



Understanding cultural drivers in the medicinal use of wild animals: global patterns and lessons for conservation

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The use of wild animals in traditional medicine can have serious impacts on species, ecosystems, and human health. Unsustainable harvesting for medicinal use can lead to species declines and the loss of associated ecosystem services, e.g., the ongoing collapse of vulture populations across Africa. In addition, the market trade in live animals creates a significant threat of emerging infectious diseases, e.g., the COVID-19 pandemic. Nevertheless, the medicinal use of animals may also be associated with substantial benefits, given that traditional medicine is the primary source of health care for 80% of the world's population. In light of these facts, there is an urgent need to better understand the medicinal use of wild animals to inform conservation and public health policy. However, despite some high-profile case studies, the global picture is poorly known since accounts of the use of animals in medicines are dispersed in the literature. This project would bring together accounts of medicinal use of animals into one database, and use that database to explore these practices and their wider implications.

Anthropologists have used methods borrowed from evolutionary biology to gain an increasingly sophisticated understanding of the evolution of political, religious, social and material culture. These new approaches to cultural evolution have recently been applied to the study of the medicinal plant use (Figure 1), but the use of animals in medicine is an aspect of culture that has never been explored using evolutionary methods. Cultural evolutionary theory in general, and phylogenetic comparative methods in particular, provide a framework for cross-cultural study of the diversity of animals used in medicine. The student carrying out this project would use their novel database of animals used in traditional medicine and a phylogenetic framework to ask questions such as:

- Do people from different cultures in different parts of the world use the same or different lineages of animals in their traditional medicine?
- What are the environmental, cultural or intrinsic (trait) drivers of selection of animal species for medicine, and to what extent is traditional knowledge shared vertically (ancestor-descendant) or horizontally (between cultures)?
- Where are the priority regions for ethnozoological fieldwork or conservation assessments of levels of use?

Phylogenetic methods can be applied to specific animal taxa or geographic regions, as well as to the entire set of animals used globally in medicine. Depending on their interests, the student might choose a part of the world or a specific taxon in order to focus their investigation into the drivers of animal use in medicine, using phylogenies to account for the non-independence of data when testing for environmental, cultural or other drivers of animal use.

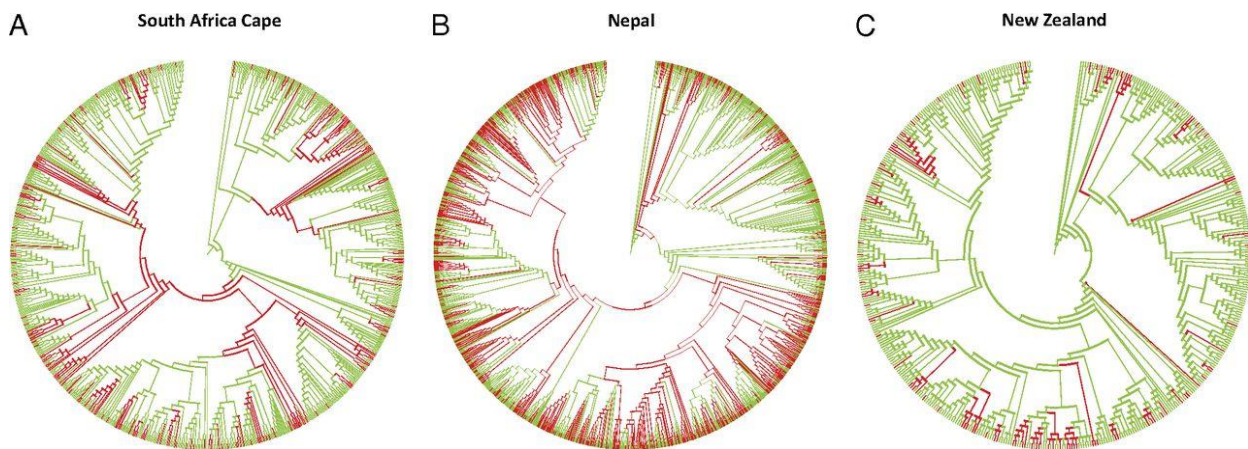


Figure 1. Phylogenetic methods reveal that the same plant lineages are used by people for traditional medicine in different parts of the world. Whether the same animal taxa are used cross-culturally has never been investigated (Figure from a paper first-authored by a PhD student of Julie Hawkins: Salsis-Lagoudakis et al., 2012. Phylogenies reveal predictive power of traditional medicine in bioprospecting. *Proc. Natl. Acad. Sci. U. S. A.*, 109: 15835.

Training opportunities:

At the University of Reading and at the Institute of Zoology, the research arm of ZSL (the Zoological Society of London), the student would be trained in database design and dissemination, and in phylogenetic comparative methods, specifically those used in community ecology. The student would also have the opportunity to interact with conservation scientists and practitioners at ZSL. There might be an opportunity for ethnozoological fieldwork, but this would be dependent on the interests of the student, and government advice on travelling abroad.

Student profile:

This project would be suitable for students with a degree in biology, with specialism or particular interest in evolution and phylogenetic methods. The project also has a strong interdisciplinary element, and would suit students with wider interests in anthropology and conservation.

References:

- Salsis-Lagoudakis, C. H., Hawkins, J. A., Greenhill, S. J., Pendry, C. A., Watson, M. F., Tuladhar-Douglas, W., Baral, S. R. and Savolainen, V. (2014) The evolution of traditional knowledge: environment shapes medicinal plant use in Nepal. *Proceedings of the Royal Society B-Biological Sciences*, 281 (1780). p. 20132768. ISSN 0962-8452
- Souza, E. d. N. F. and Hawkins, J. A. (2020) Ewé: a web-based ethnobotanical database for storing and analysing data. *Database*, 2020. baz144. ISSN 1758-0463
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<https://research.reading.ac.uk/scenario/>