

Antarctic Science Bursary Report- Katherine Short

I applied for an Antarctic Science Bursary to be able to expand my PhD research project. My project was looking into the phylogeny, biogeography and population differences of two tardigrade species within Antarctica. The first species I was studying was *Acutuncus antarcticus*, which was believed to be a pan-Antarctic endemic species, and an ancient survivor on the continent. The second species was *Mesobiotus furciger*, a globally common genus and a Southern Hemisphere distributed species, believed to be a recent coloniser. These were both selected to be able to test the different potential colonisation patterns of terrestrial life within Antarctica. Samples for this project were provided from the maritime area of Antarctica only as this was the area that the British Antarctic Survey sampled regularly.

Preliminary morphological and molecular analysis of populations from the maritime Antarctic showed interesting patterns of significant differences between areas sampled, even over short distances. They also indicated that both species may have endemic, ancient origins. To be able to investigate this further I needed further samples from the main East Continental area of Antarctica. However, the British Antarctic Survey did not have access to these samples. I was able to make contact with Professor Mark Stephens of the South Australian Museum who did hold samples from this area who agreed that I could use these samples for my research. Due to Australian regulations the raw samples could not be exported from the country and I would need to go to the Australian laboratory and work with the samples there. Travelling to Australia and the work on the samples there was not covered by my NERC PhD grant and therefore I applied for, and was successful, a grant from the Antarctic Science Bursary to be able to analyse these samples.

My work in Australia was a success and I was able to find and analyse my two target species from multiple areas of East Antarctica. The processed samples were then brought back to the UK where I analysed their morphology and performed molecular extractions for molecular barcoding (COX1 and 18S gene regions).

Results from my work has shown that there is a strong separation of populations between the maritime and continental areas of Antarctica indicating at least three different species of *Acutuncus antarcticus* within Antarctica, and four to five species of *Mesobiotus furciger*. These populations are also highly isolated with little to no connection between them. This work has also shown that both species have ancient, Gondwanan origins on the continent and both are Antarctic endemic species groups. This work is important as it increases the known biodiversity on the continent and with implications for future conservation efforts of these isolated, endemic groups.

Future work for this project would be to sample further areas to be able to truly understand the tardigrade biodiversity within Antarctica and the best way to protect these habitats into the future.

I am now preparing three manuscripts for submission from this work that I am aiming at Antarctic Science and Molecular Biology and Evolution.