Fungi from *Pandanus* I. *Pandanicola* gen. nov. from Australia and the Philippine Islands

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Hyde, K. D. (1994). Fungi from *Pandanus*. I. *Pandanicola* gen. nov. from Australia and the Philippine Islands. – Sydowia 46: 35–40.

Studies on the saprotrophs of dead *Pandanus* leaves from N. E. Queensland yielded an *Anthostomella*-like taxon with reddish-brown ellipsoidal ascospores. The taxon, however, is distinct from *Anthostomella* and therefore a new genus *Pandanicola* is introduced to accommodate it. *Pandanicola* is characterised by having ascoma immersed under a black, shiny, dome-shaped clypeus, paraphyses in a gelatinous matrix, broad cylindrical asci, lacking an apical apparatus, and reddish brown unicellular ascospores with thick smooth walls, provided with polar germ pores. *Pandanicola* can be included in the Xylariales. In comparing the new taxa with *Anthostomella* species from *Pandanus*, it was found to be identical to *A. calocarpa*. *A. calocarpa* is therefore transferred to *Pandanicola* and typifies the new genus.

Keywords: *Anthostomella*, *Pandanicola*, *Pandanus*.

Studies on *Pandanus* saprotrophs in Australasia and South East Asia have yielded several *Anthostomella*-like species. One specimen from leaf sheaths in north Queensland had reddish-brown ascospores with polar germ pores and could not be suitably placed in *Anthostomella*. The same fungus occurred on *Pandanus tectorius* in the Philippines and had been described by Sydow and Sydow (1913) as *Anthostomella calocarpa* Syd. & P. Syd. *Pandanicola* gen. nov. is therefore introduced to accommodate this taxon with *P. calocarpa* as the type species of this monotypic genus.

Taxonomy

Pandanicola K. D. Hyde, gen. nov.

Ascomata immersa, clypeata, nigra, ostiolata, ad basim applanata. Peridium cellulis elongatis compositum. Asci 8-spori, cylindrici, pedunculati, unitunicati, apparato apicali praediti. Ascosporae 1–2-seriatae, ellipsoideae, brunneae, unicellulares.

Typus generis: *Pandanicola calocarpa* (Syd. & P. Syd.) K. D. Hyde.

Ascomata developing beneath black, shiny, dome-shaped clypei, with a central ostiole; in section conical with a flattened base. – Peridium comprising brown elongated cells, hyaline inwardly. – Paraphyses hypha-like, filamentous, irregular, septate and embedded in a gelatinous matrix. – Asci 8-spored, broad cylindrical, pedunculate, unitunicate, apically rounded and lacking an apical apparatus. Asci and paraphyses forming from the base and sides of the ascomata. – Ascospores 1–2-seriate, ellipsoidal, reddish-brown, unicellular, very thick-walled, with polar germ pores.

Pandanicola calocarpa (Syd. & P. Syd.) K. D. Hyde, comb. nov. – Figs. 1-9.

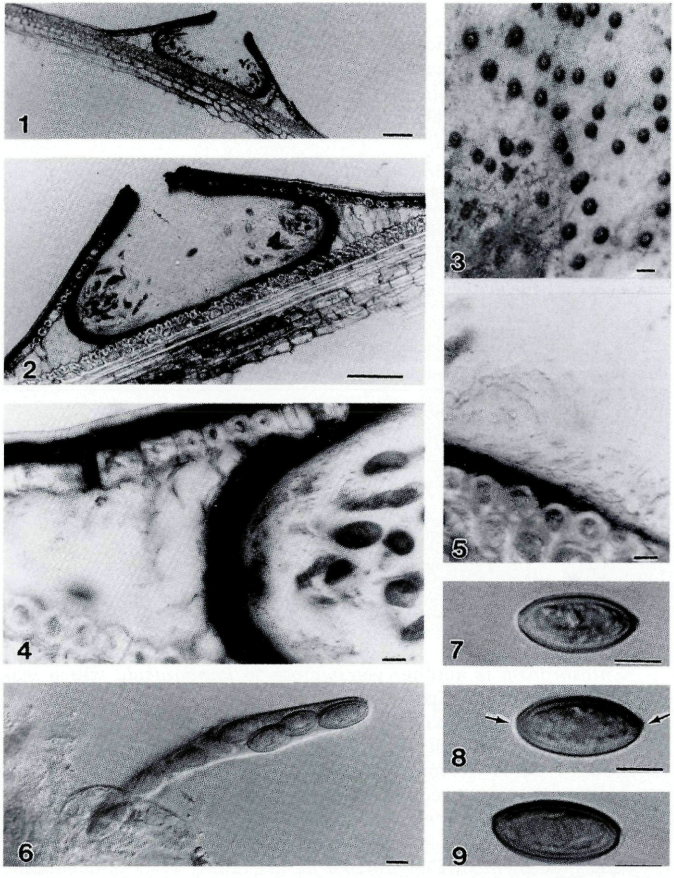
Bas.: *Anthostomella calocarpa* Syd. & P. Syd. Phil. J. Science, Sect. C., Botany 8: 272. 1913.

Ascomata developing beneath black, shiny, dome-shaped, oval spots, up to 1.3 mm diam, with a central periphysate ostiolar canal, solitary or clustered in groups of 2–3 (Fig. 3); in horizontal section globose; in vertical section up to 640 µm diam. and 240 µm high, conical with a flattened base (Figs. 1, 2). – Clypeus ca 10 µm thick, comprising the host epidermis, blackened by fungal tissue which also forms a layer between the epidermal cells and cuticle (Figs. 2, 4, 5). – Peridium 20 µm thick at the sides, almost disappearing at the centre of the base, comprising several layers of compressed brown or black-walled cells, hyaline inwardly (Figs. 2, 4). – Paraphyses hypha-like, filamentous, irregular, septate and embedded in a gelatinous matrix (Fig. 5). – Asci 160–180 × 20–25 µm, 8-spored, pedunculate, unitunicate, thin-walled, apically rounded and lacking an apical apparatus, forming from the base and sides of the ascoma (Fig. 6). – Ascospores 24–30 × 12–14 µm, 1–2-seriate, ellipsoidal, reddish-brown, unicellular, with very thick smooth walls, 2–2.5 µm wide, with polar germ pores (Figs. 7–9).

Material examined. – PHILIPPINES, Luzon, Manila, on dead sheath bases of *Pandanus tectorius*, 7 Oct 1912, Merrill 182, S (holotype of *Anthostomella calocarpa* Syd. & P. Syd). – AUSTRALIA, N.E. Queensland, Atherton Tablelands, Davies Creek National Park, on dead basal sheaths of leaves of *Pandanus* sp., June 1992, K. D. Hyde 1418 BRIP 21965.

Ascospores in the Australia collection of *Pandanicola calocarpa* are slightly smaller than the type from the Philippines (21–28 × 12–14 µm, vs 24–30 × 12–14 µm), but the differences are not great enough to warrant separate species.

Pandanicola calocarpa is distinct from *Anthostomella* spp. and differs mainly in ascospore morphology (Tab. 1). Most importantly, the thick-walled reddish-brown ascospores with two polar germ pores



Figs. 1–9. Interference contrast micrographs of *Pandanicola calocarpa*. – Figs. 1, 2. Sections of ascomata. Note the clypeus and thin peridium at the applanate base. – Fig. 3. Blackened shiny clypeus on host surface. – Fig. 4. Section of clypeus and peridium. – Fig. 5. Basal peridium and paraphyses. – Fig. 6. Ascus. – Figs. 7–9. Ascospores with thickened walls and bipolar germ pores (arrowed in 8). – Bars: 1, 2 = 100 µm; 3 = 1 mm; 4–9 = 10 µm.

differ from the thin-walled brown ascospores of *Anthostomella*, which possess a germ slit, are often surrounded by a slimy sheath, and have a dwarf cell (Francis, 1975). Furthermore the apical apparatus present and mostly amyloid in the asci of *Anthostomella* spp. is absent in the ascus of *Pandanicola*. The stromatic tissue and ascospore features of *Pandanicola* are truly xylariaceous and justify its placement in the Xylariales.

Tab. 1. – Synopsis of *Anthostomella tomicoides* Sacc. (type species of *Anthostomella*) and *Pandanicola calocarpa*.

	Anthostomella tomicoides	*Pandanicola calocarpa*
Ascomata	Immersed under a clypeus	Immersed under a large, black, shiny dome-shaped clypeus.
	Lenticular	Conical with a flattened base
Paraphyses	Amphisphaeriaceous	Amphisphaeriaceous
Asci	Broad cylindrical	Broad cylindrical
	apical apparatus J+	No apical apparatus
Ascospores	Oval to ellipsoidal	Oval
	Two-celled, a brown cell and a hyaline dwarf cell	One celled, reddish-brown
	Often surrounded by a sheath	No sheath, thick walls
	Germ slit	No germ slit, polar germ-pores

Entosordaria is another genus close to *Pandanicola* which was recently considered congeneric with *Clypeosphaeria* (Barr, 1989). In *Entosordaria* the ascospores are provided with a radiating germ-pore at one end and a small hyaline apical cell with mucilage at the other (Eriksson, 1966; Hyde, unpublished). The peridium in *Entosordaria* is very different, being composed of light-brown compressed cells towards the inside, *textura intricata* towards the outside, and light-brown compressed cells at the base.

The placement of *Pandanicola* at the family level is debatable. Eriksson & Hawksworth (1992) accept three families in the Xylariales: Amphisphaeriaceae, Clypeosphaeriaceae, Xylariaceae. *Pandanicola* is related to *Anthostomella*, which is presently, but very likely not ideally, placed in the Xylariaceae. *Pandanicola* differs considerably from typical species of the Xylariaceae which have ascospores with a germ slit and ascomata seated in a stroma situated superficially on its substrate. Paradoxically, species of *Anthostomella*

have more in common with members of the Xylariaceae, but the latter genus may eventually have to be transferred into another family. On the other hand, *Pandanicola*, being closely related to *Entosordaria* and thus *Clypeosphaeria* could be accommodated in the Clypeosphaeriaceae or Amphisphaeriaceae, if one follows Eriksson & Hawksworth (1992) and considers these two families to be different. It is evident that the placement of genera into the various families of the Xylariales needs to be revised, possibly taking into consideration molecular and anamorphic data. In addition, the nature of the paraphyses should be evaluated as a taxonomic criterium at the family level. In members of the Xylariaceae (e. g. *Xylaria*, *Rosellinia*, *Hypoxylon*) the paraphyses are usually wide, tapering, straight, sparse and not in a gelatinous matrix. In the Amphisphaeriaceae (i.e. *Amphisphaeria*, *Amphisphaerella*) they are amphisphaeriaceous (*sensu* Eriksson, 1966): hypha-like, irregular, not tapering noticeably and embedded in a gelatinous matrix. In *Clypeosphaeria*, they are also amphisphaeriaceous and are similar to the paraphyses found in *Anthostomella*.

So far only three *Anthostomella* species have been described from *Pandanus* leaves (Verona, 1932). Two of these are good *Anthostomella* species: *Anthostomella lucens* Sacc. (ascospores 15–18 × 7–9 µm) from the Philippines (Saccardo, 1916; Hyde, personal observations) and *Anthostomella pandani* (Rbh.) Sacc. (ascospores 8–10.4 × 4–5 µm). The third one, *A. calocarpa* on *Pandanus tectorius* in the Philippines described by Sydow & Sydow (1915) is transferred here to *Pandanicola*. In addition to these taxa, Francis (1975) includes a collection of *Anthostomella phoenicicola* Speg. from *Pandanus tectorius* in Burma.

Acknowledgments

I should like to thank the curators of K and S for the loan of the type material mentioned in this study.

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(Manuscript accepted 27th December 1993)