Journal of Marine and Island Cultures (2013) 2, 78–84

Journal of Marine and Island Cultures

www.sciencedirect.com

The use of the Māori language in species nomenclature

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Received 29 October 2013

KEYWORDS

Māori;
New Zealand;
Taxonomy;
Linnaean;
Culturally-sensitive approach

Abstract The Linnaean system has a set of rules governing botanical nomenclature, zoological nomenclature and bacteriological nomenclature for the scientific naming of species. These set the principles, rules and standards with which authors should comply with when naming new species. In Aotearoa/New Zealand (ANZ), the knowledge and taxonomic systems of Māori (the indigenous people) have largely been the preserve of Western anthropologists, linguistics and ethnographers. As such, the Linnaean classification system has been superimposed over the pre-existing classifications of Māori since European settlement approximately 200 years ago. A range of strategies have been applied to the naming of new species within a scientific context when using the Māori language (an east-Polynesian language), which do not adhere to the Linnaean system including arbitrary practices, hybridisation, incorrect linguistic context, a lack of full understanding of the meanings of the words and names and questionable naming practices of taxonomists. This paper discusses these issues, including examples, to illustrate the breadth of issues that we encountered. Although no code of practice or set of rules can anticipate or resolve the problem, there is an advantage to developing a set of possible recommendations as to the use of Māori words in the names of new species.

Introduction

The Western scientific view of classification and taxonomy has traditionally been associated with the identification and categorisation of life forms into a hierarchical taxonomy of Kingdoms, Order, Class and group based on their morphological features. Humans have always classified life; we have a natural disposition to want to organise and systematise knowledge, concepts, and things of importance to us, including living organisms (Gordon, 2012). The Greek philosopher Aristotle (384–322 B.C.), organized five hundred types of animals according to habitat and body form (Blits, 1999), but Swedish botanist Carl Linnaeus (1707–1778 B.C.), provided what is considered the basis of scientific classification grouping species according to shared physical characteristics and presumed natural relationships.

Linnaeus proposed a taxonomic system where all living things are classified in categories of successively more inclusive rank – kingdom, phylum, class, order, family, genus and species – and endowed each organism with a unique two-part

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Peer review under responsibility of Mokpo National University.

2212-6821 © 2013 Production and hosting by Elsevier B.V. on behalf of Institution for Marine and Island Cultures, Mokpo National University.
http://dx.doi.org/10.1016/j.imic.2013.11.007

binomial Latin name indicating its genus and species (Linnaeus, 1758). Prior to Linnaeus, taxonomic names were not standardised and biological taxonomy was regarded as a chaotic discipline marked by miscommunication and misunderstandings. Biologists disagreed on the categories of classification, how to assign taxa to those categories, and even how to name taxa (Ereshefsky, 2001).

A century after Linnaeus, Charles Darwin revolutionised to the concept of evolution by natural selection where he demonstrated that the origin of species could be explained by descent with modification. Darwin's theory of evolution by natural selection provided a mechanism that could explain the diversity and complexity of nature without requiring divine influence. Biologists, like linguists, became interested in common ancestry, descent with modification, and family trees (Atkinson and Gray, 2005). Developments in the 20th Century of the *synthetic theory of evolution* (or synthetic Darwinism) in the 1950s, *numerical taxonomy*, which deals with the grouping using numerical methods of taxonomic units based on their character states in the 1960s, as well as protein sequencing and cladistics in the 1980s, have not only illuminated some of the problems within taxonomic classification, but it has also unearthed a range of others (Wilkins, 2009; Yoon, 2010). Traditional taxonomic systems associated with the identification and classification of species have come under intense pressure from cladistics (phylogenetic) approaches (Philip, 2004). Two main rival schools (cladistics and taxonomy) emerged with different conceptual frameworks, different organizing principles, criteria, terminology, and types of evidence which lead to partially different or incongruent results. Thus, it is not surprisingly that these two schools hold very different views regarding the value and role of their own field and that of the alternative school (Grant, 2003). This disagreement continues to be waged throughout the literature on taxonomy (Ereshefsky, 2001; Gao and Sun, 2003; Lee, 2003; Nixon et al., 2003; Schuh, 2003; Haber, 2005; Kwok, 2011).

To deal with both the different approaches and the proliferation in the naming of species, a number of codes and commissions have been established. These codes establish a set of principles, rules and standards with which authors should comply with when naming new species for botanical, zoological and bacteriological nomenclature. For example, the international commission on zoological nomenclature (ICZN) is responsible for producing the international code of zoological nomenclature, a set of rules for the naming of animals and the resolution of nomenclatural problems, the international code of nomenclature for algae, fungi, and plants (ICN – formally known as the international code of botanical nomenclature, ICBN) is the set of rules and recommendations dealing with the formal botanical names that are given to plants, fungi and a few other groups of organisms, the international code of nomenclature of bacteria (ICNB) or Bacteriological Code (BC) governs the scientific names for bacteria, including Archaea, and the PhyloCode for regulating the naming of phylogenetic nomenclature is being drafted in association with the international society for phylogenetic nomenclature (ISPN). An index of the world's known species is also available online. The index, known the 'Catalogue of Life', is a quality-assured checklist of more than 1.3 million species of plants, animals, fungi and micro-organisms, about 70% of all those known to science (Species 2000, 2012). A priority of the Global Taxonomy initiative of the United Nations Convention on Biodiversity (Gordon, 2009), the digital catalogue provides information through a widely accessible checklist of known species worldwide. More than three thousand taxonomists worldwide contribute and maintain 115 databases with information on 1 315 754 species, 113 716 infraspecific taxa, 870 920 synonyms and 351 941 common names. The catalogue provides information for the comparison of species for global bio security purposes (Bisby et al., 2000). Nonetheless many invertebrates and most bacteria, viruses and other micro-organisms are poorly known and described.

Māori classification

Classifications of plants and animals have been extensively documented among many different groups of indigenous peoples and languages ranging from purely descriptive inventories of culturally salient species to broadly theoretical and comparative analyses (see Brown, 1982, 1984, 1986; Berlin, 1992; Medin and Atran, 1999; Medin et al., 2007; Atran and Medin, 2008). The Māori classificatory system is founded on a whakapapa (genealogy) relationship that incorporates, amongst other things, many deities within Māori cosmology and the natural world as well as relationship between species (Walker, 1996). When the Māori ancestors reached ANZ from their Polynesian origins circa 1250 B.C., they brought with them an extensive knowledge of nomenclature that they quickly adapted to the new surroundings (Biggs, 1991). Many of the new locations and species discovered by our ancestors were named after those that closely resembled locations and species from far off homelands (Riley, 2001). Biggs (1991) estimates that there are more than 200 Polynesian plant names have etymologies and rather less than half of them have reflexes in Māori. Vocabulary adapted by a combination of neologism and semantic shift in order to describe this novel environment containing flora and fauna not previously encountered in their migration from tropical island Polynesian (Harlow, 2007). Rapid population growth occurred, and Māori and the Māori language changed, evolved and spread with a number of linguistic differences, regional and tribal names developing for plant and animal species (Biggs, 1989; Harlow, 1994). The uniqueness, richness and diversity of the Māori classificatory system was captured in oral sources such as whakapapa, mōteatea (laments) and whakataukī (ancestral sayings) (Ngata et al., 1945; Ngata and Jones, 1961, 1980; Mead and Grove, 2001). It provides knowledge of a Māori world view in terms of relationships (relationships within and between species and relationships among phenomena of different kinds).

Early Māori contact with Europeans in the 1780s was limited to interactions with whalers, sealers and early missionaries and by the time of the signing of the Treaty of Waitangi in 1840 (Orange, 2011), the Māori population outnumbered the permanent European settlers by approximately 80 000–2000 (Pool, 1991). These demographics quickly changed with a massive influx of European migrants, diseases and land wars which decimated the Māori population in the latter half of the 1800s. The Māori people, language, culture and systems of knowledge came under threat from intermarriage, individualisation, modernisation and assimilation (Walker, 2004). The knowledge and taxonomic systems of the Māori became the preserve of Western anthropologists, linguistics and ethnographers such as Best (1924, 1925, 1942), Buller (1872–1873), Smith (1913), and Tregear (1891).