



# Why a strategic shift in action is needed to recognise and empower Indigenous plant pathology knowledge and research

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## Abstract

Plant pathology researchers play a pivotal role in thought leadership and its translation to action regarding the recognition and demonstration of the value of Indigenous knowledge and science. For many scientists, navigating the space of Indigenous rights and perspectives is challenging. In pursuit of a cultural shift in research and development within the field of plant pathology, the 2019–2021 Management Committee of the Australasian Plant Pathology Society (APPS) undertook a review and modernization of the Society's Constitution. The aim was to ensure its alignment with principles that foster inclusivity of Indigenous peoples in the development and implementation of relevant research projects impacting their communities. Additionally, a dynamic repository of guidelines and resources was compiled. These resources are designed to assist plant pathologists, while respecting and not superseding the guidance provided by local Indigenous researchers, practitioners, and advisors. The collective efforts of plant pathologists hold immense potential in championing Indigenous Peoples and their rights, steering the field toward a more inclusive and equitable future. This paper builds upon the thesis presented in the APPS Presidential Address at the Biennial APPS Conference in 2021, held virtually in lutruwita (Tasmania) on the unceded lands of the Palawa people. It underscores the potential impact when plant pathologists unite in advocating for Indigenous Peoples and their rightful place within the field.

**Keywords** Plant pathology · Ethics · Indigenous people · Australasia · Indigenous knowledge · Indigenous science

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## Introduction

There is growing recognition and demonstration of the value of Indigenous knowledge and science in a broad range of research disciplines (Adams et al. 2014; Halewaters et al. 2021; McAllister et al. 2023), including plant pathology (Black et al. 2019; Hill et al. 2021; Lambert et al. 2021). Based on this acknowledgement and for the purpose of this paper, we have adopted the United Nations Educational, Scientific and Cultural Organization (UNESCO) definition of Indigenous knowledge as the understandings, skills, and philosophies developed by local communities with long histories and experiences of interaction with their natural surroundings (Hiwasaki et al. 2014). Indigenous cultures and knowledge systems synthesise centuries of know-how, wisdom, and connection with nature across millennia from direct observations, holistic perspectives, lived experience, and accumulated Indigenous knowledge communicated across generations orally and through cultural practice (Mazzocchi, 2006). Indigenous science comprises the various forms of place-based knowledge inherent in Indigenous peoples' world views and knowledge systems, and therefore Indigenous researchers use 'knowledge' and 'science' interchangeably (Cajete 2000). In contrast, western science (also recognised as modern science, western scientific knowledge or international science) is knowledge typically generated by objectively studying and analysing the structures and functioning of the natural world (Cajete 2006; Mazzocchi 2006). The reductionist discipline of western science, including plant pathology, most often isolates objects of study from their natural context within simplified and controllable experimental environments and separates the scientist from the study (Roué and Nikashima, 2002). Commonly, as researchers, we are often disconnected from the impact and interpretation of results once communicated through published literature. For several decades, 'western science' and associated research have had, and continue to have, countless unintended consequences on Indigenous peoples (Halewaters et al. 2021; Jessen et al. 2021; Summerell 2022; Ens et al. 2023). With a critical role in thought leadership and its translation into how we undertake research, scientists should be more responsible and accountable by reflecting more deeply and considering how their actions contribute to creating the desired future world and empowering Indigenous science (Rockström et al. 2023; Turner et al. 2022).

While it is increasingly recognised that these knowledge systems have a lot to offer each other (Carr and McCallum 2009; Mazzocchi 2006; Mervis 2023; Ogar et al. 2020), for many scientists trained in 'western science', navigating the space of Indigenous rights and perspectives is challenging, raising many questions that confront how projects

are conventionally conceptualised, developed, funded, and implemented. As researchers, we all have unconscious biases and values based on our world view, personal experiences, academic exposure, institutional affiliations, funding, and many more influential factors (May 2021; Fernández Pinto 2023). These viewpoints influence our framing of perspective, line of questioning, referenced literature, funding potential and how our research is structured, including who is involved. While unconscious bias and differing values are an inevitable part of the human condition, these world views have led western scientists and communities to elevate above other knowledge systems the knowledge that is based on research publications (Altbach 2007). Institutions, departments, and professional societies have a responsibility to encourage individual researchers and teams to conduct research that goes beyond a single world view of science to shared production, and implementation of knowledge systems.

To promote change in how research and development are undertaken by plant pathology practitioners, the 2019–2021 Management Committee of the Australasian Plant Pathology Society (APPS) reviewed and modernised the Society's Constitution to ensure it encompasses principles to foster inclusiveness of Indigenous peoples. We included a societal objective of observing inclusive and ethical practices, supported by two additional constitutional powers: (1) establish inclusive and ethical guidelines, and (2) advance cultural knowledge and competence, and increase knowledge co-production, sharing, and protections when engaging with Indigenous/First Nation Peoples among the membership (APPS 2021a).

As a group of practising plant pathologists, the Indigenous and non-Indigenous authors contributed to a text that was delivered as the Presidential Address at the Biennial Australasian Plant Pathology Conference in 2021 (APPS 2021b) which was virtually held in lutruwita (Tasmania) on the unceded lands of the Palawa people. We acknowledge the Palawa people and show our most profound respect to their ancestors and elders, past, present, and emerging. We are grateful for their Welcome to Country for the conference participants. The ensuing Presidential address aimed to provide background and perspective on the importance of the proposed changes to the Society's Constitution (APPS 2021b) and the inclusion of guiding research principles for all APPS members to use in their research. From this speech, we present this paper as an additional call to action on Indigenous rights in plant pathology to all societies and researchers.

## A researcher's perspective

Quoted excerpts are from the speech given by Associate Professor Robin MacDiarmid, President (2019–2021) of the APPS, The New Zealand Institute for Plant & Food Research Limited and University of Auckland, New Zealand.

*“I grew up in Kerikeri in the Bay of Islands, in the very northern tip of the North Island of Aotearoa New Zealand. The hills of Mātākā and Rakaumangamanga guard the entrance of the waters of the bay, Pēwhairangi, which is fed by many rivers – the Waipapa River is the one I now live beside. I grew up on a citrus and tamarillo orchard that was owned and operated by my parents and went to school in Kerikeri until I was 18. Historically, Kerikeri and the Bay of Islands were a place of great importance in the history of New Zealand’s colonisation, as this is where the missionaries first established settlements. Kerikeri is the home of the oldest remaining buildings in the country – built just 185 years ago. So, I grew up in this nexus of racial interaction between Māori and European settlers.*

*On reflection, three experiences stand out for me as important for shaping how I now think and choose to conduct myself regarding Indigenous Rights.*

*Firstly, when I was about six, one Monday morning at school, I listened to my Māori classmate tell the story of his adventures on his weekend trip up to Auckland. I don’t recall much about his adventures, but I do recall what happened next. You see, the Bay of Islands is about 250 km north of Auckland. My classmate had told of going UP to Auckland. After the morning sharing time, the teacher asked if I would explain to him why we travel DOWN (south) to Auckland and not UP, and I did. About 30 years later, I discovered that Māori view the North Island of Aotearoa New Zealand, as an ika (fish), which has its mouth at Te Whanganui-a-tara (Wellington) and its tail in Te Tai Tokerau (Northland). In this perspective, one travels UP from the tail towards the head (from the Bay of Islands to Auckland). Suddenly I understood my mistake. Up or down on a globe is entirely a matter of perspective rather than right or wrong, and that I had spoken from a place of cultural dominance. The “fact” that you travel down from the bay to Auckland is simply a cultural perspective. I realised that without any consciousness, I had dominated and diminished my classmate 30 years ago. For me, it was a true revelation.*

*Secondly, as I progressed through high school, I remember looking around me and asking: Where have all my Māori friends gone? One by one, they disappeared. By the final school year, there were no Māori in my class despite a demographic of about 15% in the region. As I went to the University of Otago, I saw few Māori and thought to myself, could this just be that I was deep in the South Island? However, this continued when teaching at the University of*

*Auckland, again so few Māori and Pasifika despite being in the largest urban population of Māori and Pasifika. Slowly, over my lifetime, I have realised that the education and research systems do not serve and support Māori and Pasifika.*

*Finally, in 2021 I had the privilege of reading an inspiring and instructional piece of writing by Tina Ngata titled ‘What’s Required from Tangata Tiriti’ (Ngata 2021). There are many lessons and advice that we could all take away from this writing:*

*Stop trying to be Māori, I don’t need you to be Māori – I’ve got that covered. I need you to be a good treaty partner.*

*Be aware of your own privilege that has descended down to you by virtue of that process [colonization]. Be ready to respond to the legacy of that story.*

*Be prepared to make sacrifice. Be prepared to redress that power imbalance.*

*Stand with us for our language rights, for our health rights, for the rights of our children and women and stop perceiving Indigenous Rights abuses as an Indigenous problem rather than a colonial inevitability.*

*The learning for me here is a call to action. A call to take up my role in parity, in decolonisation, in recognising and calling out systemic racist activity, in recognising ways of working that continue to turn a blind eye – even if it is my own behaviour!*

*These three examples are some of the ways that my eyes have been opened to experiences that are not mine but experiences that are present in the country I live in and the systems in which I work. With this new knowledge, I have begun asking new questions around co-development of projects, the caretakers of biological resources through history, the questions of importance, reciprocity and equitable benefit sharing with Indigenous peoples, timeframes for engagement and research, unintended consequences, data custody, and ownership, and more. This is not to say that I have not made mistakes along the way. I have many examples of poor behaviour:*

- *Not including Indigenous partners prior to submitting a funding proposal, nor ask for their input about the priority research question.*
- *When finding a new-to-science insect on an orchard site and not realising I should have discussed with the local hapū – the local Indigenous people – and whether they would support the research. And we killed the insect.*
- *Built research questions cloaked in supporting (scientific) literature with no thought of how the research and*

*the outcomes will further deepen the disassociation of communities from decisions made about THEIR land.*

- *Taking on a leadership role without even considering that it would be more appropriate for my Māori colleague to be the lead.*

*Nonetheless, I strive to be better as the issues do not go away by not addressing them. By doing nothing, the current situation remains. In essence, by doing nothing, I become a supporter of the disempowerment. Instead, I need to change my ways and challenge others to do the same. How do I DO science? I must examine the research questions and research undertaken and ask myself: how and what are they the important questions and methods, and is this process inclusive in thought and action? From my perspective as an open-minded, objective, well-trained scientist, who am I to rank my capabilities for observation, quantification, interpretation, and application of knowledge above those with a different world view.”*

### How we can all do science

Indigenous knowledge enables a genuine form of Indigenous science that is acknowledged by Indigenous peoples all over the globe and most definitely in the Pacific. By example, Matariki is the Māori New Year when the star cluster Pleiades (as named in western science) arrives on the horizon of Aotearoa New Zealand. This astronomical event is recognised across the Pacific where it is known as: Makali’i in Hawai’i; Mat’al’i in Samoa; Matariki in the Cook Islands; Matar’i in Tahiti, Mataiki/ Mata’i in The Marquesas Islands; or Mataliki in Tonga, Niue, Tokelau, Tuvalu, Wallis, and Futuna. It marks a location-specific time to celebrate, plan, and prepare for the new season of growing, foraging, and harvesting (Whaanga et al. 2020; Whaanga and Matamua 2016). Other examples of Indigenous knowledge are the similar processes for detoxification of the black bean (*Castanospermum australe*) seed (Birtles 1997) and the cycad nut in Australia, and the karaka nut in New Zealand (Kuru et al. 2021). Furthermore, the flowering of certain local plant species on land are signs that it is a good time to fish or harvest seafood in that area (Kuru et al. 2021; Reid et al. 2013). Similarly, environmental indicators are used across the Pacific and the world (Green and Raygorodetsky 2010). These environmental indicators also measure the health and vitality of an ecosystem. It is more than a coincidence that similar practices have evolved in different Indigenous societies, as the methodologies used to develop these practices are very much alike. For instance, understanding mātauranga Māori and the many elements of Te Ao Māori (the environment, the cosmos, the tangible, and intangible) is a common thread that can connect this

knowledge system with the Indigenous peoples across the globe. This accumulated and widespread understanding is what promotes Indigenous knowledge as the output of a legitimate scientific discipline.

Over recent years, more and more examples illustrate how First Nations people in Australia have for thousands of years manipulated the environment using Indigenous knowledge that clearly aligns with a scientifically defined discipline. Practices involving cultural burning of landscapes are recognised to have modified numerous environments across Australia to facilitate larger numbers of marsupials to provide more reliable food resources (Pascoe 2018; Constantine et al. 2023). Genetic research has clearly shown that prehistoric distribution of some plant species was the result of deliberate movement of germplasm to ensure continuity of food sources (e.g. black bean tree, Rossetto et al. 2017).

As a result of a more broadly appreciated awareness of traditional practices, we have been witnessing the growing acknowledgement of the scientific value of Indigenous knowledge worldwide (Pascoe 2018; Reid et al. 2020; Constantine et al. 2023; Moko-Painting et al. 2023). This resurgence has enabled iwi (tribes) to investigate whether whalebone could treat kauri dieback disease in Te Tai Tokerau, Aotearoa; how Indigenous fire management in the Northern Territory, Australia, could reduce bushfire risk and support biodiverse habitats; and, how Indigenous and local knowledge could aid the conservation of threatened native plant species in the homelands of the Karuk Tribe in California, USA (Bowman et al. 2022; Mucioki et al. 2022). Such projects begin the transformation of how and why we do science by moving away from the traditional scientific norms of performing research and move towards respectful and mutually beneficial collaboration in developing new knowledge systems. Additionally, they represent how the interpretation of research from a cultural perspective of a particular group of Indigenous peoples can complement western science. These examples are only a few of the multitude of projects that have been and are being undertaken, providing models of engagement and examples of how Indigenous science and western science can co-exist.

Yet, the progress made by many researchers and practitioners, both Indigenous and non-Indigenous, continues to be impeded by some scientists who question the value of Indigenous science and knowledge, including in Australasia (Dunlop 2021; Henry 2021; Sadler and Forbes 2021). Their narrative suggests that Indigenous knowledge falls short of what can be defined as science and the scientific method. However, both knowledge systems were developed using sound and pragmatic methodology, and each is an expression of scientific curiosity, experimentation, careful observation and finally, interpretation of the results (Nola and Sankey 2014; Martin 2017). For many researchers, the

inclusion of Indigenous science and Indigenous rights is a very challenging space, given that virtually all educational institutions teach us how to do science using the ‘western’ approach. It is not always easy to combine sciences and this dyad requires researchers to have a deep understanding of different ways of knowing (Mazzocchi 2018; Mervis 2023; Morgan and Manuel 2020).

As a society and community of practice, the APPS is not alone in responding to these challenges. Indigenous communities have been asking for recognition of a greater diversity of world views, recognition of Indigenous intellectual property, project co-development and partnership with researchers, and political, industry and community stakeholder groups. In Aotearoa New Zealand, a review of the research, science, and innovation system through Te Ara Paerangi – Future Pathways has recognised that future systems need to “affirm and embed Te Tiriti o Waitangi and provide appropriate opportunities for mātauranga Māori, Māori researchers and Māori-led research” (MBIE 2022). This policy direction will dramatically change how research is developed, funded, and implemented within Aotearoa New Zealand as mātauranga Māori, Māori Indigenous knowledge, is invested at a governmental level and is upheld as a valid and equally meritorious knowledge system. This action is in line with the Nagoya Protocol on Access and Benefit-sharing, United Nations Declaration on the Rights of Indigenous Peoples, Uluru Statement from the Heart, Ko Aotearoa Tēnei, and many more declarations, which all call for positive change in how we do science (Convention on Biological Diversity 2010; United Nations 2007; First Nations National Constitutional Convention 2017; Waitangi Tribunal, 2011).

*“At an individual level, we must acknowledge the well-worn tracks of developing and deploying research that, without intention, will dominate and diminish a people’s knowledge and rights. We must instead choose to train ourselves to follow new tracks based on working in partnership and respect with Indigenous peoples. This requires a bit of soul-searching and reflection:*

- *What is my consideration of Indigenous and local communities’ customary laws, protocols and procedures, or traditional knowledge regarding the biological resources I study?*
- *How well informed am I, and how might I change my research to address the Treaty of Waitangi and principles of the Nagoya Protocol?*
- *What are my actions to support the Uluru Statement from the Heart?*
- *What is my process regarding the “Free, prior and informed consent to the sharing of knowledge” as*

*indicated in the UN Declaration on the Rights of Indigenous Peoples?*

*[Our] ultimate vision of how we do science is within a system that supports Indigenous peoples rather than continuing to dominate and disempower. That the next generation of researchers are taught about Indigenous research and methods, resulting in the normalisation of intergenerational thinking and holistic benefits in science in plant pathology. They ask us to imagine what that might feel like while embracing the words of Tina Ngata (Ngata 2021): ‘Benchmark the discomfort of your decolonization experience against that of our [Indigenous] colonization experience’.*

Such discomfort can promote change to a better state. This discomfort relates to acknowledging colonisation, not just of land (first or subsequent occupation), but also of mind (how we think), planning and participation (who we include), evidence (data), and systems (organisations, institutions and power) that contribute to the growing body of knowledge produced within the science and research system. It relates directly to us, the science and research we do, and particularly how we all conduct ourselves and our research. Discomfort may also be raised from those who do not wish to change (Henry 2021; Sadler and Forbes 2021).

### **Turning a vision into reality – a call to action for the APPS**

It is only once cultural dominance is recognised that change can occur amongst ourselves and within our systems. Individually we can read and talk to increase understanding of our individual or specific societal situation. With open and enquiring hearts and minds, we can gain insights that can lead to actions that advance equity and multiple knowledge systems. We call every researcher to begin by considering one thing that you can change. This can include how to plan a project or collect endemic/native samples, who are the people necessary to consult, include and compensate on a project, how to incorporate and elevate Indigenous science and knowledge, and what methods to use to disseminate your research. The guidelines are a living (rather than authoritative) document and do not supersede the advice and guidance of local Indigenous researchers, practitioners, and advisors. This is not an exhaustive list but offers starting points for the individual to make change, which collectively will result in societal change to how science is done.

The Objects for which the APPS were established in 1969 were the advancement and dissemination of the knowledge of plant pathology and its practice, particularly,

but not exclusively, in relation to Australia, New Zealand and neighbouring countries (APPS 2021a). In 2020, the APPS management committee decided to broaden the ways in which the Objects could be achieved by including new language in the Society's Constitution that purposefully engaged with the full breadth of diversity and abilities within the society and those communities' members with whom the Society's members work. Additionally, the committee wanted to indicate the Society's cognisance of Indigenous peoples and their rights, especially regarding plant pathology research. The aim of beginning with the Society's founding document was to provide leadership and guidance from a top-down approach while ensuring that the ethical practice and responsible engagement with Indigenous /First Nation People fell within the Society's remit.

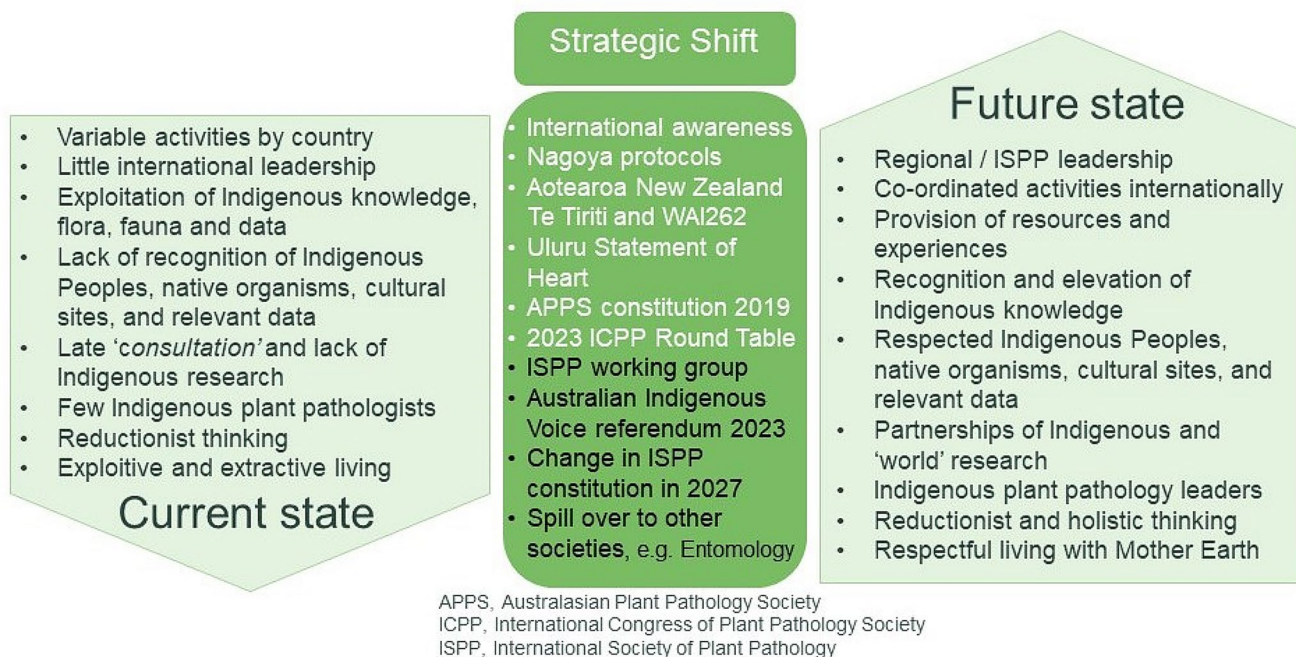
At the annual general meeting held during the APPS Biennial Conference in 2021, over 100 members unanimously voted to update the Constitution by adding a new clause (3.3. (f)) to the Objects of the Society vis. to advance plant pathology by "observing inclusive and ethical practices, and diversifying Society membership and public engagement". This was followed with two new constitutional Powers (4.1. (s) and (t)) vis. to "(1) establish inclusive and ethical guidelines for plant pathology practice; and (2) advance cultural knowledge and competence, and increase knowledge co-production, sharing, and protections when engaging with Indigenous/First Nation Peoples, native organisms, cultural/sacred sites, and/or relevant data". Such amendments to the

Constitution can now be acted upon by the Society to support the membership in their endeavours to uphold inclusive and ethical practices in plant pathology. This is one of many strategic shifts needed to move from the current state to a future state (Fig. 1).

Changes to the Constitution of a Society are nothing if they are not supported by ongoing individual and collective action.

*"Keep making personal changes and together celebrate the collective changes that we make in our workplaces, our society, our nations... our world."*

A set of guidelines and supporting documents has been produced to show how researchers could undertake science when engaging with Indigenous/First Nation Peoples, native organisms, cultural/sacred sites, and/or relevant data (APPS 2021c). The guidelines are prefaced by indicating that relationship building, and appropriate and meaningful consultation is required first and that there should be an expectation to be challenged on how members conduct their research. There are five key principles presented in the guidelines to enable members to start in culturally appropriate ways: Indigenous self-determination, consent and ethics, cultural competence and safety, equity and benefit-sharing, and responsibility and accountability. It has been stressed to the APPS members that the guidelines are a living document (not an authoritative document) and do not replace advice



**Fig. 1** Strategic shift that moves from the current state of Indigenous rights recognised and empowered within plant pathology internationally. Black text identifies future actions towards a stra-

tegic shift. 'Entomology' refers to Entomology Societies whose members often collaborate with plant pathologists to research vectoring of pathogens and integrated disease and pest management

and guidance of Indigenous researchers, practitioners, and advisors.

## Conclusion

In continuing to move this conversation forward, similar changes to foundation documents and supporting guidelines could be adopted by other representative societies and the International Society of Plant Pathology. What a difference might plant pathologists make if we work collectively on being inclusive, promoting Indigenous Peoples and their rights, and enabling the field of plant pathology to move towards the future state (Fig. 1).

In the words of APPS Past President and virologist, Associate Professor Robin MacDiarmid during the Presidential speech at the 2021 APPS Conference: “*Let’s go viral for Indigenous Rights in Plant Pathology!*”

## Glossary of terms

Aotearoa New Zealand	Māori and English names of New Zealand.
Iutruwita	The name for Tasmania in palawa kani, the revived language of Tasmanian Aborigines
Mātauranga Māori	Body of Māori knowledge, Māori epistemology. “mātauranga Māori is thus made up of a core of inherited knowledge, plus the values and ethics that go with it, and new knowledge” – Sir Hirini Moko Mead (E-tangata: <a href="https://e-tangata.co.nz/comment-and-analysis/understanding-matauranga-maori/">https://e-tangata.co.nz/comment-and-analysis/understanding-matauranga-maori/</a> , accessed 21 July 2023).
Tangata Tiriti Treaty people	Tangata Tiriti are non-Māori who live in Aotearoa New Zealand and are committed to a Tiriti-led country, based on the articles of Te Tiriti o Waitangi. By contrast, Tangata Whenua are people of the whenua (land); Māori, Indigenous people of Aotearoa New Zealand.
Te Ao Māori	The Māori world, including its languages, community practices, and sites of

importance.

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**Conflict of interest** The authors have no conflict of interest to declare that are relevant to this article.

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