

## ***Spadicoides palmicola* sp.nov. on *Licuala* sp. from Brunei, and a note on *Spadicoides heterocolorata* comb.nov.**

**T.K. Goh and K.D. Hyde**

**Abstract:** *Spadicoides palmicola* sp.nov. is described from a senescent leaf of *Licuala* sp. collected in Brunei. It differs from other *Spadicoides* species in having verruculose conidiophores producing verrucose, obclavate, rostrate, multi-euseptate, versicoloured conidia. *Spadicoides obclavata* Kuthub. & Nawawi var. *heterocolorata* R.F. Castañeda, Guarro & Cano is considered distinct from *Spadicoides obclavata*, and *Spadicoides heterocolorata* comb.nov. is proposed.

**Key words:** Hyphomycetes, *Licuala*, palm fungi, systematics, tropical fungi.

**Résumé :** Les auteurs décrivent le *Spadicoides palmicola* sp.nov. prélevé sur une feuille sénescence du *Licuala* sp. récoltée au Brunei. Il diffère des autres espèces de *Spadicoides* par ses conidiophores verruculeux portant des conidies verruqueuses, obclavées, rostrées, multi-euseptées et versicolorées. Les auteurs considèrent que le *Spadicoides obclavata* Kuthub. & Nawawi var. *heterocolorata* R.F. Castañeda, Guarro & Cano est distinct du *Spadicoides obclavata* et proposent le *Spadicoides heterocolorata* comb.nov.

**Mots clés :** Hyphomycètes, *Licuala*, champignons des palmiers, systématique, champignons tropicaux.

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### **Introduction**

The dematiaceous hyphomycete genus *Spadicoides* S. Hughes (1958) contains species that produce solitary, unicellular, or euseptate conidia from polytretic conidiogenous cells on macronematous, mononematous conidiophores (Ellis 1971, 1972; Holubová-Jechová, 1982). The genus has recently been reviewed by Goh and Hyde (1996), who accepted 21 species. A further taxon, *Spadicoides obclavata* Kuthub. & Nawawi var. *heterocolorata* R.F. Castañeda, Guarro, & Cano has since been described from dead leaves in Cuba (Castañeda Ruíz et al. 1997).

During a survey of microfungi occurring on palms in a tropical rain forest in Brunei, we identified a new species of *Spadicoides*, which is described and illustrated here. It is distinct among all previously described *Spadicoides* species (Castañeda Ruíz et al. 1997; Goh and Hyde 1996) in having verruculose conidiophores producing conidia which are verrucose, obclavate, rostrate, multi-euseptate, and versicoloured (comprises cells with various degrees of pigmentation). It is compared with *S. obclavata* Kuthub. & Nawawi

(Kuthubutheen and Nawawi 1991) and *S. obclavata* var. *heterocolorata* (sensu Castañeda Ruíz et al. 1997), which also produce obclavate, versicoloured conidia (Figs. 1–3, Table 1).

### **Taxonomy**

*Spadicoides palmicola* Goh & K.D. Hyde, sp.nov. (Figs. 3–21)

**ETYMOLOGY:** palmicola = referring to the palm substratum where this fungus was found.

Conidiophora mononematosa, non ramosa, erecta, recta vel leniter flexuosa, multiseptata, crassitunicata, verruculosa, 230–780 µm longa, apicem versus attenuata et versicoloria: ad basem robusta, 9–15 lata, atro olivaceobrunnea; superne plus minusve cylindrica, 7–8 µm lata, modice olivaceobrunnea; ad apicem rotundata vel subobtusa, 4.5–5.5 µm lata, dilute olivacea vel subhyalina. Conidia 25–70 × 5–7 µm, recta vel curvata, obclavata, ad basem obconico-truncata, ad apicem subacuta, saepe rostrata, verrucosa vel tuberculata, 3–5(–6)-euseptata, ad septa plerumque constricta, versicoloria: basem atro olivaceobrunnea, mediuam modice olivaceobrunnea, apicem subhyalina.

**HOLOTYPE:** BRUNEI DARUSSALAM: Temburong, Kuala Belalong Field Studies Centre, Ashton Trail, on veins of a rotten leaf of *Licuala* sp. (Arecaceae), Aug. 1997, K.D. Hyde & T.K. Goh, L13 (HKU(M) 4785).

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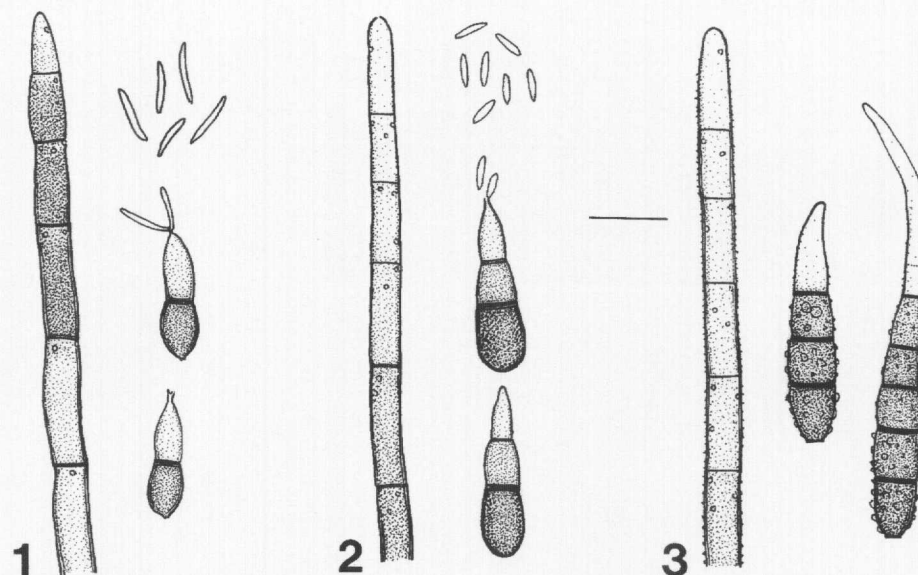
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**Figs. 1–3.** Conidiophores, conidia, and synanamorphs of *Spadicoides* species drawn to the same scale for comparison.

Fig. 1. *Spadicoides heterocolorata*, redrawn from Castañeda Ruíz et al. (1997). Note that the apex of the conidiophore is dark.

Fig. 2. *Spadicoides obclavata*, redrawn with reference to Kuthubutheen and Nawawi (1991). Note that the apex of the conidiophore is pale and smooth.

Fig. 3. *Spadicoides palmicola*, from holotype. Note that the apex of the conidiophore is also pale and distinctly verruculose. Scale bar = 10 µm.



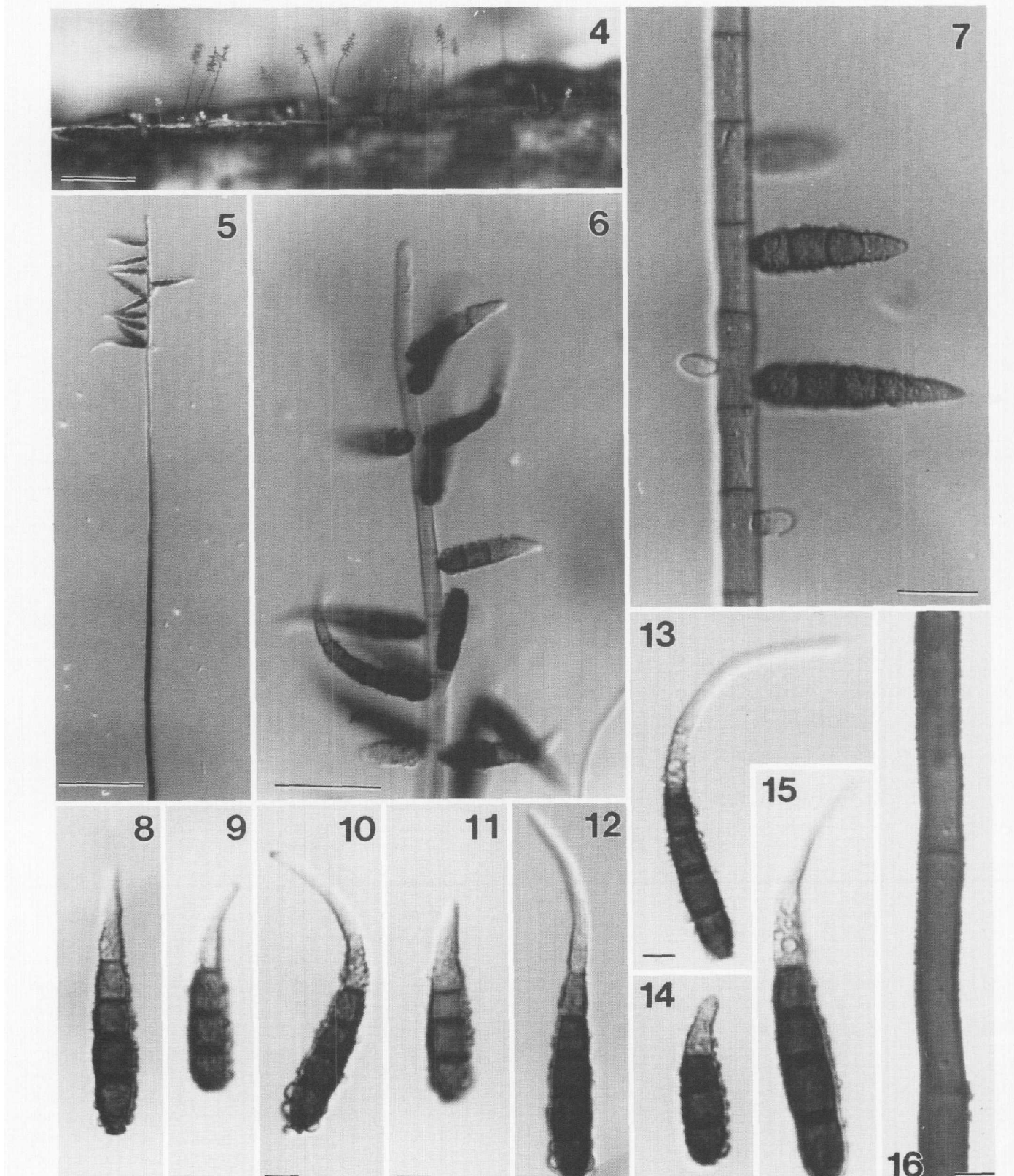
**Table 1.** Synopsis of characters of three similar *Spadicoides* species with obclavate conidia.

	<i>S. heterocolorata</i>	<i>S. obclavata</i>	<i>S. palmicola</i>
Source	Castañeda Ruíz et al. 1997	Kuthubutheen and Nawawi 1991	This paper
Host	Unidentified dead leaves (dicot)	Unidentified dead leaves (dicot)	Dead leaves of <i>Licuala</i> sp. (palm, monocot)
<b>Conidiophores</b>			
Wall texture	Smooth	Smooth	Verruculose
Colouration	Darker at the apex	Darker at the base	Darker at the base
Size	Up to 420 × 6–10 µm	Up to 550 µm long, 5–8 µm wide at base, 4–5 µm wide at apex	Up to 780 µm long, 7–15 µm wide at base, 4–5.5 µm wide at apex
<b>Conidia</b>			
Shape	Obclavate	Obclavate	Obclavate, rostrate
Colouration	Versicoloured	Versicoloured	Versicoloured
Wall texture	Smooth	Smooth	Verrucose, tuberculate
Base	Slightly protruding	Rounded	Obconically truncate
Septation	Mostly one-septate	Mostly two-septate	Mostly four- or five-septate
Size	16–25 × 3.5–5 µm	16–22 × 4–6 µm	25–70 × 5–7 µm
Synanamorph	<i>Selenospora</i> -like microconidia, 4–7 × 0.5–1 µm	<i>Selenospora</i> -like microconidia, 3.5–5 × ca. 1 µm	Absent
Type locality	Cuba	Malaysia	Brunei

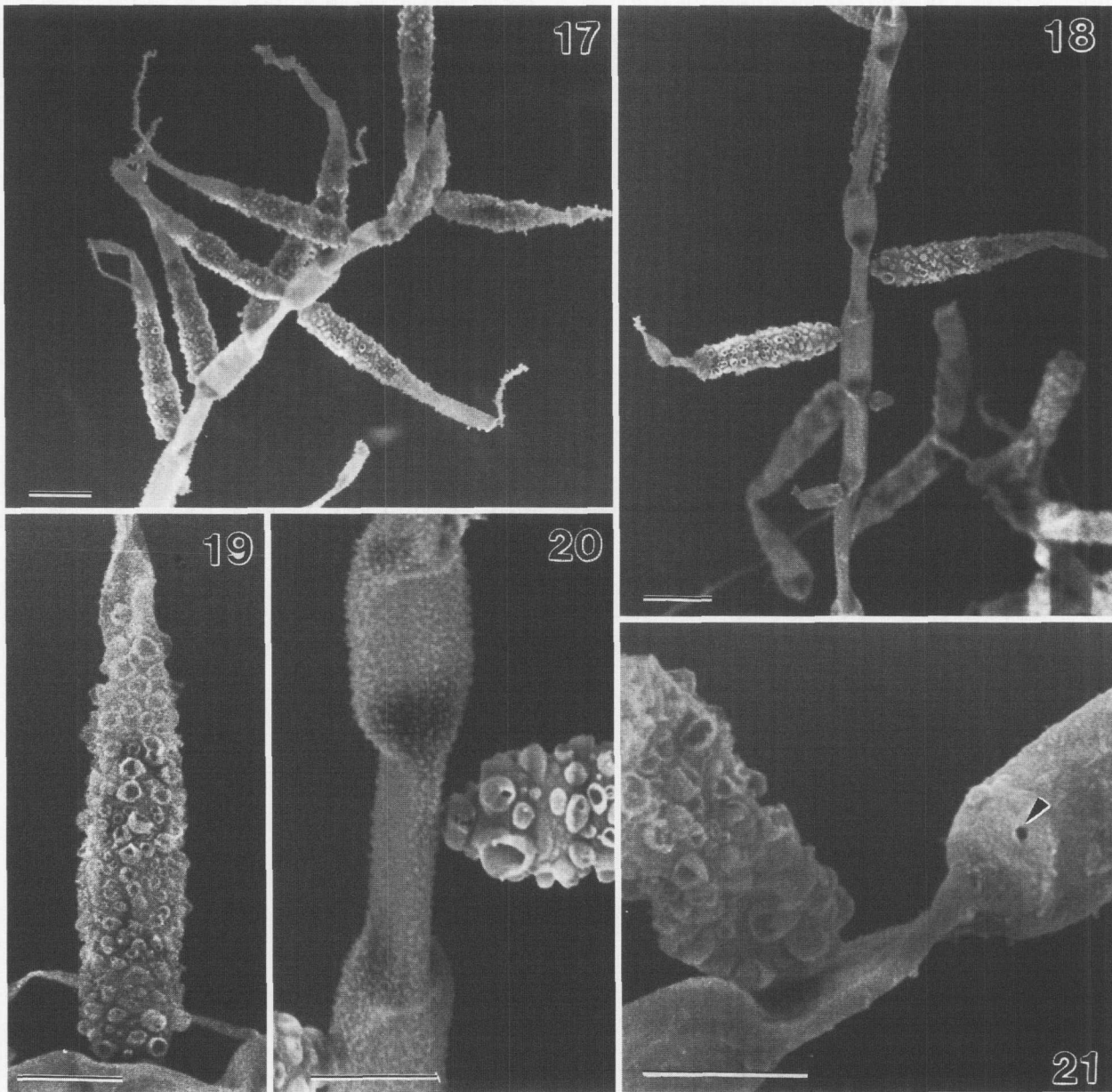
Colonies on natural substratum effuse, hairy, dark brown (Fig. 4). Mycelium partly superficial and partly immersed in the substratum, composed of subhyaline to pale brown, verruculose, septate, branched, 2–2.5 µm wide hyphae. Conidiophores macronematous, mononematous, unbranched, erect, straight to slightly flexuous, 230–780 µm long, rounded or subobtusate at the apex, robust at the base (9–15 µm wide), more or less cylindrical at the middle (7–8 µm wide) and gradually attenuated towards the apex (4.5–5.5 µm wide),

multiseptate, thick-walled, verruculose, versicoloured, dark olivaceous brown at the base, gradually paler and becoming subhyaline towards the apex (Figs. 5, 6, 16, and 20). Conidiogenous cells integrated, terminal and intercalary, polytretic, subhyaline to pale olivaceous brown (Figs. 7 and 21). Conidia straight to curved, obclavate, obconically truncate at the base, subacute at the apex, often rostrate, verrucose to tuberculate, with 3–5(–6) thick eusepta, usually constricted at the septa, versicoloured, with basal cell dark

**Figs. 4–16.** Light micrographs of *Spadicoides palmicola* from holotype. Fig. 4. A portion of the colonies on natural substratum. Fig. 5. A conidiophore bearing conidia. Note that the conidiophore apex is paler than its base. Fig. 6. A higher magnification of the apical portion of a conidiophore bearing conidia. Fig. 7. Close-up of the polytretic conidiogenous cells illustrating pores and developing conidia. Figs. 8–15. Conidia. Note the verrucose ornamentation of the wall and the hyaline, rostrate apex. Fig. 16. Middle portion of a conidiophore illustrating septation and verruculose wall. Scale bars: Fig. 4 = 500  $\mu\text{m}$ ; Fig. 5 = 100  $\mu\text{m}$ ; Fig. 6 = 20  $\mu\text{m}$ ; Fig. 7 = 10  $\mu\text{m}$ ; Figs. 8–16 = 5  $\mu\text{m}$ .



**Figs. 17–21.** Cryo-fixed SEM micrographs of *Spadicoides palmicola* from holotype. Figs. 17 and 18. Apical portions of conidiophores bearing conidia. Fig. 19. Higher magnification of a conidium showing coarsely verrucose or tuberculate wall. Fig. 20. Close-up of conidiophore and the base of a conidium, showing details of rough wall ornamentation. Fig. 21. Part of a conidiophore and the base of a conidium. Note conidiogenous pore (arrowed) in the conidiophore. Scale bars: Figs. 17 and 18 = 10  $\mu\text{m}$ ; Figs. 19–21 = 5  $\mu\text{m}$ .



olivaceous brown, central cells medium olivaceous brown, apical cells subhyaline,  $25\text{--}70 \times 5\text{--}7 \mu\text{m}$  (Figs. 8–15 and 17–19).

**Notes on *Spadicoides obclavata* var. *heterocolorata***

*Spadicoides obclavata* var. *heterocolorata* (Castañeda Ruíz et al. 1997) resembles *S. obclavata* (Kuthubutheen and Nawawi 1991) in its conidial morphology (Figs. 1 and 2). In both taxa, conidia are obclavate, versicoloured, and are of similar size. The Cuban taxon, however, was introduced as a “variety” and was considered to differ in conidial septation and conidiophore colouration. We, however, believe that *S. obclavata* var. *heterocolorata* is a distinct species from

*S. obclavata* (Table 1). In *S. obclavata*, the conidiophores are paler towards the apex and  $4\text{--}8 \mu\text{m}$  wide, and the conidia are mostly two-septate,  $16\text{--}22 \times 4\text{--}6 \mu\text{m}$ , with a smoothly rounded base. In *S. obclavata* var. *heterocolorata*, the conidiophores are darker towards the apex and  $6\text{--}10 \mu\text{m}$  wide, and the conidia are mostly one-septate,  $16\text{--}25 \times 3.5\text{--}5 \mu\text{m}$ , with an observable protruding hilum. Moreover, although a *Selenosporella*-like synanamorph has been reported in both taxa, the microconidia produced from the apical cell of their conidia differ in shape and size. In *S. obclavata*, the microconidia are shorter and spindle-shaped, more or less straight, and measure  $3.5\text{--}5 \times \text{ca. } 1 \mu\text{m}$  (Kuthubutheen and Nawawi 1991). In *S. obclavata* var. *heterocolorata* (sensu

Castañeda Ruíz et al. 1997), however, the microconidia are narrowly fusiform, slightly curved, and more slender ( $4\text{--}7 \times 0.5\text{--}1 \mu\text{m}$ ). Based on these differences, the Cuban taxon is considered to be separate species rather than a "variety." A new binomial name is therefore proposed.

*Spadicoides heterocolorata* (R.F. Castañeda, Guarro & Cano) Goh & K.D. Hyde, comb.nov.

≡ *Spadicoides obclavata* Kuthub. & Nawawi var. *heterocolorata* R.F. Castañeda, Guarro & Cano, Mycotaxon, 63: 177 (1997)

The conidia of *Spadicoides* species vary in shape. They are mostly ellipsoidal, obovoidal, or cylindrical, but may be cuneiform, cymbiform, or pyriform (Goh and Hyde 1996). In *Spadicoides heterocolorata*, *S. obclavata*, and *S. palmicola*, conidia are obclavate. *Spadicoides palmicola* differs from *S. heterocolorata* and *S. obclavata* primarily in having larger, four- or five-septate, coarsely verrucose conidia.

The ornamentation of the conidia in *S. palmicola* requires further elaboration. Under the light microscope this appears as a very rough, verrucose, or tuberculate wall comprising disc-like protrusions (Figs. 8–15). In the SEM, the disc-like protrusions are in fact cup-like elaborations that occur along the conidia wall (Figs. 17–21). In most cases, the rostrate apical cell lacks such exaggerated, coarse protrusions, but it is verruculose (Figs. 10, 12, 13, 17, and 18). The functions of these cuplike elaborations are unknown, but they may be involved in dispersal.

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## References

- Castañeda Ruíz, R.F., Guarro, J., and Cano, J. 1997. Notes on conidial fungi XII. New or interesting hyphomycetes from Cuba. *Mycotaxon*, **63**: 169–181.
- Ellis, M.B. 1971. Dematiaceous Hyphomycetes. Commonwealth Mycological Institute, Kew, Surrey, U.K.
- Ellis, M.B. 1972. Dematiaceous hyphomycetes. XI. *Mycol. Pap.* **131**: 1–25.
- Goh, T.K., and Hyde, K.D. 1996. *Spadicoides cordanoides* sp. nov., a new dematiaceous hyphomycete from submerged wood in Australia, with a taxonomic review of the genus. *Mycologia*, **88**: 1022–1031.
- Holubová-Jechová, V. 1982. Lignicolous Hyphomycetes from Czechoslovakia. 6. *Spadicoides* and *Diplococcium*. *Folia Geobot. Phytotaxon.* **17**: 295–327.
- Hughes, S.J. 1958. Revisiónes Hyphomycetum aliquot cum appendice de nominibus rejiciendis. *Can. J. Bot.* **36**: 727–836.
- Kuthubutheen, A., and Nawawi, A. 1991. Two new species of *Spadicoides* from Malaysia. *Mycol. Res.* **95**: 163–168.