

## A new species of *Dictyomeridium* (Trypetheliaceae) from Aotearoa / New Zealand and an updated key to species of the genus

Andrew J. Marshall, André Aptroot,  
Dan J. Blanchon, Peter J. de Lange

<https://doi.org/10.34074/pibdiv.002108>

A new species of *Dictyomeridium* (Trypetheliaceae) from Aotearoa / New Zealand and an updated key to species of the genus by Andrew J. Marshall, André Aptroot, Dan J. Blanchon and Peter J. de Lange is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.

This publication may be cited as:

Marshall, A. J., Aptroot, A., Blanchon, D. J., de Lange, P. J. (2024). A new species of *Dictyomeridium* (Trypetheliaceae) from Aotearoa / New Zealand and an updated key to species of the genus. *Perspectives in Biodiversity*, 2 (1): 69–76.

Contact:

[www.unitec.ac.nz/epress](http://www.unitec.ac.nz/epress)

Unitec

Private Bag 92025, Victoria Street West

Tāmaki Makaurau Auckland 1142

Aotearoa New Zealand



Unitec is a business division of Te Pūkenga –  
New Zealand Institute of Skills and Technology



ISSN 3021-114X

# A new species of *Dictyomeridium* (Trypetheliaceae) from Aotearoa / New Zealand and an updated key to species of the genus

---

Andrew J. Marshall<sup>1\*</sup> , André Aptroot<sup>2</sup> , Dan J. Blanchon<sup>3</sup> , Peter J. de Lange<sup>1</sup> 

## Affiliations:

1. Applied Molecular Solutions Research Group, School of Environmental and Animal Sciences, Unitec, Private Bag 92025, Victoria Street West, Auckland 1142, New Zealand
2. Laboratório de Botânica / Liquenologia, Instituto de Biociências, Bairro Universitário, Campo Grande, Mato Grosso do Sul, Brazil
3. Auckland War Memorial Museum Tāmaki Paenga Hira, Private Bag 92018, Victoria Street West, Auckland, New Zealand

\* Corresponding author: [amarshall2@unitec.ac.nz](mailto:amarshall2@unitec.ac.nz)

Associate Editor: Associate Professor Mark Large

Article type: Research Paper

## Abstract

*Dictyomeridium neureuterae* A.J. Marshall, Aptroot, de Lange et Blanchon sp. nov. (Trypetheliaceae) is described from Aotearoa / New Zealand. The new species is described from a single location in the Hauraki Gulf Islands and is the only known representative of the genus in Aotearoa / New Zealand. It is characterised by having a pale, ecorticate, UV- thallus, eccentric to lateral ostioles lacking any pigmentation, and 8-spored asci containing comparatively small, muriform, non-amyloid ascospores.

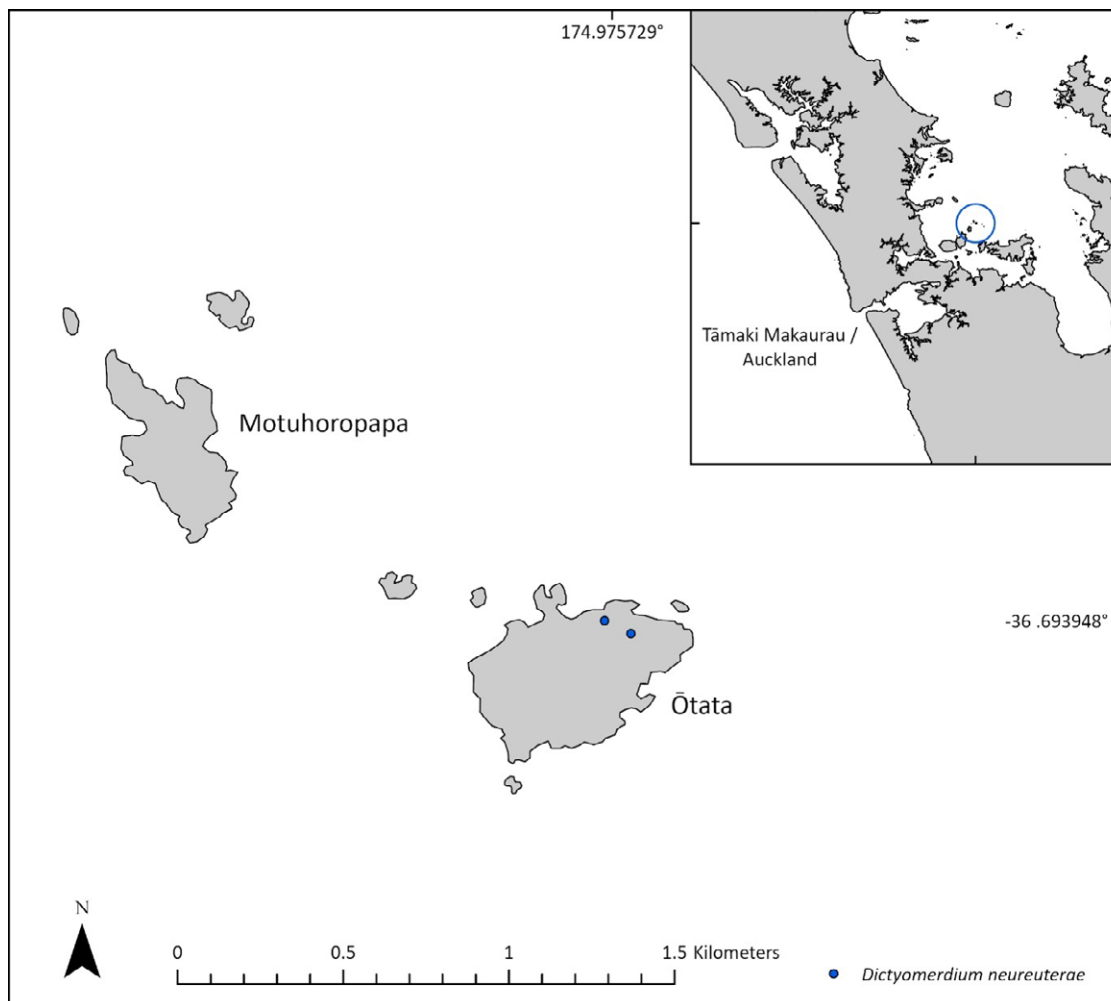
## Keywords

*Dictyomeridium*, Trypetheliaceae, Ōtata, The Noises, New Zealand lichenised mycobiota

## Introduction

Understanding of the Trypetheliaceae in Aotearoa / New Zealand has changed considerably since Galloway (2007), who accepted four genera: *Laurera* Reichenb. (three species), *Mycomicrothelia* Keissl. (two species), *Polymeridium* (Müll.Arg.) R.C.Harris (one species) and *Trypethelium* Spreng. (one species). Now, following the global revision of the family (Aptroot & Lücking 2016), the following genera are considered present in Aotearoa / New Zealand: *Aptrootia* Lücking & Sipman (one species), *Arthopyrenia* A.Massal. (six species), *Astrothelium* Eschw. (one species), *Bathelium* Trevis (one species), *Bogoriella* Zahlbr. (one species), *Mycomicrothelia* Keissl. (one species) and *Polymeridium* (Müll.Arg.) R.C.Harris (one species). Currently, the status of the four Aotearoa / New Zealand assumed endemic *Arthopyrenia*, in relation to the segregation of that genus and recognition of *Constrictolumina* Lücking, M.P.Nelson & Aptroot (Aptroot & Lücking 2016), requires further study. In this

paper we admit a further genus, *Dictyomeridium* Aptroot, M.P.Nelson & Lücking, on the basis of a specimen (Unitec 13988) collected during January 2021 from Ōtata (15 ha, 67 m a.s.l., Figure 1), the largest island in The Noises island group, Tīkapa Moana / Hauraki Gulf (Rayner et al. 2021). This specimen was pyrenocarpous but had very unusual muriform-euseptate ascospores. Images of this specimen were sent to the second author, who identified it as a species of *Dictyomeridium*. A subsequent trip to Ōtata allowed the senior author a brief opportunity to search for further material, resulting in the discovery of one more specimen. The Ōtata *Dictyomeridium* specimens differ from the other eight species in the genus by possessing a combination of non-amyloid ascospores ( $25\text{--}42 \times 10\text{--}20 \mu\text{m}$ ), a UV- thallus, the lack of ostiolar pigment, 1- ascospores, asci containing 8 spores and prominent (not immersed) ascomata. As this combination of characters is unique, even with so few specimens we feel confident in describing it at the rank of species *Dictyomeridium neureuterae* as below.



**Figure 1.** Map Showing the greater Tāmaki Makaurau / Auckland region and the locality of The Noises island group.

## Materials and Methods

Specimens were examined with standard microscopic techniques using a Leica s9i and Meiji MT4000H with attached Infinity 1 camera. Microscopic images were taken with material mounted in water and analysed using Infinity Analyze 6.5.5 and Leica Application Suite X 3.8.2.27713. Sections were hand cut with a razor blade and measurements were taken mounted in water. Chemistry was analysed using a UV lamp, 10% KOH and Lugol's solution. TLC was not performed.

## Taxonomy

***Dictyomeridium neureuterae*** A.J.Marshall, Aptroot, de Lange et Blanchon sp. nov.

**Mycobank accession number:** 854985

**Holotype:** New Zealand, North Island, Hauraki Gulf Islands, Noises Islands group, Ōtata, -36.693948°S 174.975729°E, 37 m, 9.xii.2021, A. J. Marshall (AJM42). On bark of *Pseudopanax lessonii* (Unitec 13988; paratype AK).

**Diagnosis:** Distinguished from other species of *Dictyomeridium* by having non-amyloid ascospores in the size range 25–42 × 10–20 µm, a UV- thallus and 8-spored asci.

**Etymology:** The species epithet 'neureuterae' honours the naturalist Sue Neureuter (1961–), one of the custodians of The Noises island group, and without whose tireless work towards establishing a marine reserve around the islands, and her and her family's efforts to conserve the islands and keep them predator free, the botanical survey work leading up to this discovery would not have taken place.

**Description:** Corticolous. *Thallus* crustose, epiphloeodal, smooth, whitish green when fresh, pale brown after storage, up to 30 mm wide, 30–65 µm thick, ecorticate, UV-. *Photobiont cells* very sparse, trentepohlioid, 15–17 × 10–12 µm. *Prothallus* sometimes present, black, 100–220 µm wide. *Ascomata* mainly solitary, prominent, emergent from thallus, black, occasionally slightly overgrown by thallus, (0.36–)0.52(–0.96) mm in diameter ( $n = 26$ ), 0.15–0.25 mm tall, hemispherical, ostiole eccentric to lateral, indistinct,

40–70 µm wide, usually difficult to distinguish from ascomatal wall, wall 125–185 µm thick, K-. *Hamathecium* hyaline, 150–200 µm tall, not interspersed with oil droplets, KI-, paraphysoids commonly anastomosing, 0.5–1.5 µm thick. *Asci* 8-spored, cylindrical to cylindroclavate, 85–100 × 30–35 µm. *Ascospores* ellipsoidal, muriform-euseptate, I-, biseriate or randomly arranged in ascus, cells angular 8–15 × 2–5 µm, smooth-walled but becoming constricted at septae when over-mature, (25–)32(–42) × (10–)14(–20) µm ( $n = 30$ ), measurements not including perispore which is smooth, 2–5 µm thick. *Pycnidia* not seen.

## Recognition

*Dictyomeridium neureuterae* is the ninth species to be described in the genus, which was established in 2016 (Lücking et al. 2016) to accommodate a lineage distinct from *Polymeridium* (Müll.Arg.) R.C.Harris. The genus is pantropical with the centre of diversity in South America (Aptroot et al. 2013; Aptroot & Lücking 2016; Ingle et al. 2017), although three species, *D. proponens* (Nyl.) Aptroot, M.P.Nelsen & Lücking, *D. amylosporum* (Vain.) Aptroot, M.P.Nelsen & Lücking, and *D. tasmanicum* P.M.McCarthy & Kantvilas, are known from Australia, and a fourth, *D. campylothelioides* (Aptroot & Sipman) Aptroot, M.P.Nelsen & Lücking, from Papua New Guinea (Aptroot et al. 1994). *Dictyomeridium neureuterae* differs from *D. tasmanicum* by having 8- rather than 2-spored asci. From *D. amylosporum* it differs by having non-amyloid, somewhat smaller ascospores. From *D. proponens* it differs by the lack of a thalline UV reaction. From *D. campylothelioides* it is recognised by having smaller spores (25–42 × 10–20 µm vs 55–80 × 17–25 µm for *D. campylothelioides*). All other species differ by having a UV+ thallus, except for *D. isohypocrellinum* (Xavier-Leite, M. Cáceres & Aptroot) Aptroot, M.P. Nelsen & Lücking, which differs by having a red (K+ green) pigment in the ostioles.

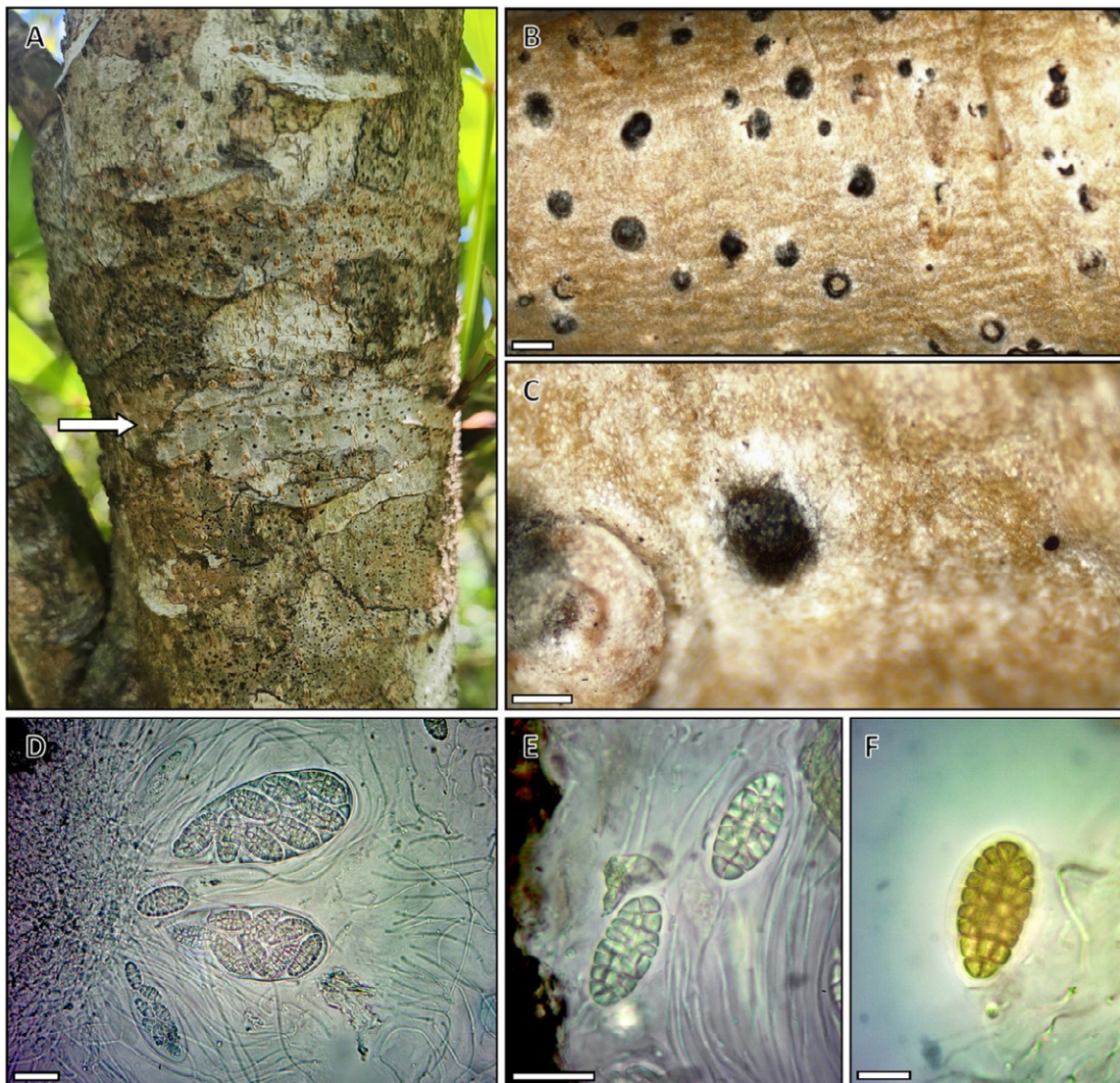
A noticeable feature of the species is the difficulty in locating the ostioles when specimens are under the microscope. Eccentric to lateral ostioles are considered to be a feature of the genus, but ostiole position is not clear in specimens of *D. neureuterae*. At first glance, faint apical interruptions in thalline material overgrowing the ascomata can be mistaken for ostioles. However, dissection of ascomata shows lateral openings, similar to the illustrations of *Dictyomeridium tasmanicum* by McCarthy and Kantvilas (2022).



## Ecology

*Dictyomeridium neureuterae* was found on the trunk of a houpara tree (*Pseudopanax lessonii* (DC.) K.Koch) (Figure 2A), which is a common coastal species of the northern North Island (Dawson & Lucas 2011), widespread in the forests of the Tīkapa Moana / Hauraki Gulf islands (see [https://avh.ala.org.au/occurrences/search?q=taxa%3A%22Pseudopanax+lessonii%22#tab\\_mapView](https://avh.ala.org.au/occurrences/search?q=taxa%3A%22Pseudopanax+lessonii%22#tab_mapView)). Associated lichens included *Arthopyrenia gemellipara* C.Knight, *Bactrospora metabola* (Nyl.) Egea & Torrente, *Megalaria grossa* (Pers. ex Nyl.) Hafellner, *Megalaria melanotropa* (Nyl.) D.J.Galloway, *Pyrenula*

*nitidula* (Bres.) R.C.Harris, *Pyrenula subumbilicata* (C.Knight) Aptroot, and *Thallolema subvelata* (Stirt.) D.J.Galloway, all generalist species colonising a range of phorophytes and substrates. Interestingly, admittedly brief searches of other associated trees, such as horoeka (*Pseudopanax crassifolius* (Sol. ex A.Cunn.) K.Koch) and karo (*Pittosporum crassifolium* Banks et Sol. ex A.Cunn.), did not disclose further specimens. The island, specifically the northern slopes where the new species was found, is recovering from a fire in the 1930s and regeneration is advanced and characterised by dense scrub. It is noted that the host trees for *Dictyomeridium neureuterae* were both trackside,



**Figure 2.** Morphology of *Dictyomeridium neureuterae*. **A.** Habitus, pictured with *Megalaria* sp., *Arthopyrenia gemellipara* and *Thallolema subvelata*. Species has a greenish tinge when fresh. Arrow indicates *Dictyomeridium* location. **B.** Thallus morphology, brown after storage. Scale = 1 mm. **C.** Close-up of ascocarp with lateral ostiole. Scale = 250  $\mu$ m. **D.** Section of the hymenium showing 8-spored asci at varying stages of maturity and anastomosing paraphyses. Scale = 20  $\mu$ m. **E.** Spores mounted in water. Scale = 20  $\mu$ m. **F.** Spore after staining with Lugol's solution demonstrating lack of amyloidity. Scale = 10  $\mu$ m.

## Updated key to the species of *Dictyomeridium* (modified from Aptroot & Lücking 2016)

1. Thallus UV+ yellow ..... 2.  
Thallus UV- ..... 5.
2. Ascumata deeply immersed in the bark, partly covered by bark remnants; ascospores 2 per ascus, 45–70 × 17–25 µm, l- ..... *Dictyomeridium immersum*  
Ascumata erumpent, ascospores 8 per ascus, otherwise variable ..... 3.
3. Ascospores 25–35 × 12–17 µm, l-; ascumata prominent, with pruina-like whitish thallus cover ..... *Dictyomeridium lueckingii*  
Ascospores over 35 µm long, l- or l+ amyloid; ascumata erumpent, the upper portion more or less exposed and black ..... 4.
4. Ascospores 35–54 × 12–19 µm, l+ amyloid; ascumata single, upper portion fully exposed ..... *Dictyomeridium proponens*  
Ascospores 55–75 × 19–21 µm, l-; ascumata fused in groups of 2–3 but with separate ostioles, upper portion partially covered by thallus ..... *Dictyomeridium parapropens*
5. Asci 2-spored; ascospores 35–75 × 12–20 µm, l- ..... *Dictyomeridium tasmanicum*  
Asci 8-spored; ascospores variable ..... 6.
6. Ascospores 55–80 × 17–25 µm, l- ..... *Dictyomeridium campylothelioides*  
Ascospores under 55 µm long, l- or l+ amyloid ..... 7.
7. Ostiole with red, K+ green pigment inside, ascospores 33–55 × 11–15 µm, l- ..... *Dictyomeridium isohypocrellinum*  
Ostiole without red pigment; ascospores l- or l+ amyloid ..... 8.
8. Ascospores l+ amyloid, 35–55 × 12–21 µm ..... *Dictyomeridium amylosporum*  
Ascospores l-, 25–42 × 10–20 µm ..... *Dictyomeridium neureuteræ*

For illustrations and descriptions of most of the species mentioned above, see Schumm and Aptroot (2022) and Aptroot and Lücking (2016).

75 m apart, in areas of high light. The search in 2023 to re-locate the species and find new populations included areas further away from the track, but the species and many of its cohabitants were absent where light levels were lower.

### Author Contributions

**Andrew J. Marshall:** Conceptualisation (lead); data curation (lead); validation (lead); visualisation (lead); writing – original draft (lead); writing – review and editing (lead).

**Dan J. Blanchon:** Conceptualisation (equal); validation (equal); visualisation (equal); writing – original draft (equal); writing – review and editing (equal).

**André Aptroot:** Investigation; writing – review and editing.

**Peter J. de Lange:** Conceptualisation (equal); validation (equal); visualisation (equal); writing – original draft (equal); writing – review and editing (equal).

### Acknowledgements

The authors would like to thank the Neureuter family for their ceaseless work to ensure the ongoing protection of The Noises island group, permission to work in that location, and their advocacy for marine protection surrounding the islands. We would also like to thank the staff at Auckland War Memorial Museum for creating the monitoring project that resulted in this discovery, with special thanks to Yumiko Baba, Ella Rawcliffe, Cameron Kilgour, Dhahara Ranatunga, Carolina Stavert and Campbell James, who comprised the vegetation monitoring team. We also wish to thank Auckland Council, in particular Georgianne Griffiths and Miriam Ludbrook, for funding the vegetation plot work on Ōtata that allowed the senior author the passage over and the chance to collect. We greatly appreciate the helpful comments on the submitted paper by the reviewers, Dr Patrick McCarthy and Dr Robert Lücking.

## References

- Aptroot, A., Diederich, P., Sérusiaux, E., Sipman, H. J. M. (1994). Lichens and lichenicolous fungi of Laing Island (Papua New Guinea). *Bibliotheca Lichenologica*, 57: 48.
- Aptroot, A., Menezes, A. A., de Lima, E. L., Xavier-Leite, A. M., Cáceres, M. E. (2013). New species of *Polymeridium* from Brazil expand the range of known morphological variation within the genus. *The Lichenologist*, 45: 545–553. <https://doi.org/10.1017/S0024282913000200>
- Aptroot, A., Lücking, R. (2016). A revisionary synopsis of the Trypetheliaceae (Ascomycota: Trypetheliales). *The Lichenologist*, 48: 763–982. <https://doi.org/10.1017/S0024282916000487>
- Dawson, J., Lucas, R. (2018). *Field guide to New Zealand's native trees*. Revised Edition. Nelson: Pottton and Burton. 436pp.
- Ingle, K. K., Trivedi, S., Nayaka, Upreti, D. K. (2017). The lichen genera *Dictyomeridium* and *Polymeridium* (Trypetheliales: Trypetheliaceae) in India. *Taiwania*, 62: 50–54. <https://doi.org/10.6165/tai.2017.62.50>
- Galloway, D. J. (2007). *Flora of New Zealand lichens. Revised Second Edition in two volumes: Including lichen-forming and lichenicolous fungi*. Volume I. Lincoln: Manaaki Whenua Press. 1006pp.
- Lücking, R., Nelsen, P., Aptroot, A., Barillas de Klee, R., Bawingan, P. A., Benatti, M. N., et al. (2016). A phylogenetic framework for reassessing generic concepts and species delimitation in the lichenized family Trypetheliaceae (Ascomycota: Dothideomycetes). *The Lichenologist*, 48: 739–762. <https://doi.org/10.1017/S0024282916000505>
- McCarthy, P. M., Kantvilas, G. (2022). A new species of *Dictyomeridium* (lichenised Ascomycota, Trypetheliaceae) from Tasmania. *Australasian Lichenology*, 90: 10–13. <https://www.anbg.gov.au/abrs/lichenlist/AL90.pdf>
- Rayner, M. J., Baba, Y., Barry, M., Blom, W., Bray, R., Cameron, E., Dell'Araccia, J. Early, J., Galbraith, J. A., Walker, L., Smith, H., Haggitt, N., Shears, N., Trnski T. (2021). *A monitoring plan for The Noises ecosystem*. Auckland: Auckland War Memorial Museum Tāmaki Paenga Hira. 63pp.
- Schumm, F., Aptroot, A. (2022). *Atlas of Pyrenulaceae and Trypetheliaceae*, four volumes. Norderstedt: Books on Demand. 2101pp.

## Authors

Andrew J. Marshall is a Research Associate at the School of Environmental and Animal Sciences, Unitec. He is an author of 13 papers, has broad interests in botany, especially crustose lichens, and is engaged in a study of the lichenised mycobiota of northern Aotearoa / New Zealand. Andrew is the director of an ecological consultancy specialising in surveying and mapping the indigenous native and naturalised flora of the Tāmaki Makaurau / Auckland region.  
eco@lgn.kiwi

André Aptroot is a Professor of Botany in Brazil. He specialises in the taxonomy of tropical microlichens, but also researches phanerogams and bryophytes. He is an honorary member of the British Lichen Society and the Bryologische en Lichenologische Werkgroep van de Koninklijke Nederlandse Natuurhistorische Vereniging.  
andreaptroot@gmail.com

Dan J. Blanchon is Curator of Botany at Auckland War Memorial Museum Tāmaki Paenga Hira, and an Adjunct Associate Professor at The School of Environmental and Animal Sciences, Unitec. Dan currently has active research projects on the ecology and management of invasive plants, and the systematics, ecology and conservation of indigenous plants and lichens. Dan has published revisions of *Libertia* (Iridaceae), *Ramalina* (Ramalinaceae) and a range of the lichens of Aotearoa / New Zealand.  
dblanchon@aucklandmuseum.com

Peter J. de Lange is Professor at the School of Environmental and Animal Sciences, Unitec. A biosystematist, Peter regularly publishes on plant taxonomy, conservation, threat listing and the flora of South Pacific and outlying Aotearoa / New Zealand islands. A recipient of the New Zealand Botanical Society Allan Mere Award (2006) and Loder Cup (2017), Peter is a Fellow of the Linnean Society and a lifetime member of the New Zealand Plant Conservation Network.  
pdelange@unitec.ac.nz