

## **Project Update: January 2024**

Since receiving funding from the Rufford Foundation in January 2023, I have completed two large field seasons at the Mpala Research Centre (MRC) in Laikipia, Kenya (February-May 2023; June-August 2023). Our aim for these two field seasons was to advance our understanding of the diversity, resource specialisation, and extinction risk of African savanna dung beetles. To do this, we employed three key lines of investigation: 1) field cafeteria trials, 2) laboratory assays, and 3) DNA barcoding. We ran field cafeteria trials during both field seasons, which yielded 9,000+ individuals, making up over 140 species (subject to change based on DNA taxonomic assignments) and many which have not previously been recorded at our study site.

Our laboratory assays, on the other hand, were not as successful due to difficulty in sampling specific dung beetle species in June 2023 (onset of dry season). Hence, to supplement the information acquired through our field cafeteria trials, we decided to identify additional food sources from the guts of the dung beetles that we collected using DNA metabarcoding – a technique that has proven successful for identifying cryptic food sources and interactions in various taxa including insects. We therefore selected and dissected a subsample of individuals (total 2,296) for each dung beetle species collected in our traps and extracted their gut DNA for analysis. These samples are currently being processed for sequencing at Princeton University and will provide a high level understanding of dung beetle diets in African savannas. Lastly, we had one 1st-year undergraduate student from Princeton University (Rohan Kumar) join us in the field during the summer as part of a hands-on research internship funded by the High Meadows Environmental Institute at Princeton University. This was Rohan's first fieldwork and research experience, through which he gained skills in molecular biology, field ecology, and chemical ecology. Rohan presented preliminary results from our summer field season at a Princeton research symposium in September 2023 and is now interested in pursuing a degree in either molecular biology or ecology.

Following the completion of our fieldwork, a major challenge that we faced was acquiring the necessary export permits to complete our last objective – that is, to establish a DNA reference library for species at MRC. Since no barcoding facilities exist within the country, we needed to export and ship specimen legs to collaborators at the Canadian Center for DNA Barcoding at the University of Guelph. This, however, proved to be a very difficult and time consuming process due to ongoing paperwork backlogs in permitting offices ensuing from the pandemic. After a long delay, we were able to get our export permits in November 2023 and ship our samples in December 2023. We are now therefore in the process of building the reference library in collaboration with taxonomists at the National Museums of Kenya (NMK) and entomologists at the Smithsonian Institution, which we expect to be completed by June 2024.



