The Lichenologist **49**(3): 253–258 (2017)
doi:10.1017/S0024282917000147

Tapellaria palaeotropica (*Pilocarpaceae*), a new foliicolous lichen species from the Seychelles, and a world key to the genus

Gerhard NEUWIRTH and Elfie STOCKER-WÖRGÖTTER

Abstract: The new lichenized ascomycete *Tapellaria palaeotropica* is described from Mahé Island in the Seychelles. The species is characterized by a crustose, pale green, smooth thallus dispersed in patches and by having black, rounded apothecia with flat discs, hyaline, transversely, 3–5-septate ascospores and a purplish brown excipulum. Morphology, distribution and related species are discussed. A world key to all currently known species in the genus is presented.

Key words: lichen diversity, rainforest, taxonomy, tropical islands

Accepted for publication 9 *December* 2016

Introduction

The genus *Tapellaria* is characterized by mostly black, lecideine apothecia with a dark brown, K+ purplish hypothecium, branched and anastomosing paraphyses and campylidia producing filiform conidia, present in numerous species of the genus. It is a predominantly foliicolous genus with only a small number of species growing on bark (Kalb & Vězda 1987; Kalb & Hafellner 1992) or on rock (Vězda & Poelt 1988). The genus was introduced by Müller Argoviensis (1890) for the single species *T. herpetospora*, now a synonym of *T. moelleri*. Two additional names in *Tapellaria*, based on material collected during research expeditions in New Guinea and Samoa, were described by Rechinger (1905*a*,*b*), namely *T. gilva* and *T. samoana* which are, however, synonyms of species in the unrelated genus *Echinoplaca* (*Gomphillaceae*), *Echinoplaca pellicula* and *E. diffluens* (Lücking 2008). A comprehensive study by Santesson (1952) included eight foliicolous species of *Tapellaria*. Much later, an important contribution was made by Kalb & Vězda (1987) who discovered two corticolous species in Brazil. Lücking (1992) treated seven species of *Tapellaria* from Costa Rica, while Kalb & Hafellner (1992) described another corticolous species from the island of Madeira. Somewhat surprising was the discovery of the only known saxicolous species in the Himalaya region by Vězda & Poelt (1988). Lücking (1999) provided further additions in his treatment of the family *Ectolechiaceae* (now a synonym of *Pilocarpaceae*) for Costa Rica. Cáceres (2007) reported a species from Brazil, whereas Breuss & Neuwirth (2007) presented six species in a collection from Costa Rica. In a complete revision of neotropical foliicolous lichens Lücking (2008) discussed a wide range of features, ecological aspects and distribution patterns of *Tapellaria*. In the same year Flakus & Lücking (2008) published a new species from Bolivia. Lücking (in Lumbsch *et al*. 2011) described another new *Tapellaria* species in an assembly of 100 new species and two new corticolous species from Florida (Lücking *et al*. 2011). A list of all known lichen species from the Golfo Dulce Region in Costa Rica (Neuwirth *et al*. 2011) included *Tapellaria* species from the area. A new species list from the Galapagos Islands comprised six *Tapellaria* species (Bungartz *et al*. 2016).

As a result, the genus *Tapellaria* currently comprises 20 species (13 foliicolous, five

G. Neuwirth: Rabenberg 18, A-4911 Tumeltsham/Ried, Austria. Email: gerh.neuwirth@tele2.at
E. Stocker-Wörgötter: Karl-Franzens-University of Graz, Institute of Plant Sciences, Holteigasse 6, A-8010 Graz, Austria.

corticolous, one saxicolous and one species known to be both foliicolous and corticolous) occurring in tropical regions of America, Asia, Australasia, tropical Africa and the Hawaiian Islands. While collecting lichens in the Seychelles a foliicolous species of *Tapellaria* new to science was discovered growing on leaves of shrubs on the summit of Mt. Brulée and is described here.

Material and Methods

Morphological and anatomical investigations were carried out with a Euromex Mic 1642 ZHT dissecting microscope and a Reichert Neovar compound microscope. The chemistry of the type material was tested by spot reactions with KOH. Photographs of *Tapellaria palaeotropica* were taken using a Canon EOS 600D-camera connected to an LM-Scope camera adapter. Specimens were collected in February 2015 and the holotype is now deposited in LI and an isotype in the private herbarium of the second author.

The New Species

Tapellaria palaeotropica Neuwirth & Stocker-Wörgötter sp. nov.

MycoBank No.: MB 818730

Foliicolous *Tapellaria* close to *T. nigrata* with 3–5-septate, hyaline ascospores, 20–30 × 4–6 µm, a dark brown to reddish brown hypothecium 30–45 µm, and a purplish brown excipulum.

Type: Africa, Seychelles, Mahé, Montagne Posée Road, 4°42'S, 55°30'E, Mt. Brulée, Glacis La Reserve, Top Forest, 12 February 2015, *E. Stocker-Wörgötter* (LI 794441—holotype; hb. Stocker 107A—isotype).

(Figs 1, 2 & 3)

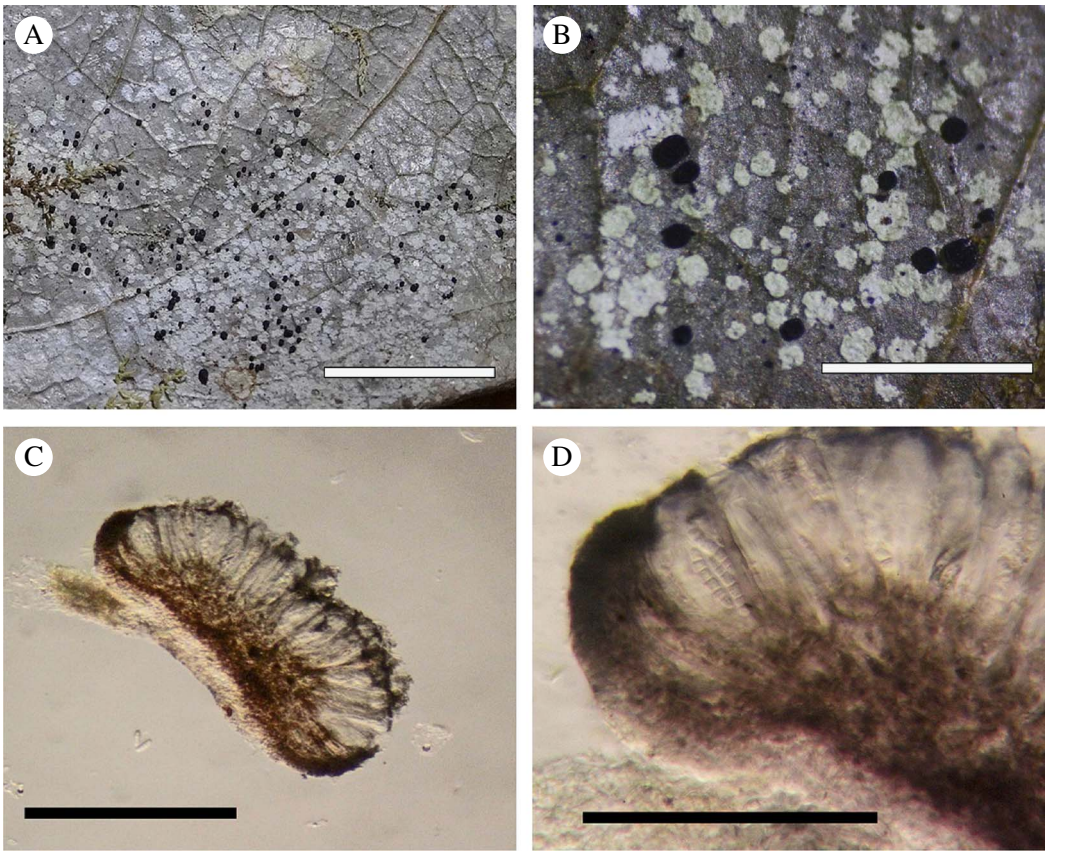

FIG. 1. *Tapellaria palaeotropica*, holotype. A & B, habit of thallus and apothecia on leaf; C, section through apothecium showing epithecium, hymenium and hypothecium; D, apothecial margin and excipulum. Scales: A = 10 mm; B = 5 mm; C = 0·15 mm; D = 100 µm. In colour online.

https://doi.org/10.1017/S0024282917000147 Published online by Cambridge University Press

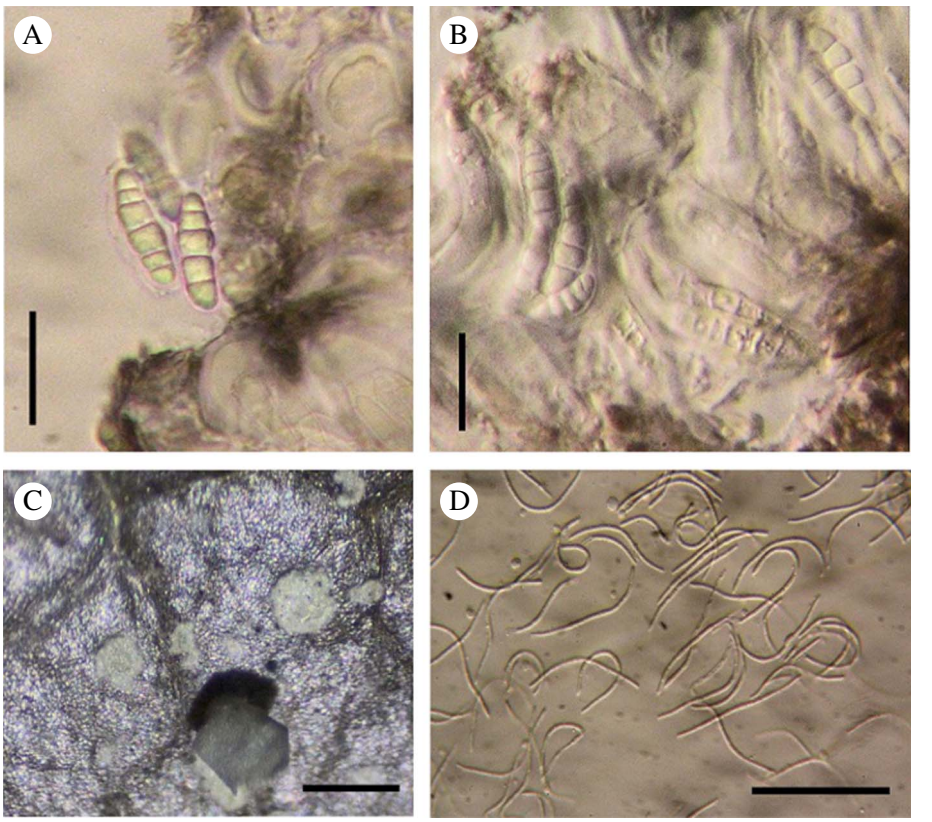

FIG. 2. *Tapellaria palaeotropica*. A, 3–5-septate ascospores; B, ascospores in asci; C, campylidium; D, conidia. Scales: A & B = 20 µm; C = 0·3 mm; D = 30 µm. In colour online.

FIG. 3. *Tapellaria palaeotropica* collecting site on Mt. Brulée, Mahé Island, Seychelles. In colour online.

Thallus crustose, epiphyllous, grey-green, smooth, shiny, dispersed in patches, K− .

Apothecia 0·1–0·4 mm diam., rounded, black, epruinose, flat, margin concolorous, constricted at the dark brown base; *epithecium* aerugineous, 10–15 µm; *hymenium* hyaline, 30–35 µm high; *excipulum* purplish brown; *hypothecium* dark brown to reddish brown, 30–45 µm, K+ purplish; *paraphyses* densely branched and anastomosing; *asci* clavate, 35–60 × 20–40 µm. *Ascospores* 6–8 per ascus, hyaline, 3–5-septate, narrowly ellipsoid to oblong with rounded ends, 20–30 × 4–6 µm.

Campylidia rare, 0·3–0·4 mm high, with large hood-shaped lobe, grey to white pruinose; *conidia* filiform, 3–7-septate, straight to curved, 15–45 × 1·5–2·0 µm.

Chemistry. Spot tests K−.

Etymology. The name refers to the discovery of this taxon in the Palaeotropics, in contrast to the similar, neotropical species *Tapellaria major*.

https://doi.org/10.1017/S0024282917000147 Published online by Cambridge University Press

Ecology and distribution. So far the species has been collected only once on the summit of Mt. Brulée in the primary mountain rainforest of the Glacis La Reserve (Fig. 3) in an undisturbed area with a dense understory, surrounded by endemic palm trees. The lichen grew on smooth leaves of tropical shrubs between mossy granite boulders.

Discussion. Four species in the genus are similar to the new taxon as they share the foliicolous habit and transversely 3–5-septate ascospores. *Tapellaria major* differs by the aeruginous excipulum and its distribution in the Neotropics. *Tapellaria albomarginata* has a pale brown excipulum, smaller (14–20 µm long), 3(–4)-septate ascospores, distinctly grey-pruinose apothecial margins and neotropical distribution, whereas *Tapellaria bilimbioides* is palaeotropical and has pure black apothecia. *Tapellaria nigrata* has a brown excipulum lacking a purple tinge and larger ascospores (30–40 µm long) with 5–7 septa and is a pantropical species. *Tapellaria nigrata* is evidently the closest species and differs by its brown rather than purplish brown excipulum.

World key to the species of the genus *Tapellaria*

1 Ascospores transversely septate 2
Ascospores submuriform or muriform 11

2(1) Ascospores large, 70–90 × 8–12 µm, 7-septate, 6–8 per ascus; apothecia with white margins; foliicolous; Neotropics . . . . . **T. puiggarii** (Müll.Arg.) R. Sant.
Ascospores small, 13–40 × 3–8 µm; apothecia variable 3

3(2) Ascospores predominantly 3(–4)-septate 4
Ascospores variably 3–7-septate 7

4(3) Ascospores 20–26 × 5–7 µm, 8 per ascus; apothecia black, with flat discs; excipulum with dark brown granules; saxicolous on gneiss rocks; Nepal . . . . . **T. saxicola** Vězda & Poelt
Ascospores 13–20 × 3–6 µm, 8 per ascus; corticolous or foliicolous 5

5(4) Corticolous; apothecia brown-black; excipulum colourless, no campylidia observed; Madeira . . . . . **T. similis** Kalb
Foliicolous; apothecia black; excipulum purple-brown 6

6(5) Apothecia with grey margins; ascospores 6–8 per ascus; Neotropics . . . . . **T. albomarginata** Lücking
Apothecia pure black; ascospores (6–)8 per ascus; Palaeotropics . . . . . **T. bilimbioides** R. Sant.

7(3) Ascospores 3–5-septate, 17–30 µm long 8
Ascospores 5–7-sepate, 24–40 µm long 10

8(7) Ascospores 3(–5)-septate, (1–3)4(–8) per ascus; apothecial margins blue pruinose; corticolous; Brazil . . . . . **T. corticola** Kalb & Vězda
Foliicolous; apothecia pure black 9

9(8) Excipulum aeruginous; foliicolous; Neotropics . . . . . **T. major** (Lücking) Lücking
Excipulum purplish brown; Palaeotropics . . . . . **T. palaeotropica** Neuwirth & Stocker-Wörgötter

https://doi.org/10.1017/S0024282917000147 Published online by Cambridge University Press

10(7) Ascospores 7-septate, 30–35 × 4–5 µm; apothecial margins pale grey-pruinose; Mexico, Brazil . . . . . **T. leonorae** M. Cáceres & Lücking
Ascospores 5–7-septate, 25–40 × 4–7 µm; apothecial margins black; pantropical . . . . . **T. nigrata** (Müll. Arg.) R. Sant.

11(1) Ascospores submuriform, 0–1 longitudinal septa per segment, 5–11 µm wide 12
Ascospores distinctly muriform with 1–3(–5) longitudinal septa per segment, 9–25 µm wide 14

12(11) Ascospores 16–20 × 9–11 µm with 3 transverse septa, (6–)8 per ascus; apothecial margins black, prominent, distorted or crenulate, blue pruinose; excipulum violet-black; corticolous; Brazil . . . . . **T. schindleri** Kalb & Vězda
Ascospores 35–110 µm long with 7–15 transverse septa 13

13(12) Ascospores 35–65 × 5–8 µm, 8 per ascus; excipulum with colourless inner part and blackish tinge in outer part; foliicolous; Bolivia . . . . . **T. intermedia** Flakus & Lücking
Ascospores 70–110 × 7–10 µm; excipulum brown throughout; Neotropics and tropical Africa . . . . . **T. moelleri** (Henriq.) R. Sant.

14(11) Ascospores single, 15–25 µm wide 15
Ascospores 2–8 per ascus, 9–17(–20) µm wide 16

15(14) Apothecial margins with white pruina; Neotropics and eastern Palaeotropics: Hawaii . . . . . **T. nana** (Fee) R. Sant.
Apothecia pure black; excipulum purplish brown; pantropical and extending into subtropical areas . . . . . **T. epiphylla** (Müll. Arg.) R. Sant.

16(14) Ascospores 60–115 µm long; foliicolous 17
Ascospores 20–35 µm long; foliicolous or rarely corticolous 18

17(16) Ascospores 70–11 × 10–15 µm; apothecia with grey margins; excipulum purplish black; Neotropics and South Africa . . . . . **T. marcellae** Lücking
Ascospores 60–100 × 9–17 µm; apothecia pure black; excipulum blackish brown; pantropical, also Australasia . . . . . **T. phyllophila** (Stirt.) R. Sant.

18(16) Ascospores 25–35 × 14–20 µm, mostly (2–)4(–6)-septate; apothecial margins grey or black; excipulum aeruginous brown; foliicolous and corticolous; Neotropics . . . . . **T. malmei** R. Sant.
Ascospores 20–25 × 9–15 µm 19

19(18) Apothecia with grey margins (especially young); thallus smooth; corticolous; Florida . . . . . **T. floridensis** Common & Lücking
Apothecia pure black; thallus granulose; corticolous; Florida . . . . . **T. granulosa** Lücking & Rivas Plata

The authors are grateful to Robert Lücking for checking the characters, suggesting the description of the new species and reviewing the manuscript. We thank Elvis Nivette and the Seychelles Bureau of Standards for the research and collection permit which allowed the collection of specimens. We are also grateful to an

anonymous reviewer for helpful comments and corrections. Josef Hafellner is thanked for providing important literature. ESTW is very grateful to the Austrian Science Foundation FWF for supporting the Projects P-23570-B06 and P-20887. ESTW would like to thank Katy Beaver (Conservation Action Group) and her husband for guiding us to the collection site.

References

Breuss, O. & Neuwirth, G. (2007) Flechtenfunde im Bosque Esquinas, Costa Rica. *Linzer Biologische Beiträge* **39:** 557–569.

Bungartz, F., Ziemmeck, F., Yánez Ayabaca, A., Nugra, F. & Aptroot, A. (2016) CDF Checklist of Galapagos Lichenized Fungi. FCD Lista de especies de Hongos liquenizados Galápagos. In *Charles Darwin Foundation Galapagos Species Checklist - Lista de Especies de Galápagos de la Fundación Charles Darwin* (F. Bungartz, H. Herrera, P. Jaramillo, N. Tirado, G. Jiménez-Uzcátegui, D. Ruiz, A. Guézou & F. Ziemmeck, eds): http://darwinfoundation.org/datazone/checklists/true-fungi/lichens/. Puerto Ayora, Galapagos: Charles Darwin Foundation. Last updated: 29 September 2016.

Cáceres, M. E. S. (2007) Corticolous crustose and microfoliose lichens of northeastern Brazil. *Libri Botanici* **22:** 151–152.

Flakus, A. & Lücking, R. (2008) New and additional records of foliicolous lichenized fungi from Bolivia. *Lichenologist* **40:** 423–436.

Kalb, K. & Hafellner, J. (1992) Bemerkenswerte Flechten und lichenicole Pilze von der Insel Madeira. *Herzogia* **9:** 45–102.

Kalb, K. & Vězda, A. (1987) Einige nicht-foliicole Arten der Familie *Ectolechiaceae* (Lichenes) aus Brasilien. *Folia Geobotanica et Phytotaxonomica* **22:** 287–312.

Lücking, R. (1992) Foliicolous lichens – A contribution to the knowledge of the lichen flora of Costa Rica, Central America. *Nova Hedwigia* **104:** 1–179.

Lücking, R. (1999) Ergänzungen und Verbesserungen zur Kenntnis der foliikolen Flechtenflora Costa Ricas. Die Familie Ectolechiaceae. *Phyton* (Horn, Austria), **39**:(1): 131–165.

Lücking, R. (2008) Foliicolous lichenized fungi. *Flora Neotropica* **103:** 745–756.

Lücking, R., Seavey, F., Common, R. S., Beeching, S. Q., Breuss, O., Buck, W. R., Crane, L., Hodges, M., Hodkinson, B. P., Lay, E., *et al.* (2011) The lichens of Fakahatchee Strand Reserve State Park, Florida: proceedings from the 18th Tuckerman workshop. *Bulletin of the Florida Museum of Natural History* **49**: 127–186.

Lumbsch, H. T., Ahti, T., Altermann, S., Amo de Paz, G., Aptroot, A., Arup, U., Bárcenas Peña, A., Bawingan, P. A., Benatti, M. N., Betancourt, L., *et al.* (2011) One hundred new species of lichenized fungi: a signature of undiscovered global diversity. *Phytotaxa* **18:** 1–127.

Müller Argoviensis, J. (1890) *Lichenes Epiphylli Novi*. Genève: Georg & Richter.

Neuwirth, G., Breuss, O., Huber, W. & Weissenhofer, A. (2011) *Lichens of the Golfo Dulce Region, Costa Rica – Corcovado National Park, Piedras Blancas National Park, "Regenwald der Österreicher"*. Vienna: Verein zur Förderung der Tropenstation La Gamba.

Rechinger, K. (1905*a*) Botanische und zoologische Ergebnisse einer wissenschaftlichen Forschungsreise nach den Samoa-Inseln, dem Neuguinea-Archipel und den Salomoninseln. *Denkschrift mathematisch-naturwissenschaftliche Klasse der Kaiserlichen Akademie der Wissenschaften Wien* **88**, Teil 1: 216.

Rechinger, K. (1905*b*) Botanische und zoologische Ergebnisse einer wissenschaftlichen Forschungsreise nach den Samoa-Inseln, dem Neuguinea-Archipel und den Salomoninseln. *Denkschrift mathematisch- naturwissenschaftliche Klasse der Kaiserlichen Akademie der Wissenschaften Wien* **88,** Teil 4: 21–22.

Santesson, R. (1952) Foliicolous lichens. 1. A revision of the taxonomy of the obligately foliicolous, lichenized fungi. *Symbolae Botanicae Upsalienses* **12** (1)**:** 1–590.

Vězda, A. & Poelt, J. (1988) Beiträge zur Kenntnis der Flechtenflora des Himalaya 1. Einige neue oder bemerkenswerte gyalectoide und foliicole Flechten. *Nova Hedwigia* **47:** 415–427.