Working title: Body size patterns in individual predator-prey interactions from DNA metabarcoding

Q1: Does predator size or identity or both determine prey size?

* Approach, model selection of GLMM: log\_prey\_mass ~ log\_pred\_mass\*species + 1|sample
  + Interaction model: the slope and intercept of prey~pred\_mass changes by species
  + Mass + species model: the intercept changes by species, slope is invariant
  + Mass: species doesn’t matter
  + Species: mass doesn’t matter
* Results: best model is Mass + species model: species identity just shifts the intercept of a similar slope. The slope is promising in using as a predictive way for building feeding interactions without knowing them.
* Figures: size distributions of predators and prey alogn with ggeffects graph
* Inspiration: Brose et al. 2019, Rudolf et al. 2014, Woodward and Hildrew 2002

Q2: Can we explain the relative size of prey to predators based on hunting strategy or are these ratios species-specific (e.g. non-predictive beyond these species in this food web)?

* Approach: model selection of glmm: ratio ~ hunting\_mode\*species + 1|sample
* Results: best model is ratio ~ species. The differences are species-specific and not predicted by basic hunting mode (active versus non-active). It is likely that other life history traits are related to regulating this relationship and could be a fruitful next direction in this type of work. Including, (e.g. Brose et al. 2019). Locomotion, tools, habitat, abundance of prey items.
* Figures: boxplot of ratio by hunting mode/species
* Inspiration: Brose et al. 2019

Q3: Within a shared environment, does predator size or identity determine prey identity?

* Approach: subset predators from one canopy fog, RDA: prey community composition ~ log\_pred\_mass + species\_identity
* Results: Predator identity is the largest driver here, and very little contribution of predator size
* Figures: pretty RDA plus body size distribution of the predators from this environment
* Inspiration: Woodward and Hildrew 2002, Rudolf et al. 2014

Q4: Within a species, do smaller individuals eat a subset of the prey of larger individuals (e.g. nestedness)?

* As QC here, show species accumulation of prey species for these three predator species
* Approach: nestedness analyses in vegan based on Jaccard similarity and NDOF nestedness
* Results: no clear nestedness in these predators (still waiting on QC of species accumulation)
* Figures: matrices w/o nestedness plus example “food webs” with and without nested pattern
* Inspiration: Woodward and Hildrew 2002