

***Echinosphaeria cincinnata*, a new species from Rimutaka forest park, near Wellington, New Zealand.**

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Abstract

This paper describes a new species of the ascomycete genus *Echinosphaeria* which was found in New Zealand on dead water soaked wood.

Key words: Helminthosphaeriaceae, Lasiosphaeriaceae, systematics.

Introduction

Based on evidence provided by sequencing data, Miller & Huhndorf (2004) proposed that *Lasio-sphaeria canescens* (Pers.) Karst. should be removed from the Lasiosphaeriaceae and included in the Helminthosphaeriaceae as *Echinosphaeria canescens* (Pers.) A.N.Mill. & Huhndorf. These two families share a number of features in common insofar as they include perithecia which are variously adorned. However, the Helminthosphaeriaceae as previously circumscribed differ in many other morphological features including the fact that all species of *Helminthosphaeria* are accompanied by the anamorph genus *Diplococcium* (Réblová 1999). Matters concerning other species of *Lasio-sphaeria sensu lat.* which morphologically match the circumscription of *Echinosphaeria* are discussed at some length in Bell & Mahoney (2008) and Declercq (2009). For these reasons the following new species is included in the genus *Echinosphaeria*. Currently there are five species included in the genus *Echinosphaeria* (Puja *et al.*; Bell & Mahoney 2008; Declercq 2009; Dhargalkar & Bhat 2009).

Materials & Methods

This specimen was found on a recent collecting trip to the Rimutaka Forest Park near Wellington, New Zealand. Initial microscopic examination of the specimen was made in water mounts and several semi-permanent slides were subsequently made using Shear's mounting medium. Ascospores sizes were determined by measuring 50 ascospores emanating from several perithecia. Colour references in the following description follow the notation of Kornerup & Wanscher (1989). While the original material was still fresh, attempts were made to grow this fungus in culture. Past experience had shown that immersing the perithecia of ascomycetes having thin walled hyaline ascospores in a 3% solution of hydrogen peroxide to surface sterilize the material even for a very brief period, frequently leads to the death of the spores. Hence on this occasion a perithecium was picked off the substrate and agitated in a drop of sterile water on a slide in order to wash off any extraneous material adhering to the woolly perithecial surface. The perithecium was broken open

in a further drop of sterile water using sterilized needles and the centrum contents dissected on a plate of sterile potato carrot agar (PCA). The plate was scrutinized daily using a $\times 10$ objective for signs of germination. A tiny portion of growth originating from the centrum was excised and mounted on a sterile slide for inspection. While ascospore germination could not be ascertained, the surrounding paraphyses and other centrum tissue clearly showed growth. Three small portions of this growth were transferred to a fresh plate of PCA agar, incubated at room temperature and subjected to a normal diurnal regime of light and dark. Growth was extremely slow resulting in three small identical colonies of approx. 1 cm diam. after a month. The hyaline mycelium grew appressed to the agar surface with no aerial hyphae. The hyphae were of various widths, the cells of which had a tendency to disarticulate at the cross-walls. Copious small, (2–3 μm diam.) conidia were produced in patches along the hyphae (Fig. 2), each conidium containing a prominent droplet. The teleomorph was not produced in culture. A culture of the anamorph has been deposited with the Centraalbureau voor Schimmelcultures, Utrecht, Netherlands (CBS 126534).

Results

Echinosphaeria cincinnata A. Bell sp. nov.
Mycobank MB50985.
Etymology: *cincinnata* = having curled hair.

Ascomata aggregata, superficialia. Ventre globosus 1 mm diam., capillatura. Pili copiosi cincinnati, hyalini, suffusi, punicei, crassitunicati, longitudine indeterminate. Asci cylindranei, circa 150 μm longulus stipitate, octospori. Ascosporae uniseriatae, oblongata, symmetrica, transeuns uniseptatae, hyalinae vel subfuscae, 10–12 \times 5–6 μm . Fungus lignicolous.

Holotypus: On unidentified dead decorticated wet wood, Rimutaka Forest Park, near Wellington, New Zealand, 30/7/09, A. Bell (PDD 98341) (= Bell & Mahoney 1097).

Ascomata superficial, densely crowded on very wet wood, approx 1 mm diam., reddish brown (8E6), drying to reddish grey (8B2). Perithecia enveloped in a dense

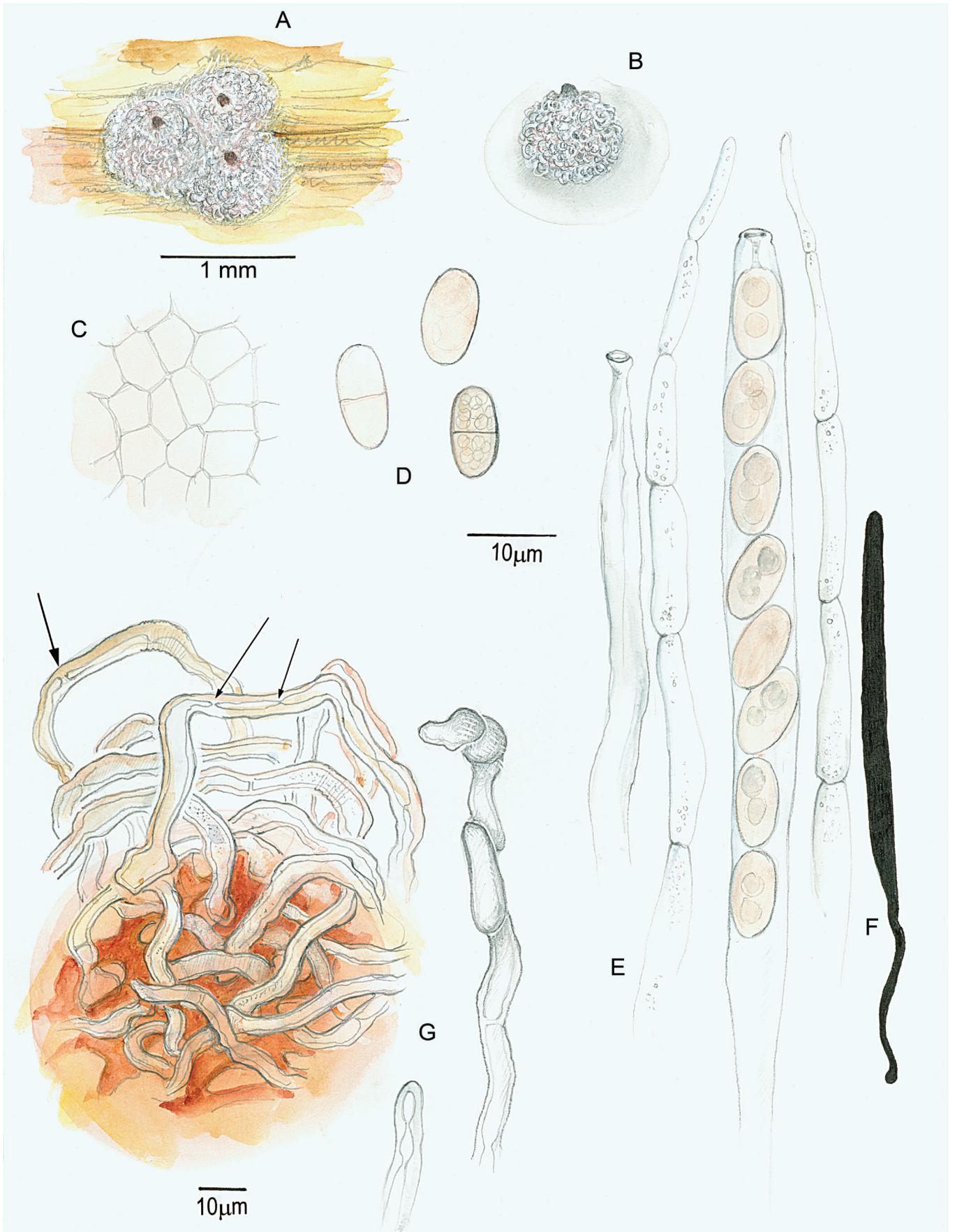


Fig. 1 A perithecia on substrate; B excised perithecium; C inner perithecial wall tissue; D discharged ascospores; E mature ascus, discharged ascus and paraphyses; F silhouette of mature ascus; G detail of perithecial hairs, arrows indicating trabeculae.

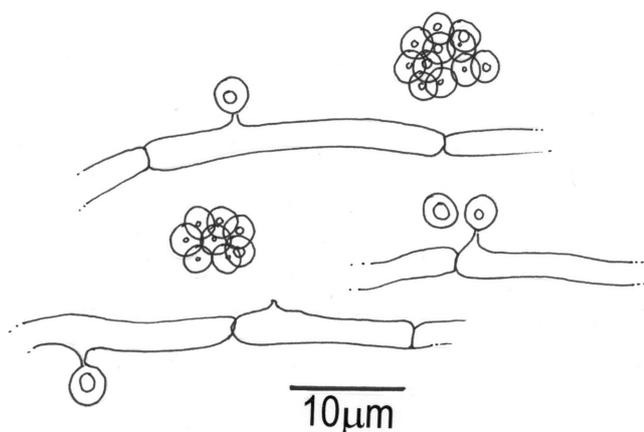


Fig. 2 Anamorph grown on agar.

and tightly curled tomentum of thick walled hairs (Fig. 1A & B). Hairs of variable thickness appearing more or less hyaline or very dilute brown under transmitted light, thick walled with narrow lumen and sparsely trabeculate (Fig. 1G, arrows indicating trabeculae). Due to the curled nature of the hairs, their length was impossible to ascertain. The underlying perithecial wall is composed of thick walled, brown (6D), angular cells (Fig. 1G). Inner perithecial wall of angular paler cells (Fig. 1C). Upon drying, a small black ostiole becomes more visible (Fig. 1B). Centrum contents white, *Paraphyses* hyaline, septate, wider at the base tapering towards the tips with free ends, containing conspicuously granular contents when viewed under a phase microscope objective, (Fig. 1E). *Asci* cylindrical with elongated stipes (Fig. 1F), difficult to separate from the centrum material, approx. 150 μm long and 8 μm at their widest point, each bearing a small (approx 2–3 μm diam.) non-amyloid ring, but no subapical globulus (Fig. 1E). Each ascus containing 8 uniseriate or irregularly uniseriate ascospores (Fig. 1E). *Ascospores* symmetrical, oblong, blunt-ended, initially hyaline and single-celled, without germ pores, (9–)10–12 \times 5–6 μm , becoming very pale brown (6E7) and two celled after release (Fig. 1D).

Discussion

This striking species is very different from the five other species of *Echinosphaeria* (Puja *et al.* 2006, Bell & Mahoney 2008, Declercq 2009, Dhargalkar & Bhat 2009). The perithecia are a different colour and the perithecial hairs are quite different. Beneath the hairs the thick walled cells composing the perithecia are identical in colour and structure to those of *E. medusa* A. Bell & Mahoney, but the very thick walled more or less hyaline hairs of *E. cincinnata* dilute the macroscopic colour of the perithecia such that in common parlance the perithecia appear a dilute pink, (reddish brown to reddish grey using the terminology of Kornerup & Wanscher 1989). The ascospores of *E. cincinnata* are

two celled and without germ pores as are those of other species of *Echinosphaeria*, but they are much shorter and not allantoid and their arrangement is uniseriate or irregularly uniseriate within the asci.

The Helminthosphaeriaceae originally defined by Samuels *et al.* (1997), was based upon four species of *Helminthosphaeria* all of which were fungicolous, growing upon basidiomycetes. Subsequently, Réblová (1999) added a further three lignicolous species to the genus. Members of the Helminthosphaeriaceae are invariably accompanied by the anamorph genus *Diplococcium*. Anamorphs associated with other described species of *Echinosphaeria* include *Endophragmiella* and *Selenosporella* (Hughes 1979). More recently the anamorph *Vermiculariopsiella* has been recorded for two endophytic species of *Echinosphaeria* (Puja *et al.* 2006; Dhargalkar & Bhat 2009). However, neither of these endophytic species exhibited the perithecial vestiture deemed as characteristic of the genus. A *Brachysporium* anamorph was found on the same woody substrate as *E. cincinnata*, but since this anamorph has been frequently encountered on dead wood, there is no substantive evidence of any connection between this new species and the *Brachysporium*. Although there have been a number of reported associations of hyphomycetes such as *Endophragmiella* with various members of the Lasiosphaeriaceae *sensu lat.*, there is a lack of irrefutable evidence connecting these anamorphs with the various teleomorphs.

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