RSPCA Australia
PO Box 265, Deakin West ACT 2600 Australia
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We are happy to provide our final report for the Alan White Scholarship for Animal Welfare Research. This grant supported our work "Developing a novel electronic nose to combat the illegal trade of the native Australian reptile, *Tiliqua rugosa*". Despite delays due to the 2019 bushfires and 2020 COVID-19 epidemic, we have made significant progress. To date, we have established a reptile-specific odour database that is comprised of Shingleback lizards (*Tiliqua rugosa*), Eastern Blue tongue lizards (*Tiliqua scincoides*), Children's Pythons (*Anasari childrenii*), Bearded dragons (*Pogona barbata*) and Centralian Blue tongues (*Tiliqua multifasciata*). We have also purchased analytical standards that we are using to train our electronic nose device, the "NOS.E". Through the analysis of all of the odours that reptiles produce, (i.e. volatilomes), we have selected the most relevant sensors for the NOS.E that will be used to detect reptiles in simulated trafficking scenarios.

We were able to publish a manuscript that describes our optimised volatilome collection and analysis methods (Titled: "Reptile volatilome profiling optimisation: a pathway towards forensic applications") in the journal "Forensic Science International: Animals and Environments" (https://doi.org/10.1016/j.fsiae.2021.100024).

This work was also recognised by ABCNews (please see article: (https://www.abc.net.au/news/2021-02-13/scientists-to-build-electronic-nose-wildlife-trafficking-fight/13147692), Facebook video (https://www.facebook.com/abcperth/videos/923583078385894) and attached video) and through the Australian Museum Research Institute (https://australian.museum/blog/amri-news/whats-that-smell-protecting-our-wildlife-using-volatilomes/).

We were also able to present our work at two online conferences. The first was an international conference entitled "Crossing Forensic Boarders" that can be viewed with the following link (www.uts.edu.au/crossing-forensic-borders) under the "Forensic Biology/Taphonomy/Wildlife Parallel session" tab. Additionally, this work was presented at the Australian New Zealand Forensic Science Society's "Research in the Spotlight", where it was awarded the "Committee's Choice" Award (https://fb.watch/771lT6wD8-/).

The aim of this project is to use reptile-specific odour biomarkers to train an electronic nose to detect illegally trafficked reptiles that are inhumanely confined. By increasing detection events of illegally trafficked reptiles, we will improve reptile welfare and reduce the illegal trade of native Australian animals. The impacts of this work, along with the works and advocacy of other groups, has been able to help contribute to the conservation of the shingleback lizard. It was recently announced that the Department for Agriculture, Water and the Environment would apply for the Convention on International Trade in Endangered Species of Wild Fauna and Flora

(CITES) Appendix III listing for all four shingleback subspecies. This listing will increase the regulations for trading shinglebacks and afford an additional level of protection from exploitation.

Although this is our final grant report, our work is still ongoing. We have engaged with statisticians and data scientists to help us validate our biomarker selection methods, as well as to develop methods that are more accurate to assess reptile volatilomes. Within the next year, we aim to publish 2-3 more papers regarding our work in analysing reptile volatilomes, which we will send to the RSPCA as they are published.

We are very thankful for the support of the Alan White Scholarship for Animal Welfare Research. This research could not have been conducted or completed to the standard required for forensic analysis without this support!

Warm regards,

Amber Brown