

Forum

Missing in translation: Maori language and oral tradition in scientific analyses of traditional ecological knowledge (TEK)

Priscilla M. Wehi¹, Hēmi Whaanga², and Tom Roa³

Recent conceptual shifts in ecology towards integration of humans into ecosystems requires all possible sources of ecological knowledge available (Berkes 2004, 2009 this issue). Māori traditional ecological knowledge of natural systems (TEK) can add valuable ecological data to more conventional scientific studies as the former tends to be diachronic, based on a cumulative system of understanding the environment founded on observations and experience (Gadgil et al. 1993; Berkes 2008), while the latter is frequently synchronic, with experiments that may explore causal effects in ecological patterns (Newman & Moller 2005; Moller et al. 2009a). However accessing TEK can be both difficult and time-consuming, as demonstrated by the 14-year research project *Kia Mau Te Tīti Mo Ake Tonu Atu* (the ‘Keep the Tīti Forever’ research project; Moller et al. 2009a). We argue that oral traditions offer a wealth of information that is frequently overlooked, in part because of a lack of knowledge of *te reo Māori* (the Māori language) and, further, a lack of recognition of the inextricable link between biological and cultural diversity (Maffi 2005).

Māori rarely express concepts and ideas directly, rather tending to use imagery in order to understand and convey history (Tau & Anderson 2008). Thus, *whakataukī* (ancestral sayings), *pūrākau* and *kōrero* (myths and stories), *karakia* (prayer), and *waiata* (song) are enduring and relevant as “records of tribal memory” (Kawharu 2008). Such cultural knowledge is not always easily accessible, and may require extensive contextualisation to make sense. Many of the above vehicles for TEK are embedded in idiom, dialect, and tribal identity markers, and are dependent on the structure, meaning and function of their context. That is, they are rarely transparent at face value (Steiner 1998).

Posey (1996) argues that taxonomic systems, emic perceptions, and codified knowledge of overt and covert categories depend on language as a major vehicle for cultural transmission. Māori structured taxonomies differ from Linnaean taxonomy, for example, as *whakapapa* (genealogy) expresses relationships between ecosystem components, human beings, and their relationship with the environment (Roberts et al. 2004). Additionally, each name has its own *whakapapa*, imbued with information about the process of naming. Thus, names may reference tribal markers, for instance, and in doing so create a knowledge system for future generations to follow. Unfortunately, traditional knowledge of names, classifications and taxonomies has been eroded over generations (Tipa & Nelson 2007). However, current work on

¹Allan Wilson Centre for Molecular Ecology and Evolution, Institute of Natural Resources, Massey University, Private Bag 11222, Palmerston North 4442, New Zealand. p.m.mcallum@massey.ac.nz

²Ngāti Kahungunu, Ngāi Tahu, Ngāti Mamoe, Waitaha, School of Māori and Pacific Development, University of Waikato, Private Bag 3105, Hamilton 3240, New Zealand. hemi@waikato.ac.nz

³Ngāti Maniapoto, Waikato, School of Māori and Pacific Development, University of Waikato, Private Bag 3105, Hamilton 3240, New Zealand. tomroa@waikato.ac.nz

the biosystematics of New Zealand biota demonstrates that Māori conceptions of taxonomy are grounded in *tikanga* (cultural concepts), so that knowledge of world view, as well as the processes and contexts of naming are essential to these taxonomies (Tipa & Nelson 2007; Papa et al. 2009). Hybrid taxonomic systems fail to recognise the essence of either Māori naming processes or Linnaean descriptions of current biodiversity (Tipa & Nelson 2007).

Increasing collaborations of scientists, conservation managers and Māori community members to protect biodiversity and manage biota within bicultural partnerships has resulted in increased awareness of TEK and interest in how it can be incorporated into common goals. *Kia Mau Te Tīti Mo Ake Tonu Atu* is perhaps the most significant of these projects to date in New Zealand (Moller et al. 2009c). Nonetheless, publications from this project highlight a missed opportunity. Research of this nature rarely integrates archive material written in Māori, in part because few scientists are able to interpret these observations and traditions. Furthermore, it is not always easy to link oral tradition with current knowledge. Miskelly (1987) painstakingly examined archival evidence on the *hakawai* (most likely the Stewart Island snipe), and concluded that in some sources it has become confused with the *hokioi*, a bird spoken of in Māori mythical traditions. In instances such as this, distinguishing the reliability, validity and context of knowledge fragments becomes paramount. Specialist knowledge of context, including for example, knowledge of the characters and biases of the ethnographers, assists interpretation of TEK, and other linguistic and cultural expertise helps clarify these (at times) subtle issues. Problems can also arise if either the knowledge system or oral tradition data gathered by researchers is incomplete. Interpretations of historical and anatomical evidence now concur that the *hokioi* was probably the extinct Haast's eagle *Harpagornis moorei*, an avian predator with a 2–3 m wingspan (Grey 1873; Scofield & Ashwell 2009). Public interest remains high in this kind of research, with the *hokioi* featured in a front page story in the *New Zealand Herald* on 14 September 2009.

Despite this example of how TEK can extend our knowledge of biota, Miskelly's approach has not been widely adopted. Instead, much TEK research in New Zealand has been based on interviews with Māori (e.g., Lyver 2002; King & Skipper 2006; Ramstad et al. 2007; Kitson & Moller 2008; Moller et al. 2009b; Wehi & Wehi in press). Moreover, the widespread lack of Māori language archive and interview material entering the scientific realm highlights an area that needs attention if we are to examine all sources of ecological data. In *Kia Mau Te Tīti Mo Ake Tonu Atu*, the Māori language appears to have been rarely used (e.g., Moller et al. 2009b) compared to other projects, perhaps because of a greater presence of the language within other communities (e.g., Lyver et al. 2009). A key principle of kaupapa Māori research is *taonga tuku iho*, the principle of cultural aspiration, which asserts the centrality and legitimacy of te reo Māori, *tikanga* and *mātauranga Māori* (traditional Māori knowledge) (Smith 1990). In our view, knowledge of Māori language and its intimate connections with TEK in New Zealand stimulates new perspectives and allows evaluation of previously inaccessible ecological data, yet is currently undervalued and underestimated. As Ngāpuhi leader Sir James Henare reiterated in his evidence to the Waitangi Tribunal in 1985, "The language is the core of our Maori culture and mana. *Ko te reo te mauri o te mana Maori?* (The language is the life force of the Maori people)" (Waitangi Tribunal 1986).

As researchers, conservation managers and restoration ecologists come to recognise that many "natural" ecosystems are in fact "cultural" landscapes that are human-modified, examination of TEK and indigenous resource management strategies have become more important to effective conservation of biodiversity (Posey 1996; Wehi 2009). Mead (2003) argues that research processes, procedures and consultation need to be correct:

"so that in the end everyone who is connected with the research project is enriched, empowered, enlightened and glad to have been a part of it".

The seven kaupapa Māori practices outlined by Smith (1999) act as an appropriate code of conduct that can guide transdisciplinary science research. In addition to these principles, we suggest transdisciplinary studies that build on partnerships between scientists and iwi should include team members with well-honed language and cultural skills, to allow full exploration of the data available.

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REFERENCES

- Berkes F 2004. Rethinking community-based conservation. *Conservation Biology* 18: 621–630.
- Berkes F 2008. Sacred ecology, traditional ecological knowledge and resource management. Philadelphia, Pennsylvania, USA, Taylor and Francis.
- Berkes F 2009. Indigenous ways of knowing and the study of environmental change. *Journal of the Royal Society of New Zealand* 39: 151–156, this issue.
- Gadgil M, Berkes F, Folke C 1993. Indigenous knowledge for biodiversity conservation. *Ambio* 22: 151–156.
- Grey G 1873. Description of the extinct gigantic bird of prey, hokioi. *Transactions and Proceedings of the New Zealand Institute* 5: 435.
- Kawharu M 2008. *Tāhuhu kōrero: the sayings of Taitokerau*. Auckland, New Zealand, Auckland University Press.
- King D, Skipper A 2006. *Water and Atmosphere* 14: 22–23.
- Kitson JK, Moller H 2008. Looking after your ground: resource management practice by Rakiura Māori tūi harvesters. *Papers and Proceedings of the Royal Society of Tasmania* 142: 161–176.
- Lyver PO 2002. The use of traditional environmental knowledge to guide sooty shearwater (*Puffinus griseus*) harvests by Rakiura Maori. *Wildlife Society Bulletin* 30: 29–40.
- Lyver PO, Jones CJ, Doherty J 2009. Flavor or forethought: Tūhoe traditional management strategies for the conservation of kereru (*Hemiphaga novaeseelandiae novaeseelandiae*) in New Zealand. *Ecology and Society* 14(1): 40.
- Maffi L 2005. Linguistic, cultural, and biological diversity. *Annual Review of Anthropology* 34: 599–617.
- Mead HM 2003. *Tikanga Māori: living by Māori values*. Wellington, New Zealand, Huia Publishers.
- Miskelly CM 1987. The identity of the hakawai. *Notornis* 34: 95–116.
- Moller H, Charleton K, Knight B, Lyver PO'B 2009a. Traditional ecological knowledge and scientific inference of prey availability: harvests of sooty shearwater (*Puffinus griseus*) chicks by Rakiura Maori. *New Zealand Journal of Zoology* 36: 259–274.
- Moller H, Kitson JC, Downs TM 2009b. Knowing by doing: learning for sustainable muttonbird harvesting. *New Zealand Journal of Zoology* 36: 243–258.
- Moller H, Lyver PO, Bragg C, Newman J, Clucas R, Fletcher D, Kitson J, McKechnie S, Scott D, Rakiura Titi Islands Administering Body 2009c. Guidelines for cross-cultural participatory action research partnerships: a case study of a customary seabird harvest in New Zealand. *New Zealand Journal of Zoology* 36: 211–241.
- Newman J, Moller H 2005. Use of mātauranga (Māori traditional knowledge) and science to guide a seabird harvest: getting the best of both worlds? *Senri Ethnological Studies* 67: 303–321.
- Papa JW, Roa T, Karapu R 2009. 'He Kauwhanga Koiora'. A tracking of the process in the setting up of a Tainui Māori Reference Group with NIWA in the taxonomy of newly discovered species. *Te Pua Wānanga ki te Ao Report for NIWA*, University of Waikato, Hamilton, New Zealand. 31 p.
- Posey DA 1996 (with contributions by G. Dutfield, K. Plenderleith, E. da Costa e Silva, & A. Argumedo). *Traditional resource rights: international instruments for protection and compensation for indigenous peoples and local communities*. IUCN, Gland, Switzerland.
- Ramstad KM, Nelson NJ, Paine G, Beech D, Paul A, Paul P, Allendorf FW, Daugherty CH 2007. Species and cultural conservation in New Zealand: Maori traditional ecological knowledge of tuatara. *Conservation Biology* 21: 455–464.

- Roberts, M, Haami B, Benton R, Satterfield T, Finucane M, Henare M, Henare M 2004. Whakapapa as a Maori mental construct: some implications for the debate over genetic modification of organisms. *The Contemporary Pacific* 16: 1–28.
- Scofield MP, Ashwell KWS 2009. Rapid somatic expansion causes the brain to lag behind: the case of the brain and behaviour of New Zealand's Haast's eagle (*Harpagornis moorei*). *Journal of Vertebrate Paleontology* 29: 637–649.
- Smith GH 1990. Research issues related to Maori education. Paper presented to NZARE Special Interest Conference, Massey University. Reprinted in 1992 as the issue of Research and Maori, Research Unit for Maori Education, University of Auckland, Auckland, New Zealand.
- Smith LT 1999. Decolonising methodologies: research and indigenous peoples. New York, Zed Books and Dunedin, New Zealand, Otago University Press.
- Steiner G 1998. *After Babel: aspects of language and translation*. 3rd ed. London, Oxford University Press.
- Tau TM, Anderson A ed. 2008. *Ngāi Tahu: a migration history: the Carrington text*. Christchurch, New Zealand, Bridget Williams Books.
- Tipa G, Nelson K 2007. *Cultural considerations when naming new species*. NIWA, Wellington, New Zealand.
- Waitangi Tribunal 1986. Findings of the Waitangi tribunal relating to Te Reo Māori and a claim lodged by Huirangi Waikerepuru and Nga Kaiwhakapumau i te Reo Incorporated Society (Wellington Board of Māori Language). Wellington, New Zealand, Government Printer.
- Wehi PM 2009. Indigenous ancestral sayings contribute to modern conservation partnerships: examples using *Phormium tenax*. *Ecological Applications* 19: 267–275.
- Wehi PM, Wehi W in press. Traditional harvesting in contemporary urban and fragmented landscapes. *Conservation Biology*.