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## A new species of *Spadicoides* and new records of bambusicolous hyphomycetes from Hong Kong

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*Spadicoides bambusicola* sp. nov. is described and illustrated from a dead culm of *Bambusa textilis* collected in Hong Kong. *Spadicoides bambusicola* resembles *S. palmicola* in having verruculose conidiophores producing verrucose, obclavate, multi-euseptate conidia, but differs from *S. bambusicola* in its bigger, concolorous conidia having a non-rostrate apex. *Didymobotryum verrucosum*, *Janetia synnematos*, *Penzigomyces flagellata*, *Veronaea coprophila* and *V. indica* are introduced as new records for Hong Kong.

**Key words:** bambusicolous fungi, Hong Kong, hyphomycetes, *Spadicoides bambusicola*, taxonomy

### Introduction

In our study of the fungal diversity on bamboo in Hong Kong, an undescribed species of *Spadicoides* (Goh and Hyde, 1996a) and some other hyphomycetes were collected. This undescribed species of *Spadicoides* resembles *S. palmicola* Goh and K.D. Hyde (1998) in having verruculose conidiophores, producing verrucose, obclavate, and multi-euseptate conidia. *Spadicoides palmicola*, however, differs from this undescribed species in its conidia with a rostrate, subhyaline apex and the conidia of *S. palmicola* are smaller ( $\bar{x} = 43 \times 6 \mu\text{m}$  vs.  $48 \times 7 \mu\text{m}$ ,  $n = 50$ ). *Spadicoides bambusicola* sp. nov. is therefore described in this paper. Several other interesting hyphomycetes were isolated and are introduced as new records for Hong Kong.

### Taxonomy

*Spadicoides bambusicola* D.Q. Zhou, Goh and K.D. Hyde, **sp. nov.** (Figs. 1-7)

*Etymology:* *bambusicola*, referring to the bamboo host of this species.

*Coloniae* in substrato naturali pilosae, atrobrunneae. *Mycelium* plerumque in substrato immersum. *Conidiophora* 150-350 × 4-5 µm, macronematosa, mononematosa, non ramosa, erecta, recta vel leniter flexuosa, multiseptata, crassitunicata, verruculosa, ad basim robusta et 5-7.5 µm lata. *Cellulae conidiogenae* in conidiophoris incorporatae, terminales vel intercalares, polytreticae, rectae. *Conidia* 30-72.5 × 5-7.5 µm, recta vel curvata, obclavata, ad basim obconico-truncata, verruculosa, 5-7-euseptata, ad septa plerumque constricta, viridulo-brunnea vel olivaceo-brunnea, crassitunicata.

*Colonies* on natural culms dense, hairy, dark brown. *Mycelium* mostly immersed in the substratum. *Conidiophores* 150-350 × 4-5 µm, macronematous, mononematous, unbranched, erect, solitary, straight or slightly flexuous, robust at the base (5-7.5 µm wide), multiseptate, verruculose, thick-walled, mid grayish brown to dark olivaceous brown. *Conidiogenous cells* integrated, terminal and intercalary, polytretic (up to 3 pores per cell). *Conidia* 30-72.5 × 5-7.5 µm ( $\bar{x}$  = 48 × 7 µm, n = 50), acropleurogenous, solitary, straight to slightly curved, obclavate, obconically truncate at the base, subacute at the apex, verrucose, with 5-7 eusepta, usually slightly constricted at the septa, thick-walled, olivaceous-brown or greenish brown.

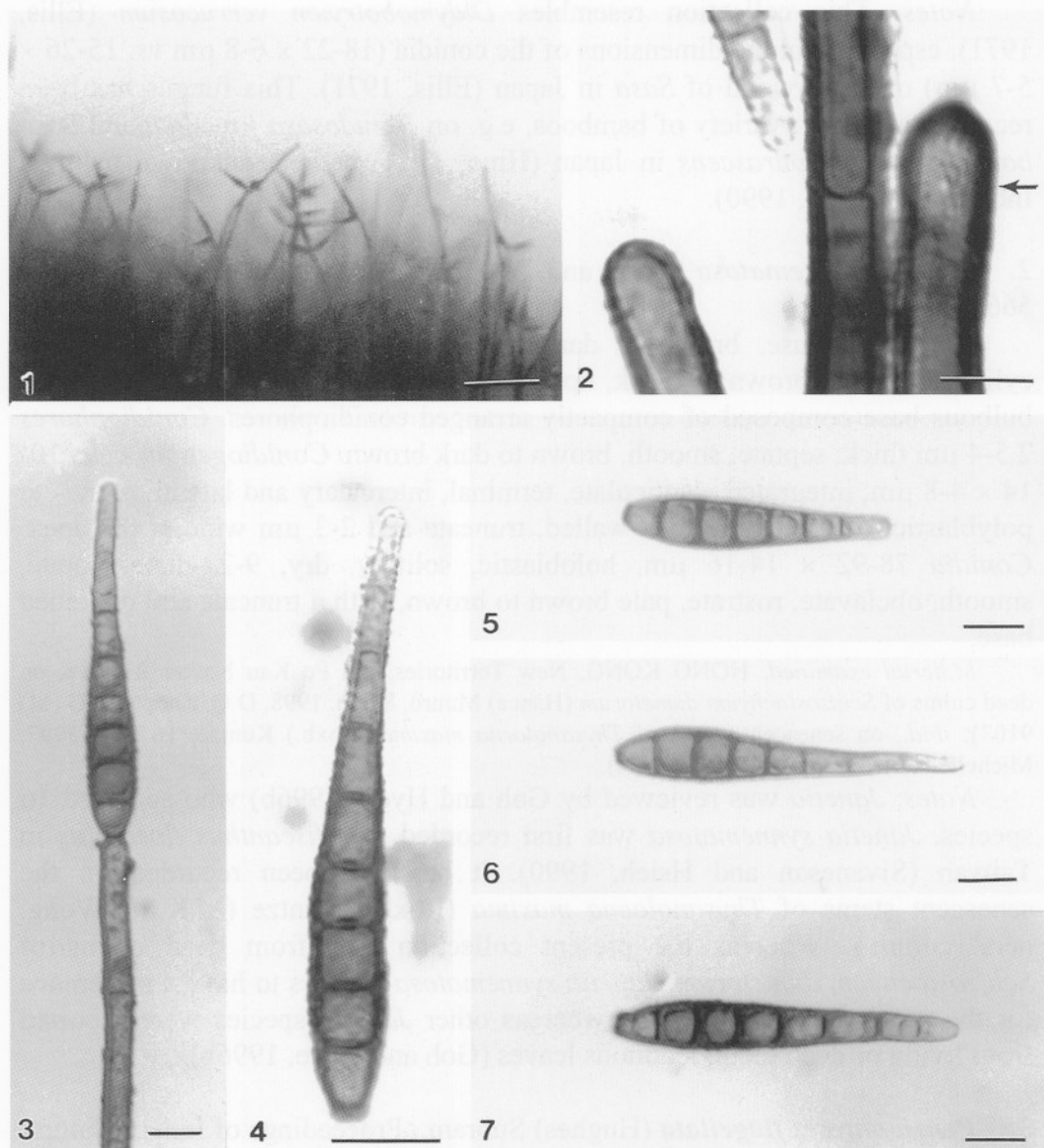
*Material examined:* HONG KONG, New Territories, Tai Po Kau Nature Reserve, on dead culms of *Bambusa textilis*, 10 Apr. 1998, D.Q. Zhou and T.E. Umali (HKU(M) 8333, HOLOTYPE; 9165, isotype).

*Notes:* *Spadicoides* was established in 1958 by S. Hughes with the type species *S. bina* (Corda) S. Hughes (Ellis, 1971). Goh and Hyde (1996a) reviewed the genus and discussed the similarities and differences between *Spadicoides* and *Diplococcium*. They accepted 21 species in *Spadicoides*. Two further species, namely *S. palmicola* Goh and K.D. Hyde and *S. heterocolorata* (R.F. Castañeda, Guarro and Cano) Goh and K.D. Hyde were added recently (Goh and Hyde, 1998). *Spadicoides bambusicola* cannot be confused with the species of *Helminthosporium*, although in the both genera, conidiogenous cells are polytretic, integrated, terminal and intercalary, determinate, cylindrical. The conidia in the species of *Helminthosporium* are pseudoseptate, frequently with a prominent, dark brown or black scar at the base (Ellis, 1971).

### **New records of bambusicolous hyphomycetes for Hong Kong**

1. *Didymobotryum verrucosum* Hino and Katumoto, Bulletin of the Faculty of Agriculture, Yamaguti University, 10: 1181 (1959).

*Colonies* effuse dark olivaceous-brown. Synnemata straight, up to 1 mm tall, 25-26 µm thick; separating threads 2-3 µm thick, septate, pale to mid olivaceous-brown. *Conidiogenous cells* usually clavate, swollen at the apex to 4-5 µm. *Conidia* 18-22 × 6-8 µm, clavate, cylindrical or ellipsoidal, rounded at the ends, pale to greyish olive.



**Figs. 1-7.** *Spadicoides bambusicola*, light micrographs. **1.** A portion of the colonies on bamboo culm. **2.** Close-up of conidiophores with conidiogenous pores (arrowed). **3.** Apex of a conidiophore with a developing conidium. **4-7.** Conidia. Bars: 1 = 100  $\mu\text{m}$ , 2 = 5  $\mu\text{m}$ , 3 = 50  $\mu\text{m}$ , 4-7 = 10  $\mu\text{m}$ .

*Material examined:* HONG KONG, Hong Kong Island, Lung Fu Shan Country Park, on dead culms of *Arundinaria hindsii* Munro, 10 Apr. 1998, D.Q. Zhou (HKU(M) 9086).

*Notes:* This collection resembles *Didymobotryum verrucosum* (Ellis, 1971), especially in the dimensions of the conidia ( $18-22 \times 6-8 \mu\text{m}$  vs.  $15-26 \times 5-7 \mu\text{m}$ ) on dead wood of *Sasa* in Japan (Ellis, 1971). This fungus has been recorded also on a variety of bamboos, e.g. on *Pseudosasa japonica* and *Sasa borealis* var. *purpurascens* in Japan (Hino, 1961) and an unknown palm in Indonesia (Seifert, 1990).

2. *Janetia synnematos* Sivan. and W.H. Hsieh, Mycological Research 94: 566 (1990). (Figs. 8-10)

*Colonies* effuse, brown to dark brown. *Synnemata* scattered, straight, cylindrical, dark brown to black, up to 27 mm tall, 500  $\mu\text{m}$  wide at the often bulbous base composed of compactly arranged conidiophores. *Conidiophores* 2.5-4  $\mu\text{m}$  thick, septate, smooth, brown to dark brown. *Conidiogenous cells* 10-14  $\times$  4-8  $\mu\text{m}$ , integrated, denticulate, terminal, intercalary and lateral, mono- to polyblastic, determinate, thick-walled, truncate and 2-3  $\mu\text{m}$  wide at the apex. *Conidia* 78-92  $\times$  14-16  $\mu\text{m}$ , holoblastic, solitary, dry, 9-22-distoseptate, smooth, obclavate, rostrate, pale brown to brown, with a truncate and darkened base.

*Material examined:* HONG KONG, New Territories, Tai Po Kau Nature Reserve, on dead culms of *Schizostachyum dumetorum* (Hance) Munro, 8 Sep. 1998, D.Q. Zhou (HKU (M) 9103); *ibid.*, on senescent stems of *Thysanolaena maxima* (Roxb.) Kuntze, 16 Sep. 1997, Michelle K.M. Wong (HKU(M) 12504).

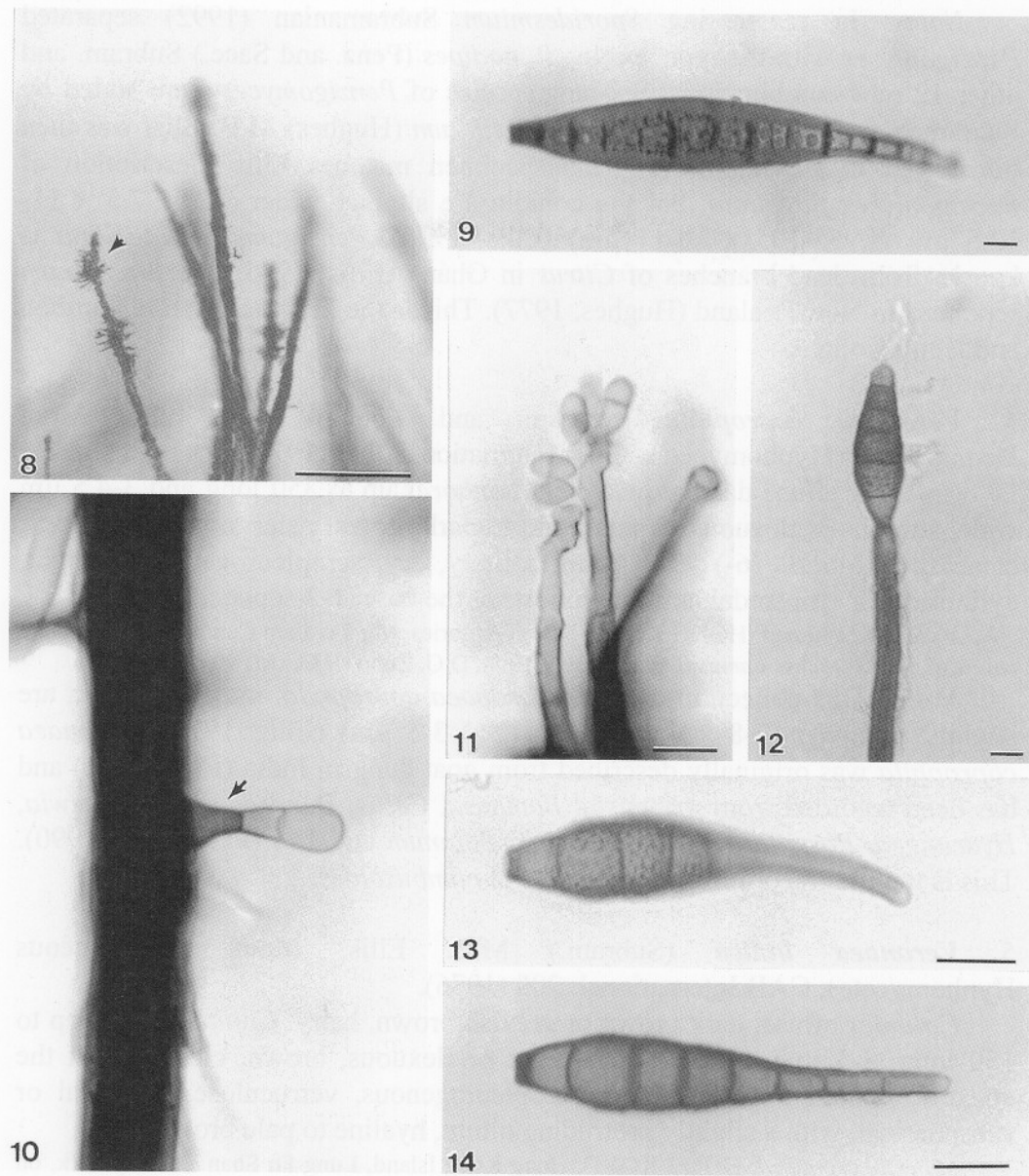
*Notes:* *Janetia* was reviewed by Goh and Hyde (1996b) who accepted 16 species. *Janetia synnematos* was first recorded on *Miscanthus floridulus* in Taiwan (Sivanesan and Hsieh, 1990). It has also been recorded on the senescent stems of *Thysanolaena maxima* (Roxb.) Kuntze (M.K.M. Wong, pers. comm.). Whereas the present collection was from dead culms of *Schizostachyum dumetorum*. *Janetia synnematos* appears to have a preference for the grass family (*Poaceae*), whereas other *Janetia* species were reported from living or dead dicotyledonous leaves (Goh and Hyde, 1996b).

3. *Penzigomyces flagellata* (Hughes) Subram., Proceedings of Indian Natural Science Academy, B58: 186 (1992). (Figs. 12-14)

For synonyms refer to Subramanian (1992).

*Colonies* effuse dark blackish brown. *Mycelium* partly superficial and partly immersed. *Conidiophores* 50-180  $\times$  5-7  $\mu\text{m}$ , straight, mid to dark brown, with 1-3 annellations. *Conidia* 52.5-97.5  $\times$  11-12.5  $\mu\text{m}$ , 4-5  $\mu\text{m}$  wide at the base, verrucose, pale to mid olivaceous-brown.

*Material examined:* HONG KONG, New Territories, Sai Kung, Tu Kwa Pin, on dead culms of *Indocalamus sinicus* (Hance) Nakai, 30 July, 1998, D.Q. Zhou (HKU(M) 9058).



**Figs. 8-10.** *Janetia synnematoso*. **8.** Synnemata with conidia. Note pleurogenous conidia (arrowed). **9.** Conidium. **10.** A conidiogenous cell (arrowed) on a synnema, bearing a developing conidium. **11.** *Veronaea coprophila*, conidiophores and conidia. **Figs. 12-14.** *Penzigomyces flagellata*. **12.** Conidiophore with a developing conidium. **13, 14.** Conidia. Bars: 8 = 300  $\mu$ m, 9-14 = 10  $\mu$ m.

*Notes:* In reassessing *Sporidesmium* Subramanian (1992) separated *Penzigomyces* with the type species *P. nodipes* (Penz. and Sacc.) Subram. and other 12 new combinations. Six new species of *Penzigomyces* were added by Subramanian (1997). *Sporidesmium flagellatum* (Hughes) M.B. Ellis was then transferred in *Penzigomyces*. This specimen matches Ellis' description of *Penzigomyces flagellata*, but the conidia are slightly wider ( $52.5-97.5 \times 11-12.5 \mu\text{m}$  vs.  $55-105 \times 10-11 \mu\text{m}$ ) (Ellis, 1976). *Penzigomyces flagellata* is known from dead branches of *Citrus* in Ghana (Ellis, 1976) and *Ripogonum scandens* in New Zealand (Hughes, 1977). This is the first record from bamboo and Hong Kong.

4. *Veronaea coprophila* (Subram. and Lodha) M.B. Ellis, More Dematiaceous Hyphomycetes, CAB International: 210 (1976). (Fig. 11)

*Colonies* effuse dark brown. *Conidiophores* up to 350 long and  $3-4.5 \mu\text{m}$  wide, straight or flexuous, septate, mid to dark brown, paler towards the apex, cicatrized. *Conidia* (6-)7-8  $\times$  4  $\mu\text{m}$ , solitary, dry, acropleurogenous, straight, cylindrical or ellipsoidal, conico-truncate at the base, 1-2-septate, hyaline.

*Material examined:* HONG KONG, New Territories, Mu Tsz Lam Country Park, on dead culms of *Phyllostachys bambusoides*, 29 July 1998, D.Q. Zhou (HKU(M) 9073).

*Notes:* This collection matches *Veronaea coprophila*, but the conidia are slightly narrower ( $7-8 \times 4 \mu\text{m}$  vs.  $6-12 \times 3-5 \mu\text{m}$ ) (Ellis, 1976). *Veronaea coprophila* was originally described from goat dung in India (Ellis, 1976) and has been recorded from *Artemisia*, *Bambusa*, *Celtis*, *Dendrocalamus*, *Grewia*, *Hydrangea*, *Passiflora*, *Prunus*, *Rumex*, *Solanum* and *Zea* (Paul *et al.*, 1990). This is the first record from *Phyllostachys bambusoides*.

5. *Veronaea indica* (Subram.) M.B. Ellis, More Dematiaceous Hyphomycetes, CAB International: 209 (1976).

*Colonies* effuse, dark brown or greyish brown, hairy. *Conidiophores* up to 150 long,  $3-5 \mu\text{m}$  wide, erect, straight or flexuous, brown, cicatrized at the apex. *Conidia*  $2.5-4 \mu\text{m}$  diam., acropleurogenous, verruculose, spherical or subspherical, with a slightly protruding hilum, hyaline to pale brown.

*Material examined:* HONG KONG, Hong Kong Island, Lung Fu Shan Country Park, on dead culms of *Arundinaria hindsii* Munro, 30 July 1998, D.Q. Zhou (HKU(M) 9084).

*Notes:* This specimen matches *Veronaea indica* except the conidia that was narrower ( $2.5-4 \mu\text{m}$  vs.  $5-7.5 \mu\text{m}$ ; Ellis, 1976). The species has been previously reported on *Phoenix* (Ellis, 1976). This collection extends the range of the hosts of a very terrestrial saprotrophic fungus.

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