RSPCA Australia Alan White Scholarship: Annual Progress Report 2020

Developing a novel electronic nose to combat the illegal trade of the native Australian reptile, *Tiliqua rugosa*

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We are happy to report our progress to date for our work "Developing a novel electronic nose to combat the illegal trade of the native Australian reptile, *Tiliqua rugosa*". Due to COVID-19 associated closures and research restrictions at Featherdale Wildlife Park (April – August), our reptile odour sampling was significantly delayed. Despite these delays, we were able to optimise odour sampling and analysis across reptile species using two-dimensional gas chromatography – time-of flight mass spectrometry (GC×GC-TOFMS). Our preliminary data support that odour profiles differ between reptile species. However, a larger sample size will need to be collected and assessed to confirm this observation. We will collect the sample size required over the next few months as we have been officially allowed back to sample at Featherdale Wildlife Park. We request that Figure 1 is not shared on RSPCA platforms at this time, as we plan to use this Figure for a publication once analysis is complete.

Currently, we are building our reptile-specific odour database in order to select odour biomarkers to be used for electronic nose (the NOS.E) analysis. We project that the building of this database will be completed by February 2021. Using our preliminary data, we have selected a few sensors that were already available from our research group to be used for NOS.E analysis. We are currently testing a non-specific NOS.E sensor configuration to determine responses (Figure 2). This preliminary analysis supports that the current sensor configuration is not reptile specific and that more accurate sensors must be selected.

The aim of this project is to use reptile-specific odour biomarkers to train an electronic nose to detect illegally trafficked reptiles that are confined in inhumane conditions. The development of this technology has many animal welfare implications, including increasing detection events, removing confined animals from cruel conditions and preventing their unlawful export. Additionally, these detection events can be used to build prosecutorial evidence against illegal wildlife traffickers and build intelligence as to which reptiles are being most highly trafficked. These prosecutions will ultimately the illegal trading of native Australian reptiles. Our preliminary analysis is promising – reptiles appear to have distinct odour profiles, which may allow for more targeted detection. Biomarker analysis is currently underway to strengthen our findings as well as develop a more specific electronic nose to be used for detection.

Figure 2. NOS.E analysis using live reptiles. The sensor response was determined not to be reptile specific. This supports that further research must be completed in order for more specific sensors to be selected and installed into the NOS.E.

Figure 3. Preparing a shingleback to have its odour sampled.