

Two new thamnolic acid-containing *Lepraria* species from Thailand

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Abstract: *Lepraria aurescens* and *Lepraria pulchra* are described as new from bark in Thailand; both contain thamnolic acid, but differ in thallus form and colour.

Key words: *Lepraria*, sterile crusts, SE Asia, Thailand

Introduction

Persistently sterile, leprose lichens are still poorly known in most of the world; there are approximately 32 currently accepted species in the genus *Lepraria* (including species formerly placed in *Leproloma*), and there are a further three currently placed in *Lecanora*. Most of the European species of *Lepraria* were shown by Ekman & Tønsberg (2002) to form a monophyletic group in which speciation evidently occurs in the absence of sexual processes. Leprose species containing usnic acid have not yet been investigated using molecular methods, and they are placed by some authors in the genus *Lecanora*.

Leprose lichens are recorded from every continent, but are currently best known in Europe. Approximately nine species are reported as predominantly tropical in distribution, namely *Lepraria sipmaniana* (Kümmerl. & Leuckert) Kukwa (Leuckert & Kümmerling 1991), *L. leprolomopsis* Diederich & Sérusiaux, *L. nigrocincta* Diederich *et al.* (Aptroot *et al.* 1997), *L. atrotomentosa* Orange & Wolseley (Orange *et al.* 2001), *L. multiacida* Aptroot (Aptroot 2002), *L. usnica* Sipman (Sipman 2003), *L. impossibilis* Sipman, *L. pallida* Sipman

(Sipman 2004) and *Lecanora coriensis* J. R. Laundon (Laundon 2003). The original description indicates that *Lepraria usnica* may prove to be a synonym of *Lecanora coriensis*.

The authors have seen several unidentified and apparently undescribed *Lepraria* species from Asia, but for several there is not enough material on which to base a reliable description. Two species are now known from several collections from Thailand, and are described below.

The Species

1. *Lepraria aurescens* Orange & Wolseley sp. nov.

Thallus leprosus, diffusus, pallide griseus vel pallide flavidogriseus; granula thallina plerumque sine hyphis projectis, sed granula marginale hyphis longis brunneis instructa. Acidum thamnolicum continens. Ascomata et conidiomata ignota.

Typus: Thailand, Chiang Mai Province, Doi Suthep, transect Wat Palad, 18°48'N, 99°56'E, alt. 680 m, dry evergreen forest, on bark, 25 November 1991, P. A. Wolseley & B. Aguirre-Hudson 5001 (BM—holotypus).

(Fig. 1)

Thallus leprose, diffuse, pale grey to pale yellowish grey in herbarium, *c.* 200 µm thick; margin diffuse or very small areas more or less delimited, but without lobes or raised rim; thallus surface of loosely attached granules 40–100 µm diam.; granules mostly

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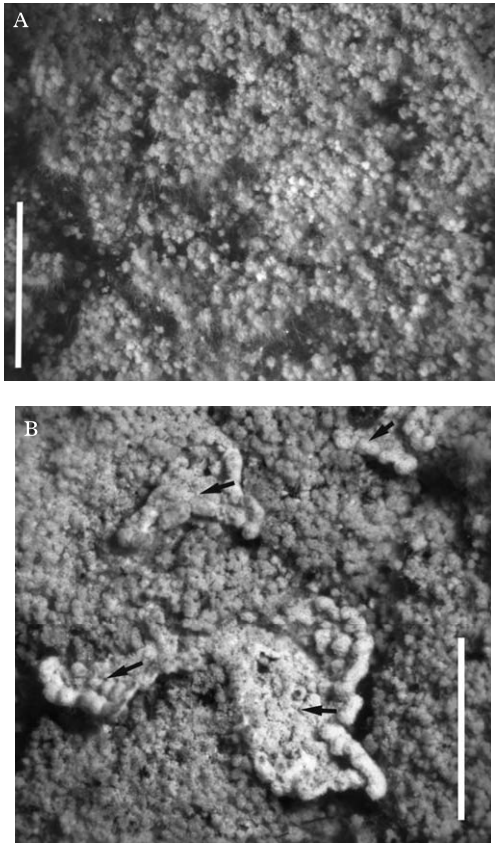


FIG. 1. A, *Lepraria aurescens* (holotype), showing thallus granules and dark hyphae; B, *L. pulchra* (arrowed) growing amongst *L. aurescens* (Wolseley & Aguirre-Hudson 5002). Scales: A & B = 1 mm.

without projecting hyphae, under high magnification surrounded by a weft of colourless branched hyphae, but marginal granules, or those in small groups, with long mostly downwardly projecting hyphae to 150(–300) μm long, these whitish then grey-brown, locally conspicuous in surface view of the thallus; medulla absent, lower surface of thallus locally with a loose weft of hyphae which are cylindrical, branched and anastomosing, brown, distantly septate, and 3.5–4 μm wide.

Ascomata and *conidiomata* absent.

Chemistry. Thamnolic acid; thallus K+bright yellow, PD+orange-yellow, C–, KC–.

Distribution. Known from five collections from Thailand.

Ecology. On rain-sheltered bark in dry evergreen, oak/pine or oak/chestnut forest at altitudes of 680–1600 m.

Notes. Mature areas of thallus have few dark hyphae visible at the surface, but granules which are not closely surrounded by other granules produce abundant dark hyphae from their lower surface. This weft of hyphae is often locally visible in surface view of the thallus, especially in areas with sparse granules, which may correspond to more heavily shaded areas of the substratum. Dark hyphae are often present on the underside of the thallus even when not visible from above.

The species strongly resembles *Lepraria nigrocincta* in the fine granules, the slight yellowish tinge to the thallus of some specimens, and the abundant production of dark hyphae, but differs in the possession of thamnolic acid (thallus K+bright yellow) rather than divaricatic acid (thallus K–) as in *L. nigrocincta*. The morphological similarity suggests that they could eventually prove to be chemotypes of a single species. There is not enough material of either species yet available to decide whether there may be subtle differences of morphology and ecology, such as those that separate the European species *L. incana* (L.) Ach. (divaricatic acid and zeorin) and *L. umbricola* (thamnolic acid). For differences from *L. pulchra*, see below. *Lepraria atrotomentosa* also occurs in tropical Asia and produces conspicuous dark hyphae, but differs in the blue-grey colour and production of small lobes, as well as in containing lecanoric acid, zeorin and atranorin.

Additional specimens examined. Thailand: Chiang Mai Province: Doi Inthanon, National Park Headquarters, alt. 1000 m, pine/oak forest, on *Wenlandia*, 18°33'N, 98°29'E, 1991, P. A. Wolseley & B. Aguirre-Hudson 5007 (BM); Doi Suthep chedi site San Khu 32, alt. 1600 m, montane oak/chestnut forest, on bark, 1993, P. W. James & P. A. Wolseley 1605b (BM); Doi Suthep, transect Wat Palad, 18°48'N, 99°56'E, alt. 680 m, dry evergreen forest, on bark, 1991, P. A. Wolseley & B. Aguirre-Hudson 5002; same locality and date, on *Shorea*, P. A. Wolseley & B. Aguirre-Hudson 5003 (BM, NMW).

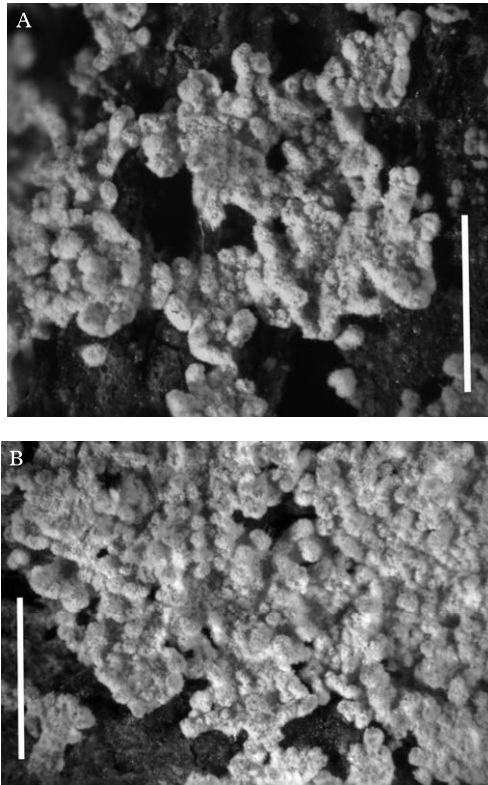


FIG. 2. *Lepraria pulchra* (holotype). A, young thalli showing raised margin; B, thallus margin. Scales: A & B=1 mm.

2. *Lepraria pulchra* Orange & Wolsley sp. nov.

Thallus leprosus, albidus vel pallide caesiogriseus; margo limitatus, irregulariter elevatus, crenulatus; granula thallina hyphis brevissimis erectis tecta. Acidum thamnolicum continens. Ascomata et conidiomata ignota.

Typus: Thailand, Chiang Mai Province, Doi Suthep chedi, site San Khu 32, 18°49'N, 99°54'E, alt. 1600 m, montane oak/chestnut forest, on bark, 31 January 1993, P. W. James & P. A. Wolsley 1605a (BM—holotypus).

(Fig. 2)

Thallus leprose, whitish grey to pale bluish grey in herbarium, c. 100 µm thick, often lightly raised from the substratum at the margin; margin delimited, when young with an irregular, raised crenulate rim 100–140 µm wide, composed of incompletely

separated granules; margin with at most very small and indistinct lobes up to 0.5 mm wide; inner parts of thallus soft in appearance, covered by granules or locally without well-defined granules; granules 80–140 µm diam., mostly with dense, very short, projecting encrusted hyphae 10–20 µm long and 2.5–3.5 µm thick, giving a pruinose appearance, occasional granules with tufts of colourless hyphae to 60 µm long; lower surface of thallus white, more or less smooth under dissecting microscope, without conspicuous wefts of hyphae. *Medulla* present, 30–50 µm thick, of more or less parallel, loosely interwoven, mostly unencrusted hyphae 2.5–4.5 µm, the wall sometimes thickened to 1.5 µm; lower surface of thallus with flexuose, more or less downwardly directed colourless encrusted hyphae, locally becoming longer and interwoven. *Photobiont* trebouxioïd; cells 12–18 × 8–14 µm.

Ascomata and *conidiomata* absent.

Chemistry. Thamnolic acid; thallus K+ bright yellow, PD+ orange-yellow, C – , KC – .

Distribution. Known from three collections from Thailand.

Ecology. On rain-sheltered bark in dry evergreen forest, oak/chestnut forest and *Pinus* savanna at altitudes of 680–1600 m.

Notes. Young thalli of *Lepraria pulchra* have a distinctive appearance owing to the combination of an irregularly indented but well-delimited margin which is not tightly attached to the substratum, and which has a raised rim at least on young thalli. The rim is clearly composed of granules, and is very much less regular and less well defined than in species including *L. membranacea* (Dicks.) Vain. and *L. sipmaniana*. The available material comprises small colonies, and it is likely that the delimited margin would be a less conspicuous feature on more extensive thalli. The granules, including the marginal ones, are covered by a dense layer of very short projecting hyphae, which has not been noted in other species in the genus. The pale

colour, often poorly defined granules, and projecting hyphae all give the thallus a soft appearance. All hyphae in the thallus are colourless.

The morphology of this species easily separates it from *L. aurescens*, which has a similar chemistry; the two species have been seen growing adjacent to each other in three collections (James & Wolseley 1605; Wolseley & Aguirre-Hudson 5001, 5002), where they clearly differ in granule size, colour, and degree of delimitation of the margin. Two other species in the genus are known to contain thamnolic acid: *L. umbricola* Tønsberg, with a diffuse greenish thallus without medulla, and *L. nylanderiana* Kümmerl. & Leuckert, with a whitish thallus lacking the projecting hyphae of *L. pulchra*; *L. nylanderiana* also contains roccellic acid.

Additional specimens examined. Thailand: Chiang Mai Province: Doi Suthep National Park, near summit, 8W, 18°50'N, 98°55'E, alt. 1600 m, *Pinus* savanna, on bark, 1988, P. A. Wolseley 470 (BM); Doi Suthep, transect Wat Palad, 18°48'N, 99°56'E, alt. 680 m, dry evergreen forest, on bark, 1991, P. A. Wolseley & B. Aguirre-Hudson 5001 (BM, sub *Lepraria aurescens*).

Discussion

The genus *Lepraria* comprises morphologically simple species, and a modern understanding of the genus began only when the

chemistry was widely investigated by thin-layer chromatography (Laundon 1992; Tønsberg 1992). However, subtle morphological features are important for the delimitation of species. This is well illustrated by *L. pulchra* and *L. aurescens*, which have an identical chemistry, but which differ in appearance.

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