

Figure 3. *Buellia tuapekensis* (H. Mayrhofer 10492 *pr.p.*, GZU). Scale = 1 mm.

A new species of *Diorygma* (Graphidaceae, lichenized Ascomycota), and notes on *Diaphorographis queenslandica*

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Abstract: *Diorygma streimannii* A.W.Archer & Elix, the first species of *Diorygma* found to contain neotricone, is described as new to science. Contrary to previous reports, *Diaphorographis queenslandica* Kalb & A.W.Archer contains protocetraric acid.

Introduction

The genus *Diorygma* was introduced by Eschweiler (1824), and subsequently *D. hieroglyphicum* (Pers.) Staiger & Kalb was chosen as the lectotype for the genus (Staiger 2002). A preliminary account published in 2004 (Kalb *et al.* 2004) listed 24 species and their synonyms, together with a key to the known species. In 2014, three new species were described and a revised world key was published (Feuerstein *et al.* 2014); that key listed a total of 52 species. References to *perstictic* acid in the key are misspellings of *peristictic* acid. A few months later, another species was described from Florida (Seavey & Seavey 2014), and a further species, from New Caledonia, was described in 2014 (Papong *et al.* 2014), raising the total to 54. Eleven species occur in Australia (Archer 2009; Archer & Elix 2009), and the new species *Diorygma streimannii* (*vide infra*) increases the total to 12.

The genus *Diaphorographis* A.W.Archer & Kalb was introduced in 2009 (Kalb *et al.* 2009) based on *D. queenslandica* Kalb & A.W.Archer. The genus is distinguished from *Graphis* Adans. by I- ascospores, and from *Carbacanthographis* Staiger & Kalb (Staiger 2002) by the absence of periphysoids. The protologue cited two species from Australia (Queensland), New Caledonia and the Solomon Islands, both of which were reported to lack lichen compounds.

Both *Diaphorographis* and *Diorygma* were placed in the subfamily Graphidoideae Rivas Plata, Lücking & Lumbsch (Lücking *et al.* 2016), but the supporting citation made no mention of *Diaphorographis* (Rivas Plata *et al.* 2012). Because no molecular data are available to determine the exact position of *Diaphorographis* in the Ascomycota, the two genera are retained here in the family Graphidaceae.

In the present work, chemical constituents were identified by thin-layer chromatography (Elix 2014) and by comparison with authentic samples.

The new species

Diorygma streimannii A.W.Archer & Elix, sp. nov.
Mycobank Number: **MB 817906**

Figs 1 & 2

Similar to *Diorygma rufopruinosum* (A.W.Archer) Kalb, Staiger & Elix, but differs in having a black epithecium with a white pruina and in containing neotricone.

Type: Australia, Queensland, Cow Bay, Cape Tribulation National Park, 26 km NNE of Mossman, 16°14'S, 145°29'E, alt. 2 m, on *Casuarina* trunk, H. Streimann 46006 *pr.p.*, 6.xii.1990; holotype: CANB.

Thallus corticolous, off-white; surface smooth and matt, lacking isidia and soralia. Apothecia disciform, sessile, usually circular, sometimes distorted, 0.7–1.2 mm in diam.; epithecium black, with a white pruinose layer; hymenium 160–200 µm tall, I–, not interspersed; exciple non-carbonized. Ascospores 1 per ascus, ellipsoid, hyaline, muriform, 120–160 × 32–40 µm, I+ blue.

Chemistry: neotricone (major), norstictic acid (minor), salazinic acid (minor), norperistictic acid (minor) and protocetraric acid (minor).

Etymology: The species is named after the collector, Heinar Streimann (1938–2001), who made important contributions to the study of Australian mosses and lichens.

Diorygma streimannii is characterized by the disciform, sessile apothecia, a non-carbonized exciple, a non-interspersed hymenium, asci with a single muriform ascospore and in particular the presence of neotricone as the major lichen compound. At present the new species is known from only the type specimen. It is distinguished from *P. rufopruinosum* by the black epithecium, hyaline to slightly brown in *P. rufopruinosum* (Kalb *et al.* 2004), and the presence of neotricone.

Neotricone was first isolated from *Phaeographis syngraphizans* (Wright) Zahlbr. and *P. neotricosa* Redinger (Elix *et al.* 2003), and was later reported from *Pertusaria neotriconica* Elix & A.W.Archer (Elix & Archer 2007).

Species of *Diorygma* contain several β-orcinol depsidones, among them norstictic acid, stictic acid, protocetraric acid and salazinic acid. Neotricone too is a β-orcinol depsidone, related to norstictic acid but with the aldehyde group replaced by a carboxy group and the cyclic hemiacetal replaced by a γ-lactone (Fig. 2). Neotricone has not been reported previously from *Diorygma*.

Notes on *Diaphorographis queenslandica*

The genus *Diaphorographis* A.W.Archer & Kalb (Graphidaceae) was introduced in 2009 (Kalb *et al.* 2009), based on *D. queenslandica* Kalb & A.W.Archer from Queensland. The type species is characterized by numerous conspicuous, scattered, sessile apothecia concolorous with the thallus, hemispherical to subspherical, 0.6–0.9 mm in diam., with a groove on the upper surface (Fig. 4). The proper exciple is completely carbonized, 80–120 µm thick, covered by a thin thalline coating with a non-interspersed hymenium 250–400 µm tall. Ascospores are 1 per ascus, fusiform-ellipsoid, hyaline, muriform, (140–)180–250 × 20–25 µm, and I– (Fig. 5).

The species was originally reported to lack lichen compounds, but a recent re-examination of the type specimen found it to contain protocetraric acid. The two additional specimens cited below also contain protocetraric acid. The genus is known from northern Queensland, New Caledonia and the Solomon Islands (Kalb *et al.* 2009).

ADDITIONAL SPECIMENS EXAMINED

Queensland: • Cow Bay, Tribulation National Park, 26 km NNE of Mossman, 16°14'S, 145°29'E, alt. 2 m, strand vegetation dominated by *Calophyllum inophyllum*, *Terminalia* and *Hibiscus tiliaceus*; on *Casuarina* trunk, *H. Streimann* 46006 *pr.p.*, 6.xii.1990 (CANB); • road from Gordonvale to Yarrabah, c. 10 km E of Cairns, wet-sclerophyll forest with *Eucalyptus*, palms and grasses, 16°55'S, 145°51'E, on bark; *H.T. Lumbsch* 11158g, 1.viii.1996 (CANB).

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Fig. 1 *Diorygma streimannii* (holotype). Scale = 1 mm.



Fig. 2 *Diorygma streimannii*. Ascospore. Scale - 50 μ m.

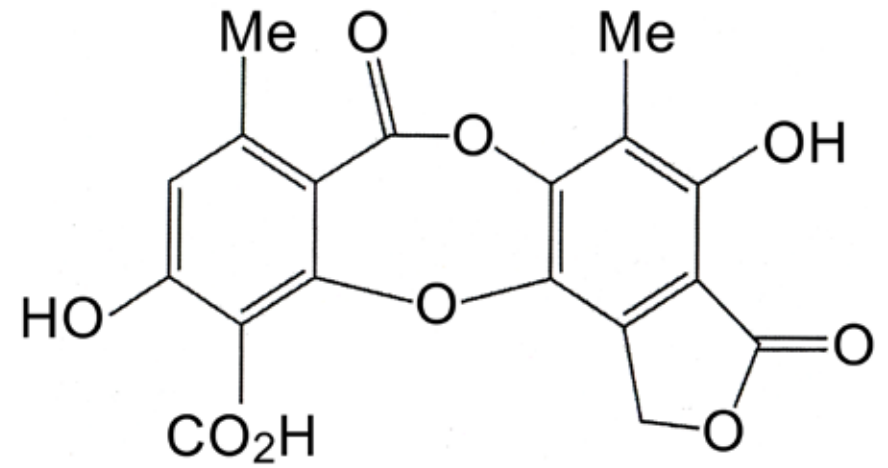


Fig. 3. Neotricone molecular structure.



Fig. 4. *Diaphorographis queenslandica* (Lumbsch 11158q). Scale = 1 mm.



Fig. 5. *Diaphorographis queenslandica*. Ascospores with iodine. Scale = 50 μm .

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