

Two new species and a new combination in the lichen genus *Pertusaria* from Brazil

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Abstract

Two new species, *Pertusaria marcellii* and *P. saxatilis*, are reported from Brazil and the new combination *Pertusaria ferax* (Müll.Arg.) A.W.Archer & Elix [basonym: *P. torquatella* Müll.Arg. β [var.] *ferax* Müll.Arg.] is made.

Introduction

An investigation of material obtained in a recent loan of South American material from the Botanical Museum, University of Helsinki, Finland (H) revealed the presence of two *Pertusaria* species new to science from Brazil. In addition, a new combination is made. In the present work chemical constituents were identified by thin-layer chromatography (Elix & Ernst-Russell 1993), high performance liquid chromatography (Elix *et al.* 2003) and comparison with authentic samples.

Taxonomy

Pertusaria marcellii A.W.Archer & Elix **sp. nov.** Fig.1

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Similar to *Pertusaria ochrostoma* Müll.Arg. but differs in having smaller ascospores and in containing 4,5-dichlorolichexanthone rather than lichexanthone.

Type: Brazil, São Paulo, Mun. Campos do Jordão, Parque Estadual de Campos de Jordão, road from Horto Florestal to São José dos Alpes, 22°43'S, 45°31'W, alt. 1400–1500 m, on *Podocarpus*, *M.P. Marcelli*, *T. Ahti* & *O. Yano* 26395, 9 Dec 1993; holotype: H; isotype: SP28375.

Description: Thallus off-white to pale olive green, thin, surface subtuberculate and dull, lacking isidia and soralia, corticolous. Apothecia verruciform, conspicuous, scattered or sometimes confluent, flattened hemispherical, constricted at the base, concolourous with the thallus, 1–1.5(–2) mm diam., 0.5–0.8 mm tall. Ostioles inconspicuous, pale brown, submamiform, 1–5 per verruca. Ascospores 4 per ascus, hyaline, ellipsoid to subfusiform, inner wall smooth, 100–125 µm long, 30–37 µm wide.

Chemistry: K⁺ weak yellow; C⁻ve; KC⁻ve; Pd⁺ yellow; 4,5-dichlorolichexanthone (minor), constictic acid (major) and stictic acid (trace).



Fig. 1. *Pertusaria marcellii*, A.W.Archer & Elix, holotype; scale bar = 1 mm



Fig. 2. *Pertusaria saxatilis* A.W.Archer & Elix, holotype; scale bar = 1 mm

Pertusaria marcellii is characterised by the relatively large apothecia, asci with 4 ascospores and the presence of 4,5-dichlorolichexanthone and constictic acid. The ascospores are smaller than those in *P. ochrostoma* Müll. Arg. (100–125 µm long compared to 125–160 µm long in *P. ochrostoma*) and the two species differ chemically. Constictic acid is rare as a major component in *Pertusaria* and is usually present as a minor to trace compound together with stictic acid. Constictic acid also occurs as a major compound in *P. ochrostoma*, but co-occurs with lichexanthone. *Pertusaria delicatula* Müll. Arg., a species described from Brazil, also contains constictic acid as a major compound (with stictic acid and 2-chlorolichexanthone) but this species has asci with eight ascospores.

The corticolous species *P. tetralthalamia* (Fée) Nyl. also has four ascospores per ascus, (53–)103(–168) µm long, (21–) 35 (–53) µm wide and contains 4,5-dichlorolichexanthone and stictic acid (Dibben 1980) but the ascospores have a rough inner wall, in contrast to the smooth inner wall present in the ascospores in *P. marcellii*.

Other species with 4 ascospores per ascus and with 4,5-dichlorolichexanthone and stictic acid (but lacking constictic acid as a major compound) include the European isidiate species *P. coronata* (Ach.) Th. Fr.; *P. hypochrysea* Vain., from Tahiti, with flattened apothecia; the Northern Hemisphere species *P. leioplaca* DC, also with flattened apothecia. *P. caesioumbrina* Eitner, ascospores 60–90 µm long and *P. glauca* Zahlbr from Japan, spores 150–185 µm long are differentiated from *P. marcellii* by the size of the ascospores.

Etymology: The species is named in honour of the Brazilian lichenologist, Dr. Marcelo Pinto Marcelli, Institute of Botany, São Paulo.

***Pertusaria saxatilis* A.W.Archer & Elix sp. nov.** Fig.2

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Similar to *Pertusaria consanguinea* Müll. Arg. but differs in containing 2-chlorolichexanthone and 2'-*O*-methylperlatolic acid rather than lichexanthone and 2'-*O*-methylperlatolic acid.

Type: Brazil, Minas Gerais, Serra da Piedade, road to summit, north slope, 19°49'S, 43°50'W, alt. 1300 m, on ferruginous rocks, *M.P. Marcelli, T. Ahti & O. Yano* 28230, 5 Sept 1993; holotype: H; isotype: SP263767.

Description: Thallus off-white to pale grey, thick, cracked, surface smooth and dull, lacking isidia and soralia, saxicolous. Apothecia verruciform, conspicuous, scattered, sometimes crowded or confluent, flattened hemispherical, 1–1.5 mm diam. Ostioles inconspicuous, black, punctiform, 1 per verruca. Ascospores usually 8 per ascus but sometime fewer (6 or 7), colourless, ellipsoid to subfusiform, inner wall smooth, 75–90 µm long, 30–37 µm wide.

Chemistry: K-ve; C-ve; KC-ve; Pd-ve; 2-chlorolichexanthone (major), 2'-*O*-methylperlatolic acid (minor) and 2'-*O*-methylstenosporic acid (trace).

Pertusaria saxatilis is characterised by the off-white thallus, the verruciform apothecia, asci usually with 8 ascospores and the presence of 2-chlorolichexanthone and 2'-*O*-methylperlatolic acid. It is distinguished from the saxicolous, Brazilian *P. rudecta* Müll. Arg. (Müller 1884) by the eight-spored asci (4 ascospores per ascus in *P. rudecta*) and the presence of 2-chlorolichexanthone and 2'-*O*-methylperlatolic acid (rather than 4,5-dichlorolichexanthone and norstictic acid present in *P. rudecta*).

As far as is known at present, there are no other saxicolous species of *Pertusaria* with asci with eight ascospores and containing 2-chlorolichexanthone as the sole xanthone. The saxicolous Australian species *P. lavata* Müll. Arg. and *P. lophocarpa* Körber each have asci with eight ascospores and contain 2'-*O*-methylperlatolic acid but with 4,5-dichlorolichexanthone. 2-Chlorolichexanthone is found as the sole lichen compound in the corticolous species *P. torquatella* Müll. Arg. (vide infra) and occurs with constictic acid in *P. delicatula* Müll. Arg. (vide supra); with stictic acid in *P. cryptostoma* Müll. Arg. (vide infra); with 2'-*O*-methylstenosporic acid in *P. boweniana* A.W.Archer & Elix and with divaricatic acid in *P. orarensis* A.W.Archer & Elix.

Etymology: The epithet *saxatilis* is Latin, dwelling or found among rocks.

***Pertusaria ferax* (Müll. Arg.) A.W.Archer & Elix, comb. et stat. nov.**

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Basionym: *Pertusaria torquatella* Müll. Arg. β [var.] *ferax* Müll. Arg., *Flora* 67: 397 (1884).

Type: Brasilia meridionali ad Novum Friburgum [Novo Friburgo], *Glaziou s.n., anno* 1882; holotype: G.

Description: Thallus dull fawn, coarsely areolate and cracked, surface smooth and dull, lacking isidia and soralia, corticolous. Apothecia verruciform, numerous, crowded, often one per areole, sometimes confluent,

distorted hemispherical, c. 0.5 mm diam., concolourous with the thallus. Ostioles inconspicuous, black, one per verruca. Ascospores colourless, ellipsoid, 8 per ascus, 2-seriate, 40–54 μm long, 20–25 μm wide.

Chemistry: K-ve; C-ve; KC-ve; Pd-ve; 2-chlorolichexanthone (minor), 2,5-dichlorolichexanthone (major), 2,4-dichlorolichexanthone (major) and 2,4,5-trichlorolichexanthone (major).

Pertusaria ferax is characterised by the crowded apothecia, asci with 8 small, biseriata ascospores and the presence of polychlorinated lichexanthonones. The lectotype of *P. torquatella* var. *torquatella* [labelled: LBn 762] contains only 2-chlorolichexanthone and is thus chemically distinct from var. *ferax* which is here raised to species status. The remaining syntype of *P. torquatella* var. *torquatella* has larger ascospores, 58–70 μm long, 26–32 μm wide, and contains 2-chlorolichexanthone and stictic acid. It is identical with *P. cryptostoma* Müll.Arg.

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