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SHORT COMMUNICATION

Arthonia borbonica (Ascomycota, Arthoniales), a new species from La Réunion

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Background – A novelty is described in the framework of an ongoing revision of the *Arthonia cinnabarina* complex.
Methods – Normal practises of herbarium taxonomy including high performance liquid chromatography (HPLC) have been applied.
Key results – *Arthonia borbonica* is described as new to science. It is characterized by having ascomata covered by an orange pruina and macrocephalic (2–)3-septate ascospores. The species is only known from La Réunion island.

Key words – *Arthoniaceae*, *Coniocarpon*, La Réunion, Mascarene, chemistry, red pigments.

INTRODUCTION

La Réunion is a small island of volcanic origin located in the Indian Ocean between 20°51' and 21°22'S and between 55°14' and 55°50'E. It is part of the Mascarene Archipelago and is an overseas department of France. The lichen flora is still poorly known despite a checklist of 208 species (Feuerer 2009). Several recent studies on the lichens and lichenicolous fungi have been published: e.g. the foliicolous lichen flora has been well studied by Rønhede et al. (2003); the genera *Phyllopsora* and *Plectocarpon* were treated respectively by Timdal & Krog (2001) and Ertz et al. (2005) with several new species described from the island.

Arthonia is the largest genus of the Arthoniales with about 400 species (Kirk et al. 2001). It is considered to be a heterogeneous group (Grube et al. 1995). During a field trip by the first authors in La Réunion in 2003, an interesting species of *Arthonia* was collected, readily recognized in the field by ascomata covered by an orange pruina. It turned out to be new for science and similar to a second specimen collected on the same island and kept in Graz. The species is described here.

MATERIAL AND METHODS

Microscopic examination was done using hand-made sections in water, 5% KOH (K), or Lugol's reagent (1% I_2) without (I) or with KOH pre-treatment (K/I). Measurements and drawings of asci and ascospores all refer to material examined in KOH. Drawings were prepared using a drawing tube. Ascospore measurements are indicated as (minimum) $\overline{X} - \sigma_X - \overline{X} + \sigma_X$ (maximum), all values rounded to the nearest multiple of 0.5 µm, followed by the number of measurements (*n*); the length/breadth ratio of the ascospores is indicated as l/b. For the other characters, the minimum and the maximum values are given and are based on the examination of at least three different ascomata.

Thin-layer chromatography (TLC) of acetone extracts was performed in solvent systems C on silica gel 60 F_{254} layer glass plates of 20 × 20 cm. For the visualization of the spots, 10% sulphuric acid was used as a reagent (Orange et al. 2001). High performance liquid chromatography (HPLC) was performed as described in Elix et al. (2003).

THE SPECIES

Arthonia borbonica Ertz, Elix & Grube **sp. nov.**

Thallus crustaceus, ecorticatus, albus. Ascomata 0.2–1(–1.5) × 0.12–0.2 mm; discus expositus, pruina aurantiaca obtectus. Hymenium I+ primum caerulescens dein cito rubescens. Paraphysoides ramosae et anastomosantes. Ascosporae oblongae-ovoideae, (2–)3-septatae, (14–)15–18(–20) × (5–)6–7(–7.5) µm. – Type: La Réunion, Cirque de Cilaos, Forêt du Grand Matarum, sentier du village de Cilaos au Piton des Neiges, 21°07'S 55°29'E, alt. c. 1900 m, gros tronc éclairé d'*Acacia heterophylla*, 24 June 2003, *D. Ertz* 4666 (holo-: BR; iso-: GZU). – MycoBank No.: MB 518037. Fig.1.

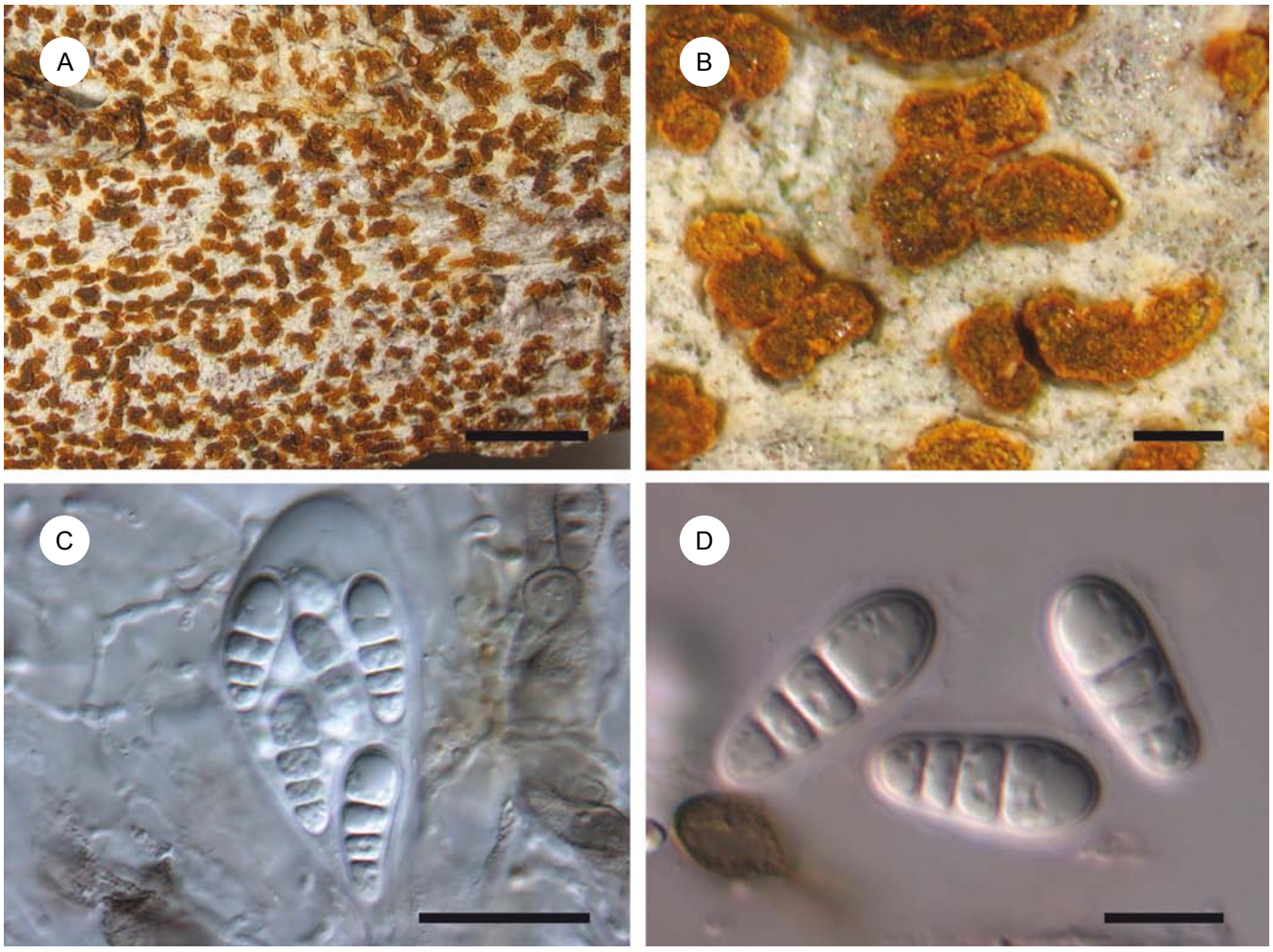

Figure 1 – *Arthonia borbonica* (holotype, BR): A,B, thallus and apothecia; C, ascus containing ascospores; D, ascospores. Scales: A = 2 mm; B = 200 µm; C = 20 µm; D = 10 µm.

Thallus thin, continuous, smooth, white, matt, c. 20–80 µm thick. Photobiont Trentepohlia, cells 12–17 × 8–14 µm. Prothallus not seen. Ascomata numerous, scattered more or less evenly over the thallus, elongated-oblong, branched, erumpent from the bark, black, entirely covered by an orange pruina, 0.2–1(–1.5) × 0.12–0.2 mm; hymenial disc widely exposed, covered by a thin layer of orange pruina. Excipulum hyaline to pale brown, very reduced. Hymenium hyaline or pale brownish, not inspersed with oil droplets, I+ blue turning quickly red, 45–55 µm tall, K/I+ blue. Hypothecium pale brown, I+ persistently blue, 20–30(–40) µm thick. Paraphysoids richly branched, anastomosing, 1–1.5 µm wide, not or slightly enlarged at the apex, up to 2 µm. Epihymenium dark reddish brown, I+ red, with orange to brown-coloured crystals K+ dissolving violet-red. Asci clavate, 8-spored, 55–65 × 17–22 µm including a foot of c. 15–20 µm long, with a large apical dome and a distinct ocular chamber, with a K/I+ blue apical ring (*Arthonia*-type). Ascospores oblong-ovoid, with an enlarged upper cell, hyaline, becoming brown walled and finely warted when overmature, (2–)3-septate, not constricted at the septa, (14–)15–18(–20) × (5–)6–7(–7.5) µm, l/b ratio 2.3–2.7 (*n* = 60); perispore not always visible, c. 1–2 µm thick. Pycnidia not seen. Fig. 1.

Chemistry – Thallus K-, C-, KC-, PD+ yellow, UV+ orange; apothecia K+ violet-red, C-, P-, UV+ orange intensifying. Ascomata contain parietin [major], xanthorin [minor], erythroglaucin [minor], physcoin bisanthrone [minor], methyl parietinate [minor], parietinic acid [trace], fallacinal [trace], psoromic acid [major], subpsoromic acid [trace], 2'-*O*-demethylpsoromic acid [trace]. Thallus contains psoromic acid [major], subpsoromic acid [trace], 2'-*O*-demethylpsoromic acid [minor], hypericin [minor – probably gives UV+] (holotype tested by TLC and HPLC).

Distribution and ecology – The species is only known from the central part of La Réunion at c. 1500–1900 m altitude, growing on the bark of trees in montane forests, including on the trunk of *Acacia heterophylla*, an endemic species of the island.

Notes – The species is well accommodated within the genus *Arthonia* by the ascus type and anatomical structure of the ascomata. Given the K+ soluble quinonoid pigments and the multiseptate, macrocephalic spores, it is probably more closely related to the *Arthonia cinnabarina* complex, which has previously been treated as section *Coniocarpon* within *Arthonia* s. lat. The new species is not likely to be

confused with other arthonioid species. The only other species so far known to produce parietin in this species complex is *Arthonia elegans* (Ach.) Almq. (syn. *Arthonia ochracea* Duf.). In contrast to *A. borbonica*, *A. elegans* is characterized by a dark ochraceous pigmentation, ascomata immersed in the substrate and by an indistinct epihymenium (Redinger 1937). *Arthonia elegans* was often collected in Europe in the 19th century but has apparently disappeared today; the oldest name for *Arthonia elegans* sensu auct. Brit. appears to be *Arthonia fallax* Ach. (Grube, unpubl. res.). There are several further arthonioid species with yellow to orange pigments from tropical regions, but these appear distantly related given other characters. Thus *A. rubiginella* Nyl. from Sri Lanka is devoid of pruina and has epihymenia which are inspersed with yellow crystals, and distinct, broad ascospores with two median septa. An orange pruina is also known in *Arthothelium aurantiacum* Müll. Arg. from tropical East Africa, but the pigments are present in the thallus of that species, which also differs in having muriform ascospores. *Arthothelium coccineum* Müll. Arg. has orange spot-like pruinose ascomata but muriform spores.

We also checked the relevant literature, especially amongst the lichens known to occur in the Mascarene Islands and Madagascar, but no other epithet was found for the new species.

Additional specimen examined – **La Réunion**: Z, südl. Teil der Strasse durch den Forêt de Bébour, 26 Mar. 1996, *G.B. Feige & E. Heibel* 16323 (GZU).

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