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RESEARCH ARTICLE

## *Lepra erythrella* (Pertusariaceae) – a new addition to the lichenized mycobiota of the Aotearoa / New Zealand archipelago

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**Abstract.** An investigation of the flora, mycobiota and lichenized mycobiota associated with the endemic Aotearoa / New Zealand plant genus *Lophomyrtus* (Myrtaceae) revealed a specimen of *Lepra erythrella* (Pertusariaceae). *Lepra erythrella*, though briefly mentioned in a paper documenting the results of that *Lophomyrtus* study, has not yet been formally admitted into the lichenized mycobiota of Aotearoa / New Zealand. Therefore, to complete that process in this paper, we provide a description based on the collection made from *Lophomyrtus* and a further one located in the Allan Herbarium (CHR). The addition of *Lepra erythrella* to the lichenized biota of Aotearoa / New Zealand highlights not only the lack of collecting of this genus in that archipelago but the need to critically examine that nation's herbarium collections. We recommend that further research on this genus is carried out in our region.

**Keywords:** Aotearoa / New Zealand, *Lepra erythrella*, lichenized mycobiota, new addition

### Introduction

On 12 January 2022, during the field sampling of the flora and mycobiota associated with the Aotearoa / New Zealand endemic myrtle, ramarama (*Lophomyrtus bullata* Burret) (Prasad et al., 2022) in the Awaroa Valley, South Kawhia, Te Ika a Māui / North Island (Fig. 1.), an unusual corticolous crustose lichen was discovered on the exposed trunks of this phorophyte (P.J. de Lange 15406, D.J. Blanchon & L.M.H. Schmid, 12 January 2022, UNITEC 13356<sup>1</sup>) (Latitude: –38.147495 Longitude: 174.938993) (Fig. 2).

The whitish-green (when wet) lichen had a markedly areolate, sorediate thallus (Fig. 2), which was not fertile and had a weak UV reaction (slightly yellow), K+ yellow to red reaction, and Pd+ yellow reactions. As such, the specimen initially defied our abilities to identify it.

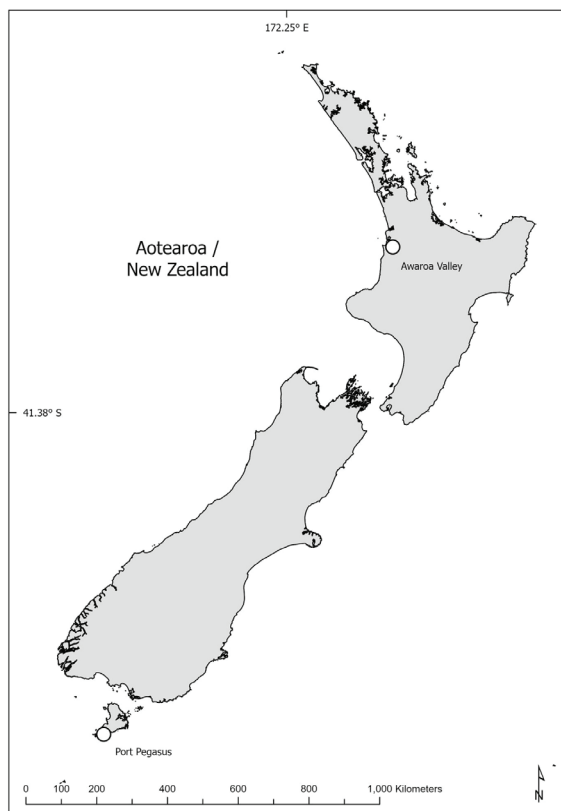
However, the suspicion that it might be a member of *Pertusariaceae* prompted further critical examination and using Archer (2004) and Archer & Elix (2014) we were able to identify the lichen as *Pertusaria erythrella* Müll. Arg. which is now placed in the genus *Lepra* Scop., as *L. erythrella* (Müll. Arg.) I. Schmitt, B.G. Hodk. & Lumbsch (Wei et al., 2017). Subsequent correspondence with Sue Gibb

<sup>1</sup> Herbarium acronyms follow Thiers (2008—onwards)

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**Fig. 1.** The Aotearoa / New Zealand archipelago, showing the locations where *Lepra erythrella* specimens reported in this paper were collected

of the Allan Herbarium (CHR) disclosed a further specimen of *Lepra erythrella* (CHR676528). This had been collected from Rakiura / Stewart Island (Fig. 1), by D.J. Galloway on 1 October 1998 from 'below Bald Cone, Port Pegasus' (Latitude:  $-47.221643$  Longitude:  $167.598686$ ) on a bark sampling of *Lepidothamnus intermedius* (Kirk) Quinn, as a minor specimen within a crustose lichen mosaic dominated by *Coccotrema cucurbitula* (Mont.) Müll. Arg. and *Megalospora campylospora* (Stirt.) Sipman.

Although *Lepra erythrella* was briefly reported from Aotearoa / New Zealand by Prasad et al. (2022), a more formal publication, including a description of the species based on CHR676528 and UNITEC 13356, to admit it to the lichenized mycobiota of that archipelago is needed. This paper fulfils that role.

## New Lichen Record

*Lepra erythrella* (Müll. Arg) I. Schmitt, B.G. Hodk. & Lumbsch, PLOS ONE 12(7): e0180284: 8. 2017.

(= *Pertusaria erythrella* Müll. Arg., Bull. Herb. Boissier 1: 41. 1893)

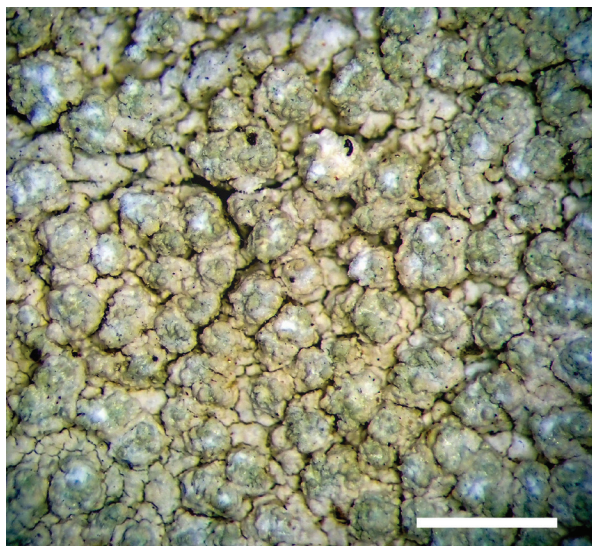
**Description** (Fig. 2). Corticolous. Thallus whitish green when wet, grey-white to off-white when dry, finely cracked, areolate,  $\pm$ wrinkled. Sorediate; Soralia 0.5–1.0 mm diameter, copious, densely covering thallus, white, subhemispherical, often constricted at base, sometimes disc-like. Apothecia not seen.

**Chemistry:** Thallus C $-$ , K $+$  yellow to red, KC $-$ , P $+$  yellow, UV $+$  (weak yellow reaction). Norstictic acid present (Archer, Elix, 2014).

**Specimens seen:** Aotearoa / New Zealand: Te Ika a Māui / North Island, Waikato, South Kawhia, Awaroa Valley, Awaroa Scenic Reserve, P.J. de Lange 15406, D.J. Blanchon & L.M.H. Schmid, 12 January 2022, UNITEC 13356; Rakiura / Stewart Island, Port Pegasus, below Bald Cone, D.J. Galloway 9254, 1 October 1998, CHR 676528 pro parte (*Lepra* is a minor associate of a mass of *Coccotrema cucurbitula* and *Megalospora campylospora*).

**General geographical distribution:** Australia (eastern, reported from Queensland, New South Wales, Victoria, Bass Strait Islands, and Tasmania) and the Galapagos Islands (where it is known from a single collection made from Volcán Darwin, Isabela Island) (Archer, 2004; Archer, Elix, 2014; Bungartz et al., 2015).

**Notes:** *Lepra erythrella* is unlikely to be confused with those species of *Lepra* currently reported from Aotearoa / New Zealand (de Lange et al., 2018). Of those sorediate *Lepra* known from the archipelago, *L. erythrella* is perhaps most similar to *L. psoromica* (A.W. Archer & Elix) A.W. Archer & Elix (Galloway, 2007, as *Pertusaria psoromica* A.W. Archer & Elix), another seemingly sterile species which also has a thallus covered in copious white soralia, which are Pd $+$  (yellow). However, that species is K $-$  rather K $+$  and has psoromic rather than norstictic acid, while the thallus is dull-fawn or pale-olive-green, rather than whitish green (wet) or grey-white to off-white (dry). Further, the soralia of *L. psoromica*, though numerous, are hemispherical rather than subhemispherical and 0.5–2.0 mm rather than 0.5–1.0 mm diameter.



**Fig. 2.** *Lepra erythrella* (dry state) showing the sorediate thallus, scale = 3 mm (image from UNITEC 13356: P.J. de Lange)

## Discussion

Although twelve species of *Lepra* are currently recognised from Aotearoa / New Zealand (de Lange et al., 2018), the genus, only recently reinstated from *Pertusaria* (Wei et al., 2017), is in serious need of better collecting and revision in that archipelago. Although Galloway (2007) recognised 54 species in his treatment of *Pertusaria* (from which *Lepra* has been segregated and reinstated), *Pertusaria* s. l. has yet to be comprehensively collected through the islands, and subjected to a modern revision. So, the discovery of *Lepra erythrella* in the archipelago is not surprising, particularly as it stems from targeted collecting of the lichens from a particular phorophyte (Prasad et al., 2022) or region (Rakiura / Stewart Island). For example, two other additions to Aotearoa / New Zealand *Pertusaria*, *P. endoxantha* Vain. and *P. puffina* A.W. Archer & Elix (Er et al., 2015; Marshall, Blanchon, 2017), were also made either by specific sampling of vegetation associations in the Tāmaki Makaurau / Auckland region or from the sampling of lichens from manawa / grey mangrove (*Avicennia marina* (Forssk.) Vierh. subsp. *australasica* (Walp.) J. Everett)

throughout the range of that phorophyte (Reynolds et al., 2017). As regards *Lepra erythrella*, we believe that the currently known highly disjunct occurrences reflect the lack of collecting of this genus, family, and indeed crustose lichens in general from the Aotearoa / New Zealand archipelago (see comments in Marshall et al., 2019a, b; Marshall et al., 2022), rather than any natural pattern. As with many lichen families within Aotearoa / New Zealand, we urge critical sampling of the *Pertusariaceae* throughout that archipelago, a sampling, which is likely to reveal further additions to the family including taxa new to science.

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## Ethics Declaration

The authors declare no conflict of interest.

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***Lepra erythrella* (*Pertusariaceae*) – новий вид ліхенізованої мікобіоти архіпелагу Аотearoa / Нова Зеландія**

**Реферат.** При дослідженні флори, мікобіоти і ліхенізованої мікобіоти на представнику ендемічного для Нової Зеландії роду *Lophomyrtus* (*Myrtaceae*) виявлено зразок *Lepra erythrella* (*Pertusariaceae*). Хоча *L. erythrella* було побіжно згадано у публікації про дослідження роду *Lophomyrtus*, офіційно у складі ліхенізованої мікобіоти Нової Зеландії цей вид ще не був зареєстрований. Тому в цій статті ми наводимо його опис на основі зібраного гербарного зразка на рослині з роду *Lophomyrtus* і ще одного зразка з колекції Гербарію Аллана (CHR). Виявлення *Lepra erythrella* як нового виду для ліхенізованої біоти Нової Зеландії підкреслює не лише обмаль колекцій цього роду в межах архіпелагу, а й необхідність критичного перегляду гербарних колекцій країни. У статті рекомендується проведення подальших досліджень цього роду.

**Ключові слова:** *Lepra erythrella*, ліхенізована мікобіота, Нова Зеландія, нові знахідки