

## **Comparative fast forward and vertical flight trajectories in Colombian hummingbirds**

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One of the first things you learn about comparative biology in animals is the importance of body size. Just by knowing the body size of an animal, you can make general predictions about an organism's physiology and morphology. Further investigation into how some of these parameters scale and relate to one another allows us to form big picture ideas about an organism's life and evolutionary history. Kleiber's Law tells us that metabolic rate scales to body mass to the two-thirds power. And while we spend time figuring out how to derive, for example, the body mass to metabolic rate proportion amongst several taxonomic groups we continue to notice the intricacies of several more interacting variables such as body temperature, seasonality effects, growth, and reproduction. And then the realization that there may be no universal metric by which to analyze all taxa comes into sharp focus.

Taxonomic groups have unique evolutionary histories that set them apart from others. You may not be able to apply the same metric for metabolism and body mass across all taxonomic groups. So in order to really parse out the details about an individual's functional morphology, we need to investigate taxa by taxa and then compare the groups in a phylogenetic context. The methods by which we perform these complicated tasks can be convoluted to say the least.

The goal of this past summer was to collect enough morphological data and video recordings to make broad comparisons about fast forward and vertical flight trajectories in Colombian hummingbirds. I formed a targeted selection of hummingbirds based on morphology and abundance. There are 338 species in the *Trochilidae* family and they are not only richly diverse in terms of species but as well as in morphometric parameters. They are diversified in both time and space and along the Colombian Andean elevational gradient. I did not delve into any behavioral aspects in my hummingbird research but it still remains a field dense with opportunity for the future.

I arrived in Bogotá and spent a few days at Universidad de los Andes gathering more field supplies and familiarizing myself with a new academic setting. My collaborator, Alejandro, is a Colombian post doc who set up my transportation plans and I drove down to his family's farm, Tierra Negra, with his family from Bogotá. The ride was not very long and we stopped along the way for coffee breaks while his family emphasized the importance of coffee in their family and culture. Their coffee farm south of Fusagasugá is my field site. Once I arrived I took note of the local flora to establish potential experimental sites. For example, I had my vertical tunnel nearby a *Heliconia* plant known for its *Phaethornis*-attracting feature. The genus *Phaethornis* is a hummingbird population known for their long tails and curved bills. This idea was from a student I worked with named Nicolás. Their population on the farm was impressive.

My intention was to collect data every day in the field. However, anybody who has been to the tropics can tell you that you are going to experience rainfall that will make it impossible to work a days out of the week. I was humbled by my expectation to gather novel data so easily and quickly when all day rainfall made it logistically a nightmare to film in. And so some days were spent drinking coffee with Nicolás on the porch and waiting out the weather. To capture hummingbirds I designed a mesh cage with a feeder in the middle and a trap door. Once captured, hummingbirds were measured, photographed, and filmed flying in both a horizontal or vertical trajectory. I captured over five species out of the available twenty on the farm, formed great friendships with Alejandro's family, worked with a bright Colombian student, and all of my data made it back safely in The United States. I hope to be able to share the results of my data this semester and to continue working in the tropics where the avifauna best suits my hypotheses as a graduate student.