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Two new species of *Letrouitia* (Letrouitiaceae: Ascomycota) from Australia

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Abstract: *Letrouitia hafellneri* S.Y.Kondr. & Elix and *L. leprolytoidea* S.Y.Kondr. & Elix are described as new to science and are compared with allied taxa. A key to the sorediate and isidiate species of *Letrouitia* is provided.

The examination of various collections of crustose lichens in preparation for a further lichen volume of the *Flora of Australia* has led to the identification of two undescribed species, namely *Letrouitia hafellneri* S.Y.Kondr. & Elix and *L. leprolytoidea* S.Y.Kondr. & Elix. Chemical constituents were identified by high-performance liquid chromatography (Elix *et al.* 2003) and comparison with authentic samples.

Letrouitia hafellneri S.Y.Kondr. & Elix, sp. nov.

Figs 1, 2

Sicut *Letrouitia domingensis* sed superfice isidiatis et sorediatis differt.

Type: Australia. Queensland: Machans Beach, a few km N of Cairns, 16°51'S, 145°45'E, 3 m, on an old mangrove along the Barron River, K. & A. Kalb *s.n.*, 26.viii.1988, (holotype CANB; isotype herb. Kalb).

Thallus up to 10 cm wide, dull to bright yellow or yellow-grey, K+ slowly purple, thin, continuous to areolate; soredia and isidia present. Areoles 0.3–0.5 mm wide, more apparent near the margins. Isidia very thin, 60–70 µm diam., up to 0.3 mm high, simple or branched and becoming coralloid, forming dense aggregations in places. Soralia 0.5–1.5 mm wide, ±orbicular, forming a convex sorediose mass. Soredia very fine at first, (12–)15–20(–25) µm diam., powdery, of irregular shape with numerous pigment granules on the surface, soon becoming aggregated in the larger, ±rounded or irregular aggregations (25–)40–55 µm diam. Hypothallus not apparent. Apothecia dispersed, round to somewhat distorted, thick (to 0.45 mm) and rising above level of thallus, constricted at base, 0.5–1.0 mm wide; disc concave at first, yellowish brown or ±yellowish pruinose, then flat and dark orange-brown to dark brown or blackish brown; margin prominent, thick, 0.1–0.15(–0.2) mm wide, bright yellow at first but soon becoming orange to brownish orange, disc and margin K+ blue-violet (appearing black under the microscope); proper exciple (in cross-section) up to 200 µm thick in the uppermost and lower lateral portions, with numerous anthraquinone crystals in the inner layers; outer layers K+ violet. Epithemium encrusted with orange anthraquinone crystals, K+ violet. Hymenium colourless, 100–110 µm high. Paraphyses conglutinated, usually branched sparingly, not expanding towards the tips, c. 2 µm diam. Hypothecium colourless, 40–50 µm thick. Asci 8-spored. Ascospores ellipsoidal, transversely septate with 6–8 lens-shaped locules, 25–37 x (9–)11–14(–15) µm in water, becoming longer in K, 27–46 x (10–)11–14(–15) µm. Conidia long, bacilliform, 4–6(–7) x 0.9–1 µm.

Chemistry: Thallus and apothecia K+ blue-violet; containing fragilin (major), ±parietin (minor), ±7-chloroemodin (trace), ±7-chloroemodinal (trace), ±7-chloroparietinic acid (trace), flavo-obscurin A (minor), ±physcoin bisanthrone (trace).

Etymology: This species is named in honour of the well-known Austrian lichenologist Josef Hafellner, author of the world monograph on the genus *Letrouitia*.

Remarks

This new species is distinguished by the simultaneous presence of true isidia and soredia on the upper surface. Both *L. corallina* (Müll. Arg.) Hafellner and *L. leprolyta* (Nyl.) Hafellner have isidia, but lack soredia and have different ascospores. Thus *L. corallina* has 2-spored asci with much larger (45–58 x 16–21 µm) submuriform ascospores. *Letrouitia hafellneri* differs from *L. leprolyta* in having longer, mainly 8-locular (6-locular in *L. leprolyta*) ascospores (25–37 µm *vs.* 18–30 µm long), as well as in having soralia. *Letrouitia coralloidea* (Müll. Arg.) Hafellner is sorediate [but is so far known only in the sterile state], but the soredia are larger (20–50 µm *vs.* 12–25 µm diam.), and it lacks isidia. The chemistries of these taxa are essentially identical (Johansson *et al.* 2005). The apothecia and ascospores of *L. hafellneri* are very similar to those of *L. domingensis* (Pers.) Hafellner & Bellem., but the latter lacks soredia and isidia.

SPECIMEN EXAMINED

Queensland: • Ellis Beach, 27.4 km N of Cairns, 16°44'S, 145°39'E, 1 m, on trees along the foreshore, J.A. Elix 2570, 25.viii.1976 (CANB).

Letrouitia leprolytoidea S.Y.Kondr. & Elix, sp. nov.

Figs 3, 4

Sicut *Letrouitia leprolyta* sed isidiis digitiformis vel coralloidibus, asci 4–8-sporis et ascosporis 6–8-locularibus differt.

Type: Australia. Queensland, Cairns, road to airport, 16°53'24"S, 145°45'41"E, 3 m, on mangrove bark [thallus and apothecia damaged by *Opegrapha* sp.], J. Vondrák 5080, 18.viii.2006 (holotype CANB; set of isotypes prepared for exsiccata).

Thallus 2–3 cm wide, greenish or greenish yellow, ±distinctly areolate, sometimes indistinct due to the development of a concolorous or yellow hypothallus, thin; isidia present, soredia absent. Areoles 0.2–0.5 mm wide, with isidiate margins. Isidia initially short and thin, 50–70 µm diam., c. 0.1 mm high, finger-like and concolorous with areoles, then becoming thicker and longer, 70–90 µm diam., 0.2–0.3(–0.4) mm high, pointed towards the tips, branched and becoming coralloid, dark orange to brownish orange, distinctly brighter and paler yellow at the apices, often aggregated in a lax isidiose mass. Hypothallus yellow, usually present. Apothecia rare, biatorine, round to somewhat distorted, thick (to 0.35 mm) and rising above level of thallus, constricted at base, 0.4–0.9 mm wide; disc concave at first, dark orange to dull brownish orange or dark brown; margin prominent, thick, 0.1–0.2 mm wide, yellow to pale brownish yellow, disc and margin K+ purple-violet; proper exciple (in cross-section) 120–150 µm thick in the uppermost lateral portions, c. 130 µm thick in the lower lateral portion and 150–170 µm thick in basal portion of 'textura intricata' in which single, thick-walled hyphae 4–6 µm wide are present; cell lumina 1–1.5 µm diam., with outer layers in lateral portions and on underside somewhat brownish orange, outer layers K+ purple. Epithemium brownish orange, K+ violet. Hymenium colourless, 80–90 µm high. Paraphyses thin, not branched or swollen towards the tips, c. 2 µm diam. Hypothecium colourless, 50–70 µm thick, with small oil droplets. Asci (4–6)–8-spored. Ascospores ellipsoidal, transversely septate with (4–)6(–8) lens-shaped locules, (17–)23–30(–31) x (8–)9–12(–14) µm in water, (22–)28–38(–42) x 12–14(–16) µm in K. Pycnidia not seen.

Chemistry: Thallus and apothecia K+ purple-violet; containing fragilin (major), ±parietin (minor), ±7-chloroemodin (trace), ±7-chloroemodinal (trace), ±7-chloroparietinic acid (trace), flavo-obscurin A (minor), ±physcoin bisanthrone (trace).

Etymology. The specific epithet derives from the Greek *-oides* (resembling or having the form of) and *L. leprolyta*, the species that the new taxon most closely resembles.

Remarks

This new species is distinguished by the presence of finger-like to coralloid isidia on the upper surface, (4–)6–(8)-spored asci and (4–)6–(8)-locular ascospores. This species has previously been confused with *L. leprolyta*, but re-examination of the type material has confirmed that the latter has short, wart-like or erumpent isidia (0.1–0.15 mm wide and 0.1–0.2 mm long), whereas *L. leprolytooides* has cylindrical, finger-like to coralloid-branched isidia (50–70 µm wide and 0.3–0.4 mm long). In addition, *L. leprolytooides* differs from *L. leprolyta* in having mainly (4–)6–(8)-spored asci and somewhat longer ascospores [(17–)23–30(–31) µm vs. (18–)19–26(–30) µm in water]. We were only able to detect 2–4 well-developed ascospores in asci of the type of *L. leprolyta*, but other specimens exhibited (2)–4(–8)-spored asci.

SPECIMENS EXAMINED

Queensland: • Ingham-Kangaroo Hills road, 30 km WSW of Ingham, 18°46'S, 145°54'E, 200 m, on sapling in disturbed rainforest, J.A. Elix 20461 & H. Streimann, 19.vi.1986, (CANB); • Conway Road, 13 km SE of Proserpine, 20°27'S, 148°42'E, 1 m, on *Rhizophora* in mangrove swamp, J.A. Elix 20960 & H. Streimann, 30.vi.1986 (CANB); • First Turkey, Mount Archer Environmental Park, 7 km NE of Rockhampton, 23°21'S, 150°34'E, 200 m, on tree trunk in low monsoon scrub beside seasonal stream, J.A. Elix 34538, 24.viii.1993 (CANB); • Ross Creek, Yeppoon, 23°08'S, 150°45'E, 2 m, on *Bruguiera* in mangrove swamp, J.A. Elix 34593, 24.viii.1993 (B, CANB).
Northern Territory: • Channell Point, 23 km NNW of mouth of Daly River, 13°07'S, 130°13'E, 10 m, on tree trunk in monsoon forest, J.A. Elix 27725, H.T. Lumbsch & H. Streimann 48285, 5.vii.1991 (CANB); • Black Jungle, 42 km ESE of Darwin, 12°33'S, 131°13'E, 15 m, on treelet in scrub dominated by *Acacia* and *Barringtonia*, H. Streimann 48638, 22.vii.1991 (B, CANB, ESS, MINN), H. Streimann 48644 (CANB).

Key to species of *Letrouitia* with soredia or isidia

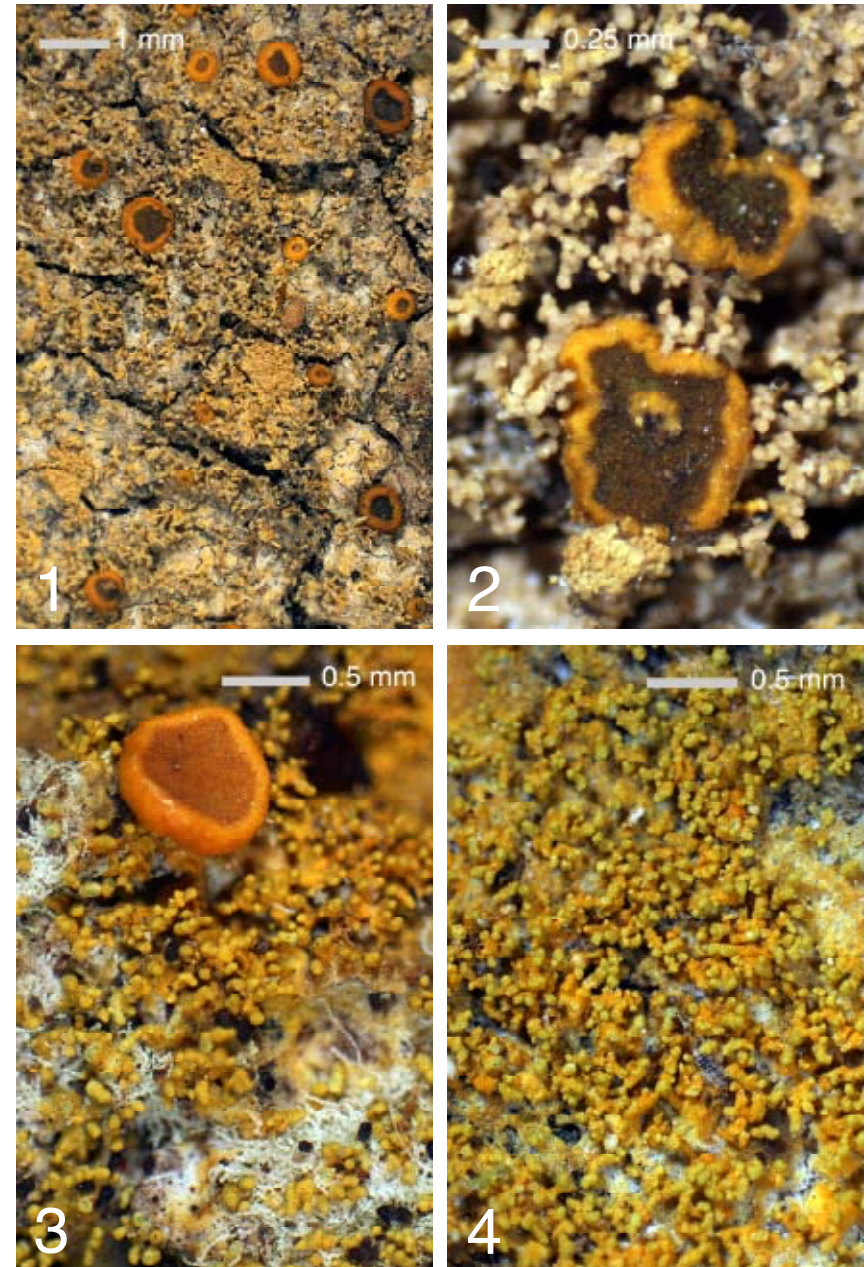
- 1 Thallus with soredia and ±pseudoisidia; true isidia absent.....**coralloidea**
- 1: Thallus isidiate; soralia present or absent.....**2**
- 2 Isidia wart-like, erumpent or flattened; soralia absent.....**3**
- 2: Isidia cylindrical, finger-like or coralloid; soralia present or absent.....**4**
- 3 Isidia wart-like or erumpent; asci (2)–4(–8)-spored; ascospores transversely septate, 18–30 x 8–13 µm**leprolyta**
- 3: Isidia ±flattened; asci 1- or 2-spored; ascospores submuriform, 36–42 x 15–20 µm.....**corallina**
- 4 Soralia present; asci 8-spored; ascospores 25–37 x 9–15 µm**hafellneri**
- 4: Soralia absent; asci (4)–6–8-spored; ascospores 17–31 x 8–14 µm.. **leprolytooides**

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Figures: 1–2. *Letrouitia hafellneri* (holotype in CANB); 3–4. *Letrouitia leprolytooides* (holotype in CANB).