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The paradoxical Giant Hummingbird: Comparison of Andean and coastal subspecies with respect to blood, migration, and genes

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The Giant Hummingbird (Patagona gigas) is twice as large as the next largest hummingbird species and has long been considered paradoxical with respect to flight biomechanics. It is also an extreme outlier in other respects. For example, it is the only hummingbird species that breeds above 4,000 m elevation and also along the beaches of the Pacific Ocean. The high Andean populations of Giant Hummingbird (P. g. peruviana) that we have studied previously have a beta-hemoglobin genotype (serine at beta-hemoglobin A positions 13 and 83) that is characterized by high O₂-affinity and is only shared with four unrelated hummingbird taxa that are also restricted to extreme high altitudes. Here we report that lowland-breeding populations of Giant Hummingbird (P. g. gigas) are genetically highly similar to their high-elevation counterparts; they even share the same beta-hemoglobin genotype, a unique characteristic among lowland hummingbirds. We found that hemoglobin concentration is lower and red blood cell volume is higher in the lowland P. g. gigas compared to their high Andean relatives. Complicating this comparison is the possibility that coastal P. g. gigas may be a seasonal elevational migrant, but neither the geographic range nor elevation of non-breeding P. g. gigas are known at present. We describe our efforts to describe its migratory behavior using geolocators.

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