Two new species of *Costantinella* from Hong Kong

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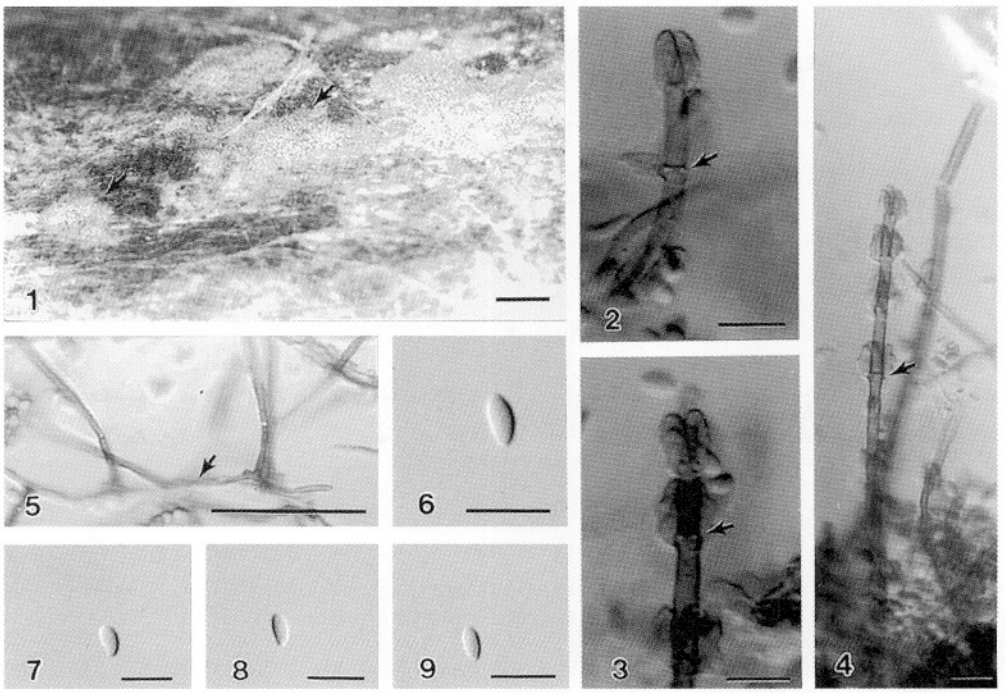
Two *Costantinella* species, collected in Hong Kong, are described and illustrated: *Costantinella palmicola* sp. nov. from decaying petioles of *Livistona chinensis*, and *C. phragmitis* sp. nov. from decaying culms of *Phragmites australis*. *Costantinella palmicola* has brown, verruculose conidiophores and distinctly lobed conidiogenous cells. *Costantinella phragmitis* has olivaceous-brown, smooth, cylindrical conidiophores, and hyaline, cylindric-clavate conidiogenous cells bearing elongated denticles near the apex. A synopsis of the morphological characters of all accepted species in *Costantinella* is provided.

Key words: *Costantinella*, graminicolous fungi, mitosporic fungi, palmicolous fungi, systematics.

Introduction

The genus *Costantinella* was introduced based on *C. cristata* Matr. (Hughes, 1958). Three species, *C. tilletei* (Desm.) Mason and S. Hughes, *C. athrix* Nannf. and Erikss. and *C. clavata* Hol.-Jech. have been added to the genus (Ellis, 1971). However, as *C. cristata* and *C. tilletei* were found later to be synonymous with *C. terrestris* (Link) S. Hughes, and *C. micheneri* (Berk. and M.A. Curtis) S. Hughes was considered to be an earlier name for *C. athrix*, the three *Costantinella* species now recognised are *C. clavata*, *C. micheneri* and *C. terrestris* (Hughes, 1958; Ellis, 1971; Holubová-Jechová, 1980).

Costantinella is characterised by macronematous and mononematous conidiophores, with cylindrical to clavate conidiogenous cells, which are arranged in whorls at intervals along the conidiophores, usually arising just below the septa. The conidia are produced from sympodially proliferating conidiogenous cells and secede rhexolytically. The proliferation and conidial secession result in the tips of the conidiogenous cells appearing ragged or irregular in outline in some species. The conidiogenous cells bear minute denticles which are torn due to rhexolytic conidial secession. The conidiophores are usually subhyaline to pale brown, smooth or slightly verruculose, and the conidia are unicellular, hyaline, with a minute, torn basal frill. Species of *Costantinella* are distinguished from each other by the shape



Figs. 1-9. *Costantinella palmicola.* **1.** Colonies on natural substratum (arrowed). **2-4.** Conidiophores with conidiogenous cells which are slightly lobed and arranged in whorls on the conidiophore axis. Note the swellings at the nodes (arrowed). **5.** Basal hyphae (arrowed). **6-9.** Conidia with truncate bases. Bars: 1 = 1 mm; 2, 4-9 = 10 μm; 3 = 100 μm.

and arrangement of conidiogenous cells on the conidiophores, and the shape and size of the conidia.

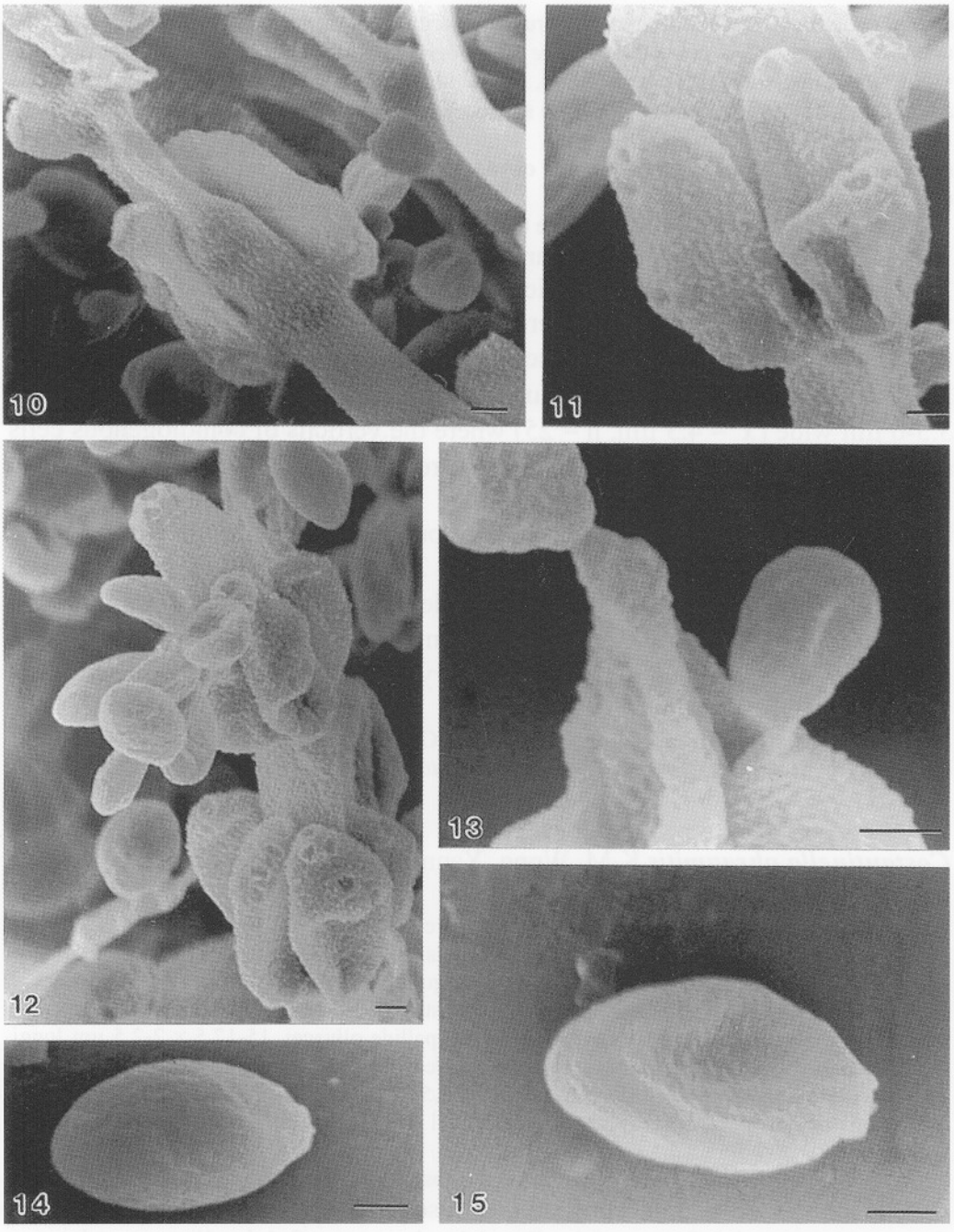
During studies on microfungi on grasses and palms in the tropics (Goh and Hyde, 1996, 1998; Goh *et al.*, 1998; Yanna *et al.*, 1998; Wong *et al.*, 1998, 1999), we have identified two undescribed species of *Costantinella*, and these are described and illustrated in this paper. A tabulated synopsis of the characters of all *Costantinella* species is provided (Table 1).

The conidiophores of the two undescribed species of *Costantinella* are narrower (2-4 μm) than those of the three earlier described species which, range from 4-15 μm wide at the middle, and 8-18 μm wide at the base.

Taxonomy

Costantinella palmicola K.M. Wong, Yanna, Goh and K.D. Hyde, **sp. nov.**
(Figs. 1-15, 23)

Coloniae in substrato naturale effusae, pallide griseolae, usque 9 mm longae et 3 mm latae. *Hyphae basales* superficiales, brunneae, laeves, *ca.* 4 μm latae. *Conidiophora* recta,



Figs. 10-15. SEM of *Costnatinella palmicola*. **10.** Verruculose walls of conidiogenous cells and conidiophores. **11-12**. Conidial scars on conidiogenous cells resulting from rhexolytic conidial secession. **13.** Developing conidia attached to the apex of the conidiogenous cells. **14-15.** Conidia with a basal frill resulting from rhexolytic secession. Bars: 10, 12 = 10 μm; 11, 13-15 = 1 μm.

erecta, cylindrica, irregulariter ramosa, brunnea, verruculosa, septata, 140-300 × 2.5-4 µm, ad nodos tumidosa, 3.5-6 µm lata. *Cellulae conidiogenae* polyblasticae, discretae, in ordidem verticillatae, obovoideae vel ellipsoideae, in ambitis lobatae, hyalinae vel olivaceo-brunneae, ad apicem cum proliferationis sympodice sine progressione et denticulis parvis praeditae, 9-12 × 3-6 µm. *Conidia* 5-8 × 3-4 µm, solitaria, elliptico-fusiformia vel sub-fusiformia, unicellularia, subhyalina vel pallidissime olivacea, laevia, ad basem truncata cum hilo minuto non incrassato praedita.

Etymology: *palmicola*, in reference to the palm host.

Colonies on natural substratum effuse, pale greyish, up to 9 mm long and 3 mm wide. Basal hyphae superficial, brown, smooth, thin-walled, *ca.* 4 µm wide. *Conidiophores* straight, erect, cylindrical, irregularly branched or unbranched, brown, verruculose, septate, 140-300 µm long ($\bar{x}$ = 220 µm, n = 25) and 2.5-4 µm wide ($\bar{x}$ = 3.3 µm, n = 25), swollen at the nodes which are 3.5-6 µm wide ($\bar{x}$ = 4.3 µm, n = 25) where the verticils of conidiogenous cells arise. *Conidiogenous cells* polyblastic, discrete, arranged in whorls on the main axis, obovoid to ellipsoid, slightly lobed in outline, hyaline to olivaceous brown, sympodially proliferating without progression, and with tiny denticles at the apex, 9-12 µm long ($\bar{x}$ = 9.8 µm, n = 25), 3-6 µm wide at the middle and the base ($\bar{x}$ = 3.8 µm, n = 25), 2-4 µm wide at the apex ($\bar{x}$ = 2.6 µm, n = 25). *Conidia* 5-8 × 3-4 µm, ($\bar{x}$ = 6.4 × 3.1 µm, n = 25), solitary, elliptic-fusiform to sub-fusiform, unicellular, subhyaline to very pale olivaceous, smooth, truncate with a scar at the base.

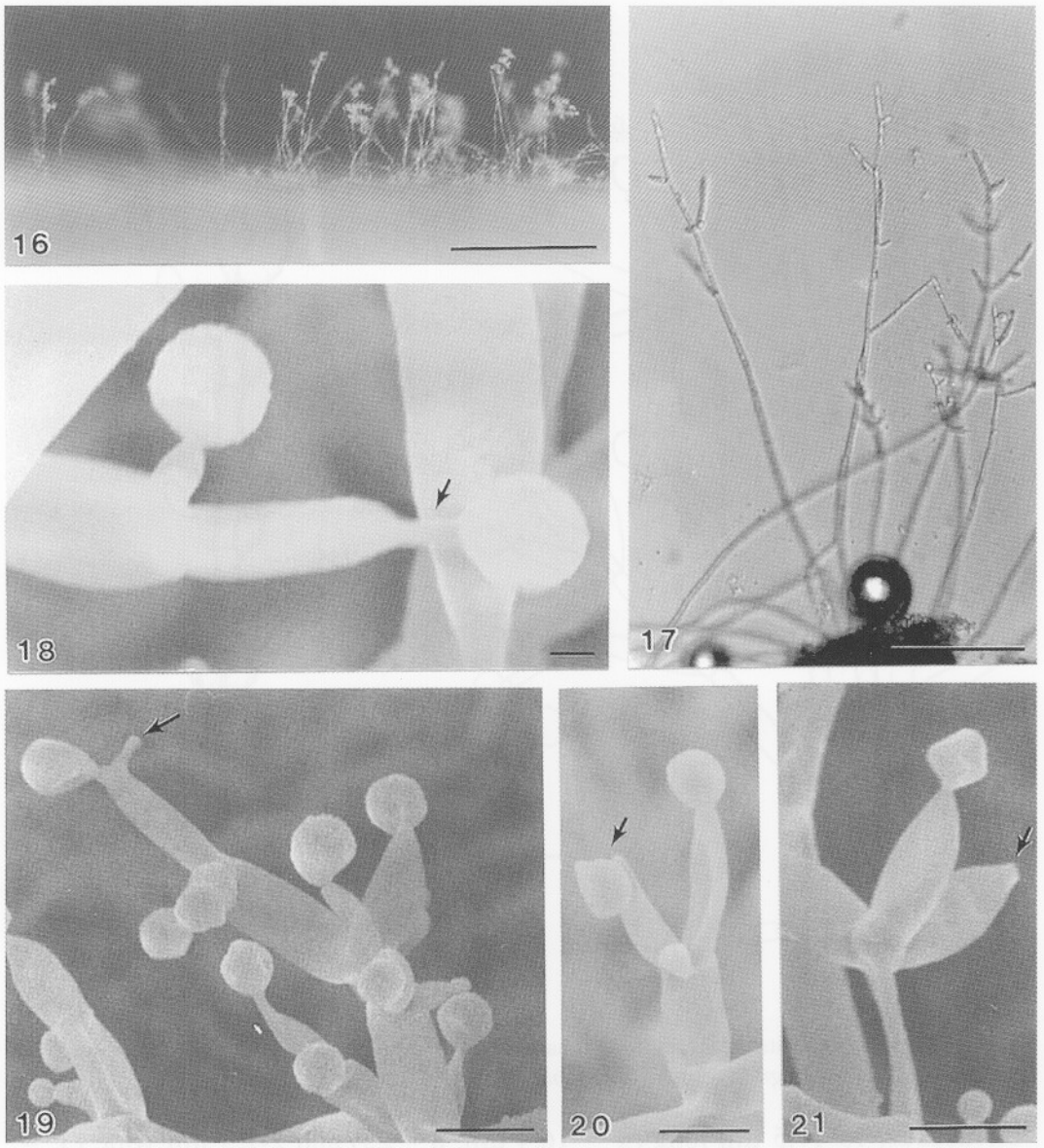
Holotypus (designated here): HONG KONG, Hong Kong Island, forest behind The University of Hong Kong, on dead petiole of *Livistona chinensis* (*Arecaceae*), 10 June 1997, Yanna YAN124 (HKU(M) 5347).

Costantinella phragmitis K.M. Wong, Yanna, Goh and K.D. Hyde, **sp. nov.**
(Figs. 16-21, 22)

Coloniae in substrato naturale effusae, floccosae, albae vel griseolae, usque 7.5 mm longae et 2.5 mm latae. Hyphae basales superficiales, olivaceo-brunneae, laeves, 2.5-3 µm latae. *Conidiophora* recta, erecta, cylindrica, irregulariter ramosa, olivaceo-brunnea, laevia, septata, 325-450 × 2.5-4 µm, deorsum leniter constricta, 2-3 µm lata; sursum ramsosa; rami leniter angustati (*ca.* 2-3 µm latae), subhyalini vel pallide olivacei, 15-17.5 × 2-2.5 µm longi. *Cellulae conidiogenae* monoblasticae vel polyblasticae, discretae, obclavatae, hyalinae, laeves, cum proliferationis sympodice sine progressione, 7.5-12.5 × 2-2.5 µm, cum denticulis minutis mucronatis praeditae. *Conidia* solitaria, globosa vel subglobosa, unicellularia, hyalina, laevia, tenuitunicata, 2.5-4 µm diam.

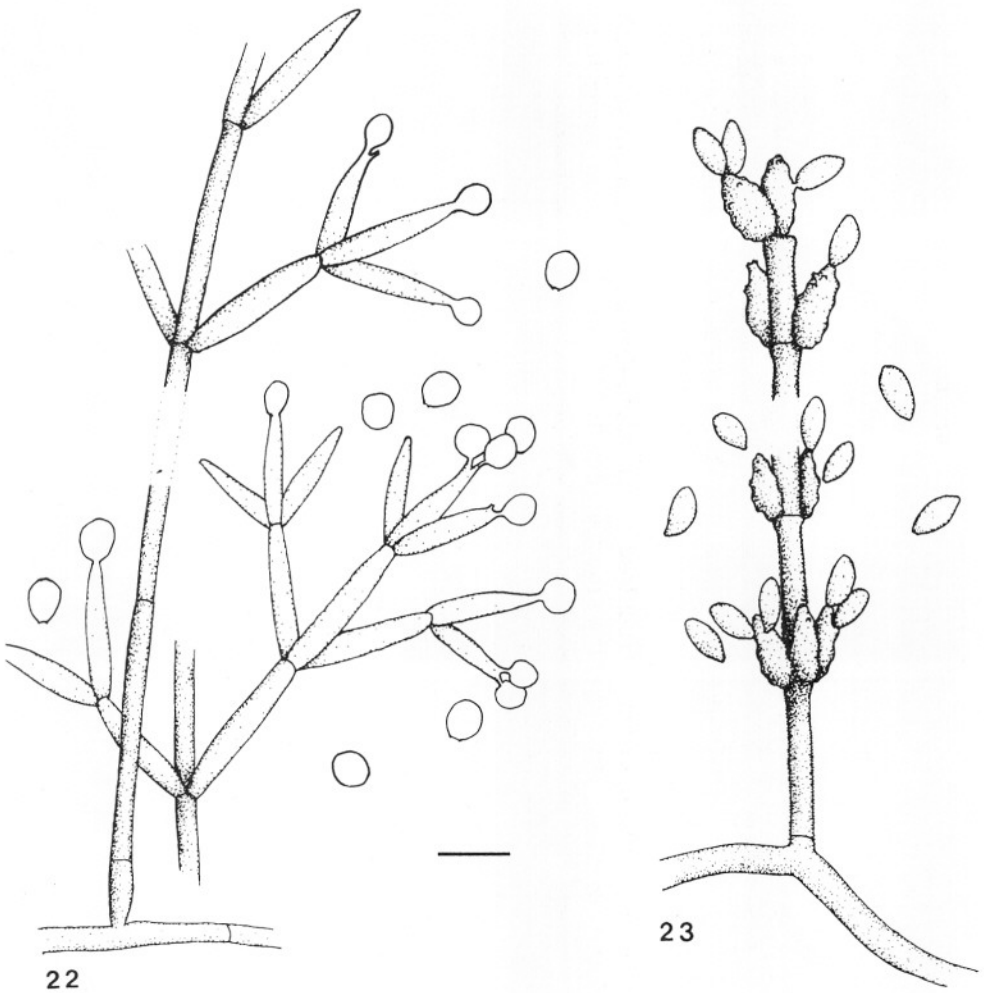
Etymology: *phragmitis*, in reference to the host *Phragmites*.

Colonies on natural substratum effuse, cottony, white to greyish, up to 7.5 mm long and 2.5 mm wide. Basal hyphae superficial, olivaceous brown, smooth, thin-walled, 2.5-3 µm wide. *Conidiophores* straight, erect, cylindrical, septate, irregularly branched above the septa, usually with tertiary branching, olivaceous brown, smooth, 325-450 µm long ($\bar{x}$ = 399 µm, n = 10) and 2.5-4



Figs. 16-21. *Costantinella phragmitis*. **16.** Colonies on natural substratum. **17.** Conidiophores which are irregularly branched on the upper half of the main axis. **18-21.** SEM of *Costantinella phragmitis*. **18.** Smooth-walled conidiogenous cells with denticles (arrowed) giving rise to spherical conidia. **19.** Polyblastic conidiogenous cells producing conidia from denticles (arrowed). **20, 21.** Conidiogenous cells and conidia. A conidium is seen detaching from the conidiogenous locus in 30 (arrowed). Bars: 16, 18 = 1 mm; 17 = 50 µm; 19-21 = 5 µm.

µm wide ($\bar{x}$ = 2.8 µm, n = 10), slightly constricted at the junction with the basal hyphae, 2-3 µm wide; branches occurring on upper part of conidiophores slightly narrower (*ca.* 2-3 µm wide) than the main axis, subhyaline to pale



Figs. 22-23. Composite diagram with characteristics of *Costantinella phragmitis* and *C. palmicola*. **22.** *C. phragmitis*. **23.** *C. palmicola*. Bars = 10 μm.

olivaceous, 15-17.5 μm long ($\bar{x}$ = 16.4 μm, n = 25) and 2-2.5 μm wide ($\bar{x}$ = 2.1 μm, n = 25). *Conidiogenous cells* monoblastic or polyblastic, discrete, obclavate, hyaline, smooth, sympodially proliferating without progression, 7.5-12.5 μm long ($\bar{x}$ = 10.4 μm, n = 25) and 2-2.5 μm wide ($\bar{x}$ = 2.1 μm, n = 25), denticulate; denticles minute, tapering, restricted to a small region at the apex. *Conidia* solitary, globose to subglobose, unicellular, hyaline, smooth, thin-walled, 2.5-4 μm diam. ($\bar{x}$ = 3.2 μm, n = 25).

Holotypus (designated here): HONG KONG: New Territories, Mai Po Marshes, Gei Wai no. 9, on aerial part of a senescent culm of *Phragmites australis* (*Poaceae*), 7 August 1997, K.M. Wong MW147PH52 (HKU(M) 8002).

Table 1. Synopsis of *Costantinella* species.

	C. clavata (Holubová-Jechová, 1980)	*C. micheneri* (Ellis, 1971; Holubová-Jechová, 1980)	*C. palmicola*	*C. phragmitis*	*C. terrestris* (Ellis, 1971; Holubová-Jechová, 1980)
Colonies on natural substrata	White, effuse, cottony to hypochnoid	White, loose, cottony, hypochnoid	Pale grey, effuse	Effuse, cottony	Fawn-coloured or greyish brown
Basal hyphae	Superficial and immersed, hyaline, smooth or finely roughened, 10-15 µm wide	Smooth, thin-walled, 10-15 µm wide	Superficial, brown, smooth, thin-walled, *ca.* 4 µm wide	Pale olivaceous, superficial, smooth, 2.5-3 µm wide	Yellowish or brownish, warty walls, 10-15 µm wide
Conidiophores	Hyaline, verticillately or irregularly branched, up to 250 µm long, 8-14 µm wide at base, 7-9 µm at middle, 3.5-5 µm at apex	Hyaline, up to 350 µm, 8-14 µm wide at base, 7-9 µm at middle, 3.5-5.5 µm at apex	Brown, verruculose, swollen at the junction with conidiogenous cells, 140-300 µm × 2.5-4 µm	Olivaceous-brown, smooth, 325-450 × 2.5-4 µm, narrower at the base, *ca.* 2-3 µm	Main axis yellowish-brown, verruculose, with sterile setiform apex, fertile branches in the lower part, hyaline, up to 1 mm long, 4-15 µm wide, 9-18 µm near the base
Conidiogenous cells	Attenuated towards the slightly cicatrized or denticulate apex, hyaline, 8-23 (-30) µm long, 3.5-4 µm wide at septa, 1.5-2.5 µm at apex	Strongly recurved and denticulate apex with small denticulate region due to unilateral acropetal secession of conidia, hyaline, 9-21 × 4-4.5 µm	Obovoid to ellipsoid, + denticulate near the apex, brown, slightly lobed, 9-12 µm long, 3-6 µm at base, 2-4 µm at the apex	Clavate, hyaline, denticulate at the apex, denticles slender and elongated, 7.5-12.5 × 2-2.5 µm	Lageniform to flask-shaped, with strongly recurved and denticulate apex, hyaline, 10-15 × 4.5-6 µm

Table 1. (continued).

	C. clavata (Holubová-Jechová, 1980)	*C. micheneri* (Ellis, 1971; Holubová-Jechová, 1980)	*C. palmicola*	*C. phragmitis*	*C. terrestris* (Ellis, 1971; Holubová-Jechová, 1980)
Conidia	Clavate or obpyriform, smooth, truncate at the base, hyaline, 4-8 × 3-4 µm	Globose to subglobose with an inconspicuous apiculus, hyaline, smooth or finely echinulate, 3.5-4.5 (-5) µm diam.	Elliptic-fusiform to sub-fusiform, subhyaline to very pale olivaceous, smooth, truncate with a scar at the base, 5–8 × 3-4 µm	Globose to subglobose with an inconspicuous apiculus, hyaline, smooth, thin-walled, 2.5-4 µm diam.	Globose to subglobose with an inconspicuous apiculus, hyaline, smooth to finely roughened, 4-5.5 µm diam.
Diagnostic features	Clavate to obpyriform conidia	Recurved conidiogenous cells without sterile setiform apex	Conidiogenous cells slightly lobed forming wavy outline	Branching up to tertiary level, denticles slender and elongated	Recurved conidiogenous cells, conidiophores with sterile setiform apex
Habitat	On rotten conifer wood	On wood debris	On decaying petioles of *Livistona chinensis*	On decaying culms of *Phragmites australis*	On decaying wood and plant debris

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