The hunt for *Ramalodium dumosum* (Pannariaceae, lichenised ascomycetes)—an enigmatic lichen endemic to the southern Waitakere Ranges

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John Bartlett (1945–1986) was without any stretch of the imagination a botanical iconoclast. Over a period of 10 or so years, he collected a vast number and range of vascular plants, liverworts, lichens and mosses (Galloway 1987). Prompted by the pursuit of anything new, he rapidly made many fascinating discoveries including an impressive tally of new genera and species, several of which were named for him. Many people will be familiar with at least one of these, Bartlett’s rata (*Metrosideros bartlettii*)—arguably one of our most threatened species, all the more remarkable for the fact it was first discovered in 1975, and is a forest tree reaching heights of nearly 20 m.

One of John’s speciality groups was lichens, which, once he was inducted into their wonders (Galloway 1987), became a key passion. John loved to find new things and, at the time when he was collecting (mid 1970s to mid 1980s) the lichens of New Zealand were still poorly investigated, so he collected them avidly, though always with a keen, discerning eye, targeting especially those genera and families which were still very little studied and/or sparingly collected. Such was his breadth of collection and habit of acquiring good specimens (often—it is to be wondered—in large quantities) showing the range of variation that even today one can still hear a visiting lichenologist poring over John’s lichen specimens in the Auckland Museum Herbarium (AK) exclaiming out loud “Wonderful! Simply wonderful”, or, grabbing you by the arm and dragging you to their work station with an excited “Will you come look at this!” Nothing seemed to escape John’s eye. So it was that, amongst his many discoveries, he added a lichen genus *Ramalodium* that was new to the New Zealand mycobiota; within it he also discovered two new endemic species. One of these a small blackish blue-green, cushion-forming (pulvinate) lichen reaching five millimetres high and twice as wide was described by Henssen (1999) as *Ramalodium dumosum*. John was said to have found this species growing through the moss *Zygodon intermedius* on porous scoria rock in association with another moss *Racomitrium crispulum* on a 30 m high south facing coastal cliff subjected to salt spray, near the small coastal village of Huia, Manukau Harbour.

Although undeniably a skilled collector, one irritating feature of John Bartlett’s collecting habits was the scant attention he usually paid to providing the all too necessary collection details. Possibly this was because he collected *en masse*, so enthusiastically, and rapidly (thus earning him the nick name of ‘Hurricane Bartlett’ (Galloway 1987)) that note-taking in the field was always done at a minimum and the subsequent task of labelling was usually undertaken when he had returned home, and sometimes even then many months after the initial collections were made (Galloway 1987; R. O. Gardner and M. Smits, *pers. comm.*). Whatever, the reasons, it’s a fact that many Bartlett herbarium specimens contain a minimum of, and, often then, usually vague collection details (e.g., ‘Coromandel’), and sadly a large number lack any data at all thus rendering them all but useless.

Possibly too, because of the ‘lag time’ between collecting and final specimen preparation, we have found that details on some Bartlett collections are suspect; sometimes the habitat notes just don’t match with what one can find in the field, or in the actual specimen packets, and at other times one of us (PdL) has found that the map coordinates given plot in the sea, or in completely different locations (sometimes island or, worse, continent) to that stated on the specimen labels.

These problems seem to be the case with *Ramalodium dumosum* where the geological and site details given by Bartlett to Henssen do not match anything we can find in the field at Huia. Obviously, this makes finding it a problem, especially when you are tasked with determining its exact conservation status. Currently, *Ramalodium dumosum* is listed as 'Data Deficient' (de Lange et al., 2012), though when we assessed it as such we had no idea that our assessment would be virtually on all levels—for this species, all we have is a few pages describing the species (Henssen 1999), a holotype that is held in a private collection now locked away in a warehouse in Helsinki (P.M. Jorgensen *pers. comm.*).
meaning that we can't even access it to study it, and then there are the vague collection and habitat
details previously noted. To make matters worse, the isotype of *Ramalodium dumosum* held at AK
(AK 327883!), proved on careful examination to comprise two clods of soil sporting the moss
*Zygodon intermedius* through which another moss, *Fissidens leptocladus*, is threaded, and there is
also a minute, loose fragment of some greyish-white, foliose Parmeliaceous lichen. Associated with
this is some black dust, which may just possibly have once been *Ramalodium dumosum*—whatever it
is or was—there is now nothing useful left in that collection of the actual species. Still, we had to
start our search somewhere, and common sense says that if the paper naming the species said it
came from 'Huia' then it was as a good place as any to start our search.

Therefore, using Huia as our survey starting point we focussed our attention on the geological
information Bartlett had provided to Henssen—this, if you recollect, stated that the lichen grew
on a coastal cliff of porous scoria, 30 m high, said to be of 'recent volcanic origin' (Henssen 1999;
p. 124), and subjected to salt spray. Geologically, no such scoria cliffs exist at Huia, or even nearby,
but assuming that Bartlett's 'scoria' was his interpretation of what is actually Miocene aged andesitic
breccia, then the massive coastal cliffs forming the Omanawanui Ridge that runs west from Jackie's
Hill, Little Huia to Whatipu seemed a good place to start searching. The only problem is that without
a boat these cliffs are scarcely accessible, mostly they plummet straight into the sea, a turbulent water
that drains right out across the notorious Manukau Bar—and if that weren't enough to put you off,
Department of Conservation shark scientist, Clinton Duffy, had cheerfully told us about all the
"really, really, big, white sharks (*Carcharodon carcharias*) that frequent that water, so you don't wanna
fall in!"

However, in a few places one can get down to
the sea, and so, in January 2013, we searched
those areas, cheerfully finding and collecting
“*Ramalodium dumosum*” specimens, all of
which turned out to be a pulvinate form of
the cyanobacteria *Nostoc*. While this is the
photobiont that forms the 'plant' component of
*Ramalodium*, and the race of it that we found,
at least in the field, looked like our target lichen,
careful dissections in the lab confirmed our
failure. So, despite the fact that we did manage to
discover a new species of liverwort (a segregate
of the *Frullania rostrata* agg.), this could not hide
the sinking feeling that finding *Ramalodium
dumosum* was going to be much harder than we
ever would have thought. Clearly, we had to have
another try.

So, in November 2013, we thought we'd try
looking east of Huia. Depending on the tides, we
intended walking the coastline from Puponga
back to Huia. While volcanic rocks are sparse
here, one of the beds within the sedimentary
Waitakere Formation (a complex turbidite
series of Miocene aged sedimentary rocks)
contains numerous andesitic angular clasts and
gritty volcanogenic material derived from the
similarly aged, and now long since eroded away
Waitakere Volcano, also, near Huia itself, is a

![Figure 1. The main population of *Ramalodium* sp. nov.,
(here indicated by the senior author's 11 year old son,
Theo), occurs at 1.4 m a.s.l. on a bed of andesitic-breccia
within the Miocene-aged Waitemata Group Formation
rocks that form the cliffs in this part of the Manukau
Harbour. This population is extremely vulnerable
because of its location on the cliff faces abutting a
popular Auckland beach frequented by numerous
bathers, recreational fisherman, and beach goers, many
of whom frequently climb the cliff faces, in the process
dislodging soil and plants. Photo: P.J. de Lange.](image)
small andesitic dyke. So, geologically speaking, these strata seemed most likely to have fitted, albeit loosely, within what Bartlett may have considered to be ‘scoria’. On our first stop for the day, we wandered down a small beach, where we were drawn to a prominent bed of the andesite-containing turbidite sequence described above (Fig. 1). On this rock face, we noted under a clump of Astelia banksii, at c. 1.4 m above sea level (Fig. 2), some loose clods of earth where, scattered amongst tufts of the moss ?Trichostomum sciophilum, we found little black, gelatinous cushions that we initially thought were yet more Nostoc (Fig. 3). However, on closer inspection, we noted these cushions sported apothecia (Fig. 4). Was this then Ramalodium dumosum? In the field, we could not say much beyond that, at least on macro-details, we seemed to have finally found the species. To confirm our find we had to check the microscopic details back in the laboratory so, for now, we decided our time would be best spent continuing our survey. We covered plenty of ground that day, including the hitherto unanticipated issue of trying to effectively survey the cliff faces of one of Auckland’s little known gay male nudist beaches (Orpheus Bay) without startlingly the beach users too much! At the end of the day, our survey had found only two more patches of the suspected Ramalodium (both about the size of a 20 cent piece), such that our tally for the mysterious lichen totalled a little less than c. 10 cm² of thallus-occupied habitat—so clearly whatever we had found it wasn’t that common.

Back in the lab, we subjected our find to critical study, including making thin sections of the apothecia to examine the spore morphology and size, and to consider other internal details of the thallus. Frustratingly, while the external and internal thallus and apothecia morphology matched Ramalodium dumosum pretty well, the spores were too large and also septate. So had we found Ramalodium dumosum, a new species of Ramalodium or perhaps something else, say a species of Collema or Leptogium? Lacking confirmed Ramalodium dumosum to check our find against, we then turned to New Zealand lichen expert, Dr David Galloway, for help. On seeing images of the lichen, David (pers. comm.) agreed that we seemed to have a Ramalodium but that, as Aino Henssen had now died, he advised it would be wise to pass our material on to the world expert on the Pannariaceae, Professor Per Magnus Jørgensen, who resides in Bergen, Norway. This, David noted (pers. comm.), was all the more pertinent now that DNA data has shown that Ramalodium is not in the Collemataceae after all but rather belongs within the Pannariaceae. Whilst we prepared a subsample of the lichen for posting to Norway, we also extracted DNA
from some material in the hope that this might also confirm the genus. Alas, as is all too often the case with extracting DNA from lichens, our initial sequences failed. However, the sample sent to Norway was more conclusive, with Per Magnus emailing back excitedly to tell us in mid-December 2013 that, while we had not found Ramalodium dumosum, we had, in fact, found another, new, apparently endemic species of Ramalodium. Amongst a raft of micro-characters our new species is most easily distinguished from all other known Ramalodium by the septate spores, otherwise, overall, it seems morphologically most closely allied to the South American *R. austroamericanum* (P. Jørgensen, *pers. comm.*).

Since the last survey, we have yet to have another crack at the singularly elusive *Ramalodium dumosum*. We still remain none-the-wiser as to whether Bartlett really got it at Huia; all we can do is keep on looking. The key thing is that we know we are looking in the right places, and that, remarkably, there are seemingly two species of maritime *Ramalodium* growing on the northern shore of the Manukau Harbour. *Ad hoc* surveys during January 2014 have so far located only one other small colony of the new *Ramalodium* in the same general area as the initial finds. Though we would not be so incautious as to say the new *Ramalodium* is endemic to the small bay where we found it, it is interesting that in the same general area we also seem to have an as yet undescribed orchid (a species of Corybas (*Nematoceras*)), and that this part of the Manukau is also one of only three known locations for an undescribed species of moss (a species of Didymodon (*Pottiaceae*)) known by the tag name “Ihu Pot” (J.E. Beever, *pers. comm.*). If the *Ramalodium* is truly endemic, then the discovery also builds on the number of Waitakere endemic plants and mycobiota, the list of which currently includes the flowering plants *Hebe bishopiana*, *Myosotis pansa* subsp. *pansa*, the moss *Lindbergia maritima* (itself known from only the one site and extremely scarce even there), an undescribed liverwort (*Frullania aff. rostrata*), and, aside from our new *Ramalodium*, the lichens *Buellia cranwelliae*¹, *Caloplaca allanii* and, of course, enigmatic *Ramalodium dumosum*.

Also, it goes without saying that the new *Ramalodium* is extremely threatened. During a visit to the main location for the species in late January 2014, the extreme vulnerability of the largest population (Fig. 2) there to stochastic events became evident when some children in the same general area took to throwing rocks into the cliff face we were surveying. The exploding rock fragments were not only worrying to us but the reverberations they were causing resulted in portions of the cliff face collapsing. The children, when confronted, seemed utterly mystified too when the potential

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¹ Galloway (2007) records this species from a Banks Peninsula specimen lodged in the Allan Herbarium (CHR) but we have so far been unable to examine that specimen. We do note, however, that there are morphologically similar *Buellia* found on coastal rocks in the Bay of Islands, and also in the Kermadecs on the Meyer Islands, which we had referred to *B. cranwelliae* but which certainly resemble that species, but using DNA sequence data we have since shown to be another, possibly as yet, undescribed species (D.J. Blanchon & P.J. de Lange, unpubl. data). Therefore, for now at least, as the only *bona fide* *B. cranwelliae* that we have seen comes only from the Waitakere Ranges coastline (from where it was first described) we prefer to regard this species as endemic to that area.
consequences of their actions on our indigenous biodiversity (let alone the surveyors) were explained. To be honest you couldn't blame them either. We guess if you had told us a few years ago that the minute bits of blackened, snot-like protuberances covering a few centimetres of loose soil (Fig. 3) on a popular beach cliff face were, in fact, a completely new endemic lichen we may not have appreciated it either. It's true what they say 'beauty is in the eye of the beholder.' Heaven help us trying to convince people that this little lichen (Fig. 4) is indeed worth protecting.

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References


Lake Runanga restoration

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Lake Runanga in Hawke's Bay is like many New Zealand wetlands and lowland lakes and has suffered a lot from intensification of the use of surrounding land, deforestation and the introduction of pest plants and animals. But, in the last 15 years, there has seen a slow but steady turning of the tide.

Brief History

Around 40 years ago, the swamp adjoining the lake was drained and cleared significantly, which, in turn, saw the outlet height of the lake lowered by around a third of a metre. To make matters worse, a large 20 litre/sec spring was diverted at the same time that, as you can imagine, had very detrimental effects on the lake's overall health.

Around 3 years ago with a strong landowner push, a 600 m long wall with a concrete weir was installed at the outlet end of the lake. This has restored the level to around its original height and, in the last 12 months, the large spring has also been reinstated, which has given great heart to local iwi, hapu and other landowners.

The long-term vision for the project is to restore the lake back to its former health and to reintroduce locally extinct plants, birds, lizards and invertebrates. The next phase of the restoration is the control of willows around the lake (taking place over one fifth of the lake this summer) and the re-establishment of native forest within the wetland system and on adjoining hillsides.

Invitation

I would like to extend an invitation to everybody, to be a part of the start of the restoration of Hawke's Bay's lowland lakes. We are holding a community planting day on 31 May. It is to be held at Alan Gunn's property 1.5km up Ohiti Road, the first road on the left off the Taihape Road driving from Omahu (it will be signposted from Ohiti Road). We will be meeting at 8.30 am to start planting