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New saprobic fungi on palm fronds, including *Brachysporiopsis* gen. nov.

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Abstract – Collections of decaying palm fronds in tropical rainforests yielded a new ascomycete species, *Mangrovispora irregularis* sp. nov., and two new anamorphic fungi, *Brachysporiopsis chinensis* gen. et sp. nov. and *Pyricularia oncosperma* sp. nov. The new taxa are described and illustrated, and compared with similar taxa.

Ascomycetes / anamorphic fungi / palm fungi / systematics / taxonomy

INTRODUCTION

As part of an ongoing study of fungi occurring on tropical palm species we have provided ecological data (Yanna *et al*. 2001a,b; 2002) and have described several species new to science (Yanna *et al*., 2000a,b, 2001c; Smith & Hyde, 2001; Hyde *et al*. 2002; McKenzie *et al*. 2002). Further collections of fungi on fronds of palms in Brunei and Hong Kong yielded three new species: *Mangrovispora irregularis*, *Brachysporiopsis chinensis* and *Pyricularia oncosperma*. These taxa are described and illustrated in this paper.

MATERIAL AND METHODS

Decaying petioles and leaves of palms were collected in Brunei and Hong Kong. The samples were incubated at room temperature in plastic boxes containing moist paper and examined within two weeks for sporulating fungi. To obtain single spore cultures of *Mangrovispora irregularis*, a suspension of spores in sterile distilled water was pipetted on to water agar plates (Choi *et al*. 1999). Single spores were allowed to germinate and were then transferred to potato dextrose agar (PDA).

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TAXONOMY

Ascomycetes

***Mangrovispora irregularis* Yanna, W.H. Ho & K.D. Hyde, sp. nov.** Figs 1-8

Ascomata solitaria vel gregaria, 220-250 µm longa × 40-80 µm diam., immersa, subglobosa vel ellipsoidea, ostiolata, papillata, membranacea, paraphysaticum. Asci 100-140 × 8-10 µm, 8-spori, unitunicati, pedicellati, apparatu apicali praediti. Ascosporae 15-20 × 6-8 µm, uniseriatae, ellipsoidae, hyalinae, 3-septatae, tunica gelatinose praeditae.

Etymology: in reference to the "irregular" ascospore sheath.

Ascomata solitary or gregarious, 220-250 µm long × 40-80 µm diam., immersed, subglobose to ellipsoidal, axis oblique to host surface, ostiolate, papillate, neck protruding through the substratum, membranous (Figs 1, 2). Neck hyaline to pale brown, periphysate (Fig. 3). Peridium thin, up to 10 µm thick, hyaline, composed of thick-walled compressed cells towards the inside, and very thick-walled small cells towards the outside (Fig. 4). Paraphyses persistent, numerous, branched, septate and composed of 4-5 µm thick cells in a gel. Asci 100-140 × 8-10 µm ($\bar{x}$ = 130 × 8.5 µm, n = 25), 8-spored, unitunicate, pedicellate, thin-walled, with a non-amyloid, cylindrical, apical thickening (Figs 5, 6). Ascospores 15-20 × 6-8 µm ($\bar{x}$ = 16 × 7 µm, n = 25), uniseriate, ellipsoidal, hyaline, 3-septate, constricted slightly at the septa, thin-walled, surrounded by an irregular sheath (Figs 7, 8).

Colonies on PDA slow growing, attaining a diameter of 4-5 cm in 3 months at 25 ºC, pale brown in colour, texture leathery, effuse, with smooth margin, no diffuse pigments, reverse creamy pink; not fruiting.

Holotype here designated: HONG KONG SAR: Twisk, Tai Mo Shan, Tsuen Wan, on decaying rachis of *Phoenix hanceana*, 2 February 1999, Yanna and W.H. Ho, YAN 311 Ph (HKU(M) 10877, living culture in HKUCC 3867, 3868).

Notes: *Mangrovispora* was previously monotypic and represented by *M. pemphii* Hyde & Nakagiri (Hyde & Nakagiri, 1991). *Mangrovispora irregularis* differs from *M. pemphii* in having smaller ascospores (15-20 × 6-8 µm *vs* 25-39 × 12-14 µm) and an irregular sheath. *Mangrovispora* was originally placed in the Hyponectriaceae but is now considered better placed in the Phyllachorales.

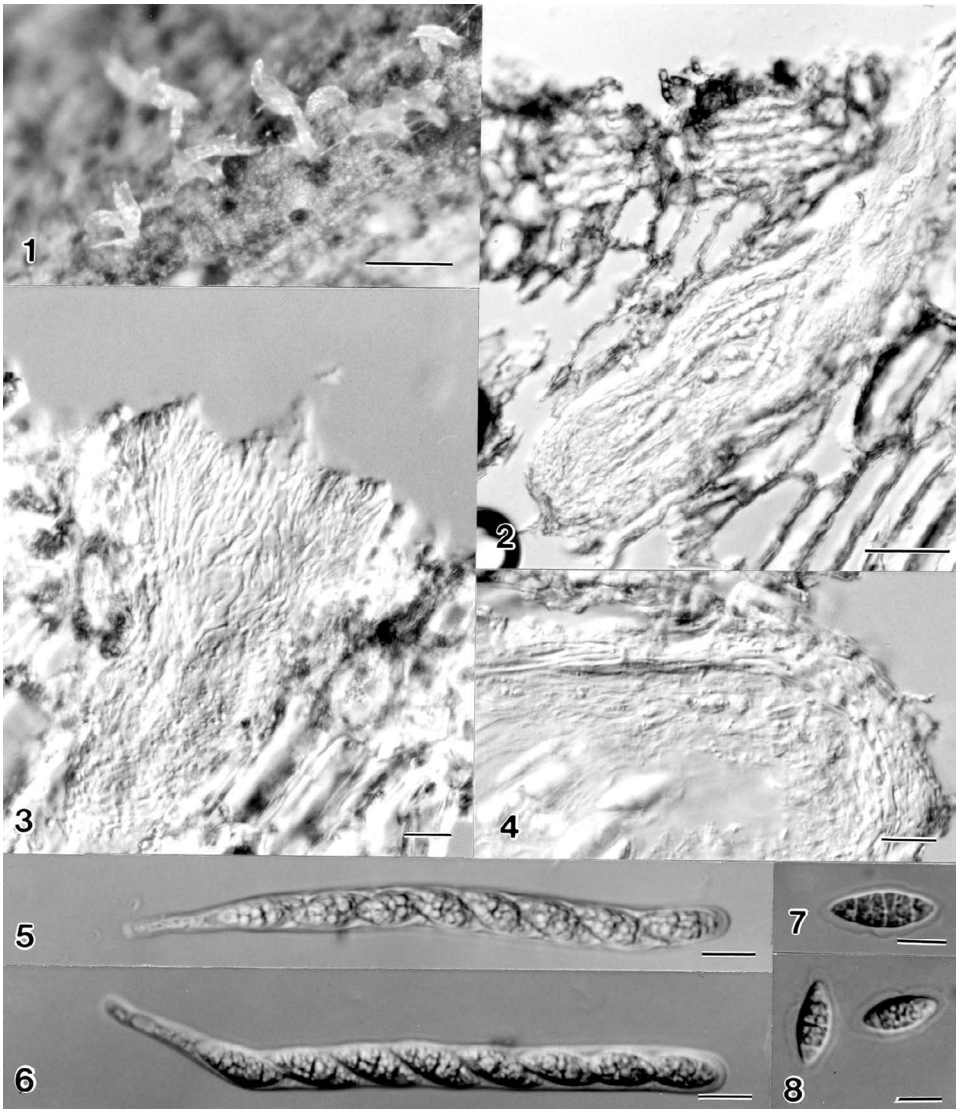
Anamorphic fungi

***Brachysporiopsis* Yanna, W.H. Ho & K.D. Hyde, gen. nov.**

Coloniae in substrato naturali effusae. Mycelium partim immersum. Stroma nullum. Setae et hyphopodia nullum. Conidiophora macronematosa, mononematosa, solitaria, erecta, recta vel flexuosa, atrobrunnea, cylindrica, cum ramis in uno verticillis ad apicem. Cellulae conidiogenae monoblasticae, integratae, terminales, determinatae, brunneae, cylindricae. Conidia acrogena, holoblastica, solitaria, sicca, atrobrunnea, pallidiores ad cellulas utrimque, obclavata, rostrata, septata, levia, tenuitunicata. Conidiorum secessio schizolytica.

Etymology: referring to the morphology being similar to *Brachysporiella*.

Colonies on natural substrata effuse. *Mycelium* partly immersed, partly superficial. *Stroma* absent. *Setae* and *hyphopodia* absent. *Conidiophores* macrone-



Figs 1-8 *Mangrovispora irregularis* (from holotype). 1: Appearance of immersed ascomata and protruding asci. 2: Section of an ascoma with hyaline peridium. 3: Periphysate neck of ascoma. 4: Peridium. 5, 6: Asci. 7, 8: Ascopores. (Scale bars: 1 = 250 μm; 2 = 50 μm; 3-8 = 10 μm).

matous, mononematous, solitary, erect, straight to flexuous, dark brown, cylindrical, bearing a whorl of branches at the apex. *Conidiogenous cells* monoblastic, integrated, terminal, determinate, brown, cylindrical. *Conidia* acrogenous, holoblastic, solitary, dry, dark brown, paler at the apical and basal cells, obclavate, rostrate, septate, smooth, thin-walled. *Conidial secession* schizolytic.

Type species: *Brachysporiopsis chinensis*.

Brachysporiopsis chinensis **Yanna, W.H. Ho & K.D. Hyde, sp. nov.** Figs 9-17

Coloniae in substrato naturali effusae, atrobrunneae, pilosae. Mycelium partim immersum, ex hyphis atrobrunneis, lobis, septatis, laevibus, tenuitunicatis, ca. 8 µm diam compositum. Conidiophora macronematosa, mononematosa, solitaria, erecta, recta vel flexuosa, levia, crassitunicata, multisepata, atrobrunnea, cylindrica, 40-90 × 8-9 µm, cum 5-8 ramis in uno verticillis ad apicem; rami 20-32 µm longi, 5-6 µm diam ad apicem. Cellulae conidiogenae monoblasticae, integratae, determinatae, brunneae, cylindricae, 3-6 × 3-4 µm. Conidia acrogena, holoblastica, solitaria, sicca, atrobrunnea, pallidiores ad cellulas utrimque, obclavata, rostrata, 4-5-septata, levia, tenuitunicata, 44-60 × 8-10 µm. Conidiorum secessio schizolytica.

Etymology: referring to the country where it was found.

Colonies on natural substrata effuse, dark brown, hairy. *Mycelium* immersed or superficial, composed of dark brown, lobed, septate, smooth, thin-walled hyphae, *ca*. 8 µm wide (Fig. 14). *Stroma* absent. *Setae* and *hyphopodia* absent. *Conidiophores* macronematous, mononematous, solitary, erect, straight to flexuous, smooth, thick-walled, multisepate, dark brown, cylindrical, 40-90 × 8-9 µm ($\bar{x}$ = 64 × 8.2 µm, n = 25), bearing a whorl of 5-8 branches at the apex; branches 20-32 µm long, 5-6 µm wide at the apex ($\bar{x}$ = 24 × 5.2 µm, n = 25) (Fig. 9). *Conidiogenous cells* monoblastic, integrated, determinate, brown, cylindrical, 3-6 × 3-4 µm ($\bar{x}$ = 4 × 3.8 µm) (Figs 10-13). *Conidia* acrogenous, holoblastic, solitary, dry, dark brown, paler at the apical and basal cells, obclavate, rostrate, 4-5-septate, smooth, thin-walled, 44-60 × 8-10 µm ($\bar{x}$ = 54 × 9.1 µm) (Figs 15-17). *Conidial secession* schizolytic.

Holotype here designated: HONG KONG SAR: Hong Kong Island, Victoria Peak, on decaying rachis of *Livistona chinensis*, 7 October 1999, Yanna and W.H. Ho, YAN 445 Li (HKU(M) 13660).

Notes: *Brachysporiopsis* is similar to *Brachysporiella* in having dark brown, usually branched conidiophores and producing holoblastic, dark brown, euseptate conidia (Ellis, 1971). *Brachysporiopsis* differs from *Brachysporiella* in that the apex of the conidiophore consistently bears a whorl of 5-8 branches. The conidiogenous cells of *Brachysporiopsis* are determinate, whereas those of *Brachysporiella* are percurrent. Conidia of *Brachysporiopsis* are widest at the lower portion and beaked, whereas those of *Brachysporiella* are widest at the upper portion and lack a beak.

Pyricularia oncosperma **Yanna, W.H. Ho & K.D. Hyde, sp. nov.** Figs 18-26

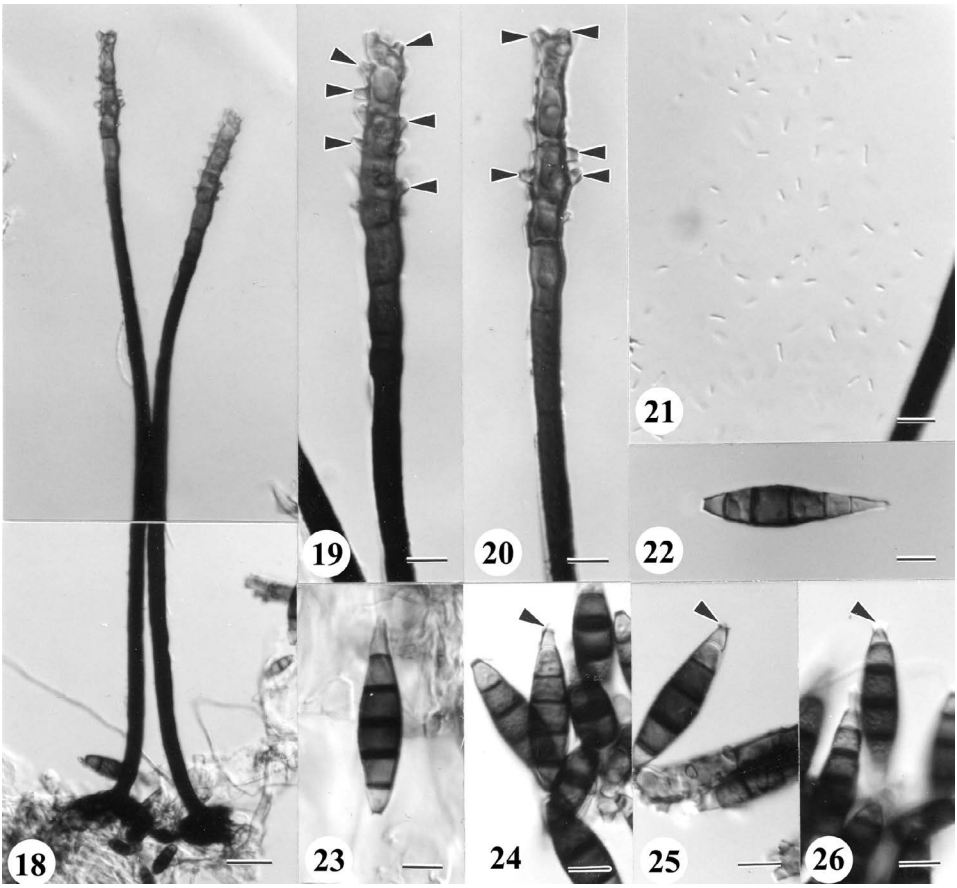
Coloniae in substrato naturali interspersae, sparsae, nigrae. Mycelium partim immersum, ex hyphis brunneis, septatis, laevibus, tenuitunicatis, ramosis compositum. Conidiophora macronematosa, mononematosa, solitaria, erecta, nonramosa, recta vel flexuosa, levia, crassitunicata, multisepata, atrobrunnea, pallidiores ad apices, cylindrica, 190-260 × 6-8 µm, cum denticlis conspicuis ad superius portiona. Cellulae conidiogenae polyblasticae, integratae, brunneae vel atrobrunneae, cylindricae, aseptatae, 24-44 × 9-10 µm, cum denticlis cylindricis et planis summis. Conidia acrogena, holoblastica, sicca, brunnea vel atrobrunnea, pallidiores ad cellulas utrimque, obclavata vel auguste ellipsoidea, 4-5-septata, verruculosa, 40-60 × 9-11 µm, cum synanamorphis. Synanamorpha conidia solitaria, aggregata in liquidis guttulis, hyalina, cylindrica, aseptata, levia, 4-5 × 1-1.5 µm. Conidiorum secessio schizolytica.

Etymology: referring to the host, *Oncosperma horridum*.

Colonies on natural subrata scattered, sparse, black. *Mycelium* partly immersed and partly superficial, composed of brown, septate, smooth, thin-walled,

Figs 9-17 *Brachysporiopsis chinensis* (from holotype). 9: A conidiophore on its host, with a developing conidium. 10-12: Upper part of conidiophores with branches and developing conidia. 13: Branches at the apex of a conidiophore. 14: Mycelium in host. 15-17: Conidia. (Scale bars: 9 = 100 μm; 10 = 50 μm; 11-17 = 10 μm).

branched hyphae. *Stroma* absent. *Setae* and *hyphopodia* absent. *Conidiophores* macronematous, mononematous, solitary, erect, unbranched, straight to flexuous, smooth, thick-walled, multiseptate, dark brown, paler towards the apex, cylindrical, 190-260 μm long, 6-8 μm wide ($\bar{x}$ = 230 × 7 μm, n = 25), bearing conspicuous denticles at the upper portion (Fig. 18). *Conidiogenous cells* polyblastic, integrated, brown to dark brown, cylindrical, aseptate, 24-44 × 9-10 μm ($\bar{x}$ = 38 × 9.2 μm, n = 25), with cylindrical and flat topped denticles (Figs 19, 20). *Conidia* acrogenous, holoblastic, solitary, dry, brown to dark brown, paler towards the ends, obclavate to narrowly ellipsoidal, 4-5-septate, verruculose, 40-60 × 9-11 μm ($\bar{x}$ = 44 ×



Figs 18-26 *Pyricularia oncosperma* (from holotype). 18: Conidiophores on natural substratum. 19, 20: Apical region of conidiophores. Note the denticles on the conidiogenous cells (arrowed). 21: Conidia of synanamorph in liquid droplet. 22-26: Conidia. Note the apical cells protruding through an opening at the tip (arrowed). (Scale bars: 18 = 50 μm; 19-26 = 10 μm).

10 μm, n = 25), with apical cells protruding through an opening at the tip (Figs 22-26). *Synanamorph* producing conidia at the protrusion of the apical conidial cells (Figs 29-31). *Conidia of synanamorph*, aggregated in liquid droplet, hyaline, cylindrical, aseptate, smooth, 4-5 × 1-1.5 μm ($\bar{x}$ = 4.1 × 1.2 μm, n = 25) (Fig. 21). *Conidial secession* schizolytic.

Holotype here designated: BRUNEI: Temburong, Batu Apoi Forest Reserve, The University of Brunei Darussalam Kuala Belalong Field Studies Centre (KBFSC), Baki Tributary, on decaying rachis of *Oncosperma horridum*, 14 October 1997, Yanna, YAN 104 On (HKU(M) 10174).

Other material examined: Brunei Darussalam, Temburong, Batu Apoi Forest Reserve, The University of Brunei Darussalam Kuala Belalong Field Studies Centre (KBFSC), Baki Tributary, on decaying rachis of *Oncosperma horridum*, 14 October 1997, Yanna, YAN 104 On (HKU(M) 10175, 10178).

Notes: There were previously 39 species and 10 varieties described in *Pyricularia*. However, only two of them, *P. buloloensis* Matsush. and *P. sphaerulata* Zucconi & Onofri produce conidia bearing liquid droplets at the apex, "calyptra gelatinosa" (Zucconi & Onofri, 1986). Only *P. sphaerulata* has an opening at the conidial apex. *Pyricularia oncosperma* can be distinguished from *P. sphaerulata* in conidial morphology (obclavate to narrowly ellipsoidal, 4-5-septate, verruculose, 40-60 × 9-11 μm *vs* fusiform, 3-septate, smooth-walled, 27.3-31.5 × 4-4.5 μm).

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