

A preliminary bird list from Río Luis, Veraguas provides further insight into an avian suture zone in Caribbean Panama

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Abstract

We present a preliminary list of birds collected on the Caribbean coast of the province of Veraguas, Panama. Here, we found birds not known from the area, instead they were believed to range limits ending either east or west of our collection site. These include: *Cnipodectes subbrunneus*, *Juliamyia julie*, *Gymnopathys bicolor bicolor*, *Mionectes (oleagineus) affinis*, and western phylopecies of *Malacoptila panamensis* and *Xenops minutus*. Our results reaffirm that the coast of Veraguas is an important suture zone between Mesoamerica and South America avifaunas along the Caribbean coast of Panama.

Presentamos una lista preliminar de aves colectado en la costa caribeña de la provincia de Veraguas, Panamá. Aquí, encontramos aves no conocido de la zona, dado a que sus límites de rango conocidos terminaron o el este o el oeste de nuestro sitio de colecta. Estos incluye: Cnipodectes subbrunneus, Juliamyia julie, Gymnopathys bicolor bicolor, Mionectes (oleagineus) affinis, y las phyloespecies occidentales de Malacoptila panamensis y Xenops minutus. Nuestros resultados confirman que la costa de Veraguas es una zona de sutura importante entre la avifauna de Mesoamérica y Sudamérica en la costa caribeña de Panamá.

Several bird species replace each other in the Caribbean lowlands of Panama. Examples include *Manacus* manakins, *Glaucis* and *Anthracothorax* hummingbirds, *Jacana* waders, *Oncostoma* flycatchers, and *Ramphocelus* tanagers. Avian taxonomic turnover becomes even more widespread when phylogeographic species are considered. Here, examples include *Mionectes* flycatchers (11), *Cantorchilus* (6) and *Henicorhina* wrens (1), *Arremon* sparrows (9), and *Cyanocompsa* buntings (4). In fact, abrupt turnover occurs in many faunal groups, which allowed Bagley and Johnson (2) to map the location of suture zones for insects, freshwater fish, and herpetofauna. However, no precise suture zone was indicated for birds, perhaps due to the fact that turnover appears to occur broadly across western to eastern Caribbean - Panama.

Gaps in sampling provide another reason for the inability to pin down an exact avian suture zone in Panama. While the avifauna of Panama is one of the most well-documented in the Neotropics (18, 22–25), few ornithological surveys of Caribbean Veraguas have been undertaken. This was largely due to difficulty of access, as no roads descended to the Caribbean lowlands from the continental divide, and coastal access has been difficult because of a lack of suitable anchorage along the Caribbean Veraguas coast (21). Thus, only a few documented ornithological expeditions have explored this region (18).

Over the last five years, the government of Panama has begun construction of a new road (Carretera Guabal-Río Luis-Calovébora; Figure 1) from the town of Santa Fé on the continental divide in Veraguas to Calovébora on the Caribbean coast. This opens up opportunities for further study of the birds of the Caribbean coast of Veraguas. From 29 - 31 July 2018, we collected birds along this new road in preparation for more intensive expeditions in the area focusing on turnover within and among bird species in the region.

We established a single field site (lat: 8.598, long: -81.206) near the town of Río Luis. Vegetation at this site consists of disturbed mature pluvial forest. We used mist-nets exclusively to collect birds. On the final half day we used playback to target a few focal widespread species for comparative genomics work. In total we collected 80 specimens representing 29 species, as follows:

Threnetes ruckeri

Thalurania colombica

Phaethornis longirostris

Phaethornis striigularis

Juliamyia julie

Amazilia tzacatl

Chalybura urochrysis

Malacoptila panamensis

Xenops minutus

Dendrocincla fuliginosa

Glyphorhynchus spirurus

Thamnophilus atrinucha

Epinecrophylla fulviventris

Poliocrania exsul

Gymnopathys bicolor

Phaenostictus mcleannani

Mionectes (oleagineus) affinis

Cnipodectes subbrunneus

Onychorhynchus coronatus

Manacus vitellinus

Cantorchilus nigricapillus

Henicorhina leucosticta

Ramphocaenus melanurus

97 *Myiothlypis fulvicauda*
98 *Mitrospingus cassinii*
99 *Tachyphonus delatrii*
100 *Saltator maximus*
101 *Sporophila americana*
102 *Sporophila funerea*
103 *Arremon aurantirostris*
104 *Arremon conirostris*
105

106 Three taxa show westward range extensions. We collected two Brownish Twistwing (*Cnipodectes*
107 *subbrunneus*) on 29 and 30 July (STRIBC:JFM024, JFM043). Previously, the westernmost extent of this
108 species was generally accepted to be just west of the Canal Zone, with records from Chepo and Barro
109 Colorado Island (24) and El Uracillo, Coclé (16). On further examination of the literature, one record
110 does exist from Punta Alegre, Bocas del Toro (12). However, this and our two Veraguan birds are the
111 only specimens known from west of the previous known limit (G. Angehr, pers. comm.).
112

113 A female Violet-bellied Hummingbird (*Juliamyia julie*; STRIBC: JFM032) was collected on 29 July.
114 This species was previously only known from as far west as El Uracillo (23). Although 19th century
115 records exist for Costa Rica and Calovébora (which is due north of Río Luis), both are generally
116 considered to be in error (17, 19, 23).
117

118 Finally, we collected four specimens of Bicolored Antbird (*Gymnopithys bicolor*) which are assignable to
119 the nominate subspecies. Olson et al (12) suggest that turnover between this taxon and *olivacens* likely
120 occurs somewhere between the Valiente Peninsula and Almirante; our record is consistent with this.
121

122 At the same time, three taxa show easternmost range extensions of phylogenetic species (which may
123 represent biological species. The first is *Mionectes [oleagineus] affinis* (STRIBC: JFM056, JFM067,
124 JFM080). Three distinct mitochondrial lineages of *Mionectes oleagineus sensu lato* occur in Panama (8,
125 11). The *affinis* taxon, which ranges from western Panama to southeastern Mexico, differs notably in
126 plumage, bill shape, and song from other Panamanian *oleagineus* (MJM pers. obs.), and likely represents
127 a separate species. The presence of *affinis* at this site is particularly surprising, given that specimens from
128 Santa Fé, Veraguas, refer to the *lutescens* subspecies, which is more closely related to some Amazonian
129 populations than it is to *assimilis*. This extraordinarily sharp divide in such a small geographic space –

approximately 22 km – reinforces that this region is key to understanding the generation of cryptic variation across Panama.

Based on mtDNA sequences, two phylogenetic species of *Malacoptila panamensis* occur in eastern and western Panama, respectively. These more or less agree with the *inornata* (sw Mexico to W Panama) and nominate (C Panama to NW Colombia) subspecies traditionally recognized (13, 23). Mitochondrial DNA sequences from our Río Luis specimen (STRIBC:JFM074) clusters with sequences from Bocas del Toro, and not sequences from Colón east to Darién provinces. This agrees with genome-wide DNA markers (J McLaughlin unpublished data).

Likewise, distinct phylogenetic species of *Xenops minutus* occur in western and eastern Panama, which refer to the *ridgwayi* and *littoralis* subspecies. The type species of *ridgwayi* is from Tocumen and Wetmore (1972) defines this subspecies to occur from eastern Panamá province westward to the Costa Rican border. Remsen (14) considers this subspecies to occur northwest to Nicaragua. Subspecies *littoralis* is generally thought to range from eastern Panamá province through Darién to NW Ecuador (24). However, Harvey and Brumfield (7) found that a bird from El Copé, Coclé clusters both in mitochondrial and genome-wide data with birds from eastern Panamá. Our Caribbean Veraguas bird has mtDNA that clusters with birds from Colón to Darién, but most genome-wide markers cluster with birds from Bocas del Toro (JF McLaughlin unpublished data). Thus, we can say that the genetic break between these phylogenetic species likely occurs in Caribbean Veraguas, suggesting that phenotypic variation between subspecies is decoupled from underlying genomic variation across this divide.

While our survey of the avifauna of the Río Luís area was brief and incomplete, the specimens recovered reinforce the notion that Caribbean Veraguas is an important suture zone where a “Mesoamerican” bird fauna meets the avifauna of eastern Panama and South America. This continental-level turnover may at least partially explain the exceptionally high levels of beta-diversity observed in many Panamanian ecological assemblages (3, 5, 10). At the same time, we call for urgent ornithological investigation of this area. The same road which has opened up this area for ornithological surveys will also likely be accompanied by the degradation and destruction of habitat through forest fragmentation, potentially leading to declines in the local avifauna (15, 20). Thus, the next few years represent a critical window in which to study this area.

Data Accessibility

A dataset (DS-RLUIS) has been created in the Barcode of Life Database (BOLD; <http://v3.boldsystems.org/>) with the mitochondrial DNA sequences used in this project. A DOI for this dataset has been requested from BOLD.

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235 *Passeriformes: Hirundinidae (Swallows) to Frigillidae (Finches)*, Vol. 4. Washington DC:
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- 238 Figure 1: Map of the sampling locality (indicated by the star). Black line represents the Carretera Guabal-
239 Río Luis-Calovébora, shown at its extent in August 2019.
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