superficial, effused-pulvinate, irregular, confluent into compound stromata up to 11 cm long × 1.5 cm wide × 0.75–1 mm thick, lacking exposed perithecial contours but roughened by wrinkles, with abrupt to sloping margins; surface of immature stromata grey, mottled with remnants of white and olivaceous yellow outermost coating giving a greenish grey overall colour, vanishing to become dark grey to dull black at maturity, bearing incrustated wood fibres in places; black carbonaceous tissue forming a thick superficial crust 170–380 µm thick immediately beneath surface, not surrounding isolated perithecia but spreading between clustered perithecia; soft, loosely fibrous whitish tissue abundant between isolated perithecia and clusters of perithecia, persistent at maturity, occasionally present beneath the perithecia, delimited from the underlying wood by a thin carbonaceous layer.

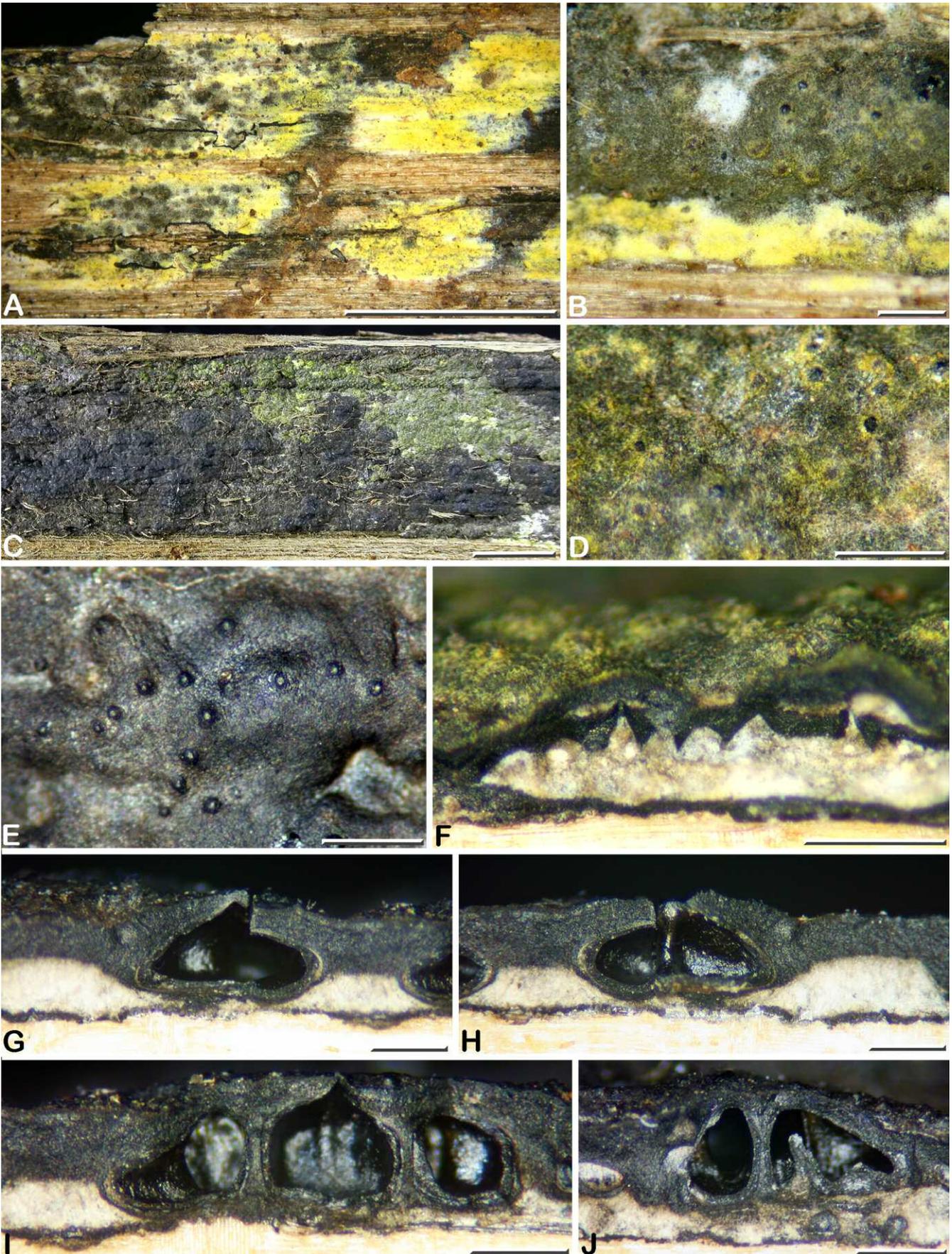


Plate 15 – *Nemaniam flavoviridis*

MJF 15100 (Holotype). A: Immature stromata in top view, surrounded with patches of bright yellow sterile hyphal tissue; B: Immature stroma in close-up showing remnants of yellow tissue at margin and olivaceous yellow surface; C: Mature black compound stroma mixed with greenish grey immature stromata (upper right); D: Stromatal surface of immature stroma in close-up showing the olivaceous yellow outermost coating more densely distributed around the ostioles; E: Black surface of a mature stroma showing rounded-papillate, shiny black ostioles; F: Immature sterile stroma in vertical section (broken) showing carbonaceous upper and basal crusts encasing a thick internal white soft tissue; G-J: Mature stromata in vertical section (broken) showing perithecia, single or clustered in small groups, beneath a thick carbonaceous crust and surrounded with or seated on persistent white soft tissue (note the thin basal black line). Scale bars: A, C = 5 mm; B-J = 0.5 mm.

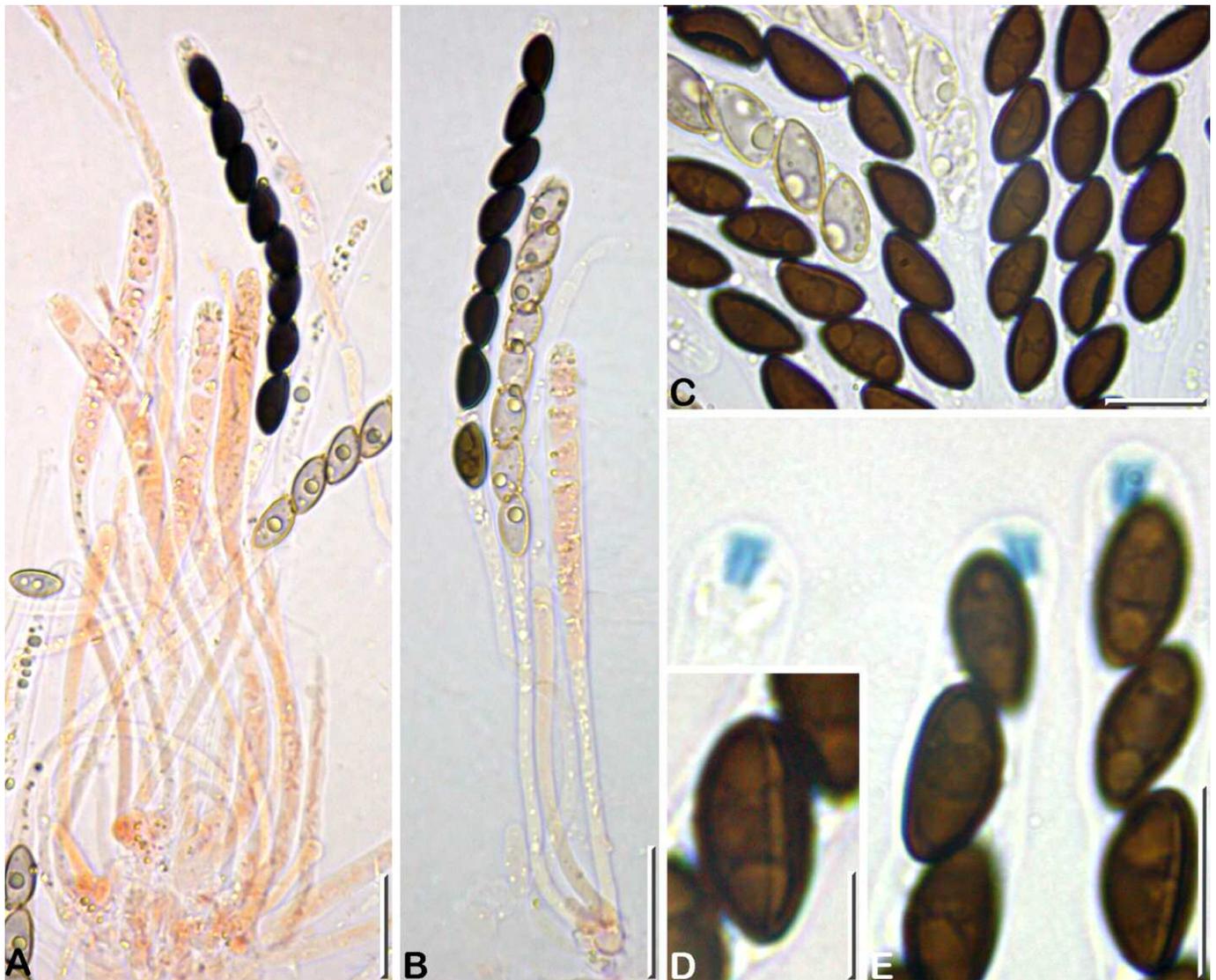


Plate 16 – *Nemanía flavoviridis*

MJF 15100 (Holotype). A, B: Immature and mature asci, in Congo red and 3% KOH; C: Immature and mature ascospores in 1% SDS; D: Ascospore in ventral view showing a germ slit, in 1% SDS; E: Tubular ascical apical apparatus, in Melzer's reagent. Scale bars: A, B = 20 μ m; C, E = 10 μ m; D = 5 μ m.

Perithecia depressed-spherical to lenticular when isolated, 0.5–0.6 \times 0.8–1 mm, subglobose or laterally compressed when clustered, the base flattened, 0.5–0.6 \times 0.4–0.6 mm. **Ostioles** conspicuous, shiny black, rounded-papillate, 40–70 μ m diam at base.

Asci cylindrical, with (6–)8 obliquely uniseriately arranged ascospores, the spore-bearing parts 63–72 \times 6.5–7 μ m, with stipes 65–82 μ m long, with apical apparatus slightly tubular with a faint upper rim, 2.1–2.7 \times 1.8–2.1 μ m (Me = 2.5 \times 2 μ m, N = 20), bluing in Melzer's reagent. **Paraphyses** copious, thin-walled, remotely septate, 4–5 μ m wide at base, filiform above asci. **Ascospores** (9.1–)9.9–11(–11.4) \times (4.5–)4.8–5.7(–6) μ m, Q = (1.6–)1.8–2.2(–2.3), N = 60 (Me = 10.4 \times 5.3 μ m, Qe = 2), ellipsoid-inequilateral with narrowly to more rarely broadly rounded ends, unicellular, brown to dark brown, with a conspicuous, straight, almost spore-length germ slit on the flattened side; epispore smooth.

Asexual morph on the natural substrate not seen.

Known distribution: Martinique, known only from the type collection.

Comments: The fungus described above is characterized by widely effused stromata erumpent from bright yellow mycelium spread over the substrate, with a greenish yellow coating vanishing at maturity, by an unusually thick outer carbonaceous crust, by abundant and persistent whitish tissue between the perithecia, and

by a base delimited by a thin carbonaceous layer. Asci and ascospores cannot be distinguished from those of *N. diffusa* and its segregates. It shares with *N. primolutea* Y.-M. Ju, H.-M. Hsieh & J.D. Rogers and *N. sublutea*, the two most resembling species, carbonaceous effused-pulvinate stromata associated with yellow mycelium and dark brown inequilateral ascospores averaging 10.4 \times 5.3 μ m with a conspicuous long germ slit on the ventral side. It primarily differs from the former, which is entirely carbonaceous (Ju *et al.*, 2005), by the presence of abundant and persistent soft whitish internal tissue and from the latter by lacking a continuous olivaceous yellow layer beneath the perithecia (this paper). Moreover, it features bluntly rounded ostioles vs. conic-papillate, and the unusually thick carbonaceous crust supports the segregation from the two above species and helps recognize it at maturity when the typical greenish yellow coating has vanished. The new species *N. flavoviridis* is proposed to accommodate this collection deviating in several respects from its closest relatives.

Nemanía immersidiscus Van der Gucht, Y.-M. Ju & J.D. Rogers, *Mycotaxon*, 55: 550 (1995). Plates 17–18. Table 5.

Stromata pulvinate to effused-pulvinate, rarely perithecioid, (1.25–)2.5–42 mm long \times (1.25–)2–12 mm wide \times 0.65–1 mm thick, separate or confluent into irregularly elongated compound stro-

mata, with inconspicuous to moderately exposed perithecial contours and usually sloping margins, at times surrounded by white sterile tissue forming a thin layer on host surface, persistent at maturity; stromatal surface orange brown, silvery grey brown to dark brown, eventually black; carbonaceous crust immediately beneath surface 80–120 µm thick and carbonaceous material encasing each perithecium; the tissue between the perithecia soft, whitish, more abundant at margins, at times extending beneath the perithecial layer, reduced to almost absent in overmature stromata; subperithecial tissue black, inconspicuous. **Perithecia** subglobose to depressed-spherical, 0.4–0.7 × 0.5–0.85 mm. **Ostioles** finely papillate, black, more or less conspicuously sunken in a shallow discoid depression 80–120 µm diam; ostiolar area blackish, shiny, frequently flattened.

Asci cylindrical, with (4–6–)8 slightly overlapping uniseriately arranged ascospores, the spore-bearing parts 82–93 × 6.5–7.5 µm, the stipes 72–117 µm long, fragile, with apical apparatus 2.3–2.8 × 2–2.4 µm (Me = 2.7 × 2.2 µm, N = 25), tubular with a faint upper rim, bluing in Melzer's reagent. **Paraphyses** copious, thin-walled, septate, 2–2.5 µm wide at base, filiform above asci. **Ascospores** (10.4–)10.8–13.1(–14.3) × (4.1–)4.4–6.2(–7) µm, Q = (1.8–)1.9–2.8(–3.1), N = 360 (Me = 12.1 × 5.3 µm, Qe = 2.3), ellipsoid strongly inequilateral to slightly fusoid, with broadly to narrowly rounded ends, unicellular, brown to blackish brown, with a conspicuous, straight germ slit spore-length to slightly less than spore-length on the flattened side; epispore smooth.

Asexual morph on the natural substrate not seen, geniculosporium-like in culture on MEA according to VAN DER GUCHT *et al.* (1995).

Specimens examined: FRENCH WEST INDIES: GUADELOUPE: Basse-Terre: Capesterre-Belle-Eau, Grand-Etang, hygrophilic rainforest, on bark, soc. *N. diffusa*, 6 Sept. 2005, *leg.* C. Lechat, CLL 5378B (LIP); Petit-Bourg, Merwart trail, hygrophilic rainforest, on a dead corticated branch, 12 Aug. 2008, *leg.* C. Lechat, CLL 8201 (LIP); Petit-Bourg, Maison de la Forêt, hygrophilic rainforest, on a dead corticated branch, 11 Aug. 2010, *leg.* C. Lechat, CLL 2366 (LIP) (depauperate, parasitized by a *Hilberina* sp.); Sainte-Rose, Sofaïa, path to Saut des Trois Cornes, mesophilic rainforest, on a dead corticated branch, 12 Sept. 2003, *leg.* C. Lechat, CLL 1036 (LIP). MARTINIQUE: Case-Pilote, Morne Rose, mesophilic rainforest, on a dead corticated branch, 8 Aug. 2013, *leg.* J. Fournier, MJF 13073 (LIP); Fort-de-France, Absalon, track to Plateau Michel, hygrophilic rainforest, on a dead decorticated branch, 15 Aug. 2013, *leg.* J. Fournier, MJF 13254 (LIP); *ibid.*, at base of a dead decorticated stump, 7 Aug. 2016, *leg.* J. Fournier, MJF 16148 (LIP); Fort-de-France, Maison forestière de la Donis, hygrophilic rainforest, on a dead corticated branch, 15 Jun. 2014, *leg.* J. Fournier, MJF 14179 (LIP); Le Marigot, Habitation Denel, Pérou forest, track to Morne Bellevue, hygrophilic rainforest, on a dead corticated branch, 10 Jun. 2014, *leg.* J. Fournier, MJF 14119 (LIP); Le Morne-Rouge, Sainte-Cécile forest trail, hygrophilic rainforest, on a dead corticated branch, associated with depauperate stromata of *Annulohyphoxylon stygium*,

22 Aug. 2008, *leg.* C. Lechat, CLL 8278B (LIP); Le Morne-Rouge, La Propreté, forest trail, hygrophilic rainforest, on dead decorticated wood of *Hibiscus* (*H. elatus* Sw., *Malvaceae*), 29 Aug. 2007, *leg.* J. Fournier, MJF 07210 (LIP); Le Morne-Vert, Caplet track, mesophilic rainforest, on a dead corticated branch, 31 Aug. 2008, *leg.* C. Lechat, CLL 8384 (LIP); Le Prêcheur, Anse Coulevre, mesophilic coastal rainforest, on dead decorticated rotten wood, 5 Sept. 2007, *leg.* J. Fournier, MJF 07320 (LIP); *ibid.*, on dead decorticated wood, 11 Jun. 2015, *leg.* C. Lechat, MJF 15005 (LIP); Sainte-Marie, Pérou forest, hygrophilic rainforest, on a dead corticated branchlet of *Macrogony* (*Swietenia macrophylla* King, *Meliaceae*), 13 Jun. 2015, *leg.* J. Fournier, MJF 15056 (LIP); Saint-Joseph, Rivière Blanche, hygrophilic rainforest, on a dead corticated branchlet, 4 Sept. 2003, *leg.* C. Lechat, CLL 748 (LIP); Schoelcher, Fond Lahaye, banks of Fond Lahaye River, mesophilic rainforest, on dead decorticated wood, 12 Aug. 2013, *leg.* J. Fournier, MJF 13164 (LIP) (depauperate).

Known distribution: Likely pantropical: Argentina (SIR *et al.*, 2017), Martinique (this paper), Panamá (CARMONA *et al.*, 2009), Papua New Guinea, USA (Hawaii) (VAN DER GUCHT *et al.*, 1995; ROGERS & JU, 2012).

Comments: The presence of a small discoid depression around the ostiolar papilla is characteristic of *N. immersidiscus* and helps distinguish it from *N. bipapillata*, the most resembling species in which the ostiolar discs are typically raised. Moreover, the stromata of *N. bipapillata* are entirely carbonaceous, whereas those of *N. immersidiscus* contain white soft tissue between and beneath the perithecia, a feature vanishing with time and almost absent in overmature stromata, thus sometimes difficult to evaluate. A further difficulty in separating both species is that in old and overmature stromata of *N. immersidiscus*, the ostiolar depressions are frequently eroded or filled with dirt and may be overlooked. During this survey, most of the material previously filed as *N. bipapillata* turned out to be *N. immersidiscus* after a thorough examination of the ostiolar discs, and the latter species appeared much more common than the former and one of the most commonly encountered *Nemania* species in Guadeloupe and Martinique.

Another species with ostiolar papilla sunken in a discoid depression is *N. circostoma*, known only from the type collection in Chile. It differs primarily from *N. immersidiscus* by wider ostiolar discs 0.2–0.3 mm diam and larger ascospores 16–19 × 7–8 µm (JU & ROGERS, 2002). The new species *N. albofarcta* resembles *N. immersidiscus* in having ostioles encircled with a narrow disc and soft whitish tissue between the perithecia but its light brown ascospores 8.5–9.9 × 3.1–3.7 µm with a short germ slit clearly set it apart from *N. immersidiscus*.

The seventeen collections of *N. immersidiscus* studied during this survey exhibit a wide range of morphological variations. The stromata may be uniperitheciate to effused-pulvinate, surrounded by a thin layer of white sterile tissue spreading on the host surface or not,

Table 5 – Ascospore dimensions in six collections of *N. immersidiscus* showing the range of intraspecific variations, compared with those recorded by VAN DER GUCHT *et al.* (1995)

Collections numbers	Ascospore measurements with extreme values in parentheses	Q = quotient l/w N = number of measurements	Mean values
CLL 8384	(10.4–)10.8–12.8(–13.1) × (4.2–)4.5–5.1(–5.3) µm	Q = (2.2–)2.3–2.7(–2.8) N = 60	Me = 11.8 × 4.8 µm Qe = 2.5
MJF 07210	(10.8–)11.1–12.7(–13.1) × (4.8–)5.2–6(–6.4) µm	Q = 2–2.3(–2.5) N = 60	Me = 12 × 5.5 µm Qe = 2.2
MJF 07320	(10.5–)11.2–13.1(–13.5) × (4.1–)4.4–5.2(–5.4) µm	Q = (2.2–)2.3–2.8(–3.1) N = 60	Me = 12.2 × 4.8 µm Qe = 2.5
MJF 13254	(11.2–)11.7–13.1(–14) × (4.7–)4.9–5.9(–6.4) µm	Q = (2–)2.1–2.5(–2.8) N = 60	Me = 12.4 × 5.4 µm Qe = 2.3
MJF 14119	(10.8–)11.5–12.9(–14.3) × (4.8–)5.2–6.1(–7) µm	Q = (1.8–)2–2.4(–2.5) N = 60	Me = 12.2 × 5.6 µm Qe = 2.2
MJF 16148	(10.2–)11.2–12.5(–13.3) × (5–)5.2–6.2(–6.7) µm	Q = (1.8–)1.9–2.3(–2.4) N = 60	Me = 11.9 × 5.7 µm Qe = 2.1
Cumulated values	(10.4–)10.8–13.1(–14.3) × (4.1–)4.4–6.2(–7) µm	Q = (1.8–)1.9–2.8(–3.1) N = 360	Me = 12.1 × 5.3 µm Qe = 2.3
VAN DER GUCHT <i>et al.</i> (1995)	(10–)11–14(–16) × (4–)4.5–5.5 µm		Me = 12.5 × 5 µm Qe = 2.5

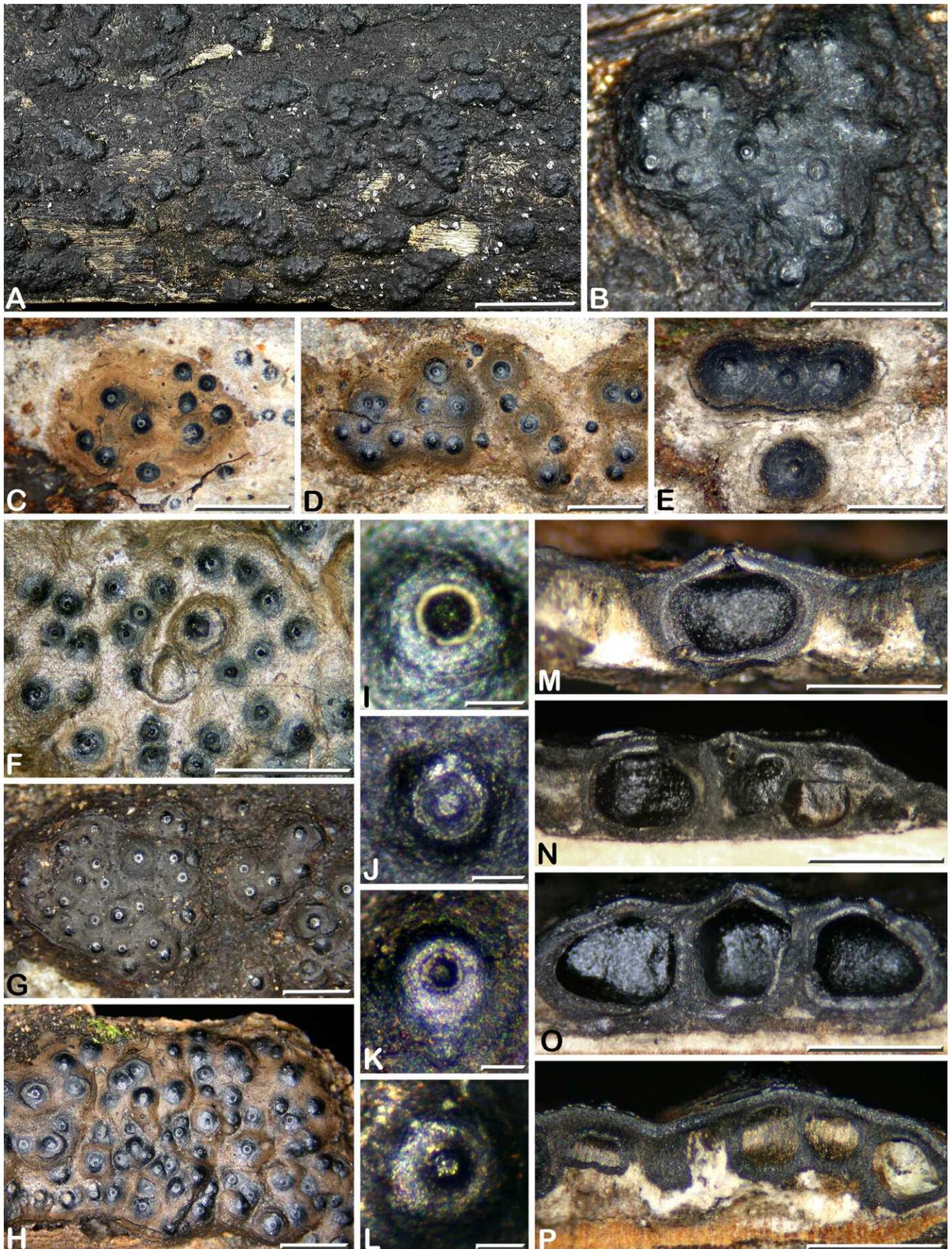


Plate 17 – *Nemanja immersidiscus*

A, B, J, N: MJF 16148; C, D: MJF 15056; E: CLL 8201; F, I, M: MJF 13254; G, K, O: MJF 14119; H, L, P: CLL 8384. A: Habit of scattered pulvinate stromata on blackened wood; B, F, H: Various coloured effused-pulvinate mature stromata; C: Immature stroma associated with white sterile tissue at margin; D, E, G: Mature stromata associated with persistent white sterile tissue at margins; I-L: Ostiolar discs in close-up; M-P: Stromata in vertical section showing a carbonaceous crust above the perithecia and a variable amount of white soft tissue between or beneath the perithecia. Scale bars: A = 10 mm; B-H = 2 mm; I-L = 0.1 mm; M-P = 1 mm.

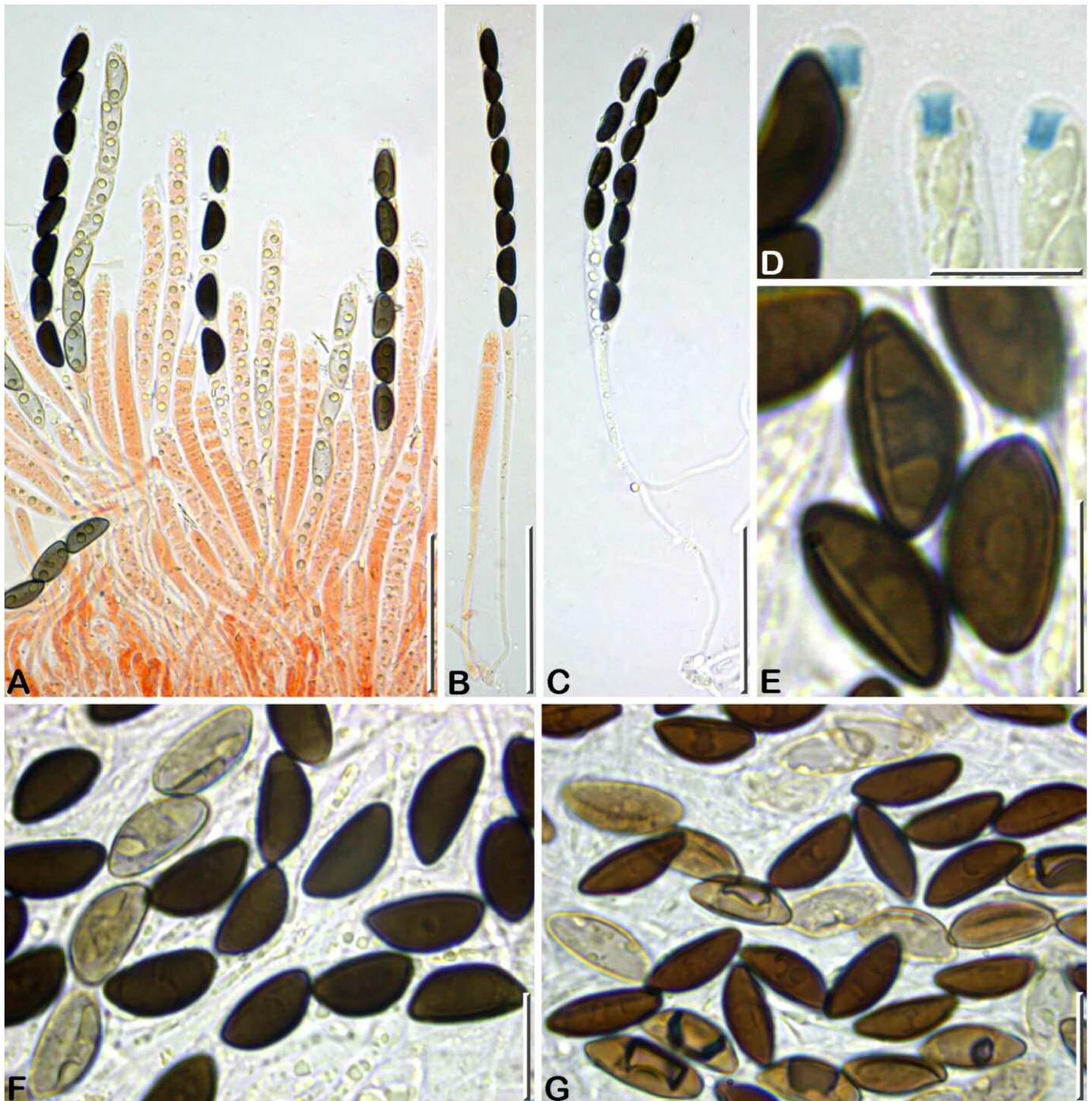


Plate 18 – *Nemania immersidiscus*

A-F: MJF 16148; G: CLL 8384. A: Immature and mature 4–8-spored asci in Congo red with 3% KOH; B: Mature and immature asci in Congo red with 3% KOH; C: Mature 4- and 8-spored asci in 3% KOH; D: Ascus apical apparatus of mature and immature asci, in Melzer's reagent; E: Ascospores in ventral view showing a germ slit, in 1% SDS; F, G: Ascospores of two different collections, in 1% SDS. Scale bars: A-C = 20 μ m; D-G = 10 μ m.

and their surface shows various tones of brown before becoming black at full maturity. Ascospores are likewise variable in dimensions (Table 5), shape and colour (Plate 18) but within the range given by VAN DER GUCHT *et al.* (1995) and their variations do not appear correlated with the morphological variations of the stromata.

Nemania nivea J. Fourn. & Lechat, *sp. nov.* – MycoBank MB823708. Plates 19–20.

Diagnosis: Differs from the most resembling species *N. diffusa* as to ascospore morphology by stromata coated with a persistent white pruina, weakly papillate to umbilicate ostioles and white to

grey soft tissue present in places between perithecia and at margins.

Holotype: FRENCH WEST INDIES: MARTINIQUE: Case-Pilote, Fond Boucher, mesophilic rainforest, on a dead corticated branch on the banks of a small stream, 31 Jul. 2016, *leg.* J. Fournier, MJF 16054 (LIP).

Etymology: From Latin *niveus* = coated with snow, for the white pruina persistent at maturity on stromatal surface.

Stromata superficial, effused-pulvinate, irregularly elongated, 4–39 mm long \times 2–8 mm wide \times 0.65–0.85 mm thick, with sloping to abrupt margins; surface with inconspicuous perithecial contours, with some longitudinal cracks at margins, coated with a white to cream-white, pruinose, persistent layer, with dark grey carbonaceous subsurface showing through in places; black carbonaceous

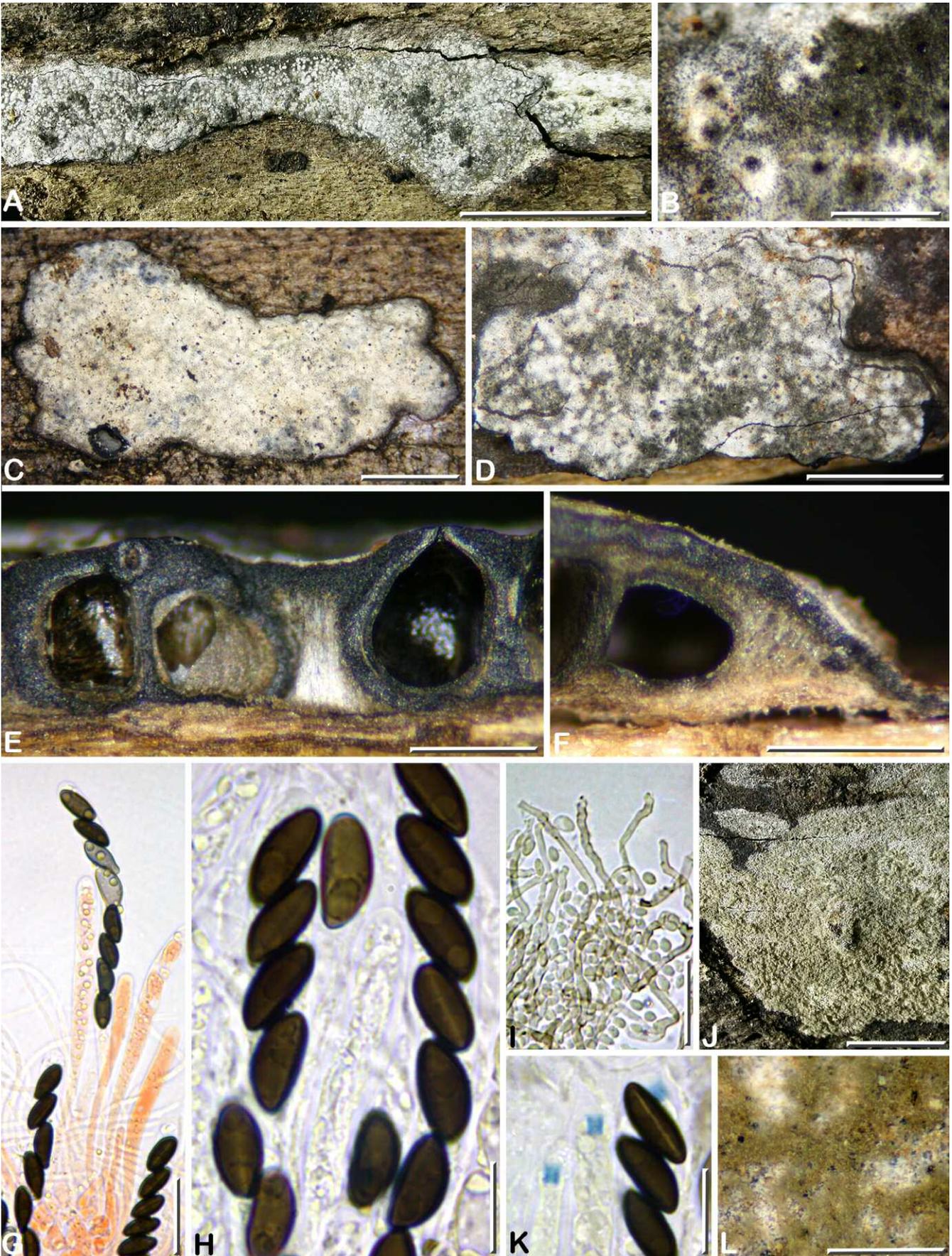


Plate 19 – *Nemanina nivea*

A, B, D, E, G-L: MJF 16054 (Holotype); C, F: MJF 16047 (paratype). A, D: Mature stromata on top surface; B: Stromatal surface in close-up showing barely papillate to umbilicate ostioles, some surrounded by white pruina; C: Immature stroma in top view; E: Mature stroma in vertical section (broken) showing the perithecia encased in a carbonaceous crust and intercalary strands of whitish soft tissue (note the umbilicate ostiole on the right); F: Margin of an immature stroma in vertical section (broken) showing greyish tissue encasing a perithecium; G: Mature and immature asci, in Congo red and 3% KOH; H: Ascospores in 1% SDS, some in ventral view showing a germ slit; I: Conidiophores and conidia of the asexual morph, in 3% KOH; J: Immature stroma bearing the superficial asexual morph; K: Ascinal apical apparatus in Melzer's reagent, from immature and mature asci with one ascospore in ventral view showing a germ slit; L: Asexual morph in close-up. Scale bars: A = 10 mm; B, E, F, L = 0.5 mm; C, D = 2 mm; G, I = 20 µm; H, K = 10 µm; J = 5 mm.

tissue forming a superficial crust ca. 100–120 μm thick above the perithecia and surrounding each perithecium, interspersed with white soft tissue; the tissue beneath the perithecial layer greyish, soft, often inconspicuous at maturity, well-developed at margins. **Perithecia** subglobose to slightly depressed, 0.5–0.6 mm diam. **Ostioles** obscurely papillate to umbilicate, inconspicuous, black, often surrounded by discoid spots of persistent white pruina.

Asci cylindrical, with (4–6)–8 obliquely uniseriately arranged ascospores, the spore-bearing parts 56–76 \times 6–6.5 μm , with fragile stipes 42–56 μm long, with apical apparatus slightly tubular, bluing in Melzer's reagent, 2.1–2.6 \times 1.9–2.3 μm (Me = 2.3 \times 2.1 μm ; N =

20). **Paraphyses** copious, thin-walled, septate, 5–7 μm wide at base, tapering above asci. **Ascospores** (9.8–)10.1–12.3(–13.6) \times (4.2–)4.5–5.3(–5.6) μm , Q = (2–)2.1–2.5(–2.8), N = 60 (Me = 11.1 \times 4.9 μm ; Qe = 2.2), ellipsoid-inequilateral with narrowly rounded ends, at times with one end beaked, unicellular, brown to dark brown, with a conspicuous, straight, almost spore-length germ slit on the flattened side; epispore smooth.

Supposed **asexual morph** on the natural substrate present on a white primordium next to a mature stroma, finely woolly, pale olivaceous grey, composed of tufts of long contorted pale brown hy-

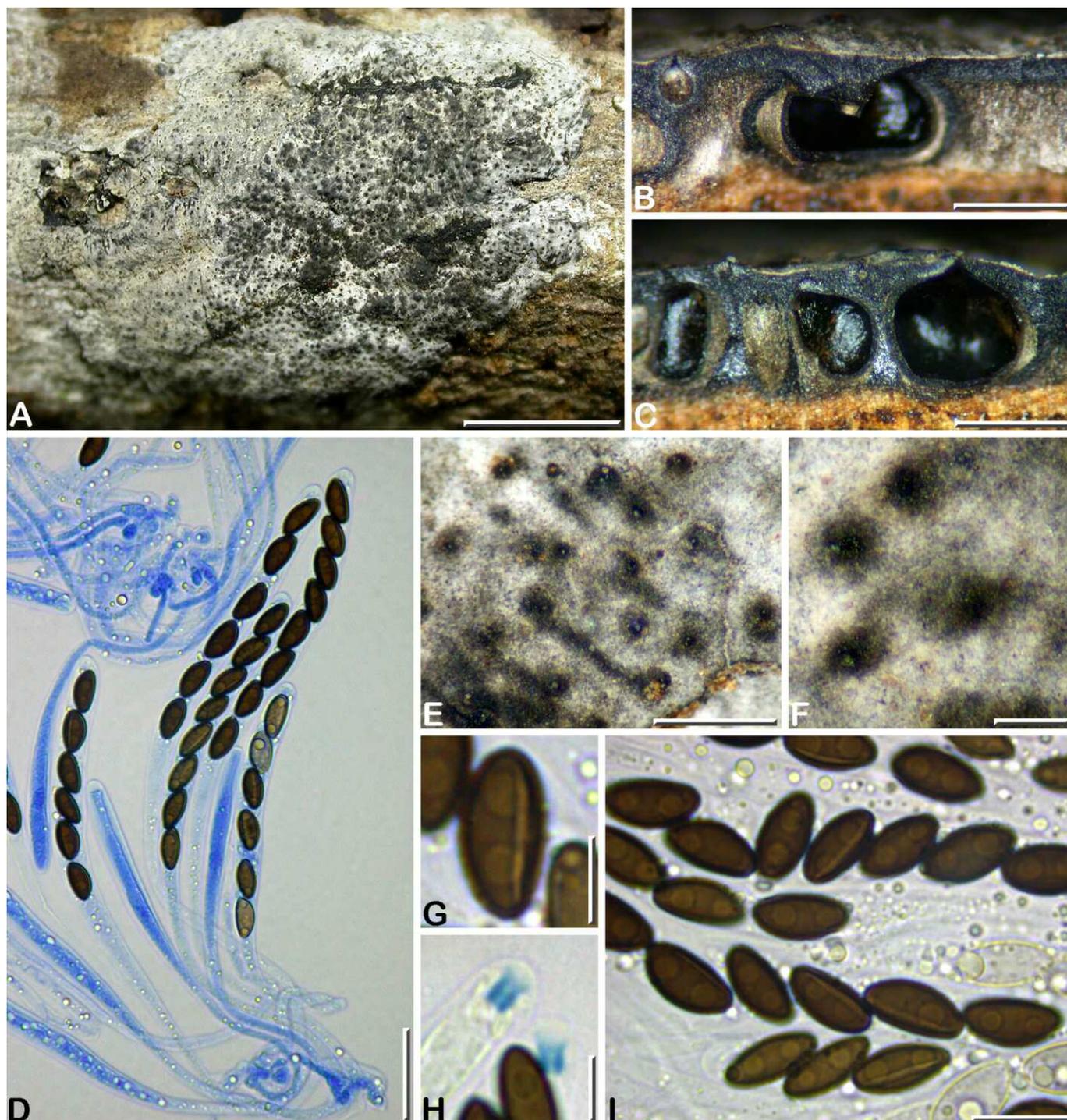


Plate 20 – *Nemania cf. nivea* MJF 16035

A: Mature stroma on host surface; B, C: Mature stroma in vertical section (broken) showing perithecia encased in a carbonaceous crust, with whitish soft interperithecial tissue in places (B); D: Mature and immature asci, in blue Pelikan® ink diluted in 1% SDS; E, F: Stromatal surface in close-up showing black conic-papillate ostioles contrasting against the persistent white superficial pruina; G: Ascospore in latero-ventral view showing a germ slit, in Melzer's reagent; H: Ascical apical apparatus in Melzer's reagent; I: Ascospores in 1% SDS, some in ventral view showing a germ slit. Scale bars: A = 5 mm; B, C, E = 0.5 mm; D = 20 μm ; F = 0.2 mm; G, H = 5 μm ; I = 10 μm .

phae 3–4 µm wide, bearing geniculosporium-like conidiophores. Conidia ellipsoid, subhyaline, smooth, 3.5–4.5 × 3–3.5 µm.

Paratypes: FRENCH WEST INDIES: MARTINIQUE: Case-Pilote, Fond Boucher, mesophilic rainforest, on a dead corticated branch on the banks of a small stream, 31 Jul. 2016, *leg.* J. Fournier, MJF 16047 (LIP) (immature); Sainte-Luce, Montravail forest, relict hygrophilic rainforest, on a dead corticated trunk, associated with developing stromata of *N. discostoma*, 30 Jul. 2016, *leg.* J. Fournier, MJF 16035 (LIP).

Known distribution: Martinique.

Comments: *Nemania nivea* features carbonaceous effused stromata and dark brown inequilateral ascospores averaging 11.1 × 4.9 µm with a long germ slit on the ventral side, which places it close to *N. diffusa*. It can be distinguished from *N. diffusa* by its persistent white pruinose coating, its inconspicuous, often umbilicate ostioles and the presence of grey to white soft tissue between the perithecia and at margins. Stromata of *N. diffusa*, though fairly variable, may be whitish when immature but become dark grey to blackish brown at maturity, they possess conic-papillate ostioles and they are entirely carbonaceous even at young stages (JU & ROGERS, 2002; this paper).

Nemania maculosa (J.D. Rogers, Callan & Samuels) Y.-M. Ju & J.D. Rogers is a taxon described from Indonesia (ROGERS *et al.*, 1987, as *Hypoxylon*), known to have likewise a whitish stromatal surface. It primarily differs from *N. nivea* by much larger ascospores 19–26 × 6–7.5 µm that are light brown to brown and possess a germ slit less than spore-length. Based on these differences, *N. nivea* sp. nov. is proposed to accommodate this material that cannot be equated with other known species.

A *Nemania* sp. from Puerto Rico was mentioned by JU & ROGERS (2002), differing from *N. diffusa* by a white surface, with ascospores 11–12 × 5–6 µm. *Nemania nivea* differs from this description by thinner stromata 0.60–0.85 mm thick vs. 2 mm thick, the lack of a thick layer of greyish soft tissue beneath the perithecia and narrower ascospores. We did not examine this specimen which might represent the same taxon, an assumption supported by the Caribbean origin, and additional collections are needed to evaluate the morphological variations within *N. nivea*.

The collection MJF 16035 illustrated on previous page is tentatively referred to *N. nivea* on account of its carbonaceous stromata with a persistent outermost white pruina and occasional presence of soft whitish tissue between the perithecia. However it differs by more conspicuous papillate ostioles and slightly smaller ascospores 9.2–10.8 × 4.6–5.6 µm, $Q = 1.8–2.2$, $N = 60$ ($Me = 10 \times 5.1 \mu\text{m}$; $Qe = 2$). Ascospore dimensions are similar to those of another *Nemania* sp. (MJF 13159) with a white stromatal surface, which we referred to *N. cf. diffusa* (this paper) based on entirely carbonaceous stromata and surface becoming dark grey at maturity.

Within the complex of species around *N. diffusa* in the wide sense followed in this paper, those with white stromata appear to form an heterogeneous subgroup from which *N. nivea* can be tentatively segregated but it is clear that a wider sampling is necessary to resolve their taxonomic status in the future.

Nemania obscura J. Fourn. & Lechat, *sp. nov.* – MycoBank MB 823709. Plate 21.

Diagnosis: Differs from the most resembling species *N. diffusa* by erumpent, black, roughened stromata with inconspicuous ostioles, and smaller, strongly inequilateral ascospores 8.2–9.4 × 4.5–5.3 µm frequently with subacute ends.

Holotype: FRENCH WEST INDIES: GUADELOUPE: Basse-Terre: Saint-Claude, Beausoleil, track to Plateau Dimba, hygrophilic rainforest, on a dead corticated branch ca. 2 cm diam, 9 Sept. 2003, *leg.* C. Lechat, CLL 0971 (LIP). Isotype: HAST 142502.

Etymology: From Latin *obscurus* = dark, ill-defined, for the black, irregularly roughened stromatal surface lacking conspicuous ostioles and perithecial contours.

Stromata erumpent from bark, raising woody fibres remaining adherent to the surface, effused-pulvinate, orbicular to irregularly elongated, 2–12 mm long × 1.5–4 mm wide × 0.55–0.7 mm thick, with sloping to abrupt margins, occasionally surrounded with scattered spots of white hyphal tissue; surface dull black, with inconspicuous perithecial contours but strongly roughened by wrinkles, depressions and prominent bumps, hard-textured, with carbonaceous tissue forming a superficial crust 80–170 µm thick and surrounding each perithecium; the tissue beneath the perithecial layer black, carbonaceous, often inconspicuous. **Perithecia** subglobose 0.4–0.5 mm diam, frequently laterally flattened by mutual pressure. **Ostioles** umbilicate to obscurely papillate, 30–60 µm diam at base, black, mostly inconspicuous.

Asci cylindrical, with 8 obliquely uniseriately arranged ascospores, the spore-bearing parts 62–68 × 6.5–7 µm, with fragile stipes 45–85 µm long, with apical apparatus short-cylindrical, wider than high, 1.3–1.7 × 1.8–2.1 µm ($Me = 1.5 \times 2 \mu\text{m}$, $N = 20$), bluing in Melzer's reagent. **Paraphyses** copious, thin-walled, remotely septate, filiform, 1.8–2.2 µm wide at base, tapering above asci. **Ascospores** (7.8–)8.2–9.4(–9.9) × (4–)4.5–5.3(–5.5) µm, $Q = (1.5–)1.6–2(–2.3)$, $N = 60$ ($Me = 9 \times 4.9 \mu\text{m}$; $Qe = 1.8$), ellipsoid strongly inequilateral with narrowly rounded to frequently subacute ends, unicellular, brown to dark brown, with a conspicuous, straight, almost spore-length germ slit on the flattened side; epispore smooth.

Asexual morph on the natural substrate not seen.

Known distribution: Guadeloupe. Known only from the type collection.

Comments: This *Nemania* is well-characterized by black, entirely carbonaceous erumpent stromata with a bumpy surface and inconspicuous ostioles, combined with dark brown strongly inequilateral ascospores averaging 9 × 4.9 µm, with a conspicuous long germ slit on the ventral side. This combination of characters does not match any known species, which leads to the recognition of the new species *N. obscura*, but it clearly suggests affinities with *N. albocincta* (Ellis & Everh.) Pouzar and *N. diffusa*. *Nemania albocincta*, known from North America (Ohio), is distinguished from *N. diffusa* by smaller ascospores in the same size range as our collection from Guadeloupe (ELLIS & EVERHART, 1892; JU & ROGERS, 2002) but its ascospores are almost equilateral, unlike those of *N. obscura* that are strongly inequilateral. Moreover the uneven, roughened surface of *N. obscura* with very inconspicuous ostioles further distinguishes it from that of *N. albocincta*, which is reported as “smooth”, with ostioles “slightly papillate” (JU & ROGERS, 2002). In a more recent paper, JU & ROGERS (2012) suspected *N. albocincta* to be a possible synonym of *N. diffusa*. The stromata of *N. obscura* differ from those of *N. diffusa* for the same reasons as explained above and ascospore dimensions of both species only slightly overlap (8.2–9.4 × 4.5–5.3 µm vs. 9.1–12.2 × 4.3–6.2 µm), while their ratios length/width are clearly different (1.8 vs. 2.1) (this paper).

Nemania obscura is unfortunately based on a single, rather scanty collection, thus the range of its intraspecific variations cannot be assessed until additional material is collected. However, it appears to deviate enough from its close relatives to be regarded as a distinct species.

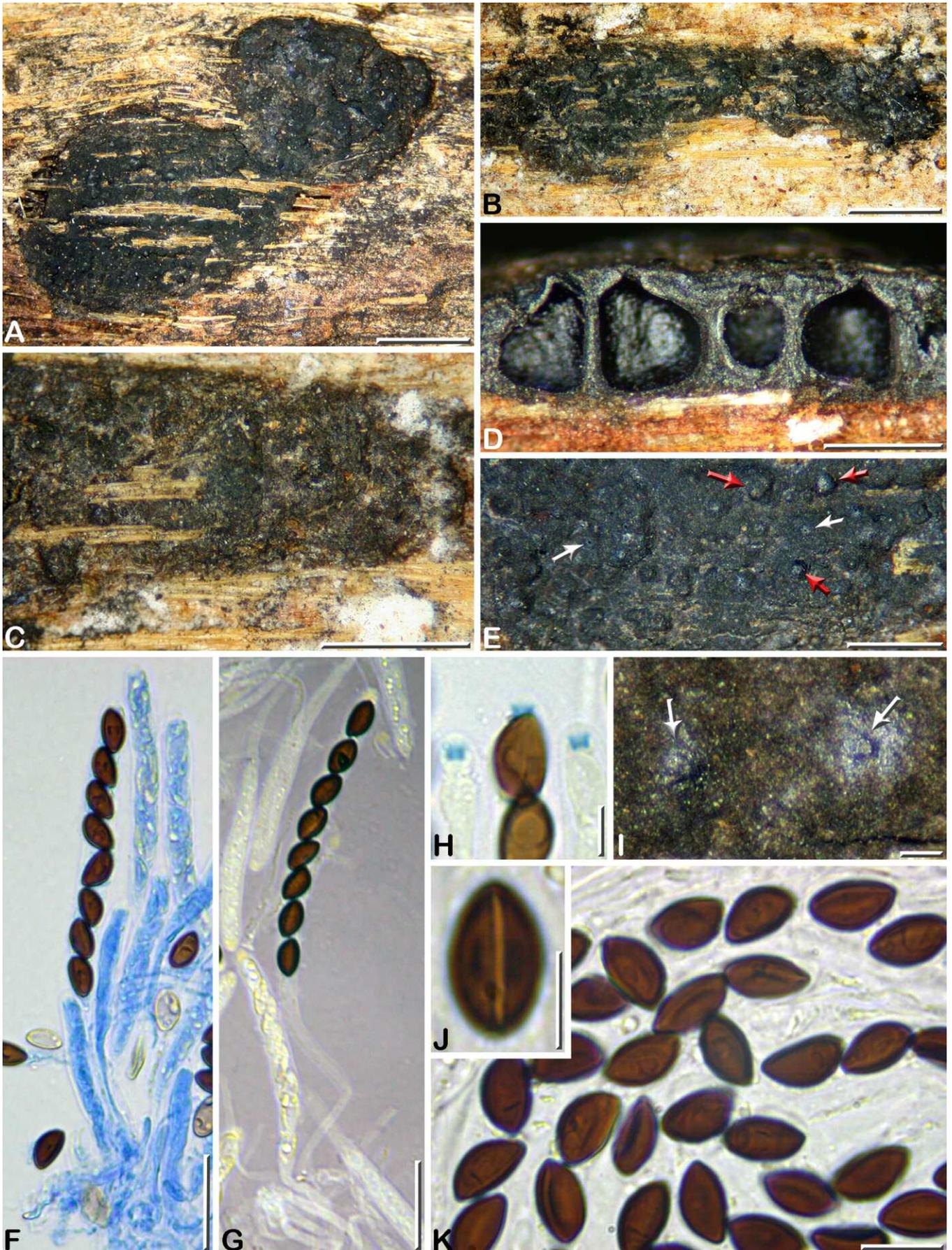


Plate 21 – *Nemanja obscura*

CLL 0971 (Holotype). A: Erumpent orbicular stromata on host surface, raising wood fibres remaining adherent to the surface; B, C: Elongated stromata with wood fibers adherent to the surface and surrounded by scattered patches of white superficial tissue; D: Stroma in vertical section showing perithecia encased in carbonaceous tissue; E: Stromatal surface in close-up showing scattered ostioles (white arrows) and tubercles (red arrows); F, G: Immature and mature asci, in diluted blue Pelikan® ink and black Pelikan® ink, respectively; H: Ascus apical apparatus, in Melzer's reagent; I: Stromatal surface in close-up showing two papillate ostioles (white arrows); J: Ascospore in ventral view showing a germ slit; K: Ascospores in 1% SDS. Scale bars: A-C = 2 mm; D, E = 0.5 mm; F, G = 20 µm; H, J = 5 µm; I = 100 µm; K = 10 µm.

Nemania roseolilacina J. Fourn. & Lechat, *sp. nov.* – MycoBank MB 823710. Plates 22–23. Table 6.

Diagnosis: Differs from typical *N. diffusa* by a distinctive pinkish, vinaceous or purple stromatal surface, gradually vanishing at maturity but persistent in places at margins or staining host surface.

Holotype: FRENCH WEST INDIES: MARTINIQUE: Le Prêcheur, Anse Couleuvre, mesophilic coastal rainforest, on a dead corticated woody liana ca. 5 cm diam [(*Macfadyena unguis-cati* (L.) A.H. Gentry (*Bignoniaceae*)], 23 Aug. 2007, *leg.* J. Fournier, MJF 07043 (LIP). Isotype: HAST 142503.

Etymology: From Latin *roseus* = pink and *lilacinus* = lilac purple, for the varying and unusual purple colour of the stromatal surface.

Stromata pulvinate to effused-pulvinate, orbicular to irregularly lobed, 0.8–5 mm diam × 0.5–0.75 mm thick, confluent into larger compound stromata up to 25 mm long × 14 mm wide, with steep, horizontally cracked margins; perithecial contours barely exposed to unexposed; surface varying from pale vinaceous grey (115; oac569), livid vinaceous (83, oac478), vinaceous purple (101, oac401) to livid purple (81, oac449) at margins, gradually vanishing at maturity, eventually blackish grey but frequently keeping remnants of the purple coating on margins or on the substrate next to the margins; the purple pellicle lacking coloured granules and not releasing pigments in 10% KOH; carbonaceous crust immediately beneath surface 100–120 µm thick; interior black, entirely carbonaceous around the perithecia; subperithecial tissue inconspicuous. **Perithecia** subglobose, depressed-spherical or obovoid, 0.4–0.6 × 0.25–0.55 mm. **Ostioles** conic-papillate, black.

Asci cylindrical, with (6–)8 slightly overlapping uniseriately arranged ascospores, the spore-bearing parts 71–82 × 6–7 µm, the stipes 72–100 µm long, with apical apparatus 1.7–2.1 × 1.5–1.9 µm (Me = 1.9 × 1.7 µm; N = 20), short-cylindrical with a sharp upper rim, bluing in Melzer's reagent. **Paraphyses** copious, thin-walled, septate, 4–5 µm wide at base, tapering above asci. **Ascospores** (8.2–)8.7–11.5(–12.3) × (3.6–)4–5.3(–5.9) µm, Q = (1.7–)1.9–2.5(–2.6), N = 360 (Me = 10.1 × 4.7 µm, Qe = 2.2), ellipsoid-inequilateral, with narrowly to broadly rounded, infrequently subacute or beaked ends, unicellular, brown to dark brown, with a conspicuous, straight to slightly sinuous germ slit slightly less than spore-length to almost spore-length, central, on the flattened side; epispore smooth.

Asexual morph on the natural substrate not seen.

Paratypes: FRENCH WEST INDIES: MARTINIQUE: Fort-de-France, Absalon, track to Plateau Michel, hygrophilic rainforest, on a dead corticated branch, 15 Aug. 2013, *leg.* J. Fournier, MJF 13240 (LIP); *ibid.*, on a dead partly decorticated branch, 15 Jun. 2015, MJF 15092 (LIP); La Trinité, Pointe Bateau, coastal meso- to xerophilic forest, on a dead decorticated branch, 26 Aug. 2010, *leg.* J. Fournier, MJF 10151 (LIP); La Trinité (Caravelle peninsula), Tartane, Pointe Rouge, coastal meso- to xerophilic forest, on a dead partly decorticated branch, 29 Aug. 2010, *leg.* J. Fournier, MJF 10229 (LIP); *ibid.*, on a rotten corticated branch, 1 Aug. 2016, *leg.* J. Fournier, MJF 16067 (LIP).

Known distribution: Martinique.

Comments: The six collections described and illustrated above share with *N. diffusa* (as illustrated in this paper) an overall morphology, including considerable variations in ascospore morphology and dimensions. However, the presence of a conspicuous purplish colour on stromatal surface and on the surrounding substrate, most striking on developing stromata but usually still present as traces on fully mature stromata, appears distinctive enough to ensure the distinctiveness of these collections. Since the distinctive purple colour was repeatedly observed in various locations and conditions, which rules out the eventuality of a fortuitous character linked to the environment, the new species *N. roseolilacina* is erected to accommodate this colourful *Nemania*. *Nemania primolutea* was separated from *N. diffusa* on the same grounds, primarily differing by a luteous stromatal surface instead of grey, becoming blackish at maturity (Ju *et al.*, 2005).

Nemania sericata J. Fourn. & Lechat, *sp. nov.* – MycoBank MB 823712. Plates 24–25. Table 7.

Diagnosis: Differs from all known species of *Nemania* by broadly conical, weakly carbonaceous, frequently perithecioid stromata coated with long-persistent white to yellowish hyphal coating and weakly inequilateral ascospores averaging 14.5 × 7.15 µm with acute ends and a conspicuous straight germ slit on the ventral side; its most frequent occurrence on heavily rotten bamboo culms is likewise distinctive.

Holotype: FRENCH WEST INDIES: MARTINIQUE: Le Prêcheur, Anse Couleuvre, coastal mesophilic rainforest, on heavily rotten bamboo culm, 1 Sept. 2007, *leg.* J. Fournier, MJF 07243 (LIP). Isotype: HAST 142504.

Etymology: From Latin *sericatus* = coated with silk, for the stromata coated with silky white to cream hyphal tissue.

Stromata superficial, perithecioid, broadly conical, 1–1.35 mm diam to confluent in small groups of 2–8 or in linear rows to 10 mm long, 0.5–0.7 mm thick compound stromata with exposed perithecial contours; surface coated with a silky white to cream hyphal tissue persistent until maturity, spreading around the base of stromata and uniting nearby perithecioid stromata, frequently turning yellowish with a greenish tinge on mature stromata; black carbonaceous tissue forming a thin superficial crust 40–80 µm thick immediately beneath surface and surrounding each separate perithecium, not extending into the substrate, not extending downwards between perithecia in compound stromata; interior soft, loosely fibrous around the base of perithecia, whitish, turning greyish brown in older stromata; subperithecial tissue inconspicuous.

Asci cylindrical, with (6–)8 obliquely uniseriately arranged ascospores, the spore-bearing parts 94–104 × 8–9 µm, with stipes 30–47 µm long, with apical apparatus short-cylindrical, flattened, with a marked upper rim, 1.5–2.4 × 2.4–3.5 µm (Me = 1.9 × 2.9 µm, N = 60), bluing in Melzer's reagent. **Paraphyses** copious, thin-walled, re-

Table 6 – Ascospore dimensions in six collections of *N. roseolilacina* showing the range of intraspecific variations

Collections numbers	Ascospore measurements with extreme values in parentheses	Q = quotient l/w N = number of measurements	Mean values
MJF 07043 holotype	(9.4–)10.1–11.3(–11.6) × (4.1–)4.4–5.3(–5.8) µm	Q = (1.8–)2–2.45(–2.5) N = 60	Me = 10.6 × 4.8 µm Qe = 2.2
MJF 10151	(8.7–)9.1–10.8(–11.9) × (3.9–)4.2–5(–5.2) µm	Q = (1.8–)2–2.4(–2.5) N = 60	Me = 10 × 4.7 µm Qe = 2.2
MJF 10229	(9.2–)9.9–11.5(–12.3) × (4.3–)4.6–5.3(–5.9) µm	Q = (1.8–)2–2.3(–2.6) N = 60	Me = 10.7 × 4.9 µm Qe = 2.2
MJF 13240	(8.9–)9.4–10.4(–11.2) × (3.9–)4.1–5(–5.4) µm	Q = (1.9–)2–2.4(–2.6) N = 60	Me = 9.9 × 4.6 µm Qe = 2.2
MJF 15092	(8.2–)9.2–10.3(–11.2) × (4.1–)4.3–5.1(–5.4) µm	Q = (1.7–)1.9–2.2(–2.5) N = 60	Me = 9.8 × 4.8 µm Qe = 2.1
MJF 16067	(8.4–)8.7–9.9(–11) × (3.6–)4–4.9(–5) µm	Q = (1.8–)1.9–2.3(–2.6) N = 60	Me = 9.3 × 4.4 µm Qe = 2.1
Cumulated values	(8.2–)8.7–11.5(–12.3) × (3.6–)4–5.3(–5.9) µm	Q = (1.7–)1.9–2.5(–2.6) N = 360	Me = 10.1 × 4.7 µm Qe = 2.2

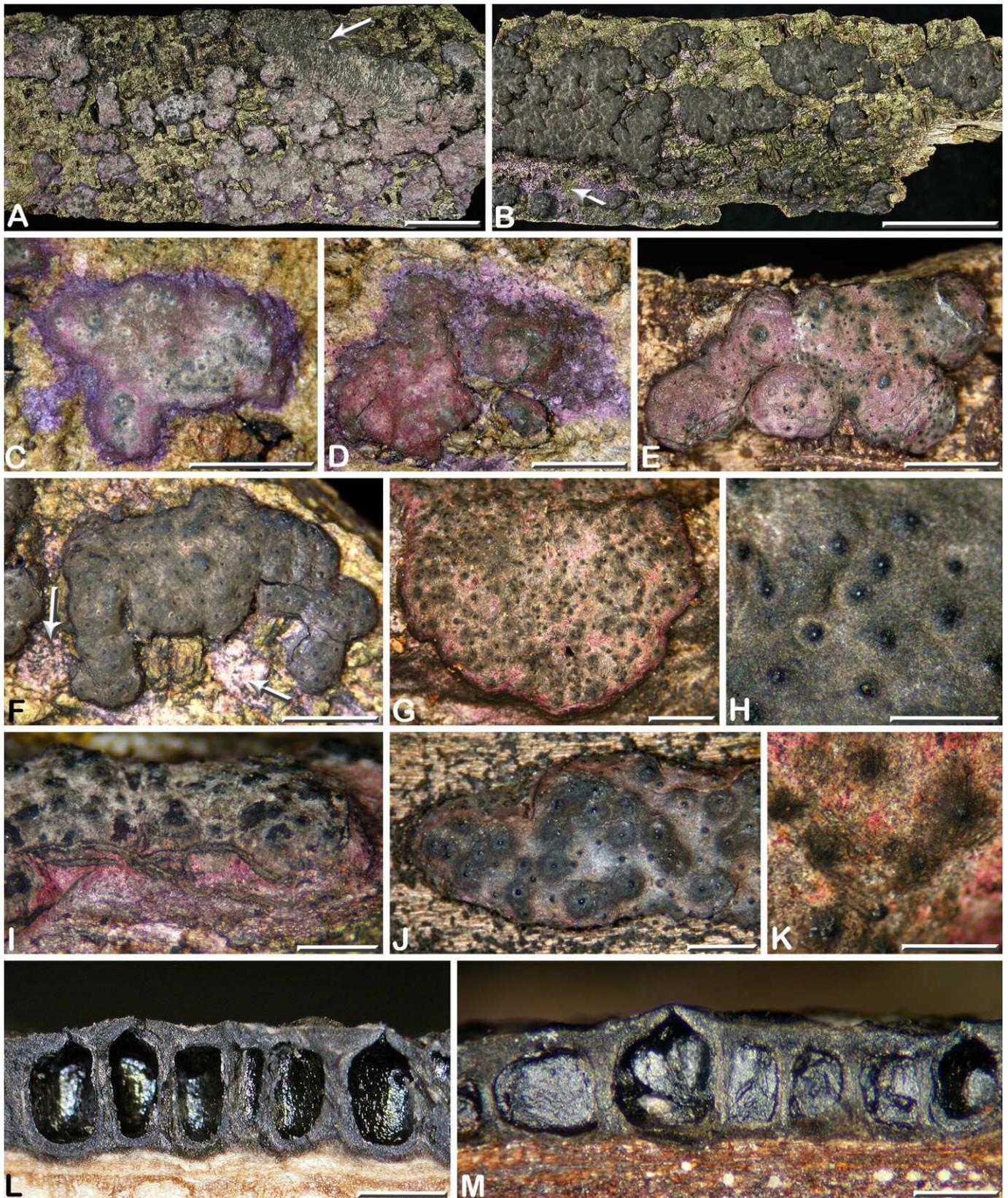


Plate 22 – *Nemaniam roseolilacina*

A-D, F, H, L: MJF 07043 (Holotype); E: MJF 16067; G, K: MJF 13240; I, M: MJF 15092; J: MJF 10151. A: Immature and barely mature purplish stromata aggregated on host surface, along with a dark grey mature stroma (arrow); B, F: Mature blackish grey stromata, with remnants of purple pellicle next to the margins (arrows); C, D: Immature stromata showing the various tones of pink or purple of the stromatal surface and the substrate stained purple at margins; E: Mature confluent stromata with pinkish tones; G, J: Mature stromata with various tones of vinaceous to purple on surface; H, K: Stromatal surface in close-up showing black papillate ostioles; I: Mature stroma in oblique side view showing a grey surface and a purple steep margin with horizontal cracks; L, M: Stromata in vertical section showing variously shaped perithecia. Scale bars: A, B = 10 mm; C-G = 2 mm; H, K-M = 0.5 mm; I, J = 1 mm.

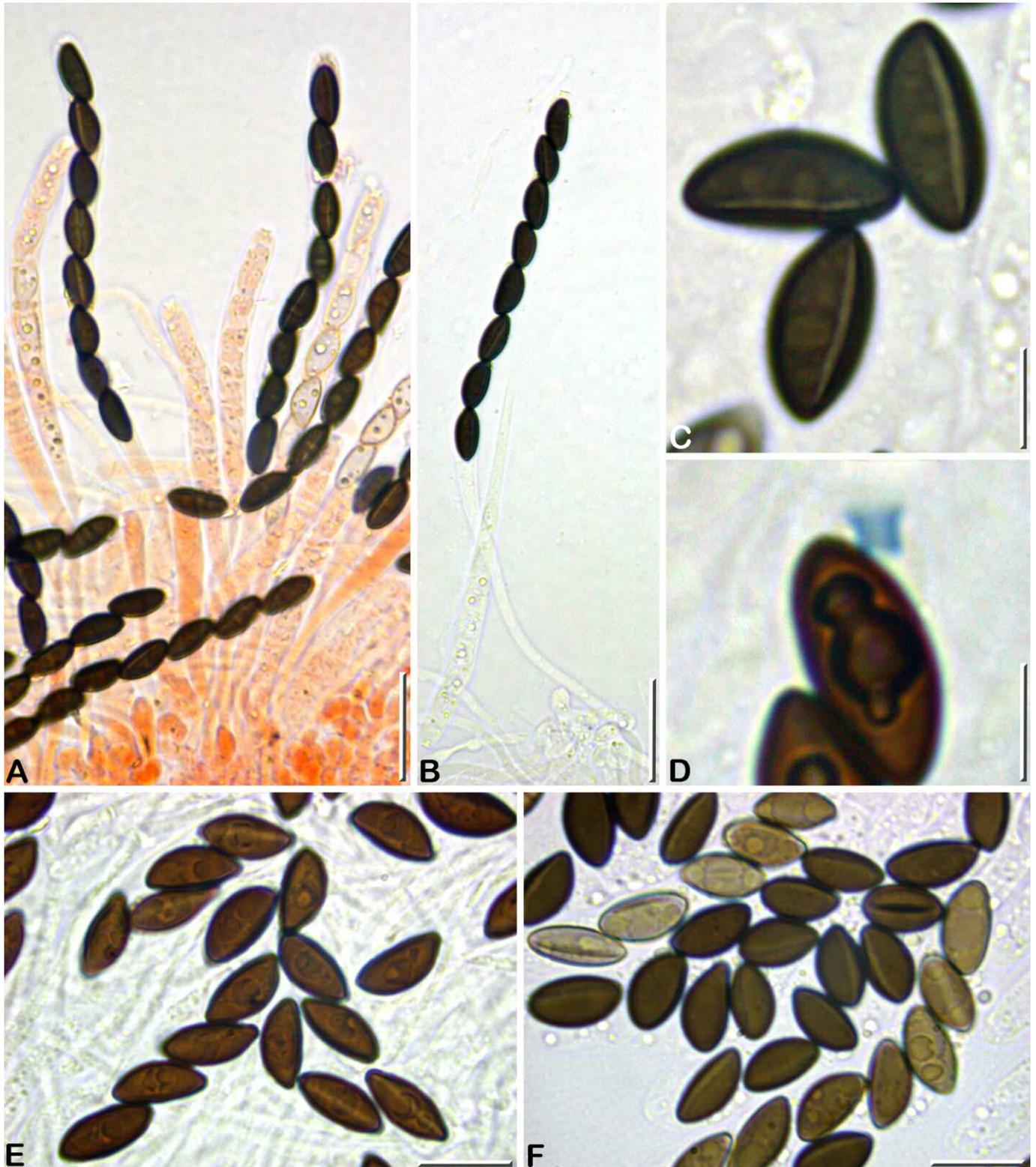


Plate 23 – *Nemania roseolilacina*

A-E: MJF 07043 (Holotype); F: MJF 16067 (paratype). A: Immature and mature asci, in Congo red with 3% KOH; B: Long-stipitate ascus, in 3% KOH; C: Ascospores in ventral view showing a germ slit, in 3% KOH; D: Ascus apical apparatus in Melzer's reagent; E, F: Ascospores of two different collections in 1% SDS, some showing a germ slit. Scale bars: A, B = 20 μ m; C, D = 5 μ m; E, F = 10 μ m.

motely septate, 6–7 µm wide at base, tapering above asci, embedded in mucilaginous material. **Ascospores** (12.7–)13–15.5(–17.2) × (5.9–)6.4–7.9(–8.4) µm, Q = (1.7–)1.8–2.3(–2.6), N = 300 (Me = 14.5 × 7.2 µm, Qe = 2), ellipsoid slightly inequilateral with narrowly rounded to acute ends, unicellular, olivaceous brown at fresh state, medium to dark brown after desiccation, with a conspicuous straight germ slit almost spore-length on the least convex side; epispore smooth, without slimy sheath but occasionally bearing some fugacious mucilaginous remnants just after ejection from the ascus, visible in India ink.

Supposed **asexual morph** on the natural substrate frequently present on or around immature stromata, appearing as loosely clustered synnemata 0.3–0.4 mm high with a short dark brown stipe and a fluffy pale brown head bearing conidiophores of the geniculosporium-like asexual morph. Conidiophores 70–90 µm long × 1.8–2.2 µm wide, remotely branching. Conidiogenous cells yellowish to subhyaline, geniculate, densely roughened by scars. Conidia subglobose, 2.7–3.2 µm diam, subhyaline, smooth.

Paratypes: MARTINIQUE: Case-Pilote, Fond Boucher, mesophilic rainforest, on rotten bamboo culm, 31 Jul. 2016, *leg.* P.-A. Moreau, MJF 16061 (LIP) (immature); Le Prêcheur, Anse Couleuvre, coastal mesophilic rainforest, on heavily rotten wood, 3 Sept. 2003, *leg.* C. Lechat, CLL 0763 (LIP) (HAST 142506); *ibid.*, on heavily rotten bamboo culm, 27 Aug. 2007, *leg.* J. Fournier, MJF 07144 (LIP) (depauperate); *ibid.*, MJF 07145; *ibid.*, on heavily rotten bamboo culm, 21 Aug. 2010, *leg.* J. Fournier, MJF 10008 (LIP); *ibid.*, on heavily rotten bamboo culm, 23 Aug. 2010, *leg.* J. Fournier, MJF 10060 (LIP) (immature); *ibid.*, on heavily rotten bamboo culm, 23 Aug. 2013, *leg.* J. Fournier, MJF 13380 (LIP) (HAST 142505); *ibid.*, on heavily rotten bamboo culm, 4 Aug. 2016, *leg.* J. Fournier, MJF 16120 (LIP); Les Anses-d'Arlet, Anse Noire, coastal mesophilic forest, on heavily rotten bamboo culm, 22 Aug. 2007, *leg.* C. Lechat, MJF 07021 (LIP); Sainte-Marie, La Philippe, coastal mesophilic rainforest, on heavily rotten wood, 31 Aug. 2010, *leg.* J. Fournier, MJF 10269 (LIP); *ibid.*, on bleached dead wood, 2 Aug. 2016, *leg.* J. Fournier, MJF 16076 (LIP) (immature).

Known distribution: Martinique.

Comments: This distinctive *Nemania* is characterized by typically perithecioid, broadly conical, weakly carbonaceous stromata over 1 mm diam coated with a conspicuous, persistent white hyphal tissue spreading over host surface and occurrence mostly on rotten bamboo; its slightly inequilateral ascospores with acute ends and a long straight germ slit on the least convex side, averaging 14.5 × 7.2 µm further distinguish it from other known species of *Nemania*. Based on twelve collections consistently showing this unusual combination of characters, the new species *N. sericata* is proposed to accommodate them.

While most of the material was collected on rotten bamboo, three collections with similar overall morphology were made on rotten wood. Based on the absence of significant morphological differences including ascospore dimensions (Table 7) and shape (Plate 25), they are included in our concept of *N. sericata*. Bambusicolous

ascomyces are usually considered to occur exclusively on woody *Poaceae*, not on dicot wood, and references to ascomycota shifting from monocot to dicot hosts could not be found in literature, even in the most recent survey (DAI *et al.*, 2017). In our experience, dicot wood-inhabiting *Xylariaceae* like *Hypoxylon haematostroma* Mont. (FOURNIER *et al.*, 2015) or *Rosellinia aquila* (Fr.) De Not. (PETRINI, 2013) may occasionally occur on bamboo but not conversely and *N. sericata* appears as the first bambusicolous *Xylariaceae* reported also on dicot wood.

Nemania taxa known to occur on bamboo are *N. minutula* (Penz. & Sacc.) Y.-M. Ju & J.D. Rogers and *N. nummularioides* (Rehm) Y.-M. Ju & J.D. Rogers (JU & ROGERS, 1994, as *Hypoxylon*; JU & ROGERS, 2002). Both species are only known from Asia and differ markedly from *N. sericata* by effused-pulvinate multiperitheciolate stromata lacking a white hyphal coating, with minute perithecia 0.1–0.2 mm diam and smaller ascospores 10.5–13 × 4–5 µm for the former and perithecia 0.3 mm diam and larger ascospores 19.5–25.5 × 9–10.5 µm for the latter.

Kretzschmariella culmorum is a fairly frequent *Nemania*-like fungus with a neotropical distribution which primarily differs from *N. sericata* in having effused-pulvinate multiperitheciolate stromata with grey to black surface with unexposed perithecial contours and small perithecia 0.2–0.3 mm diam, and ascospores bearing a fugacious appendage (JU & ROGERS, 1994; this paper). Moreover, the asexual morph of *K. culmorum* is different from the typical geniculosporium-like asexual morph of the subfamily *Xylarioideae* in producing large cylindrical multiseptate conidia and was assigned to the hyphomycetous genus *Mirandina* G. Arnaud ex Matsush. (JU & ROGERS, 1994).

The frequently perithecioid stromata of *N. sericata* occurring on rotten substrate and their silky white hyphal coating extending over the substrate are reminiscent of *Rosellinia* taxa assigned to the *R. mammoidea* group (PETRINI & PETRINI, 2005; PETRINI, 2013; FOURNIER *et al.*, 2017b). *Nemania sericata* can be distinguished from all *Rosellinia* taxa of this group by its broadly conical stromata but a molecular re-evaluation of *Nemania* and *Rosellinia* including *N. sericata* and representatives of the *R. mammoidea* group is needed to test the assumption of phylogenetic affinities between these fungi.

Nemania subaenea Y.-M. Ju & J.D. Rogers, *Nova Hedwigia*, 74 (1–2): 109 (2002). Plates 26–27. Table 8.

Stromata irregularly effused-pulvinate, 4–38 mm long × 2.5–10 mm wide × 0.5–1.5 mm thick, with barely exposed perithecial contours, furrowed by irregular wrinkles, bumpy in places, with sloping to abrupt margins; surface grey to dark grey with a slightly shiny metallic tone; subsurface a thin carbonaceous crust, 40–50 µm thick, not extending downwards around the perithecia; interperithecial tissue cream-coloured to off-white, soft, pithy, frequently blackened around the perithecia; subperithecial tissue inconspicuous to 0.8 mm thick, soft, whitish. **Perithecia** subglobose to depressed-spherical, 0.4–0.65 mm diam. **Ostioles** finely papillate, black, contrasting against the grey background.

Table 7 – Ascospore dimensions in five collections of *N. sericata* showing the narrow range of intraspecific variations, regardless of occurrence on bamboo (B) or on wood (W)

Collections numbers	Ascospore measurements with extreme values in parentheses	Q = quotient l/w N = number of measurements	Mean values
CLL 0763 (W)	(13–)13.3–15.4(–17.2) × (5.9–)6.5–7.6(–8.6) µm	Q = (1.7–)1.8–2.3(–2.6) N = 60	Me = 14.3 × 7.1 µm Qe = 2
MJF 07145 (B)	(13.6–)13.9–15.4(–15.8) × (6.3–)6.7–7.9(–8.4) µm	Q = (1.7–)1.8–2.2(–2.4) N = 60	Me = 14.7 × 7.3 µm Qe = 2
MJF 07243 holotype (B)	(12.9–)14–15.5(–16.7) × (6.4–)7.1–7.9(–8.3) µm	Q = (1.8–)1.84–2.1(–2.3) N = 60	Me = 14.8 × 7.5 µm Qe = 2
MJF 10269 (W)	(12.7–)13–15.5(–16.6) × (6.1–)6.4–7.3(–7.7) µm	Q = (1.8–)1.9–2.3(–2.6) N = 60	Me = 14.3 × 6.8 µm Qe = 2.1
MJF 13380 (B)	(12.8–)13.4–15.3(–16.2) × (6.1–)6.6–7.6(–7.9) µm	Q = (1.8–)1.9–2.2(–2.4) = 60	Me = 14.4 × 7 µm Qe = 2.1
Cumulated values	(12.7–)13–15.5(–17.2) × (5.9–)6.4–7.9(–8.4) µm	Q = (1.7–)1.8–2.3(–2.6) N = 300	Me = 14.5 × 7.2 µm Qe = 2

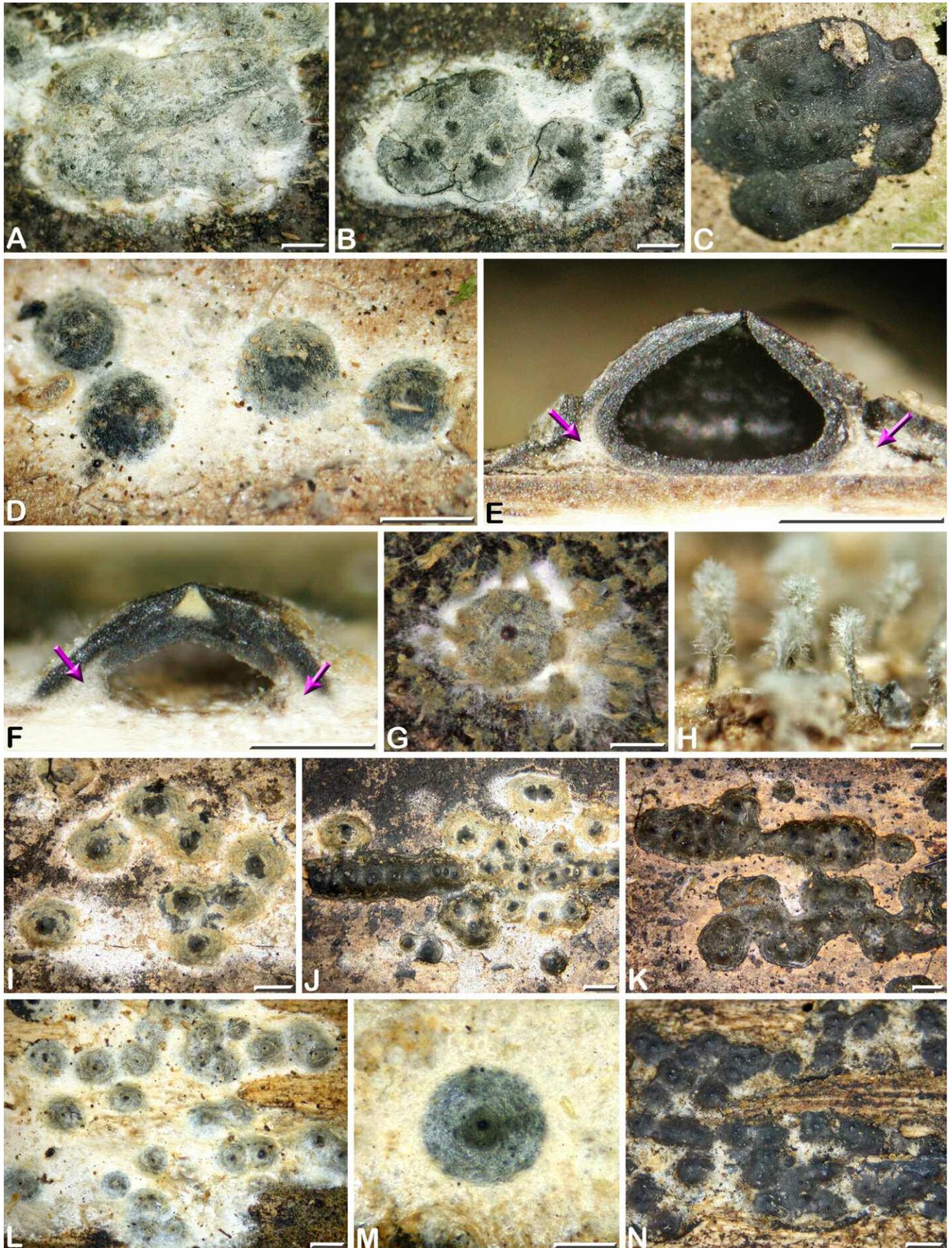


Plate 24 – *Nemania sericata*

A-F, H: MJF 07243 (Holotype); G: MJF 16120; I-K: MJF 13380; L-N: CLL 0763. A, L: Immature stromata in surface view; B, D, I, J, N: Perithecioid to coalescent mature stromata showing variations in density of white hyphal coating; C, K: Overmature stromata; E, F: Mature (E) and immature (F) stromata in vertical section showing a thin carbonaceous crust and whitish woolly tissue surrounding the perithecial base (arrows); G: Immature perithecioid stroma associated with tan synnematous conidiophores of the asexual morph; H: Synnematous conidiophores of the asexual morph in close-up; M: Immature perithecioid stroma in close-up showing a whitish silky coating and a porate ostiole. Scale bars: A-D, I-L, N = 1 mm; E-G, M = 0.5 mm; H = 100 μ m.

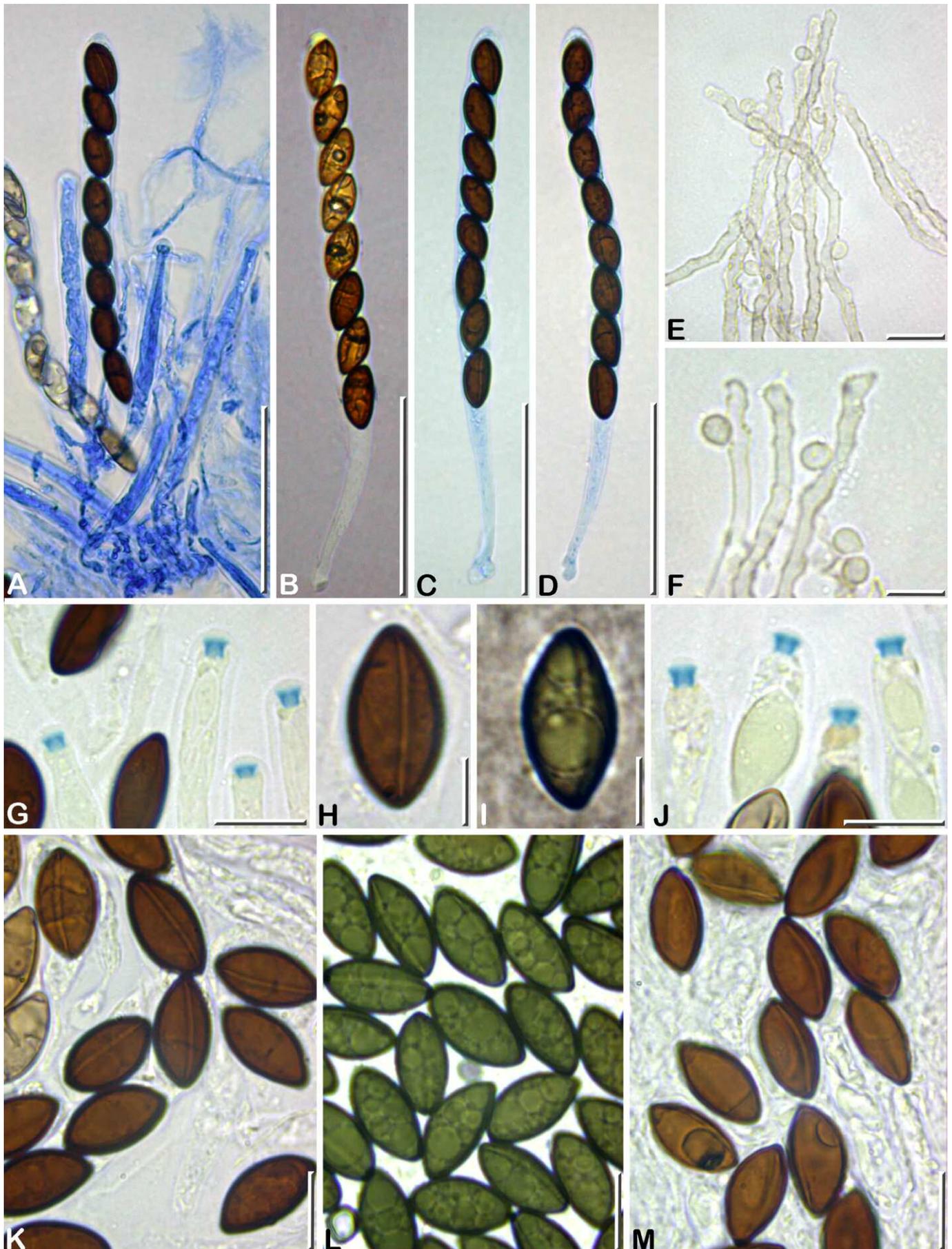


Plate 25 – *Nemania sericata*

A-I, K: MJF 07243 (Holotype); J, M: CLL 0763; L: MJF 13380. A: Immature and mature asci with paraphyses, in blue Pelikan® ink diluted in 1% SDS; B-D: Mature asci in black Pelikan® (B) and in blue Pelikan® ink diluted in 1% SDS (C, D); E, F: Conidiophores and conidia of the geniculosporium-like asexual morph, in 3% KOH; G, J: Ascus apical apparatus, in Melzer's reagent; H: Ascospore in ventral view showing a germ slit, in 1% SDS; I: Freshly ejected ascospore showing scattered remnants of mucilaginous material, in India ink; K, M: Ascospores from dry material, in 1% SDS; L: Ascospores from fresh material, in 1% SDS. Scale bars: A-D = 50 µm; E, G, J, K-M = 10 µm; F, H, I = 5 µm.

Table 8 – Ascospore dimensions in two Caribbean collections of *N. subaenea* compared with those of the holotype of *N. subaenea* and that of *N. plumbea*

Collections numbers	Ascospore measurements with extreme values in parentheses	Q = quotient l/w N = number of measurements	Mean values
<i>N. subaenea</i> MJF 14110	(13–)14–15.6(–16.3) × (5–)5.5–6.5 (–6.9) µm	Q = (2.1–)2.3–2.8(–2.9) N = 60	Me = 14.7 × 5.9 µm Qe = 2.5
<i>N. subaenea</i> MJF 15111	(13.8–)15.6–18.1(–18.8) × (5.4–)5.7–6.8(–7.2) µm	Q = (2.2–)2.5–2.9(–3) N = 60	Me = 16.8 × 6.2 µm Qe = 2.7
Cumulated values	(13–)14–18.1(–18.8) × (5–)5.5–6.8(–7.2) µm	Q = (2.1–)2.3–2.9(–3) N = 120	Me = 15.8 × 6.1 µm Qe = 2.6
<i>N. subaenea</i> (Ju & ROGERS, 2002)	14–17.5 × 6–7.5 µm		Me = 15.7 × 6.7 µm Qe = 2.33
<i>N. plumbea</i> holotype (TANG <i>et al.</i> , 2007)	13–16 × 5.4–6.6 µm	N = 30	Me = 14.3 × 6.1 µm Qe = 2.34

Asci cylindrical, with (6–)8 slightly overlapping uniseriately arranged ascospores, the spore-bearing parts 98–110 × 6.5–8 µm, the stipes 22–63 µm long, with apical apparatus 3.4–4.5 × 2.4–3 µm (Me = 3.9 × 2.7 µm, N = 50), tubular to slightly urn-shaped with a faint apical rim, bluing in Melzer's reagent. **Paraphyses** copious, thin-walled, remotely septate, 4–6(–8) µm wide at base, tapering above asci. Ascospores (13–)14–18.1(–18.8) × (5–)5.5–6.8(–7.2) µm, Q = (2.1–)2.3–2.9(–3), N = 120 (Me = 15.8 × 6.1 µm, Qe = 2.6), ellipsoid-inequilateral to subballantoid, with broadly to narrowly rounded ends, unicellular, pale olivaceous brown at fresh state, turning yellowish brown to medium brown after desiccation, with a short, inconspicuous, straight, central or shifted to the ends germ slit 3.5–5.5 µm long predominantly on the dorsal side, less frequently on the ventral side, barely visible in water mounts, best seen after incubation in PVA-lactophenol; multiple germ slits occasionally present; epispore smooth.

Asexual morph on the natural substrate not seen.

Specimens examined: FRENCH WEST INDIES: MARTINIQUE: Le Prêcheur, Anse Couleuvre, coastal mesophilic rainforest, banks of the River Couleuvre, on heavily rotten wood, 9 Jun. 2014, *leg.* J. Fournier & C. Lechat, MJF 14110 (LIP) (HAST 142507); *ibid.*, on a dead decorticated branchlet, 16 Jun. 2015, *leg.* J. Fournier, MJF 15111 (LIP).

Known distribution: Guyana (Ju & ROGERS, 2002), Martinique (this paper) and Thailand (TANG *et al.*, 2007).

Comments: *Nemania subaenea*, previously known only from the type collection in Guyana, is characterized by blackish effused-pulvinate stromata with copper brown tone, with finely papillate ostioles and with carbonaceous tissue restricted to a thin layer above the perithecia rarely enclosing them and conspicuous whitish, soft internal tissue, combined with pale brown ascospores 14–17.5 × 6–7.5 µm with a short germ slit on the convex side (Ju & ROGERS, 2002). As the two collections from Martinique show a fairly high variability as to the ascospore dimensions, largely overlapping with those of *N. subaenea*, and as other slightly deviating characters may just reflect intraspecific variations within a taxon known from only few records, we feel justified in equating them with *N. subaenea*.

Nemania plumbea A.M.C. Tang, R. Jeewon & K.D. Hyde, known from Thailand, was segregated from *N. subaenea* based on slight differences in stromatal superficial colour and slightly smaller ascospores (TANG *et al.*, 2007). The wide range of ascospore morphological variations exhibited by the two collections from Martinique shows that this character only cannot warrant the separate status of *N. plumbea* which is therefore a synonym of *N. subaenea* (Ju, pers. comm., 2017).

An unnamed collection of *Nemania* was described from Taiwan by Ju & ROGERS (1999), as Ju Y.-M. 800822010, likewise featuring the rarely encountered combination of large light brown ascospores with a short germ slit on the convex side. However, the stromata of the Taiwanese *Nemania* differ from those of *N. subaenea* in being

superficially black, with brown fibrose tissue and carbonaceous material encasing the perithecia, along with longer ascospores 17–22 × 6–7 µm and therefore should represent a different taxon (Ju & ROGERS, 2002).

The north temperate taxon *N. aenea* (Nitschke) Pouzar var. *macrospora* (J.H. Miller) Y.-M. Ju & J.D. Rogers is morphologically similar to *N. subaenea* (MILLER, 1961; PETRINI & ROGERS, 1986; POUZAR, 1985b; FOURNIER & MAGNI, 2002). The position of the ascospore germ slit on the ventral side in *N. aenea* var. *macrospora* is the main difference distinguishing it from its tropical look-alikes.

Nemania saladerana G.J.D. Smith & K.D. Hyde, known from Ecuador on palm (SMITH & HYDE, 2001), should likewise be considered for comparison since it features grey brown pulvinate stromata and light brown ascospores 16–21 × 6–7.5 µm with a short germ slit. The presence of white internal tissue is not documented in the original description, thus it is assumed it is absent, and ascospores have a germ slit on the flattened side and bipolar appendages, the latter feature is most unusual in *Nemania* and is a further way to distinguish *N. saladerana* from *N. subaenea*.

The above review of *Nemania* taxa with large light brown ascospores with a short germ slit and our observations on the two collections of *N. subaenea* from Martinique show that most taxa are known from one or a few collections, making the boundaries of their intraspecific variations ill-defined. More extensive sampling is obviously needed to improve the taxonomic delimitation within this group.

Nemania sublutea (Ellis & Everh.) J. Fourn. & Lechat, *comb. nov.* – MycoBank MB 823717. Plates 28–30. Table 9.

Basionym: *Hypoxylon subluteum* Ellis & Everh., *North American Pyrenomycetes*: 648 (1892) [MB#215396].

Original description: Stroma effused, mostly elongated to 5 or more centimeters in length and 2 or more cm. wide, about 1 mm thick, surface cinereous roughened by the projecting, obtusely conical, darker colored ostiola, black inside except the layer next the wood, which is pale yellow with a greenish tint. Perithecia monostichous, ovate, about ½ mm wide and a little more than that in height, their vertices slightly raising the surface of the stroma in a pustuliform manner. Asci cylindrical, 75–80 × 6 µ (p. sp.), with a slender base about 40 µ long. Sporidia uniseriate, navicular, 2-nucleate, becoming opaque, 10–12 × 4–5 µ.

On decaying soft wood, 24 VIII 1890, near St. Martinsville, La. (A.B. Langlois, *Flora Ludoviciana*, 2276).

Stromata effused-pulvinate, superficial, irregular in outline, often confluent into larger compound stromata up to 5 cm long × 2.8 cm wide × 0.7–1.7 mm thick, with unexposed perithecial contours but wrinkled by shallow depressions around groups of perithecia, with abrupt to sloping margins; developing stromata lined by widely effused yellow to olivaceous yellow pruinose sterile tissue composed

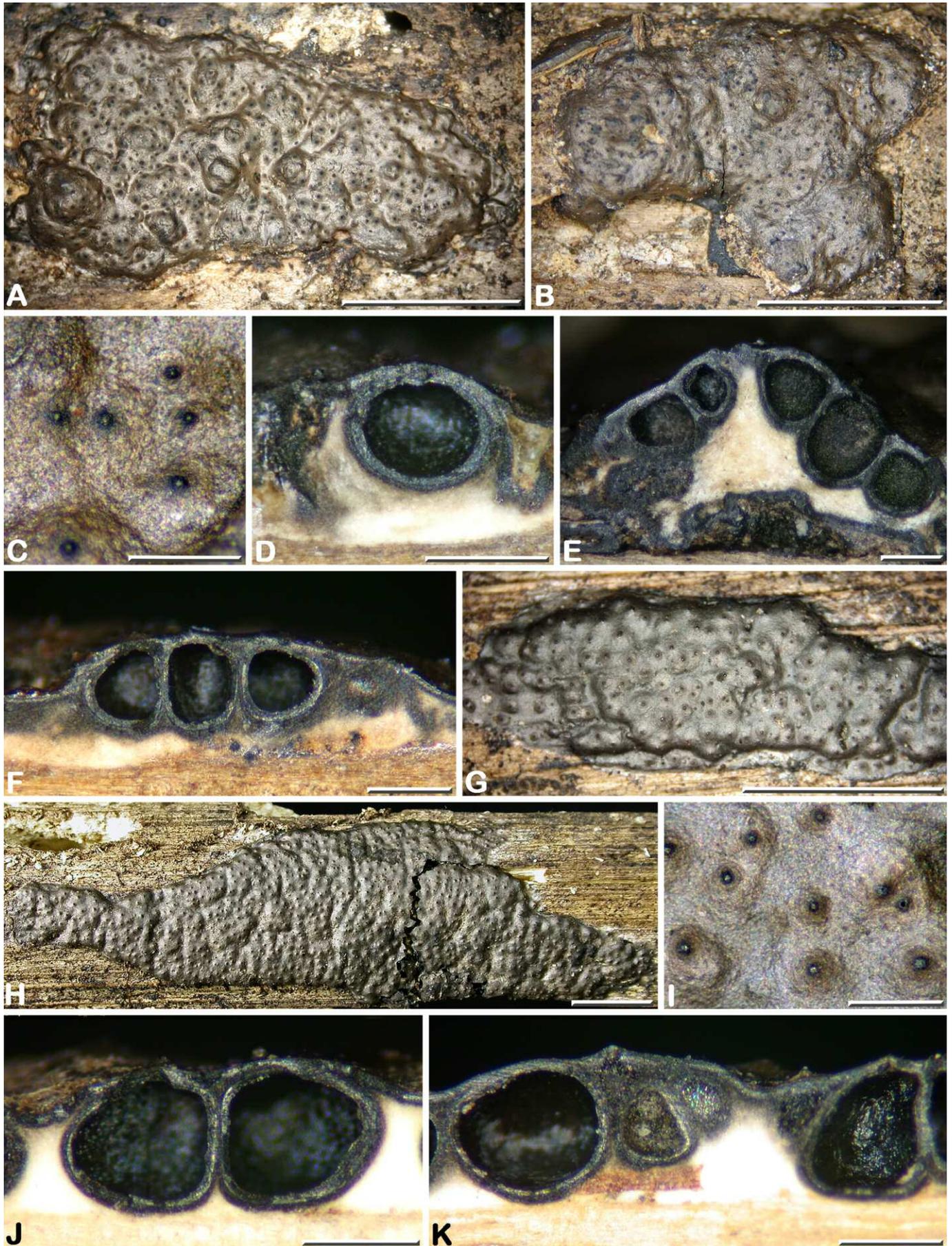


Plate 26 – *Nemanja subaenea*

A-F: MJF 14110; G-K: MJF 15111. A, B, G, H: Various shaped effused-pulvinate stromata on host surface; C, I: Close-up on stromatal surface showing black papillate ostioles; D, F, J, K: Stromata in vertical section showing a thin black carbonaceous crust above the perithecia and white to blackish soft tissue surrounding them. Scale bars: A, B, G, H = 5 mm; C-F, I-K = 0.5 mm.

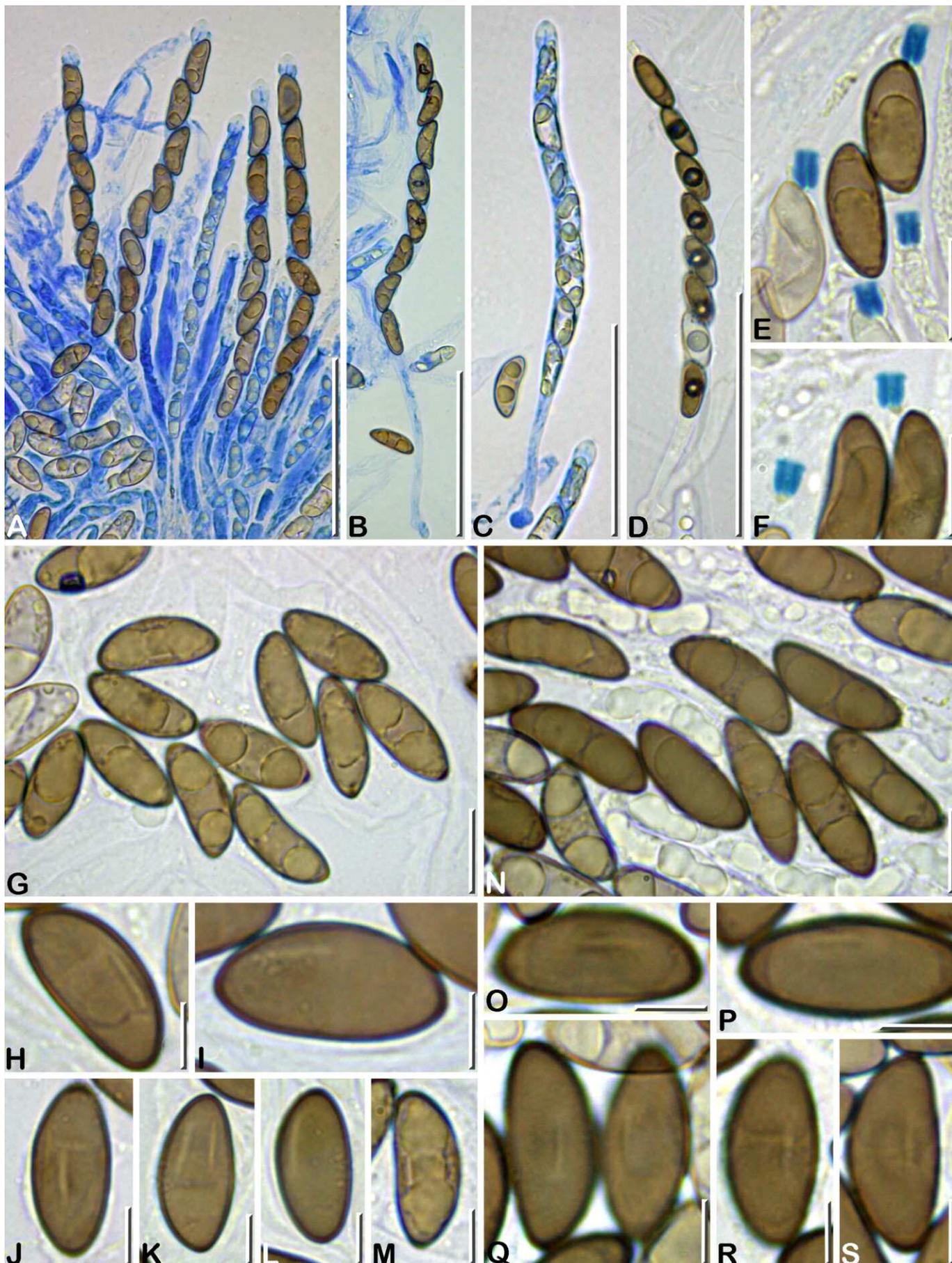


Plate 27 – *Nemanja subaenea*

A-E, G-M: MJF 14110; F, N-S: MJF 15111. A-C: Immature and mature asci and paraphyses, in blue Pelikan®ink diluted in 1% SDS; D: Shortly stipitate ascus, in 3% KOH; E, F: Ascus apical apparatus in Melzer's reagent; G, N: Ascospores in 1% SDS; H-L, O-Q: Ascospores in dorsal view showing variously placed germ slits, in PVA-lactophenol; M, R, S: Ascospores in ventral view showing germ slits, in PVA-lactophenol. Scale bars: A-D = 50 µm; E-G, N = 10 µm; H-M, O-S = 5 µm.

of hyaline contorted hyphae 2–2.7 µm wide, incrustated with yellow granules not dissolving in 3% KOH; surface of immature stromata grey to blackish grey, partly covered with remnants of olivaceous yellow pruinose tissue, becoming dark grey to dull black at maturity but usually retaining a yellowish tone; black carbonaceous tissue forming a thick superficial crust 80–120 µm thick immediately beneath surface, extending downwards between perithecia, delimiting them by a thin black wall ca. 40 µm thick; soft, loosely fibrous whitish tissue occasionally present in places between clusters of perithecia in immature stromata; soft, golden yellow to olivaceous yellow tissue surrounding the base of perithecia, forming a continuous or discontinuous layer, either mixed with greyish brown soft subperithecial tissue or delimited from the underlying wood by a thin, black carbonaceous layer. **Perithecia** subglobose to tubular, often laterally compressed, 0.5–0.85 × 0.35–0.75 mm. **Ostioles** black, bluntly papillate, 60–85 µm diam at base, minutely porate.

Asci cylindrical, with (4–6)–8 obliquely uniseriately arranged ascospores, the spore-bearing parts (51–)80–98 × 6–7 µm, with stipes 80–115 µm long, with apical apparatus slightly tubular with a faint upper rim, 2.2–2.9 × 1.9–2.3 µm (Me = 2.6 × 2.1 µm, N = 40), bluing in Melzer's reagent. **Paraphyses** copious, thin-walled, remotely septate, 3.5–5 µm wide at base, filiform above asci. **Ascospores** (9.6–)10.3–13.5(–14.3) × (4.4–)4.9–6.5(–7) µm, Q = (1.7–)1.9–2.4(–2.5), N = 300 (Me = 11.9 × 5.8 µm, Qe = 2.1), ellipsoid-inequilateral with narrowly to more rarely broadly rounded ends, unicellular, brown to dark brown, with a conspicuous, straight, almost spore-length germ slit on the flattened side; epispore smooth.

Supposed **asexual morph** on the natural substrate geniculosporium-like, felty, pale grey, developing on a basal yellow tissue. Conidiophores 2.5–3.5 µm wide, subhyaline, smooth, densely ramified and imbricated, conidiogenous cells slightly geniculate, 1.8–2.7 µm wide, subhyaline, smooth; conidia broadly ellipsoid with a truncate base, 4.5–5.5 × 3.2–3.5 µm, subhyaline, roughened.

Known distribution: Martinique, USA (Louisiana) and U.S. Virgin Islands (St. John).

Specimens examined: FRENCH WEST INDIES: MARTINIQUE: Case-Pilote, Fond Boucher, mesophilic rainforest, on a dead corticated branch, 31 Jul. 2016, *leg.* J. Fournier, MJF 16057 (LIP); Le Saint-Esprit, Bois La Charles, mesophilic rainforest, on a dead corticated liana, 20 Aug. 2013, *leg.* J. Fournier, MJF 13331 (LIP); Sainte-Marie, La Philippe, coastal mesophilic rainforest, on corticated wood, 27 Aug. 2008, *leg.* C. Lechat, CLL 8341 (LIP) (HAST 142508); *ibid.*, on a dead corticated branch, 31 Aug. 2010, *leg.* J. Fournier, MJF 10302 (LIP); Schoelcher, Fond Lahaye, banks of Fond Lahaye River, mesophilic rainforest, on a dead corticated branch, 12 Aug. 2013, *leg.* J. Fournier, MJF 13142 (LIP); *ibid.*, MJF 13156 (LIP). USA, Louisiana, near St. Martinsville, on rotten wood, Langlois 2276, in Ellis herbarium (NY), holotype of *Hypoxylon subluteum*;

U.S. VIRGIN ISLANDS, Saint John, Cinnamon Bay ruins, near Danish community, on a dead fallen corticated branch, 1 Jun. 1994, *leg.* A. Ledger, St. J 101 (NY) [as "*Hypoxylon*" (*Nemania*) *cf. subluteum* Ellis & Everh.].

Comments: In their monographic revision of *Nemania*, Ju & ROGERS (2002) only mentioned *N. chrysoconia* as featuring stromata with a golden yellow colour due to a fugacious hyphal coating and *Hypoxylon subluteum* was considered as a synonym of *N. diffusa*. Two *Nemania* species characterized by yellow colours were subsequently described from Taiwan by Ju & ROGERS (2005), viz. *N. flavitextura* Y.-M. Ju, H.-M. Hsieh & J.D. Rogers and *N. primolutea*. Both feature a stromatal surface initially yellow, gradually turning grey to black with age but differ by the presence of soft yellow tissue between perithecia in the former, the latter being internally black and carbonaceous. They further differ by the former having conspicuously exposed perithecial contours and pale brown to brown ascospores 9.5–11.5 × 3–4 µm while the latter has unexposed perithecial contours and dark brown and wider ascospores 10–13 × 4.5–5.5 µm. Like in *N. flavitextura*, the stromata of *N. chrysoconia* have strongly exposed perithecial contours but they lack the yellow internal tissue encountered in *N. flavitextura* and also differ by equilateral ascospores with broadly rounded ends, 8–11 × 4.5–5.5 µm.

The material collected in Martinique and described above appeared obviously related to the two new taxa described from Taiwan by its striking yellow colours around and on developing stromata but could not be equated with either of them. It shares with *N. flavitextura* the presence of soft yellow internal tissue between perithecia encased in a thin carbonaceous layer, but differs in having this yellow tissue limited to the basal part of the stroma and in having unexposed perithecial contours and darker brown and larger ascospores 10.3–13.5 × 4.9–6.5 µm. Its affinities with *N. diffusa* and *N. primolutea* appear more obvious since they share unexposed perithecial contours and a similar ascospore morphology characterized by dark brown, strongly inequilateral ascospores in the size range of 9.5–13.5 × 5–6 µm with a conspicuous germ slit spore-length (Ju & ROGERS, 2002; 2005). However, *N. diffusa* lacks both the striking yellow colour associated with immature and developing stromata, remaining on mature stromata giving them a yellowish tone and the layer of yellow tissue spreading around and beneath the base of perithecia. *Nemania primolutea* likewise lacks this basal yellow tissue, being entirely black and carbonaceous inside.

Upon the suggestion of Dr. Ju (pers. comm.) to consider *H. subluteum* for the collection CLL 8341 and after examination of the holotype of *H. subluteum* housed in NY (Plate 30, Table 9), we came to the conclusion that the four collections from Martinique resembling *N. diffusa* but differing by the presence of greenish yellow subperithecial tissue were indeed conspecific with *H. subluteum*. The placement of *H. subluteum* in *Nemania* was suggested by Ju & ROGERS

Table 9 – Ascospore dimensions in four collections of *N. sublutea* from Martinique and one collection from the U.S. Virgin Islands, showing the range of intraspecific variations, compared with those of the holotype of *H. subluteum* and a slightly deviating collection from Martinique (MJF 13156).

Collections numbers	Ascospore measurements with extreme values in parentheses	Q = quotient l/w N = number of measurements	Mean values
CLL 8341	(10.9–)11.5–13.5(–14.3) × (5.3–)5.6–6.5(–7) µm	Q = (1.8–)1.9–2.2(–2.5) N = 60	Me = 12.5 × 6.1 µm Qe = 2.1
MJF 10302	(9.6–)10.8–12.3(–12.8) × (4.5–)4.9–6(–6.2) µm	Q = (1.8–)2–2.4(–2.5) N = 60	Me = 11.5 × 5.3 µm Qe = 2.2
MJF 13331	(9.8–)10.8–12.9(–13.7) × (4.8–)5.1–6.3(–6.8) µm	Q = (1.7–)1.9–2.3(–2.4) N = 60	Me = 11.7 × 5.7 µm Qe = 2.1
MJF 16057	(10.2–)10.3–12.1(–13.4) × (4.4–)4.9–5.8(–6.1) µm	Q = (1.8–)1.9–2.3(–2.5) N = 60	Me = 11.3 × 5.4 µm Qe = 2.1
St. J 101 U.S. Virgin Islands	(10.5–)11.3–13.3(–14.2) × (5.2–)5.7–6.8(–7.2) µm	Q = (1.5–)1.7–2.3(–2.4) N = 60	Me = 12.5 × 6.2 µm Qe = 2
Cumulated values	(9.6–)10.3–13.5(–14.3) × (4.4–)4.9–6.5(–7) µm	Q = (1.7–)1.9–2.4(–2.5) N = 300	Me = 11.9 × 5.8 µm Qe = 2.1
<i>H. subluteum</i> holotype	(11.1–)12–14.3(–15.7) × (4.8–)5.5–6.4(–6.9) µm	Q = (1.8–)2.1–2.5(–2.7) N = 58	Me = 13.1 × 5.9 µm Qe = 2.2
MJF 13156 <i>N. cf. sublutea</i>	(9.7–)10.2–11.9(–12.5) × (4.7–)5.1–5.8(–6) µm	Q = (1.7–)1.8–2.2(–2.4) N = 60	Me = 10.9 × 5.4 µm Qe = 2

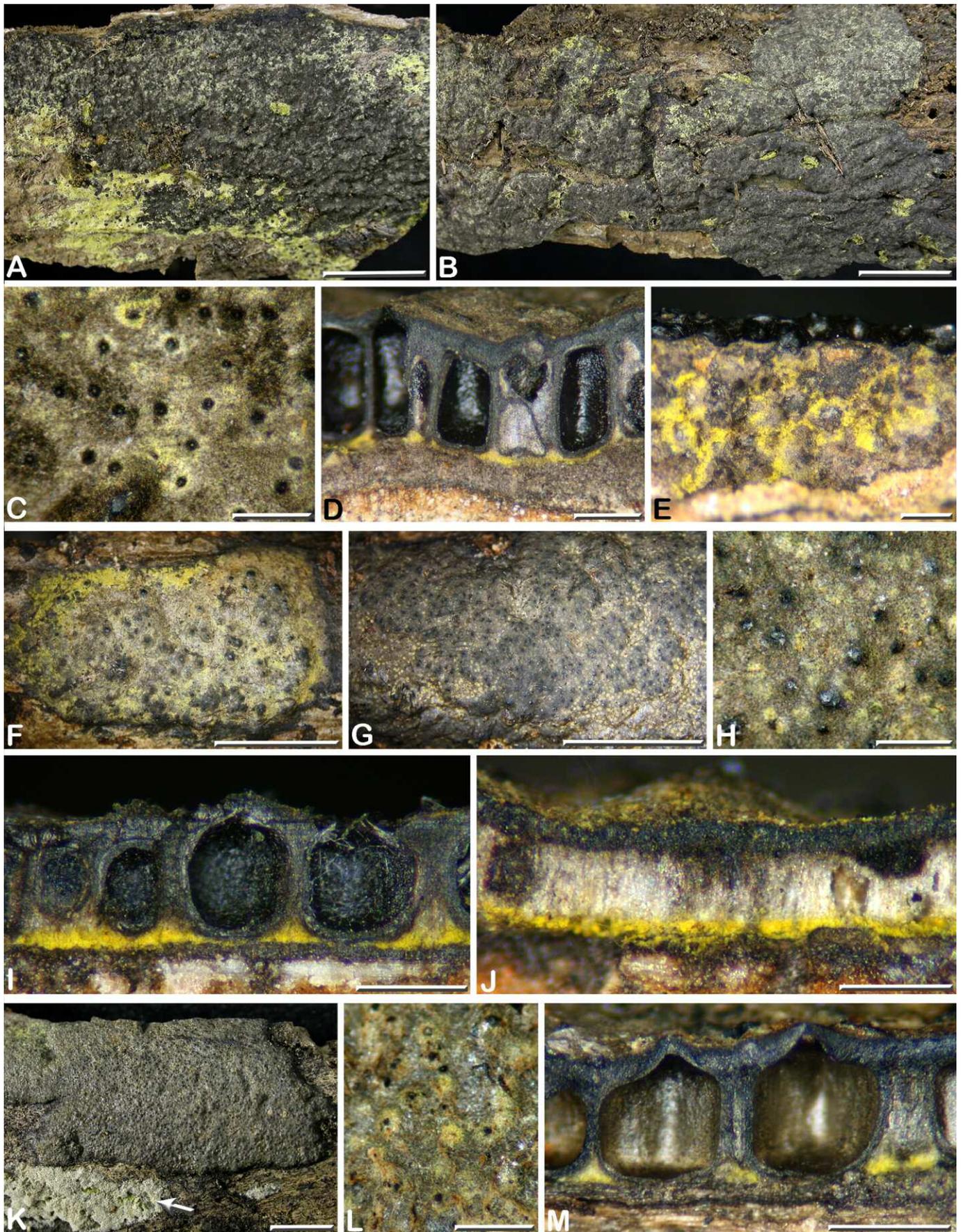


Plate 28 – *Nemanja sublutea*

A-E: CLL 8341; F-J: MJF 10302; K-M: MJF 16057. A, B, G: Habit of mature stromata in surface view; C, H, L: Stromatal surface in close-up showing papillate ostioles and remnants of olivaceous yellow coating; D, I: Mature stromata in vertical section showing a thin carbonaceous crust and yellow basal tissue; E: Reverse of a stroma detached from the substrate, showing the discontinuous yellow basal tissue mixed with greyish brown subperithecial tissue; F, K: Immature stromata in surface view, in K associated with the asexual morph (arrow); J, M: Immature stromata in vertical section showing a more or less developed yellow basal tissue and a whitish, loosely fibrous internal tissue in J. Scale bars: A, B = 10 mm; C-E, H-J, L, M = 0.5 mm; F, G, K = 5 mm.

(1996) but the formal combination was not made in the monograph because it was at this time regarded as a synonym of *N. diffusa* (JU & ROGERS, 2002). The taxonomic relevance of the presence and distribution of yellow stromatal tissue in *Nemania*, which led to the segregation of *N. primolutea* from *N. diffusa* (JU & ROGERS, 2005), supports the segregation of *H. sublutea* from *N. diffusa* and its combination with *Nemania*, as *N. sublutea*. It is noteworthy that the presence of yellow stromatal tissue beneath the perithecia was already reported by ELLIS & EVERHART (1892) in the protologue of *H. sublutea* as a diagnostic feature.

In addition to the four collections from Martinique, a collection from U.S. Virgin Islands housed in NY labelled "*Hypoxylon*" (*Nemania*) cf. *sublutea* was examined and found to match perfectly our own observations. As shown in Table 9, ascospores of the collections from Martinique and St. John slightly differ from those recorded from the type material in averaging smaller $11.9 \times 5.75 \mu\text{m}$ vs. $13.1 \times 5.9 \mu\text{m}$ but as they all largely overlap and as ascospore size appears to be fairly variable and not to be discriminant among species related to *N. diffusa* (see notes on *N. diffusa*, this paper) we find it justified to include all these collections under the name *N. sublutea*.

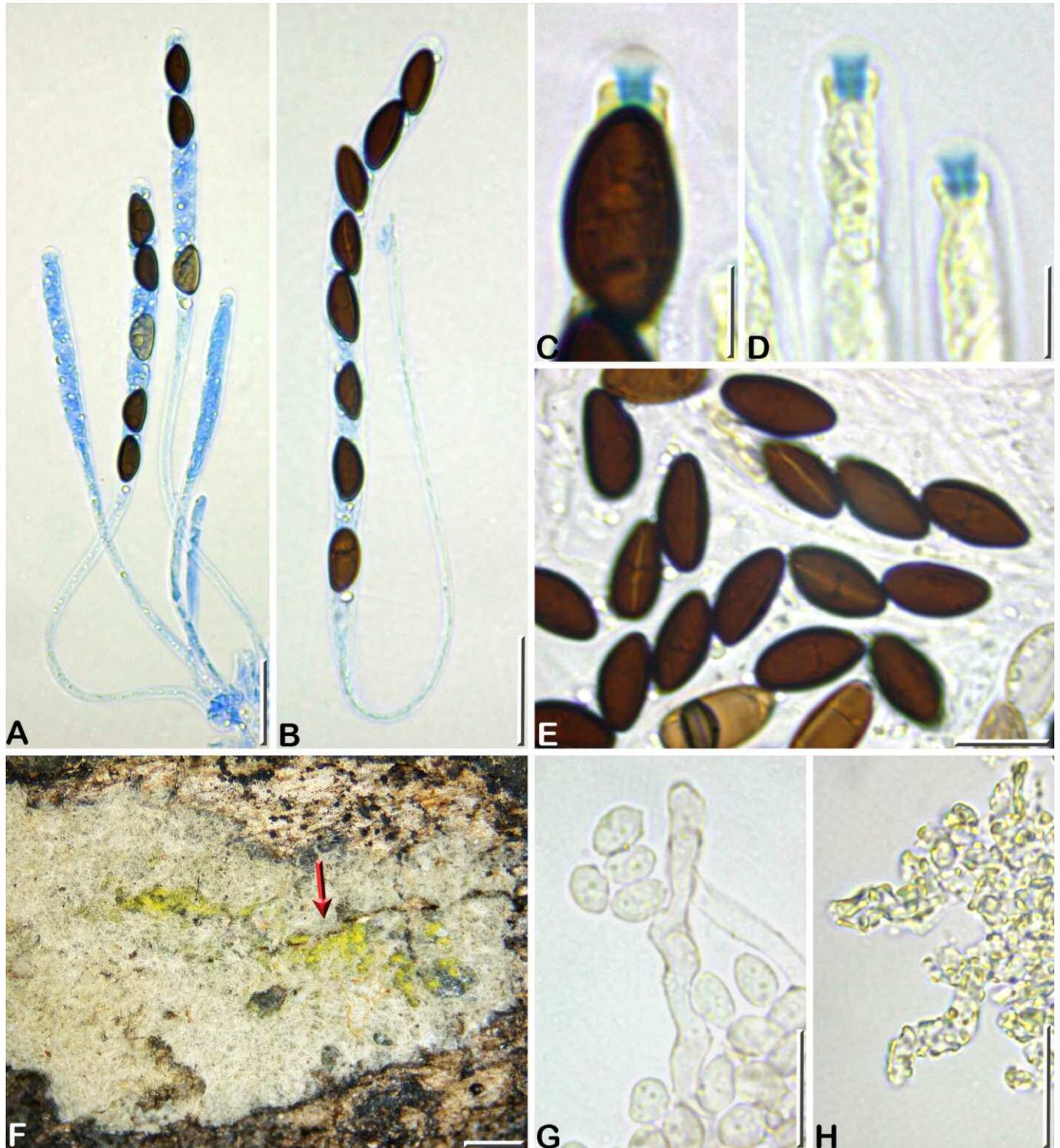


Plate 29 – *Nemania sublutea*

A-E, H: CLL 8341; F, G: MJF 16057. A, E: Immature, few-spored and eight-spored mature asci, in blue Pelikan® ink diluted in 1% SDS; C, D: Ascical apical apparatus, in Melzer's reagent; E: Ascospores in 1% SDS, some with a germ slit visible; F: Asexual morph on the natural substrate, with basal yellow tissue showing through (arrow); G: Conidiophores and conidia of the geniculosporium-like asexual morph, in 3% KOH; H: Contorted and incrusting hyphae of the yellow outermost coating, in 1% SDS. Scale bars: A, B = 20 μm ; C, D = 5 μm ; E, G, H = 10 μm ; F: 1 mm.

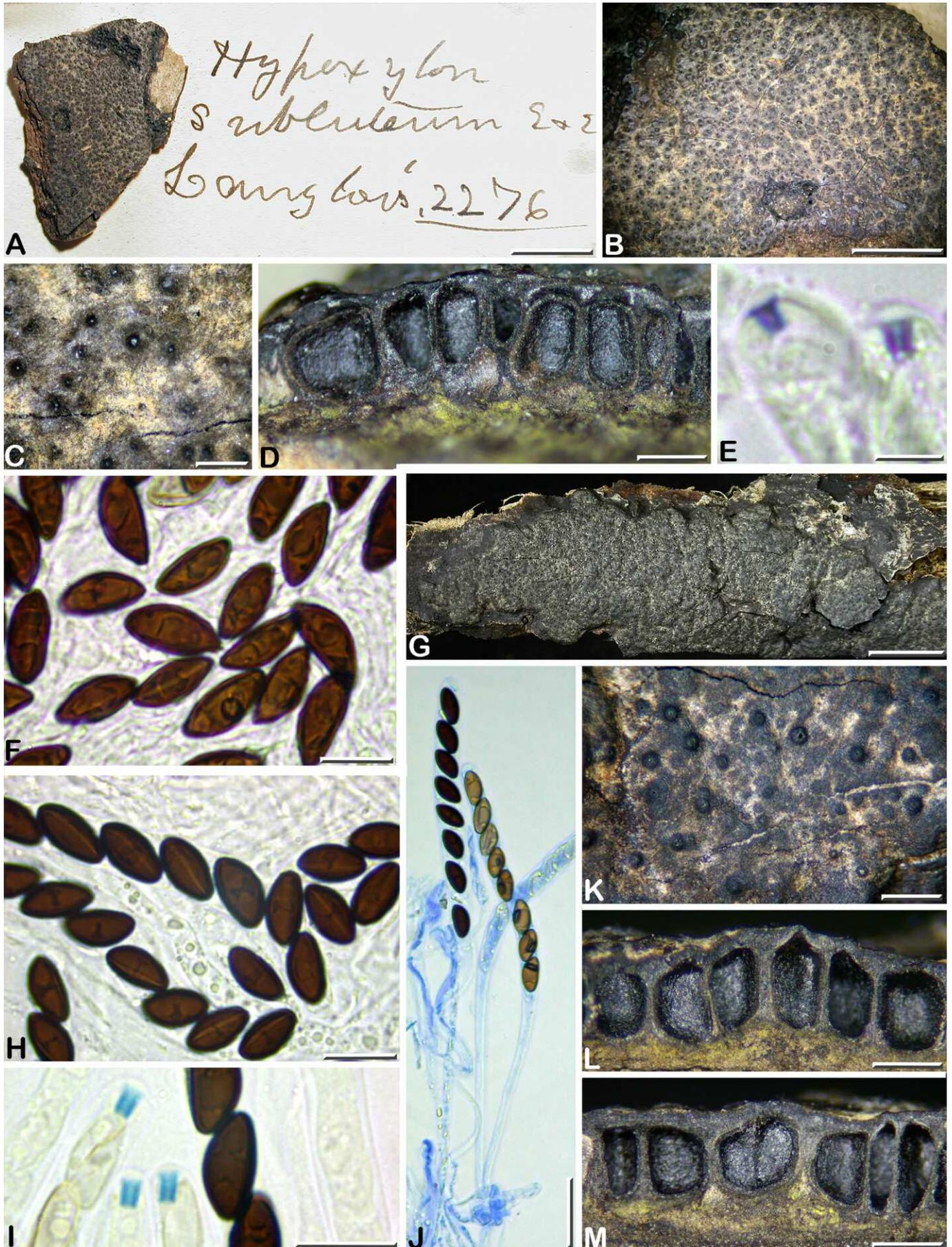


Plate 30 – *Nemaniam subulate* and *N. cf. subulate*

A-F: Langlois 2276 (Holotype of *Hypoxylon subulateum*); G-M: MJF 13156 (*N. cf. subulate*). A: Stroma on the original label; B, G: Stromata in surface view; C, K: Stromatal surface in close-up showing ostioles and remnants of the yellowish to whitish outermost coating; D, L, M: Stromata in vertical section showing the carbonaceous interior and the olivaceous yellow subperithecial layer; E, I: Ascus apical apparatus, in Melzer's reagent; F, H: Ascospores in 1% SDS; J: Immature and mature asci in blue Pelikan® ink diluted in 1% SDS. Scale bars: A, G = 10 mm; B = 5 mm; C, D, K = 0.5 mm; E = 5 µm; F, H, I, L, M = 10 µm; J = 20 µm.

The collection MJF 13156 is tentatively referred to *N. sublutea* but with reservations, based on the combination of differences in thickness of the olivaceous yellow subperithecial tissue reaching 0.5 mm thick in places, larger and more conspicuous ostioles 120–130 µm diam and smaller ascospores averaging 10.9 × 5.4 µm (Plate 30, Table 9). More extensive sampling should provide a better understanding of the intraspecific variations within *N. sublutea* and help clarify the status of this collection.

The new species *N. flavoviridis* (this paper) externally resembles *N. sublutea* in having a fugacious greenish yellow coating and similar dark brown ascospores averaging 10.4 × 5.3 µm. It can be readily distinguished when a stroma is vertically sectioned, revealing a thick superficial carbonaceous crust up to 380 µm thick and large, often depressed-spherical perithecia embedded in a thick whitish soft tissue lacking any trace of yellow.

Conclusions

With the record of nine new taxa, including a new combination, and the record of seven known taxa of which two were only known from the type collection (*N. chestersii* var. *microspora* and *N. subaenea*) and two known from very few records (*N. beaumontii* and *N. caries*), our survey demonstrates that *Nemania* features an amazing diversity in the two small islands of Guadeloupe and Martinique. When compared to our previous results on *Annulohypoxylon*, *Biscogniauxia*, *Hypoxylon* and *Rosellinia*, *Nemania* is by far the xylariaceous genus showing the highest proportion of taxonomic novelties. When compared to the number of known *Nemania* taxa roughly estimated as 50 worldwide by ROGERS & JU (2012), our results imply that similar surveys carried out in other tropical regions should reveal a much higher diversity than currently recognized and should help assess the distribution of the known taxa with more relevance.

Nemania spp. are easily overlooked in the field owing to their small and dull-coloured stromata, they may be confused with stromata of *Biscogniauxia*, *Kretzschmaria* or depauperate *Hypoxylon*. Their identification at genus and species level requires the evaluation of subtle morphological characters like ostiolar morphology, thickness of the outer carbonaceous crust, type of tissue surrounding the perithecia and its colour; microscopical analysis of asci and ascospores, including the often tricky observation of germ slits, is likewise of critical importance. However, our observations gathered in this paper show that these morphological characters of diagnostic value may be quite variable within a given species, especially when a substantial number of collections is examined. Identification at species level must therefore be based on the combination of several, at least two characters.

On the one hand, too many *Nemania* spp. are known only from the type collection or very few collections; on the other hand, some widespread species can be suspected to be complexes of closely related species.

Pending questions about the taxonomy of *Nemania* are: 1) re-defining *N. diffusa*, which is most likely a complex, on a narrower basis, starting with a comparative study of its temperate and tropical representatives; 2) investigating the taxonomic relevance of morphological characters currently used to distinguish species; 3) exploring the boundaries between *Nemania* and *Rosellinia* by investigations on those species of *Rosellinia* associated with a white subiculum, involved in the *mammoidea* group, and those currently placed in *Nemania*. Addressing these questions obviously implies more extensive sampling, especially in tropics, coupled with phylogenetic studies, and we hope our modest contribution will prompt to carry out such work in the future.

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