
The genus *Anthostomella* in Australia

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Sixteen species of *Anthostomella* have been reported from Australia. We have examined fourteen species. *Anthostomella aquatica*, *A. calamicola*, *A. eucalypti* and *A. frondicola* are considered acceptable species. *Anthostomella danthoniae* and *A. calocarpa* have previously been transferred to other genera and will be discussed in a subsequent paper. Six species are synonyms of previously described species and are new records of these taxa for Australia. Two of the specimens could not be located. We have also examined several collections in Australian herbaria and these include two new records for Australia. A new collection of *Anthostomella eucalypti* from leaf spot of *Eucalyptus globulus* is described and illustrated as it differs somewhat from the type.

Key words: *Anthostomella*, Australia, *Pandanicola*, *Sphaerodothis*, *Xylariaceae*

Introduction

Anthostomella (*Xylariaceae*, *Xylariales*) is a species-rich genus, with over 300 species. The genus has been partially monographed by Francis (1975) and Hyde (1996), however, as accepted by these authors, there is still considerable variability in ascus and ascospore morphological characters among the species (Lu *et al.*, 1998). In the process of a monograph on the genus *Anthostomella* (Lu, 1998) we have re-examined fourteen species reported from Australia plus a new collection of *A. eucalypti*, which is associated with leaf spots of *Eucalyptus globulus*. In this paper we provide an annotated list of all species reported from Australia including Australian hosts, and a key to *Anthostomella* species from Australia.

Materials and methods

Specimens examined in this study were loaned from herbaria BRIP, HKU(M), IMI, K and MELU. Dried material was rehydrated in distilled water. Slides of ascospores, asci and sections of ascomata were mounted in distilled water for observation, microphotography and

measurements. Ascus apical rings were stained using Melzer's solution. Sections of ascomata were made on a cryotome and mounted with O.C.T. compound.

Results and discussion

Key to species of Anthostomella from Australia

1. Ascospores with a hyaline dwarf cell.....2
1. Ascospores lacking a hyaline dwarf cell3
2. Ascospores 12-15 × 5-5.5 μm, smooth-walled, lacking a mucilaginous sheath
.....*A. clypeata*
2. Ascospores 14.5-19 × 6.5-7.5 μm, wall slightly verrucose, surrounded by a mucilaginous sheath*A. frondicola*
3. Asci lacking a J+, subapical apparatus; ascospores 15.5-22.5 × 12.5-16.5 × 8-9 μm, broadly inequilaterally ellipsoidal.....*A. dilatata*
3. Asci with a J+, subapical ring4
4. Ascus ring wedge-shaped or stopper-shaped.....5
4. Ascus ring discoid.....8
5. Asci long pedicellate, with a stopper-shaped subapical ring; ascospores 15-20 × 5-8 μm, inequilaterally ellipsoidal, with one side flattened, germ slit shorter than spore length.....
.....*A. aquatica*
5. Asci short pedicellate, with a wedge-shaped subapical ring; germ slit full length.....6
6. Ascospores longer than 18 μm, broadly ellipsoid-fusiform, almost lemon-shaped
.....*A. calamicola*
6. Ascospores shorter than 18 μm7
7. Ascospores 11.5-14.5 × 5-6.5 μm, ellipsoidal, with one side flattened*A. leptospora*
7. Ascospores 14.5-17.5 × 5.5-8 × 3-5 μm, inequilaterally ellipsoidal or ellipsoidal with one-side flattened and rounded*A. eucalypti*
8. Ascospores thick-walled9
8. Ascospores thin-walled10
9. Ascospores 7.5-12.5 × 5-6.5 × 2.5-4 μm, ellipsoidal to oblong-ellipsoidal, flattened ventrally, wall verrucose*A. tenacis*
9. Ascospores 16.5-22.5 × 9-11.5 × 7-8 μm, ellipsoidal, not flattened ventrally, wall smooth
.....*A. delitescens*
10. Ascospores longer than 10 μm, 10.5-13 × 4-5 × 2.5-3 μm, inequilaterally ellipsoidal.....
.....*A. puiggari*
10. Ascospores shorter than 10 μm11

11. Ascospores $5.5-7.5 \times 2.5-3 \times 1.5-2 \mu\text{m}$, oblong-ellipsoidal, yellowish brown, lacking a mucilaginous sheath *A. ludoviciana*
11. Ascospores $7.5-10 \times 4.5-5.5 \times 4-4.5 \mu\text{m}$, inequilaterally ellipsoidal to ellipsoidal with one side flattened, brown, surrounded by a thin mucilaginous sheath *A. nitidissima*

Anthostomella eucalypti Yip, Mycological Research 93: 75 (1989).

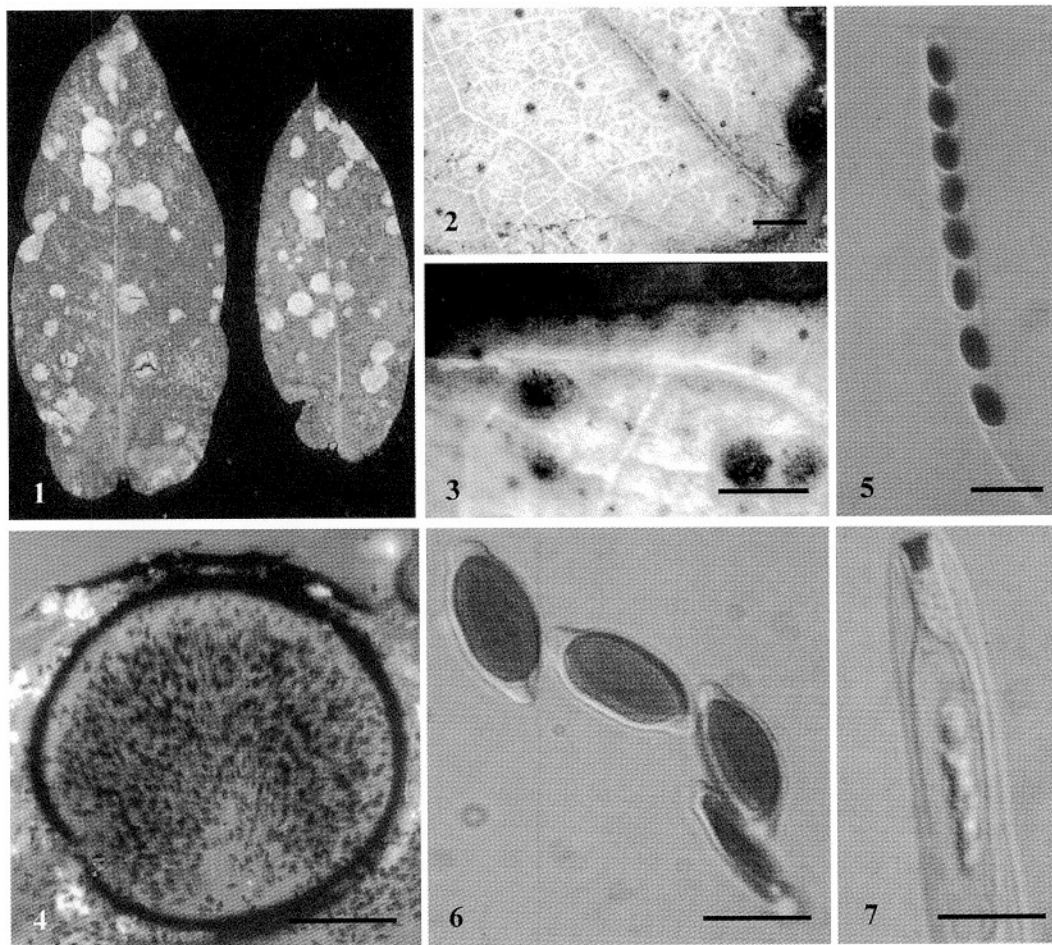
(Figs. 1-7)

Lesions hologenous, necrotic, rounded or irregular, 3-13 mm diam., discrete or confluent, pale white, with dark brown margins, covered with scattered black dots (ascomata) (Figs. 1-3). *Ascomata* immersed in the host, visible as blackened, conical areas, clustered or mostly solitary; in vertical section, 250-425 μm diam., 230-350 μm high, subglobose to globose, with a central ostiolar canal, up to 25 μm diam. *Clypeus* brown, up to 400 μm wide and 25 μm thick composed of *textura angularis* (Fig. 4). *Peridium* 30-40 μm wide, composed of *textura intricata* externally and *textura angularis* internally. *Paraphyses* ca. 5.5-6.5 μm ($\bar{x} = 6 \mu\text{m}$) wide at the base, hypha-like, hyaline, septate and numerous. *Asci* 100-132 \times 7.5-10 μm ($\bar{x} = 123.6 \times 8.2 \mu\text{m}$, $n = 20$), (6)-8-spored, cylindrical, unitunicate, with a J+, stopper-shaped, subapical ring, 1.5-2 diam. ($\bar{x} = 2 \mu\text{m}$, $n = 10$), 2-3 μm ($\bar{x} = 2.7 \mu\text{m}$, $n = 10$) high (Figs. 5, 6). *Ascospores* 10.5-16 \times 6-7.5 \times 3-4 μm ($\bar{x} = 12.3 \times 6.2 \times 3.6 \mu\text{m}$, $n = 25$), inequilaterally ellipsoidal or ellipsoidal, with one side flattened and with rounded ends, narrower in side view, uniseriate, unicellular, especially when young, surrounded by a mucilaginous sheath and with two appendages at the poles, 1-2 μm ($\bar{x} = 1.8 \mu\text{m}$, $n = 10$) wide, 1-1.5 μm ($\bar{x} = 1.4 \mu\text{m}$, $n = 10$) long, germ slit straight, full length, ventral (Fig. 7).

Material examined: AUSTRALIA, Tasmania, Compartment 6a, Togari, Smithton, on leaves of *Eucalyptus globulus*, 27 Aug. 1998, Z.Q. Yuan and T. Wardlaw (HKU(M) 7325, also VPRI).

This collection of *Anthostomella eucalypti* is very similar to the holotype, but differs as the ascospores are surrounded by a mucilaginous sheath and have drawn out rounded appendages at each end. These appendages persist at maturity. In material of the type (Australia, Darebin Greek, Darebin Parklands, Ivance, Victoria 3079, on living leaves of *Eucalyptus camaldulensis*, 22 Feb. 1987, H.Y. Yip (MELU 7877, holotype)) the sheath has not persisted and the sheath in the drawings provided in Yip (1989) are different to those in the Tasmanian collection. Other morphological characteristics of both collections are basically the same, the hosts of both collections are from the same genus, and both specimens were also collected from Australia. We therefore consider these collections to represent the same species.

The collection of *Anthostomella eucalypti* was only encountered once, where it was found on senescent leaves in the lower part of the crown of



Figs. 1-7. *Anthostomella eucalypti* (from HKU(M) 7325). **1.** Symptoms on leaves of *Eucalyptus globulus* associated with *A. eucalypti*. **2.** Lesion with fruiting bodies. **3.** Close up view of the fruiting bodies. **4.** Vertical section of an ascoma. **5.** Ascus containing ascospores. **6.** Ascus apex illustrating wedge-shaped, J+, subapical ring. **7.** Ascospores surrounded by mucilaginous sheaths. Bars: 1 = 20 mm, 2 = 50 mm, 3 = 15 mm, 4 = 100 μ m, 5 = 20 μ m, 6, 7 = 10 μ m.

Eucalyptus globulus. It was associated with leaf spots, but was probably saprobic or weakly pathogenic.

***Anthostomella* species from Australia**

Sixteen species of *Anthostomella* have been previously reported from Australia (Table 1). After reexamination, *Anthostomella aquatica* K.D. Hyde, *A. calamicola* K.D. Hyde, *A. eucalypti* H.Y. Yip and *A. frondicola* K.D. Hyde,

Table 1. Species of *Anthostomella* recorded from Australia.

Species	Herbaria	Australian hosts	Conclusions	References
<i>A. aquatica</i> K.D. Hyde and Goh	HKU(M)	Submerged wood	Accepted species	Hyde and Goh, 1998
<i>A. baileyi</i> S. Francis	BRIP, IMI	<i>Livistona</i> (Palmae)	A synonym of <i>A. puiggarii</i> Speg.	Francis <i>et al.</i> , 1980; Hyde, 1996
<i>A. bispapillata</i> H.Y. Yip	VPRI	<i>Xanthorrhoea</i> (<i>Xanthorrhoeaceae</i>)	Type material could not be traced	Yip, 1989; this paper
<i>A. calamicola</i> K.D. Hyde	BRIP	<i>Calamus</i> (Palmae), <i>Xanthorrhoea</i> (<i>Xanthorrhoeaceae</i>)	Accepted species	Hyde, 1996
<i>A. calocarpa</i> Syd. and P. Syd.	BRIP	<i>Pandanus</i> (<i>Pandanaceae</i>)	Transferred to <i>Pandanicola</i>	Hyde, 1994
<i>A. danthoniae</i> McAlpine	VPRI	Unknown	Transferred to <i>Sphaerodothis</i>	Walker and Francis, 1977
<i>A. dilatata</i> (Berk. and Broome) Petch	BRIP	<i>Livistona</i> (Palmae)	New record for Australia	This paper
<i>A. eucalypti</i> H.Y. Yip	MELU	<i>Eucalyptus</i> (<i>Myrtaceae</i>)	Accepted species	Yip, 1989
<i>A. frondicola</i> K.D. Hyde, J. Fröhl. and J.E. Taylor	HKU(M)	Unidentified palms (<i>Palmae</i>)	Accepted species	Hyde <i>et al.</i> , 1998
<i>A. hemibrunnea</i> H.Y. Yip	MELU	<i>Xanthorrhoea</i> (<i>Xanthorrhoeaceae</i>)	A synonym of <i>A. delitescens</i> (De Not.) Sacc.	Yip, 1989
<i>A. lepidosperma</i> Cooke	K	<i>Lepidosperma</i> (<i>Cyperaceae</i>)	A synonym of <i>A. leptospora</i> (Sacc.) S. Francis	Cooke, 1891
<i>A. ludoviciana</i> Ellis and Langl.	IMI	<i>Linospadix</i> (<i>Palmae</i>)	New record for Australia	This paper
<i>A. oraniopsis</i> K.D. Hyde, J. Fröhl. and J.E. Taylor	HKU(M)	<i>Archontophoenix</i> (<i>Palmae</i>), <i>Oraniopsis</i> (<i>Palmae</i>)	A synonym of <i>A. clypeata</i> (De Not.) Sacc.	Hyde <i>et al.</i> , 1998
<i>A. pandani</i> (Rabenh.) Sacc.	BRIP	Unidentified palm (<i>Palmae</i>)	A synonym of <i>A. nitidissima</i> (Durieu and Mont.) Sacc.	Hyde, 1996
<i>A. phoenicicola</i> Speg.	BRIP, IMI	<i>Livistona</i> (Palmae), <i>Lomandra</i> (<i>Lomandraceae</i>)	A synonym of <i>A. tenacis</i> (Cooke) Sacc.	Spegazzini, 1912
<i>A. pseudoclypeata</i> H.Y. Yip	VPRI	<i>Xanthorrhoea</i> (<i>Xanthorrhoeaceae</i>)	Type material could not be traced	Yip, 1989

J. Fröhl. and J.E. Taylor are considered acceptable species. Six species are found to be synonyms of previously described species in this paper. The formal synonymies are given below.

1. *Anthostomella clypeata* (De Not.) Sacc., Sylloge Fungorum 1: 283 (1882).
= *Sordaria clypeata* De Not., Sferiacei italici 1: 24 (1863).
= *Anthostomella oraniopsis* K.D. Hyde, J. Fröhl. and J.E. Taylor, Sydowia 50: 73 (1998).
Material examined: AUSTRALIA, north Queensland, Mt. Lewis, on dead frond of *Oraniopsis appendiculata*, in rainforest litter, Aug. 1992, K.D. Hyde (HKU(M) 1553, HOLOTYPE of *A. oraniopsis*); ITALY, Valle Intrasca, in sarmentis *Rubus fruticosi*, 1862, De Notaris (RO, HOLOTYPE of *Sordaria clypeata*).
2. *Anthostomella delitescens* (De Not.) Sacc., Michelia 1: 328 (1878).
= *Sphaeria delitescens* De Not., Micromycetes Italiana Novi vel Minus Cogniti, Decas 8: 124 (1854).
= *Anthostomella hemibrunnea* H.Y. Yip, Mycological Research 93: 79 (1989).
Material examined: AUSTRALIA, Victoria, Greytown State Forest, on dead leaves of *Xanthorrhoea australis*, 5 Mar. 1987, H.Y. Yip (MELU, isotype of *A. hemibrunnea*); ITALY, Genuam, on *Erica arborea*, 9 Mar. 1842 (RO, HOLOTYPE of *Sphaeria delitescens*).
3. *Anthostomella leptospora* (Sacc.) S. Francis, Mycological Papers 139: 24 (1975).
= *Anthostomella lepidosperma* Cooke, Grevillea 20: 5 (1891).
= *Anthostomella tomicum* (Lév.) Sacc. var. *leptospora* Sacc., Sylloge Fungorum 1: 82 (1882).
Material examined: AUSTRALIA, Victoria, on *Lepidosperma* sp., Marin 781 (K 56358, HOLOTYPE of *A. lepidosperma*); FRANCE, on *Cladium mariscus*, as *A. tomicum* (PAD, HOLOTYPE of *A. tomicum* var. *leptospora*).
4. *Anthostomella nitidissima* (Durieu and Mont.) Sacc., Sylloge Fungorum 1: 279 (1882).
= *Sphaeria nitidissima* Durieu and Mont., Sylloge Generum Specierumque Cryptogamarum no 831 (1856).
= *Anthostomella pandani* (Rabenh.) Sacc., Sylloge Fungorum 1: 292 (1882).
= *Sphaeria pandani* Rabenh., Hedwigia 17: 45 (1878).
Material examined: ALGER, Kaddous, Sur L'Arundo donax, ex herb. Durieu de Maisonneuve, Jan. 1840, slide ex herb PC (IMI 180626, type of *Sphaeria nitidissima*); AUSTRALIA, Bamaga, on unidentified palm, 5 Mar. 1991, K.D. Hyde 537 (BRIP, as *A. pandani*); INDIA, Calcutta, on leaves of *Pandanus furcatus*, S. Kurz, Rabenhorst, *Fungi europaena* 2338 (PAD, lectotype of *Sphaeria pandani*).
5. *Anthostomella puiggarii* Speg., Anales de Sociedad Cientifica Argentina 12: 106 (1881).
= *Anthostomella baileyi* S. Francis, Transactions of the British Mycological Society 75:

201 (1980).

Material examined: AUSTRALIA, Queensland, Forest Glen, Nambour, on *Livistona* sp., 1 Dec. 1977, J.L. Alcorn and S.M. Francis (IMI 242783, HOLOTYPE of *A. baileyi*); BRAZIL, Ipiranga, Sao Paulo, on *Bambusa*, J. Puiggari 1032 (LPS 6768, HOLOTYPE of *A. puiggarii*).

6. *Anthostomella tenacis* (Cooke) Sacc., Sylloge Fungorum 1: 281 (1882).

≡ *Sphaeria tenacis* Cooke, Grevillea 8: 67 (1879-80).

= *Anthostomella phoenicicola* Speg., Anales Museo Nacional de Buenos Aires 23: 50 (1912).

Material examined: ARGENTINA, La Plata, on *Phoenix canariensis*, 9 Sep. 1910, C. Spegazzini (IMI 193874 isotype, LPS 6757, HOLOTYPE of *A. phoenicicola*); AUSTRALIA, Victoria, W. Pt. Campbell, Sherbook Pine Plantation, on dead leaves of *Lomandra multiflora*, 23 Nov. 1965, G. Beaton 32 (IMI 116212, as *A. phoenicicola*); *ibid.*, New South Wales, Palm Beach, on *Lomandra* sp., 24 Dec. 1974, S.M. Francis (IMI 248099, as *A. phoenicicola*); *ibid.*, Queensland, near Mooloolaba, E. base, Buderim Mt., on *Livistona* sp., 20 Sep. 1975, J.L. Alcorn 75-055 (BRIP 11320, as *Anthostomella* tax. sp. 2); NEW ZEALAND, on *Phormium tenax*, May 1874, S. Berggren 391 (S, isotype of *Sphaeria tenacis*); *ibid.*, Waitaki, on *Phormium* sp., 391 (K 56332, HOLOTYPE of *Sphaeria tenacis*).

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