

Project Update November 2023

We are nearing the end of the project activities as we have managed to undertake all the planned data collection trips and have undertaken preliminary data analyses for cave macroinvertebrate community data. We have also completed laboratory analyses of samples for stable isotopes, which we will use to quantify the food web structure of the cave.



Figure 1: The project team at the study site; Gcwihaba caves.

We have collected a total of 31 macroinvertebrate taxa belonging to 18 families. Cave cockroaches (*Blaberus*) were the most common taxa with a total of 11078 individuals observed followed by cave crickets (Rhaphidophoridae) and violin spiders (*Loxosceles simillima*) with 1219 and 1183 individuals observed respectively. Out of all the reported families, Blaberidae was the most abundant during both summer and winter. Its abundance was observed to increase progressively from the light zone to the deep dark zone. Nine of the 18 families were found across all cave zones during summer, with the exception of ants (Formicidae) which were absent in the dark zone. Species abundance was generally highest in summer but highest in the dark zone during both summer and winter (Fig. 2).

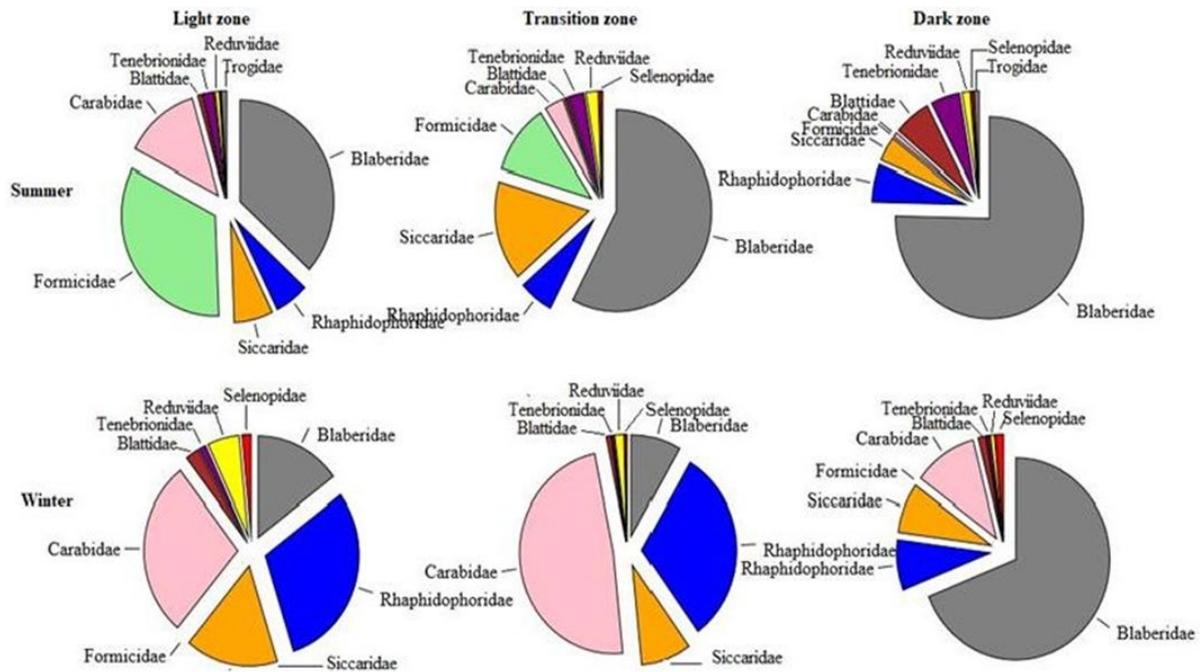


Figure 2: Relative proportions of different macroinvertebrate taxa in different zones of Gcwihaba cave during summer and winter of 2022.

While species richness was comparable across the cave zones, macroinvertebrate abundance was consistently greatest at the deep dark zone of the cave across all the seasons. This is likely due to the greater amounts of bat guano in the deep zone of the cave (Figure 2). The results on food web analyses of the cave will confirm the important carbon sources supporting macroinvertebrate production at different cave zones.

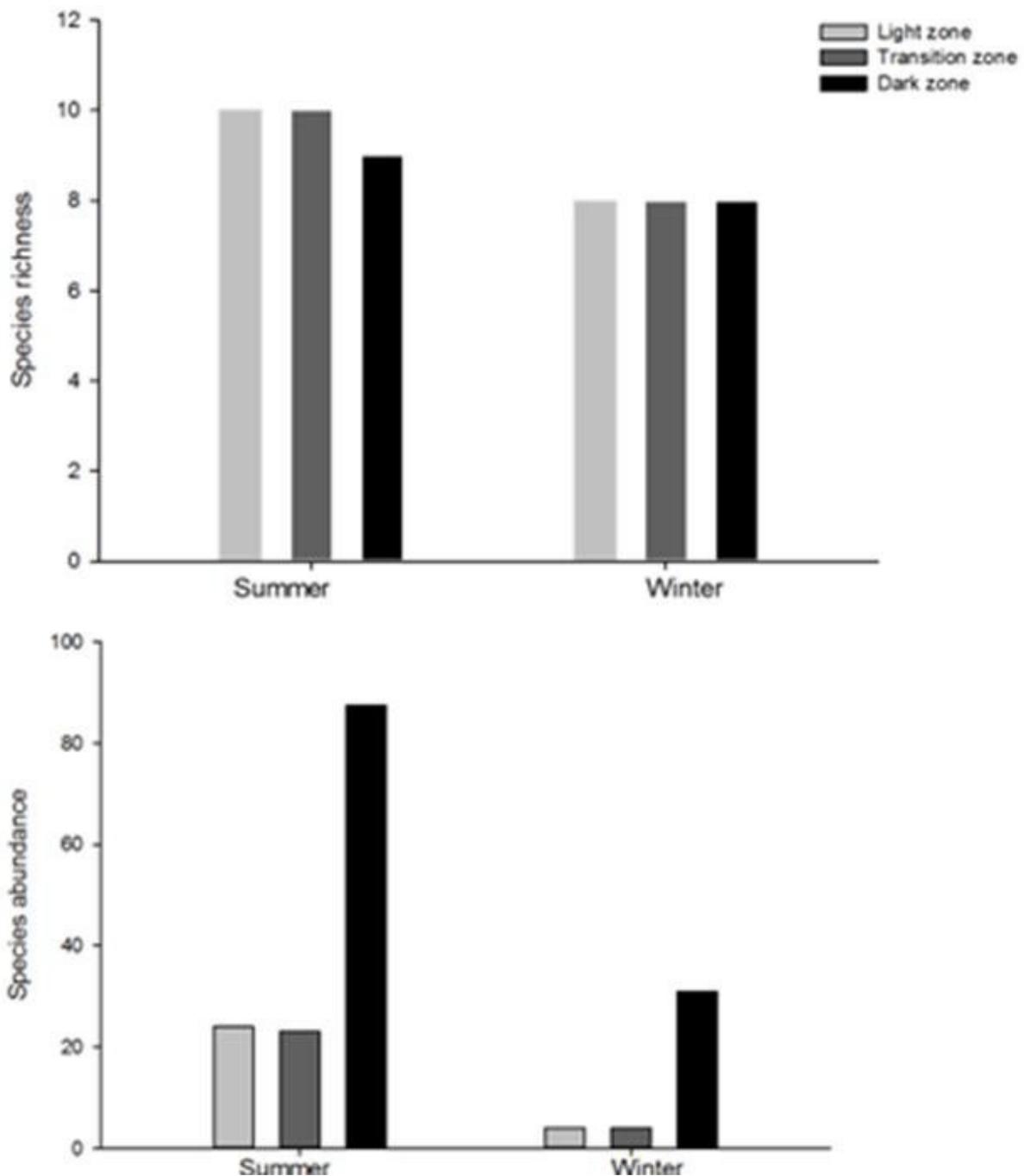


Figure 3. Macroinvertebrate species richness and total abundance at Gcwihaba cave during summer and winter of 2022.

Based on the preliminary findings, Gcwihaba caves have greater macroinvertebrate diversity than previously thought. To conserve biodiversity, it may be necessary to reduce human activity (e.g., volume of cave visitors per tour and frequency of cave tours) during summer to reduce killings of ground dwelling macroinvertebrates from human steps.

We are now doing statistical analyses for food web data and more in-depth analyses of community data.