Fungi from palms. XXXV. *Thyridium chrysomallum* associated with *Archontophoenix alexandrae* (Palmae) cultivated in Hong Kong

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Taylor, J. E., K. D. Hyde & E. B. Gareth Jones (1997). Fungi from palms. XXXV. *Thyridium chrysomallum* associated with *Archontophoenix alexandrae* (Palmae) cultivated in Hong Kong. Sydowia 49(1): 94–100.

A collection of *Thyridium chrysomallum* was found on dead petioles of *Archontophoenix alexandrae* (Palmae) in Hong Kong. This collection differed from previous material in having immersed, single ascomata and pale brown ascospores. Because of the similarities of other characteristics we do not consider the collection to represent a further species of *Thyridium* but report our species here to illustrate the variation exhibited in the taxon. The ascospores are illustrated by SEM to show the unique wall thickenings.

Keywords: Thyridiaceae, SEM, *Archontophoenix*, palm.

Archontophoenix alexandrae Wendl. is endemic to northern Queensland, Australia. It occurs in the rainforests of tropical and warm temperate regions, ranging from the northern coast of Queensland to the southern coast of New South Wales and is found in damp areas such as along streams, gullies and adjacent to swamps. It is grown commercially as an ornamental throughout regions with a favourable climate (Uhl & Dransfield, 1987). *Archontophoenix alexandrae* grows well in Hong Kong and the New Territories where it has been widely planted for many years.

Only in recent years has the mycobiota of *A. alexandrae* been studied to any extent (Matsushima, 1989; Hyde, 1994). Fröhlich & Hyde (1995) described *Maculatipalma frondicola* on a specimen of *A. alexandrae* on Mount Lewis in northern Queensland [now *Archontophoenix purpurea* Hodel & Dowe according to Dowe & Hodel (1994)]. No fungi have been described from *A. alexandrae* in Hong Kong where it occurs outside of its natural environment, although in the present study J.T. has collected many species, of which several are new to science. In this paper we report a collection of *Thyridium chrysomallum* from dead petioles of *Archontophoenix alexandrae*

(Palmae) in Hong Kong. This collection differs from previous material in having single immersed ascomata and pale brown ascospores. We do not consider the collection to represent a further species of *Thyridium* but report it here to describe variation in the taxon. The ascospores are illustrated using SEM to show the unique wall thickenings and a discussion on the presence of septa is given.

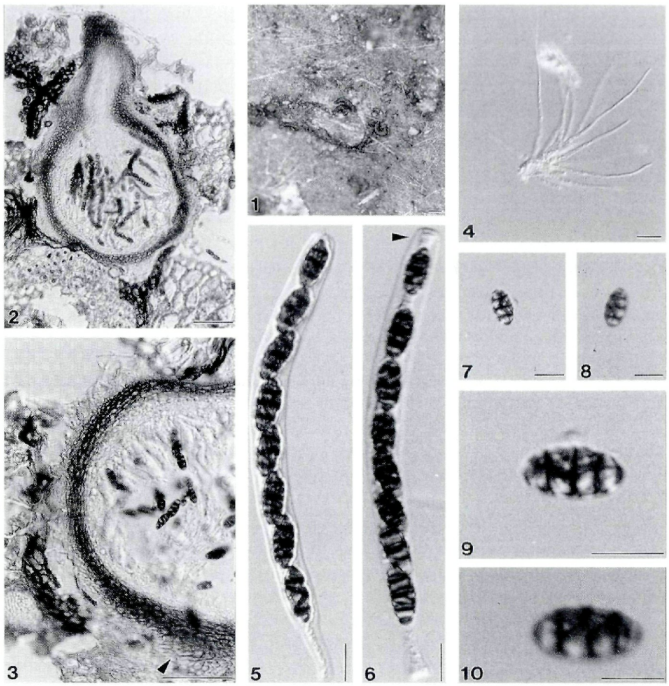
Materials and methods

Mature established palms were visited at two separate sites on Hong Kong and Lamma Island during the wet season in late June/early July 1994. Dead material of rachids, leaves and flowering parts were collected. These were returned to the laboratory and studied within one week. All measurements were made in water. Single spore isolations of this species were unsuccessful.

Taxonomy

Thyridium chrysomallum (Berk. & Broome) O. E. Eriksson & J.-Z. Yue, Syst. Ascomyc. 8:12. 1989. – Figs. 1–14.

Ascomata visible as minute blackened curved necks on the host surface, semi–immersed, erumpent through the cuticle and some of the epidermal cell layers (Fig. 1), solitary or gregarious; in vertical section 170–220 × 160–220 µm, globose, with long axis vertical to that of the host surface, ostiolate. – Neck 300–750 × 62.5–100 µm, curved, often lying across the host surface, periphysate. – Peridium 26–50 µm wide ($\bar{x}$ = 39, n = 8), (60–90 µm ($\bar{x}$ = 72, n = 3) near neck) several cells thick, comprising an outer hyaline layer of globose cells, with small lumina and an inner layer comprising angular brown–walled cells hyaline and thinner inwardly (Figs. 2–3). – Paraphyses 2.5–3.75 µm wide ($\bar{x}$ = 3.4 µm, n = 10) tapering slightly distally, sparsely septate, unbranched, same length as asci (Fig. 4). – Asci 95–112.5 × 8.75–10 µm ($\bar{x}$ = 107 × 9.3 µm , n = 25), 8–spored, cylindrical, unitunicate, pedicellate, apex broadly truncate with a J–, refractive apical apparatus (Figs. 5–6). – Ascospores 12.5–16.25 × 5–10 µm ($\bar{x}$ = 14.5 × 6.5 µm, n= 50), uniseriate, ellipsoid to ovoid, occasionally guttulate, muriformly septate, with three transsepta, joined by two oblique septa giving a helical appearance, septa distinct and dark brown, with the wall thickened and mid brown adjacent to the septa (ca. 0.8–1.2 µm wide) and at the apices of the spore, closely adherent mucilaginous layer hyaline to pale brown, beneath thickened walls with cell slightly constricted between septa (Figs. 7–14).



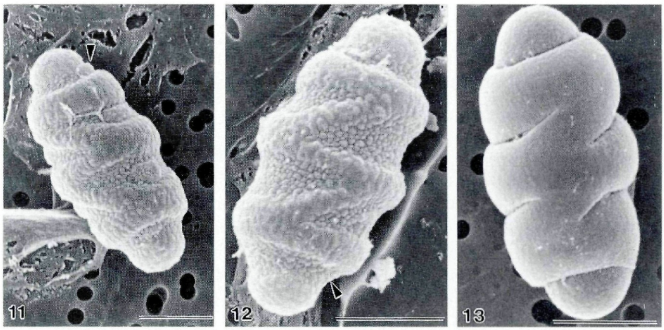
Figs. 1–10. – *Thyridium chrysomallum*. – 1. Appearance of ascomata on host surface. – 2, 3. Vertical sections through ascomata showing periphysate ostiole with a long neck, and arrangement of peridium cells. – 4. Paraphyses. – 5, 6. Asci showing refractive apical apparatus (arrowed). – 7–10. Ascospores, pale brown showing thickened pigmented walls. Bars: 1 = 500 µm; 2, 3 = 50 µm – 4 = 20 µm – 5–10 = 10 µm.

Habitat. – Saprobic on *A. alexandrae* rachids.

Known distribution. – Hong Kong; China, Hainan, Island; Peradeniya, Sri Lanka.

Known hosts. – *A. alexandrae*, Bamboo sp. and palm sp.

Material examined. – HONG KONG: Peak Road, dead rachis of *A. alexandrae*, 27 June 1994, J. E. Taylor and K. D. Hyde, JP263, HKU(M)3519; Lamma Island, dead rachis of *A. alexandrae*, 9 July 1994, J. E. Taylor and I. C. Taylor, JP291, HKU(M)3539.



Figs. 11–13. – *Thyridium chrysomallum*. SEM, Ascospores in various stages of development. – 11, 12. Note the closely adherent mucilaginous sheath (arrowed) with the overlying thickened walls and the mucilage surrounding the mature ascospores. – 13. An immature ascospore with less associated mucilage. Bars: 11–13 = 5 µm.

Discussion

In our collection of *Thyridium chrysomallum* ascomata were semi-immersed and non stromatic occurring singularly, scattered or gregarious, and having a central ostiole with long necks (Figs.1–2). Paraphyses were unbranched, slightly tapering and of the same

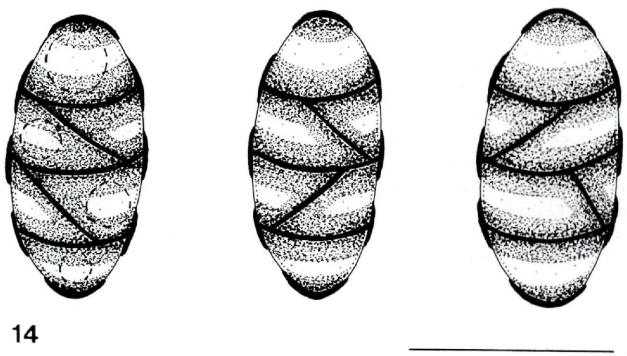


Fig. 14. – *Thyridium chrysomallum*. – 14. A diagramatic representation of the ascospores. Bar = 10 µm.

length as the asci (Fig. 4). Asci were unitunicate, cylindrical, with a truncate tip and a J- refractive apical ring (Figs. 5–6). The ascospores were uniseriate, ellipsoid to ovoid, muriformly septate, encased in a closely adherent mucilaginous layer, hyaline to pale brown, with mid brown thickened walls adjacent to septa and at the apices (Figs. 7–14).

Our collection of *Thyridium chrysomallum* has very distinctive ascospores and when first identified we could find no genus to accommodate it adequately. Because of its distinctive ascospores we were convinced that it must have been described previously and carried out an extensive search for a name. A literature search revealed that it closely resembles *Fenestella subvestita* Ferd. & Winge as illustrated by Ferdinandsen & Winge (1908). The type material was requested (Denmark, Lyngby Mose, near Hafniam, on a branch of *Alnus glutinosa*, February 1909, Ferdinandsen & Winge, C.) and examined and these fungi were found to differ greatly. In *Fenestella subvestita* ascomata occur in groups around a common central ostiole. The ascomata are semi immersed, erumpent and have short necks. Asci are bitunicate and pseudoparaphyses are trabeculae. Ascospores are mid to dark brown, ellipsoid to fusiform, 3-septate and slightly constricted at the septum.

Thyridium chrysomallum is also comparable with *Lepteutypa* Petr. in the Amphisphaeriaceae. The most significant difference between the two genera is the J- apical ring in *T. chrysomallum* as compared to the J+ ring in *Lepteutypa*. Furthermore, in *T. chrysomallum* the ascospores are muriformly septate with pigmented, thickened walls adjacent to the septa and at the apices, while in *Lepteutypa* there are transseptа without thickenings (Barr, 1993; Goh & Hyde, 1996).

The ascospores in our species most closely resembled those of *Sinosphaeria bambusicola* J.-Z. Yue & O. E. Erikss. (= *Thyridium chrysomallum*) in the Thyridiaceae. This family was erected by combining the genera *Thyridium* (formerly placed in the Amphisphaeriaceae) and *Sinosphaeria* (formerly in the Hypocreaceae) which were considered to be closely related, and atypical of their respective former families (Yue & Eriksson, 1987; Eriksson & Yue, 1989). In *Thyridium chrysomallum*, clustered ascomata develop in a rather dense yellow stromata, comprising a dense subiculoid network of rather thin-walled, branched, intertwining hyphae (Yue & Eriksson, 1987). Since our species lacked a stroma, and ascomata were mainly individual we were reluctant to include it in *T. chrysomallum*. We borrowed material from UPS (P.R. China, Hainan Province, Ai County, Nan Tian farm, Red Flag District, beside a small stream, 14 July 1987, Yue, J.-Z., Tian, J. X. and Eriksson, O. E. 870114-2a, isotype) and K (Sri Lanka, Peradeniya, on a palm stem,

September 1868, N.N. 1071, holotype) and compared the two species. The asci and ascospores were similar. The asci were of the same dimensions but lacked the distinct, apical apparatus visible in our specimens. The ascospores were of the same dimensions but paler than in our specimens. By viewing the spores under SEM we were able to elucidate the structure of the spore wall. It appeared that the spores are surrounded by a closely adherent mucilaginous sheath, which has not been discussed previously, over which are the pigmented thickened, similarly mucilaginous, walls adjacent to the septa and apicies (Figs. 11–14). We considered that the spore was possibly non-septate and simply ornamented, although it is difficult to establish without undertaking TEM studies. When the spores were examined with the stain lactophenol cotton blue, however, the unpigmented bands of young spores stained blue indicating that they were septa.

Thyridium chrysomallum has been described on several occasions and the earliest name is *Melanospora chrysomalla* Berk. & Broome. For other synonyms see Eriksson & Yue (1989).

The discovery of this conspicuous saprobic fungus on an introduced ornamental palm raises several questions. It has already been reported in China but on bamboo culms, and in Sri Lanka on a palm. However, this fungus has so far not been discovered in the hosts native range of northern Queensland. This area is poorly studied in terms of the mycobiota of the native palms, as is Hong Kong. Therefore, it is possible that it could have been introduced with the palm when it was imported as a sapling or associated with seeds. This is potentially possible for the Lamma island site, where the palms were obviously planted, but whether they were brought in as saplings or grown in Hong Kong from seeds is unknown. The palms at the Hong Kong Island site, however, were certainly self sown, indicating that the fungus is present locally and is not highly host specific. To try to determine the biogeography and host species range of *Thyridium chrysomallum* and other palm fungi, we are presently carrying out research into the mycobiota of *A. alexandrae* within and outside its natural range.

Acknowledgments

We are grateful to O. Eriksson who called our attention to *Thyridium chrysomallum*. We thank Mr A. Y. P. Lee for photographic assistance, Dr. Susan Saunders for the illustrations and Helen Leung for technical assistance. Joanne Taylor wishes to thank the University of Hong Kong for the award of a studentship. Prof. E. B. G. Jones is grateful to the British Council for travelling funds. The curators of C, and UPS and K are thanked for the loan of material of *Fenestella subvestita* and *Thyridium chrysomallum*, respectively.

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(Manuscript accepted 23rd December 1996)