

Camillea lechatii (Graphostromataceae, Xylariales), a new species from Martinique (French West Indies)

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Abstract: A new species of the genus *Camillea* is described and illustrated from four collections from Martinique. *Camillea lechatii* is distinguished from the closest known species, notably *C. cyclisca*, by morphological characters related to the diameter and shape of the ostioles, the configuration of the perithecia within the stroma, the content of the paraphyses and the length/width ratio of the ascospores. Ascospores of *C. lechatii* show a short germ slit on their ventral side, as do those of *C. cyclisca*, which corroborates their affinity. The presence of a germ slit was previously known only on ascospores of *C. labiatirima*, a species described from Costa Rica whose differences with *C. lechatii* are discussed. *Camillea lechatii* is named after my dear friend Christian, who collected the holotype in 2007 and recently passed away. It is the first *Camillea* species reported from Martinique.

Keywords: *Ascomycota*, Neotropical ascomycetes, taxonomy, 1 new species.

Résumé : une espèce nouvelle du genre *Camillea* est décrite et illustrée à partir de quatre récoltes de Martinique. *Camillea lechatii* se distingue des espèces connues les plus proches, notamment *C. cyclisca*, par des caractères morphologiques liés au diamètre et la forme des ostioles, la configuration des périthèces à l'intérieur du stroma, le contenu des paraphyses et le rapport L/l des ascospores. Les ascospores de *C. lechatii* présentent un court sillon germinatif sur leur face ventrale, de même que celles de *C. cyclisca*, ce qui corrobore leur affinité. La présence d'un sillon germinatif n'était jusqu'alors uniquement connue que sur les ascospores de *C. labiatirima*, une espèce décrite du Costa Rica dont les différences avec *C. lechatii* sont discutées. *Camillea lechatii* est nommée en hommage à mon ami Christian récemment décédé, qui en avait récolté l'holotype en 2007. C'est la première espèce de *Camillea* signalée de Martinique.

Mots-clés : ascomycètes néotropicaux, *Ascomycota*, taxinomie, 1 espèce nouvelle.

Introduction

This taxonomic note is part of an ongoing, completed and still unpublished survey of Neotropical *Camillea* species collected by the author and Christian Lechat during inventorial missions in Martinique and Guadeloupe spanning from 2003 to 2016 and more sporadically in French Guiana from 2007 to 2021. The recent and brutal passing of Christian in January 2022 interrupted this process based on a long-time, close and fruitful collaboration. Working daily on the material collected by Christian is not only painful, reminding me that we will never again have taxonomic discussions on our dear fungi, but also stimulating by pushing me to finalize the description of some of the many undescribed taxa that we have collected together over the years.

Camillea Fr. was first established based on collections made in French Guiana in 1837–1839 by F.M.R. Leprieur and identified by J.F.C. Montagne, first assigned to *Sphaeria* Haller or *Hypoxylon* Bull. (MONTAGNE, 1840; 1850). A detailed account of the nomenclatural and taxonomic history of *Camillea* leading to its modern genus concept was given by LÆSSØE *et al.* (1989) in their comprehensive monograph. *Camillea*, which was previously included in *Xylariaceae* (LÆSSØE *et al.*, 1989), was shown on phylogenetic grounds to be better placed outside *Xylariaceae* and accommodated in *Graphostromataceae* M.E. Barr, J. D. Rogers & Y.-M. Ju., *emend.* M. Stadler, L. Wendt & Sir (WENDT *et al.*, 2018) aside from *Hypoxylaceae* DC. *Graphostromataceae* currently accommodates *Biscogniauxia* Kuntze, *Graphostroma* Piroz., *Obolarina* Pouzar and *Vivantia* J.D. Rogers, Y.-M. Ju & Cand, as well as *Camillea*.

The currently accepted number of *Camillea* taxa listed in MycoBank is 63, but after deleting synonyms, spelling variants, and excluded species moved to other genera, this number is reduced to 39 taxa including two varieties. Most of these are of Neotropical origin, particularly from the Amazon basin, with only two species described from the Caribbean, i.e., Puerto Rico and Trinidad. In the absence of previous reports of *Camillea* in Martinique and the French West Indies in general, and pending the next planned work on this subject, the new species *C. lechatii* introduced and documented in what follows becomes the first record of this genus on these islands.

Materials and methods

General procedures for macro- and microscopic examination, ascospores measurements and imaging follow FOURNIER *et al.* (2017). The terminology of stromatal features, especially the superficial ostiolar structures follows LÆSSØE *et al.* (1989).

Specific terminology and microscopic observations concerning the apical structures of the ascus of *Camillea* are explained here. It has long been observed that in *C. leprieurii* (Mont.) Mont., the type species, the “apical” apparatus of the ascus, blueing with iodine, is actually far distant from the apex (PATOULLARD, 1888; LÆSSØE *et al.*, 1989). A similar configuration is present in all species of *Camillea*, although usually to a much lesser degree, and may also be encountered in *Biscogniauxia* (JF unpublished observations). The iodine reaction made in parallel with the use of a stain such as blue ink shows that the upper part of the ascus appears systematically bipartite. It is composed of a lower “amyloid” structure blueing in Melzer's reagent and Lugol's solution that I call subapical apparatus and an upper hyaline part not blueing in iodine but containing a diversely developed and shaped apical structure that I call “pulvillus”. This pulvillus (Latin = cushion), lenticular to short-cylindrical in outline, with or without a downward extension, can be more or less strongly stained by diluted blue ink or other dyes (Congo red, chlorazol black, diluted toluidine blue, etc.) used to stain chitinous apical structures. The combined morphology of the upper (pulvillus) and lower (subapical apparatus) structures forming the entire apical apparatus is sufficiently consistent in a given species to provide a valuable additional differential character or to suggest affinities in many cases.

The taxonomic relevance of the content of paraphyses is emphasized in my approach of *Camillea* because this character is strikingly consistent within a given species and may provide a good taxonomic marker. It ranges from most often reduced and minutely guttulate to highly refractive or brownish and granular or densely guttulate with a foamy appearance. It first requires microscopic observation in water, but blue ink or other usual stains may provide a better contrast in some cases.

Another feature which can be diagnostic at species level is the configuration of perithecia. They can be opening separately through

individual ostioles or in groups of 2–30 sharing a common ostiole through anastomosing ostiolar necks. I term ostiolar neck the tapering or tubular extension of the perithecial apex joining the ostiolar opening. Assessing the perithecial arrangement first requires a vertical section of the stroma. The strongly carbonaceous structure of stromata prevents to make good sections with a razor blade. Better results can be obtained by splitting the substrate along the grain of the wood, inducing the splitting of the stroma itself without damaging its structure and saving the razor blade edge. In case of anastomosing ostiolar necks, a better understanding of their configuration is obtained by the removal of the carbonaceous superficial stromatal crust, which can be safely achieved under the stereomicroscope with a scalpel provided with a short pointed blade.

Regardless of how carefully the macro images at high magnification are taken and illuminated, it is impossible to avoid the fact that concave anatomical structures sometimes appear in relief, then unfortunately making the illustrations apparently contradict their description.

The collections are deposited in LIP fungarium (Lille University, France), some duplicates remaining in the personal fungarium of JF. Nomenclature follows MycoBank (Westerdijk Fungal Biodiversity Institute, Utrecht, The Netherlands).

Taxonomy

Camillea lechatii J. Fourn., *sp. nov.* MycoBank: MB845992
Plate 1; Table 1

Diagnosis: Differs from the most closely related *C. cyclisca* by only 1(–2) perithecium per ostiole vs. 2–6, relatively broader ascospores ($Q_e = 2.2$ vs. 2.5) and narrower, minutely guttulate paraphyses lacking strongly refractive content.

Typification: FRENCH WEST INDIES: Martinique, Saint-Joseph, Coeur-Bouliki forest, 14.684543 N, 61.044266 W, hygrophilic rainforest, Mahogany plantation, on a dead corticated branchlet, 26 Aug. 2007, *leg.* C. Lechat, MJF 07102 (holotype LIP).

Etymology: For my dearest friend Christian Lechat (†) who collected the holotype specimen.

Stromata erumpent through bark, slightly raising and occasionally lifting bark tissue at margin, orbicular up to 7–9 mm diam. to elongate 20–25 mm long \times 6–15 mm wide, 0.7–1.1 mm thick, applanate to slightly convex, with a narrow, ill-defined, sloping sterile

margin; surface dark grey to dull black, occasionally slightly shiny black in places, plane to slightly irregular; subsurface crust 150–170 μm thick, carbonaceous; interperithecial tissue entirely carbonaceous, black, and subperithecial tissue woody, black, 0.10–0.20 mm thick. **Perithecia** ovoid to slightly tubular, laterally and basally flattened, 0.40–0.65 mm high \times 0.30–0.50 mm diam., opening mostly individually, rarely by two, through central to occasionally eccentric ostiolar necks. **Ostioles** uniformly distributed on stromatal surface, inconspicuous, umbilicate, appearing as minute pits 40–50 μm diam. plugged with yellowish grey substance. **Paraphyses** hyphal, thin-walled, remotely septate, much longer than asci, 3.0–5.0 μm wide at base, tapering to 1.0–1.5 μm wide, most often tightly packed in thick bunches between asci, with scattered minute refractive guttules. **Asci** cylindrical, with eight uniseriately arranged, slightly overlapping ascospores, 180–200 μm in total length \times 8.0–10.5 μm wide, including a stipe 40–55 μm long; subapical apparatus cylindrical to most often trapezoid, apically convex with a faint subapical rim, basally attenuated, 3.5–5.0 \times 2.8–4.4 μm (Me = 4.2 \times 3.8 μm , N = 100), blueing in Melzer's reagent, occasionally less strongly in upper part; apical pulvillus lenticular, apically convex, stained by blue Pelikan ink. **Ascospores** (13.0–)14.3–19.8(–20.5) \times (6.1–)6.6–9.2(–9.6) μm , Q = (1.8–)1.9–2.6(–2.8), N = 240 (Me = 17.0 \times 7.9 μm , $Q_e = 2.2$), ellipsoid-inequilateral with narrowly rounded to subacute ends, ventrally convex in side view, light yellow-brown, smooth-walled to minutely ornamented by LM, with a short inconspicuous germ slit 4.5–6.0 μm long on the ventral side, best seen in lactic acid with blue ink, with a usually single central oil droplet.

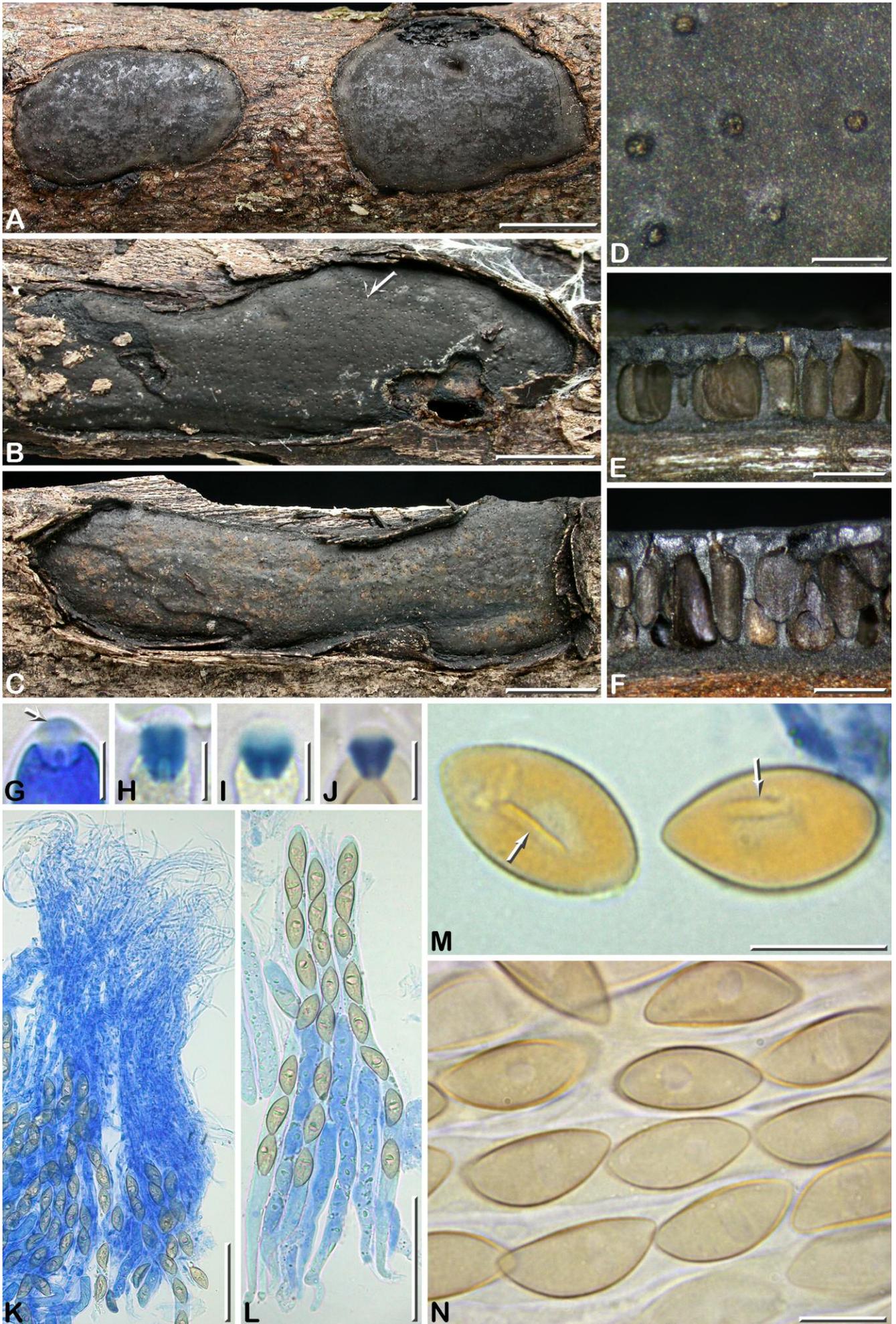
Asexual morph on the natural substrate and culture characteristics: Unknown.

Other specimens examined (paratypes): FRENCH WEST INDIES: Martinique, Case-Pilote, Fond-Boucher, mesophilic rainforest, 14.658876 N, 61.14531 W, ca. 35 m, on a dead corticated branch, 31 Jul. 2016, *leg.* J. Fournier, MJF 16062 (LIP); Fort-de-France, Absalon, track to Plateau-Michel, hygrophilic rainforest, 14.676801 N, 61.096398 W, on dead corticated branchlets, 15 Aug. 2013, *leg.* J. Fournier, MJF 13231 (LIP); *ibid.*, on dead corticated branch, 15 Aug. 2013, *leg.* J. Fournier, MJF 13239 (LIP).

Doubtful specimen excluded from paratypes: MAYOTTE: roadside between Kahani and Coconi, 12.827107 S, 45.135223 E, on a dead corticated branchlet, 14 Jun. 2014, *leg.* M. Pélissier, MP 2014-202 (JF) (depauperate).

Table 1 – Ascospore and subapical apparatus dimensions in four collections of *C. lechatii* from Martinique and a supposed one from Mayotte showing their variation range, compared with those of *C. cyclisca* inferred from twelve collections from French Guiana, Guadeloupe and Martinique.

Collections numbers	Ascospore measurements (in μm) with extreme values in parentheses	Q = quotient l/w N = number of measurements	Mean values	Subapical apparatus (h \times w) μm N = 25
MJF07102	(15.4–)16.4–18.2(–19.1) \times (6.4–)6.8–8.4(–9.0)	Q = (1.8–)2.0–2.6(–2.8) N = 60	Me = 17.3 \times 7.6 μm $Q_e = 2.3$	Me = 3.2 \times 3.7
MJF13231	(15.8–)16.2–18.3(–20.2) \times (7.1–)7.4–8.9(–9.5)	Q = (1.8–)1.9–2.3(–2.6) N = 60	Me = 17.2 \times 8.2 μm $Q_e = 2.1$	Me = 4.5 \times 3.7
MJF 13239	(16.2–)17.4–19.8(–20.5) \times (6.2–)7.4–9.2(–9.6)	Q = (1.9–)2.0–2.4(–2.8) N = 60	Me = 18.4 \times 8.4 μm $Q_e = 2.2$	Me = 4.4 \times 3.8
MJF 16062	(13.0–)14.3–16.3(–17.4) \times (6.1–)6.6–7.9(–8.1)	Q = (1.8–)1.9–2.3(–2.5) N = 60	Me = 15.3 \times 7.2 μm $Q_e = 2.1$	Me = 4.5 \times 4.0
cumulated values	(13.0–)14.3–19.8(–20.5) \times (6.1–)6.6–9.2(–9.6)	Q = (1.8–)1.9–2.6(–2.8) N = 240	Me = 17.0 \times 7.9 μm $Q_e = 2.2$	Me = 4.2 \times 3.8
MP2014-202 Mayotte	(14.0–)14.9–19.0(–20.3) \times (5.9–)6.6–8.1(–8.8)	Q = (1.9–)2.1–2.6(–2.9) N = 60	Me = 17.2 \times 7.4 μm $Q_e = 2.3$	
<i>C. cyclisca</i> (JF unpublished results)	(13.2–)14.8–19.4(–21) \times (5.4–)6.0–7.9(–8.6)	Q = (1.9–)2.1–2.9(–3.2) N = 720	Me = 16.8 \times 6.8 μm $Q_e = 2.5$	Me = 4.3 \times 3.3



(previous page) **Plate 1 – *Camillea lechatii***

A, D, G, J-N: MJF 07102 (holotype); B, C, E: MJF 16062 (paratype); F, I: MJF 13239 (paratype); H: MJF 13231 (paratype). A: Habit of two adjacent orbicular stromata on bark; B: Elongated erumpent stroma with bark lifted at margin, with minute ostiolar pits on surface (arrow); C: Elongated erumpent stroma with bark lifted at margin, with orange brown ascospore deposits on surface; D: Stromatal surface in close-up showing minute ostiolar pits; E, F: Stromata in vertical section showing variously shaped perithecia opening individually; G: Ascus apex showing a convex lenticular pulvillus stained blue in blue Pelikan ink; H-J: Variously shaped subapical apparatus stained blue in Melzer's reagent (H, I) and violet in Lugol's solution (J); K: Thick bunches of paraphyses, in blue Pelikan ink; L: Mature and immature asci, in blue Pelikan ink; M: Two ascospores in ventral view showing a germ slit (arrows), in blue-black Waterman ink diluted in lactic acid; N: Ascospores in Melzer's reagent. Scale bars: A-C = 5 mm; D = 0.2 mm; E, F = 0.5 mm; G-J = 5 µm; K-L = 50 µm; M, N = 10 µm.

Known distribution: Martinique (French West Indies), ?Mayotte island (Indian Ocean).

Comments: *Camillea lechatii* is diagnosed by dull black applanate to slightly convex stromata with narrow sloping margins, with an even surface featuring minute, uniformly distributed ostiolar pits 40–50 µm diam. and perithecia mostly opening individually. Its paraphyses occur in dense bunches, not exceeding 3.0–5.0 µm wide at base and having the content reduced to minute scattered oily guttules. Its ascus subapical apparatus are short-cylindrical and attenuated at base, beneath a convex lenticular upper pulvillus. Its ascospores are 17.0 × 7.9 µm on average, ellipsoid-inequilateral with narrowly rounded ends and ventrally convex, light yellow brown, featuring a short germ slit on the ventral side. It shares many morphological characters with the widespread *C. cyclisca* (Mont.) Læssøe, Rogers J.D. & Whalley (LÆSSØE *et al.*, 1989), including umbilicate ostioles and ascospores similar in shape, colour, dimensions and presence of a short ventral germ slit, making *C. cyclisca* definitely the most resembling species among those known to feature pitted or umbilicate ostioles.

Comparison of ascospore dimensions is fairly inconclusive because they widely overlap, though it shows a different length/width ratio of 2.2 vs. 2.5 (Table 1) associated with a slightly greater width. However, a thorough comparison of the available collections of *C. lechatii* with 23 collections of *C. cyclisca* showed the presence of reliable discriminating characters. In contrast to *C. cyclisca*, a reliable differential character of *C. lechatii* useful at first sight in the field is the smaller diameter of ostiolar pits 40–50 µm vs. 60–90 µm in *C. cyclisca*, rendering the ostioles more inconspicuous and more uniformly distributed in relation with the perithecia mostly opening through individual ostioles. Unlike *C. cyclisca*, *C. lechatii* has the stromatal margin less steep, the superficial crust thinner (150–170 vs. 170–250 µm thick), the apical apparatus more trapezoid, and the pulvillus lenticular vs. cylindrical. However, the most discriminating character concerns the paraphyses. Unlike those of *C. cyclisca* that are non-septate and have a strongly refractive content forming conspicuous cylindrical bodies up to 60 µm long at the base, those of *C. lechatii* are septate, minutely guttulate, and aggregated in dense bunches. The combination of all these characters clearly supports the recognition of *C. lechatii* as a distinct species that can be segregated from *C. cyclisca*.

Ascospore dimensions and shape as well as the presence of a ventral germ slit and minutely guttulate paraphyses found in *C. lechatii* are also encountered in *C. tinctor* (Berk.) Læssøe, J.D. Rogers & Whalley (JF unpublished observations). However, the confusion between these two species is unequivocal because of the papillate ostioles and thicker stromata with tubular perithecia of *C. tinctor*. The orange colouration of the underlying substrate typically associated with *C. tinctor* could also be a differential diagnostic feature, which is unfortunately often inconsistent among specimens.

ROGERS *et al.* (2002) described *C. labiatirima* J.D. Rogers, F. San Martín & Y.-M. Ju which resembles *C. lechatii* in featuring umbilicate ostioles and ellipsoid-inequilateral ascospores with a short germ slit; the latter character was reported for the first time for *Camillea*. Ostioles of *C. labiatirima* slightly differ in sometimes having a raised rim, but the presence of a massive subapical apparatus 7.5 × 6 µm and subhyaline, significantly larger ascospores 25–28 × 9.5–11 µm in *C. labiatirima* readily distinguish both species.

A collection from Mayotte (Indian Ocean) would considerably expand the known distribution of *C. lechatii* if considered conspecific, but we temporarily refrain to equate it to *C. lechatii* because of its largely overmature condition making a reliable morphological comparison difficult, especially in lacking asci and paraphyses.

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