Functional morphological traits and habitat tolerance in in New Zealand forest birds.

Many bird species are in decline due to issues associated with the expansion of human-altered landscapes. In areas such as oceanic islands this threat can be exacerbated by introduced mammalian predators which are often more tolerant to human-altered landscapes. The resulting homogenisation of species reduces the diversity of functional traits in these areas, which is a primary conservation concern. Previous research has shown that functional morphological traits can influence a species' tolerance to more developed habitat types in human-altered landscapes (e.g. cities). For example a larger relative brain size (found from endocranial volume) is found to increase a species' ability to overcome novel obstacles, which are more common in developed urban areas. Larger orbits are shown to assist birds in predator detection and therefore avoidance. Similarly, the relative sizes of leg bones effect a birds' take-off speed, again allowing more effective predator avoidance. Greater wingspan and relative lengths of wing bones are found to increase dispersal ability, important in more fragmented landscapes. Further to this, the size of nasal turbinates influences both thermoregulation and respiration efficiency, again enhancing a species dispersal ability.

Currently, there is insufficient information on these traits for extant New Zealand birds, particularly using contemporary techniques that produce a 3d digital image of these features. Using the case study of ten native species that are flying and found in New Zealand forests, my research aims to answer two questions. First, what is the intra- and inter- specific variation in the aforementioned focal morphological traits in case study species. Second, what is the relationship between focal morphological traits and case study species' tolerance to urban habitat types (a metric found from a previous thesis chapters' work). To answer these questions I will use both analogue measuring methods (callipers for bone sizes, microbeads for endocranial volume) and digital techniques (CT and external laser scans). The funding awarded through this grant will allow me to conduct micro CT scans on more of the case study species' skulls, and will contribute towards the purchase of the laser scanner.

Liam McAuliffe