Fungal Diversity 2 (March 1999)

A new species of *Phragmitensis* (ascomycetes) from senescent culms of *Phragmites australis*

Michelle K.M. Wong*, Teik-Khiang Goh and Kevin D. Hyde

Fungal Diversity Research Project, Department of Ecology and Biodiversity, The University of Hong Kong, Pokfulam Road, Hong Kong; * email: mkmwong@hkucc.hku.hk

Wong, M.K.M., Goh, T.K. and Hyde, K.D. (1999). A new species of *Phragmitensis* (ascomycetes) from senescent culms of *Phragmites australis*. Fungal Diversity 2: 175-180.

A second species of *Phragmitensis*, *P. ellipsoidea* sp. nov., is described and illustrated, based on a collection from culms of *Phragmites australis* made in Hong Kong. Ascomata of this species are immersed in the substratum, and linearly aggregated with erumpent ostioles. Asci are clavate, unitunicate and lack an apical apparatus. Ascospores are one-celled, broadly ellipsoidal to reniform, hyaline, guttulate, and surrounded by a wide spreading mucilaginous sheath. *Phragmitensis ellipsoidea* is compared with *P. marina*.

Key words: Ascomycotina, graminicolous fungi, intertidal fungi, systematics.

Introduction

Mai Po Marshes, a nature reserve, is situated in the northwest of Hong Kong. It comprises numerous tidal shrimp ponds, named 'Gei Wai', which are utilised for both shrimp and fish culture. The operation of the Gei Wai involves flushing with estuarine water which creates an estuarine environment in the Gei Wai. (Lee, 1990) stated that *Phragmites australis* (Cav.) Trin. *ex* Steud was co-dominant with the native mangrove *Kandelia candel* (L.) Druce in the Gei Wai, and therefore provided a major source of primary productivity. We have therefore initiated a study to investigate the fungi occurring on decaying culms of *Phragmites australis* in Mai Po Marshes, and Poon and Hyde (1998) identified sixty-one species.

Phragmitensis K.M. Wong, Poon and K.D. Hyde was established based on *P. marina* K.M. Wong, Poon and K.D. Hyde which was collected from senescent culms of *Phragmites australis* in the intertidal region of Mai Po Marshes and Ting Kok in Hong Kong (Wong *et al.*, 1998). The characteristics of *Phragmitensis marina* include linear groups of ascomata within a common pseudostroma, clavate asci without an apical structure, and the unicellular, cymbiform, hyaline ascospores which are surrounded by a mucilaginous sheath.

Recently, we collected a further species of *Phragmitensis*. It differs from the type species in having ellipsoidal to reniform ascospores, and is therefore described as new in this paper.

Materials and Methods

Collections of *Phragmites australis* were made in Gei Wai number nine, Mai Po Marshes in May 1998. The decaying culms were cut at the root region. Erumpent-superficial ascomata were visible as linear aggregations of minute, black dots at the water/air interface, as well as the aerial parts of the culms.

Cultures were obtained by single-spore isolation. The surface of an ascoma was cut open and the contents were transferred to a drop of sterile distilled freshwater. The material was squashed with fine forceps to release the ascospores and then spread onto Potato Dextrose Agar plates (PDA). Germinated ascospores were transferred to PDA and incubated at room temperature (*ca* 22 C).

Taxonomy

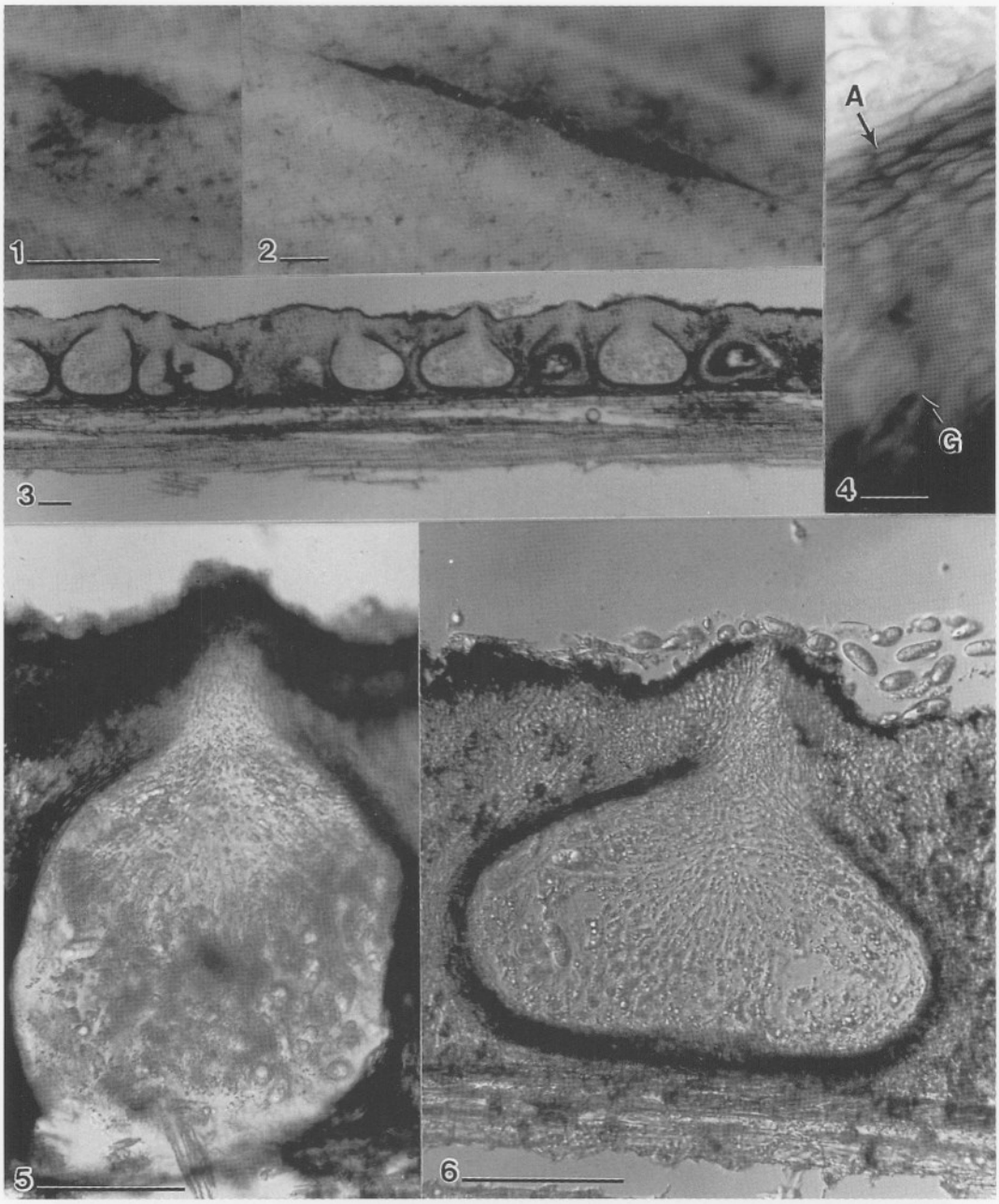
Phragmitensis ellipsoidea M.K.M. Wong, Goh and K.D. Hyde, sp. nov.

(Figs. 1-15)

Etymology: ellipsoidea, referring to the shape of the ascospores.

Coloniae in substrato naturali immersae, cum multiostiolis erumpentibus recte gregariae. *Pseudostromata* 250-288 µm alta, usque 7.5 µm longa. *Ascomata* 245-285 µm alta, 225-300 µm in diametro, immersa, ostiolata, obpyriformia, paraphysata. *Asci* 90-120 × 21.5-27.5 µm, 8-spori, clavati, unitunicati, tenuitunicati, deliquescentes, breve pedicellati, apparato apicali non praediti. *Ascosporae* 28-34 × 12-13 µm, biseriatae vel interdum triseriatae, late ellipsoideae vel reniformes, hyalinae, unicellulares, laeves, guttulatae, cum tunico mucilaginoso praeditae.

Colonies on PDA effuse, flat, greyish white, about 5 cm diam. after one week, medium-dense, fluffy, with tufts of mycelium growing upwards in central region (*ca* 2 cm diam.), staining the media pale orange, not producing fruiting structures. *Colonies* on natural substrata immersed, forming linear cracks with erumpent ostioles (Figs. 1-2). *Pseudostromata* 250-288 µm high, up to 7.5 µm long (Fig. 3), comprising an upper darkened amorphous layer (*ca* 5-6 µm thick), and a lower layer with hyaline hyphae beneath the host epidermal tissue (Fig. 3), stromatic tissues immersed in the host collenchymatous tissues, mostly comprising 1 to 15 (or up to 30) ascomata. *Ascomata* 245-285 µm high ($\bar{x}$ = 236, n = 10) and 225-300 µm diam. ($\bar{x}$ = 268, n = 10), immersed, ostiolate, obpyriform, with a rounded (Fig. 5) or flattened (Fig. 6) base, with a conical papilla which emerges through the stromatic tissue and host epidermis (Figs. 5-6). *Ostiole* 50-85 µm long and 7-8 µm diam., central, papillate, circular, hyaline and periphysate (Fig. 6). *Peridium* 8-10 µm wide, except at the neck,



Figs. 1-6. *Phragmitensis ellipsoidea* (from holotype). **1, 2.** Colonies on natural substratum with a single ascoma (in 1) and multiple ascomata (in 2). **3.** Section of a pseudostroma illustrating linearly arranged ascomata covered by a black amorphous layer. **4.** Peridium comprising two strata: an inner stratum of *textura angularis* (A) and an outer stratum of *textura globulosa* (G). **5, 6.** Section of ascomata. Bars: 1, 2 = 10 mm, 3 = 100 μm, 4 = 5 μm, 5, 6 = 100 μm.

Figs. 7-15. *Phragmitensis ellipsoidea* (from holotype). **7.** A cluster of thin-walled asci. **8, 9.** Mature asci with short pedicels. **10-13.** Mature ascospores, each with a wide spreading mucilaginous sheath (in Indian Ink). **14, 15.** Paraphyses with unequal width and constricted at the septa. Bars: 7 = 50 µm, 8, 9 = 10 µm, 10-13 = 10 µm, 14, 15 = 10 µm.

comprising two stata of cell (Fig. 4), an inner stratum of *textura angularis* (A) and an outer stratum of *textura globulosa* (G). Asci and paraphyses arising from the base and lateral wall of peridium. *Paraphyses* deliquescent, hypha-like, flexuous, markedly irregular in width (Fig. 15), thin-walled, septate, constricted at the septa, ends free, tapering slightly to a blunt apex, embedded in gelatinous matrix. *Asci* 90-120 × 21.5-27.5 μm ($\bar{x}$ = 105 × 25.3 μm, n = 10), 8-spored, clavate, thin-walled, deliquescent, short-pedicellate, lacking an apical apparatus (Figs. 7-9). *Ascospores* 28-34 × 12-13 μm ($\bar{x}$ = 32 × 12.6 μm, n = 20), biseriate, occasionally triseriate, broadly ellipsoidal to reniform, hyaline, one-celled, smooth, guttulate, and surrounded by a wide spreading mucilaginous sheath (Figs. 10-13).

Materials examined: HONG KONG, New Territories, Mai Po Marshes, Gei Wai number nine (22°29'N, 114°02'E), on intertidal to aerial culms of senescent *Phragmites australis*, 7 Aug. 1997, Michelle K.M. Wong (HKU(M) 8001, holotype); *ibid.*, 7 Aug. 1997 (HKU(M) 8003, topotype).

Discussion

Phragmitensis ellipsoidea and *P. marina* share several similarities. Both species colonise intertidal culms of senescent *Phragmites australis*. The pseudostromata, ascomata, asci and the appearance of cultures on PDA are also similar. *Phragmitensis ellipsoidea* differs from *P. marina* as the ascospores in *P. marina* are spindle-shaped, whereas those in *P. ellipsoidea* are broadly ellipsoidal. Moreover, *P. ellipsoidea* was found in freshwater and colonised aerial culms, whereas *P. marina* was found in a saline estuarine habitat and occurred in intertidal region only.

The ascospores of *Phragmitensis ellipsoidea* resemble several species of *Phyllachora*, for example, *P. graminis* (Pers.:Fr.) Nitschke, *P. hakeicola* Pearce and K.D. Hyde, and *P. melaleucae* Syd. and P. Syd., in having ellipsoidal ascospores surrounded by a mucilaginous sheath (Hanlin, 1990; Pearce and Hyde, 1995a,b). However, in most *Phyllachora* species ascomata are immersed in a black stroma and the asci are usually provided with an apical apparatus.

Acknowledgements

Michelle Wong is grateful to the Department of Ecology and Biodiversity, The University of Hong Kong for the award of Part Time Demonstratorship. T.K. Goh is also grateful for the award of a Post Doctoral Fellowship. Helen Leung is thanked for technical assistance.

References

Hanlin, R.T. (1990). Illustrated Genera of Ascomycetes. The American Phytopathological Society Press, USA.

Lee, S.Y. (1990). Net aerial primary productivity, litter production and decomposition of the reed *Phragmites communis* in a nature reserve in Hong Kong: management implications. Marine Ecology Progress Series 66: 161-173.

Pearce, C.A. and Hyde, K.D. (1995a). *Phyllachora* from Australia. Observations on *P. pseudostromatica*, *P. melaleucae* and a new species, *P. shivasii* from the host *Melaleuca* Mycological Research 99: 1253-1260.

Pearce, C.A. and Hyde, K.D. (1995b). *Phyllachora* from Australia. Observations on *P. grevilleae* and two new species: *P. victoriensis* and *P. hakeicola* from *Hakea*. Mycological Research 99: 1261-1267.

Poon, O.K. and Hyde, K.D. (1998). Biodiversity of intertidal fungi on *Phragmites australis* in Mai Po Marshes Hong Kong. Botanical Marina 41: 141-155.

Wong, M.K.M., Poon, O.K. and Hyde, K.D. (1998). *Phragmitensis marina* gen. et sp. nov., an intertidal saprotroph from *Phragmites australis* in Hong Kong. Botanical Marina 41: 379-382.