



## Mystery of the lowland Giant Hummingbirds (*Patagona gigas*) of central Chile

Blake-Nuttall Fund Report – 2016 Grant

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### Project Overview

Andean hummingbirds have narrow elevational distributions (500-1,500 m in amplitude) as a result of their specialized hemoglobin, which is genetically optimized to bind oxygen at low atmospheric pressures (Graham et al. 2009; Projecto-Garcia et al. 2013). As such, few elevational generalist hummingbird species exist. The Giant Hummingbird (*Patagona gigas*) – the largest hummingbird in the world – defies this tendency. It is distributed from sea level to ~4,500 m in the Andes (Fernández et al. 2011; Fig. 1), but it only occurs at sea level where the southern subspecies, *P. g. gigas*, breeds in central Chile (Estades et al. 2008). Furthermore, *P. g. gigas* is migratory and it does not winter at sea level. This raises the question: *At what latitude and altitude do lowland Giant Hummingbirds winter?*

### Objective

I set out to describe migratory connections between Giant Hummingbird breeding and wintering populations using ultra-light geolocators.

### Value to Ornithology

This study will identify where lowland Giant Hummingbirds winter (latitude and altitude) for the first time. Additionally, this research will begin to characterize the diversity of migratory and life history strategies within this ancient, monotypic lineage, which are unresolved in the literature. In doing so, I hope to provide clues about how differences in migratory behavior, combined with cryptic genetic adaptation to different seasonal elevational distributions, might lead to genetic isolation and speciation. Results will stimulate ecological questions about migration timing

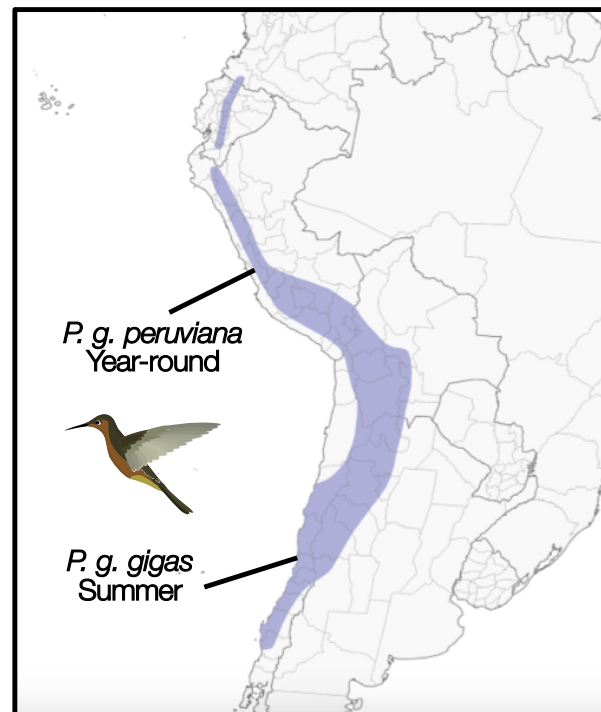


Fig. 1. Distribution of the Giant Hummingbird.

and location of stopover sites, as well as evolutionary questions about gene flow among *Patagona* populations along the extent of their Andean distribution.

### **Project Advances**

To date, we have deployed 55 light-level geolocators on lowland-breeding Giant Hummingbirds in central Chile (Fig. 2). For each individual captured, we take morphological measurements, and samples of blood and feathers for use in genetic and physiology research. Additionally, in collaboration with the Universidad Pontificia Católica de Chile, we have trained two students (one undergraduate Chilean student, and one post-baccalaureate American student) in ornithological field techniques. We maintain strong positive relationships with our local partners and government offices (Servicio Agrícola y Ganadero; SAG) in Valparaíso Region, and remain optimistic about future permitting, collaboration, and fieldwork.



**Fig. 2.** Giant Hummingbird with geolocator backpack.

### **Future Plans**

I will return to Chile in Fall 2018 to recapture individuals and recover geolocators. I am in the process of analyzing DNA from exported blood and feather samples (manuscript in preparation) that will form the basis of one of my dissertation chapters.

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