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ARTÍCULO/ARTICLE

Notes on the breeding biology of the Tumbesian avifauna in southwest Ecuador and northwest Peru

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Notas sobre la biología reproductiva de la avifauna tumbesina en el suroeste de Ecuador y noroeste de Perú

Resumen

Este artículo contribuye a la creciente cantidad de literatura sobre la biología reproductiva de las aves de Sudamérica. Provee 823 registros sobre la reproducción de 197 especies al interior de la región Tumbesina de Perú y Ecuador. En los casos posibles, incluimos notas sobre el comportamiento de los adultos, arquitectura del nido, huevos, pichones, polluelos y volantones. En general, nuestras observaciones apoyan los reportes previos sobre la naturaleza estacional de la reproducción de las aves de esta región.

Palabras clave: Biología reproductiva, bosque nublado, huevo, volantón, historia natural, nido, polluelo, pichón, bosque seco tropical.

Abstract

This paper contributes to the growing body of literature on the reproductive biology of South American birds by providing 823 records of reproduction for 197 species breeding within the Tumbesian biome of Peru and Ecuador. Where applicable, we include notes on adult behaviour, nest architecture, eggs, nestlings, and fledglings. In general, our observations support previous reports of the seasonal nature of avian reproduction in the region.

Keywords: Breeding biology, cloud forest, egg, fledgling, natural history, nest, nestling, tropical dry forest.

INTRODUCTION

The Tumbesian Endemic Bird Area of southwestern Ecuador and northwestern Peru contains the great majority of the remaining coastal tropical deciduous forest in South America and is among the most important and threatened of the currently recognized Endemic Bird Areas (EBAs; Cracraft, 1985; Stattersfield *et al*., 1998; BirdLife International, 2019). Most likely, less than 30% of the area remains forested, leaving a highly fragmented landscape of cropland surrounding small forest patches of native vegetation that are usually confined to areas with steeper slopes that are unproductive for agriculture and cattle (Best & Kessler, 1995; Portillo-Quintero & Sánchez-Azofeifa, 2010; Hansen *et al*., 2013; BirdLife International, 2019). The Tumbesian region is one of the top five regions of the world with respect to the number of avian endemics, being home to more than 60 endemic species (Wege & Long, 1995), at least 15 of which are considered at risk (BirdLife International, 2019). According to BirdLife International (2019), the avifauna in this region faces five primary threats: deforestation, understory degradation, hunting, wild animal trade, and species' small range sizes. The most severely endangered species are those which suffer a combination of these threats (Collar *et al*., 1992, 1994), and the conservation of remaining patches of habitat are of utmost importance (Parker & Carr, 1992; Williams & Tobias, 1994; Best & Kessler, 1995; Parker *et al*., 1995; Espinosa *et al*., 2012; Tapia-Armijos *et al*., 2015).

Whilst Freile *et al*. (2006) noted the relative paucity of information published on the birds of mainland Ecuador during the 20th century, recent years have seen a dramatic increase in the amount of published data on Neotropical birds (Freile *et al.,* 2014). In particular, the reproductive biology of Ecuador's relatively understudied avifauna has received a good deal of attention in the past decade (e.g., Freile & Chaves, 2004; Cisneros-Heredia, 2006; Greeney & Nunnery, 2006; Greeney & Gelis, 2007, 2008; Solano-Ugalde *et al*., 2007; Greeney *et al*., 2010, 2011; Solano-Ugalde, 2011; Carrasco *et al*., 2013). Although the aforementioned studies treat the avifauna of a large portion of Ecuador's diverse habitats, the Tumbesian region of Ecuador and northern Peru have been relatively neglected. Important recent contributions include life history information published by Freile *et al*. (2004) and Knowlton (2010), both building upon older studies from the region (Marchant, 1958, 1959, 1960a, 1960b; Best *et al*., 1992, 1993, 1996; Parker *et al*., 1995; Cook 1996). The remaining natural history information on the avifauna of the region is derived largely from a scattering of species-specific papers, most treating one or only a few species (Freile *et al*., 2003; Miller & Greeney, 2008; Miller *et al*., 2007, 2010; Greeney, 2010; Greeney *et al*., 2012, 2013; Barrionuevo-García & Montes-Torres, 2015; Greeney & Valencia-Herverth, 2016). Importantly from a conservation point of view, however, many of these smaller works include threatened or near-threatened species, including: White-winged Guan *Penelope albipennis* (Angulo, 2004, 2008; Angulo & Barrio, 2004; Cavero & Angulo, 2011), Esmeraldas Woodstar *Chaetocercus berlepschi* (Ágreda, 2007; Juiña *et al*., 2010), El Oro Parakeet *Pyrrhura orcesi* (López-Lanús & Lowen, 1999; Klauke *et al*., 2013), Watkins' Antpitta *Grallaria watkinsi* (Martin & Dobbs, 2004; Greeney *et al*., 2009), Henna-hooded Foliage-gleaner *Clibanornis erythrocephalus* (Miller *et al*., 2012), Blackish-headed Spinetail *Synallaxis tithys* (Balchin, 1996; Crespo & More, 2013), Gray-breasted Flycatcher *Lathrotriccus griseipectus* (Greeney, 2014), Ochraceous Attila *Attila torridus* (Greeney, 2006), Slaty Becard *Pachyramphus spodiurus* (Rheindt, 2008; Gelis *et al*., 2009), Peruvian Plantcutter *Phytotoma raimondii* (Flanagan *et al*., 2008, 2009; Rosina & Romo, 2012; Nolazco & Roper, 2013), and Pale-headed Brush-Finch *Atlapetes pallidiceps* (Oppel *et al*., 2003, 2004a, 2004b). With this contribution we provide 823 records of breeding activity for 197 species from the Tumbesian biome of Peru and Ecuador, including novel information on many of the aforementioned threatened species.

METHODS

All observations were made opportunistically during the course of other fieldwork in southwest Ecuador and northwest Peru between February 2000 and March 2018. Table 1 provides a list of the locations visited, their coordinates, and associated abbreviations. Because of the irregular and arbitrary dates that we were able to make observations, we emphasize that fact that our data may not be useful for some quantitative analyses. Most of the data we present is the result of brief observations and most nests were not monitored in detail. Where applicable, however, we include observations of behavior, nest architecture, eggs, and nest success. Table 2 provides a summary of all observations, including specific dates. For those species that were studied in more detail, or those whose data are worthy of additional discussion, we have expanded upon Table 2 with brief summaries of our observations in the following section. Species-level taxonomy follows Remsen *et al*. (2018), supplemented by the subspecific arrangement of del Hoyo & Collar (2016).

RESULTS AND DISCUSSION

Ecuadorian Trogon *Trogon mesurus*

The nest and eggs of *Trogon mesurus* have only recently been described (Schulenberg & Greeney, 2013), based on three nests studied at Jorupe. All three of the previously reported nests were unlined cavities within active arboreal termitaria. It is worth pointing out that two of the five additional nests we report (Table 2) were excavated within soft, rotting wood. Such variability in nesting substrates is also seen in other trogons (Skutch, 1999), but we provide the first documentation of such variation for *T. mesurus*.

Watkins's Antpitta *Grallaria watkinsi*

The breeding of this Tumbesian endemic antpitta is poorly studied (Greeney 2018). With only two nests described in the literature (Martin & Dobbs, 2004; Greeney *et al*., 2009), published information on its biology is considered of high conservation priority (Freile & Rodas 2008). We found two active nests in 2014 at Jorupe, one nearly-complete nest on 6 March, and a second with two *c*. 3-day-old nestlings on 4 April. The first nest was 2.6 m up in a tangle of small branches and vines within thick vegetation, and had the following measurements: external diameter 24 cm, external height 10 cm, inner diameter 10.5 cm, inner depth 7 cm. The second was 2.1 m up in tangled vegetation and measured: external diameter 22 cm, external height 12 cm, inner

diameter 10 cm, inner depth 6.5 cm. These breeding records, but not the nest measurements, were presented in Greeney (2018).

Table 1: Summary of localities in southwest Ecuador and northwest Peru from whence breeding data were collected.

Locality	Department (Per) Province (Ecu)	Provincia (Per) Cantón (Ecu)	Code	Coordinates	Elev. (m)
Ecuador					
Cerro Blanco	Guayas	Guayaquil	EC1	-2.1167, -80.0833	300
Buenaventura	El Oro	Piñas	EC2	-3.65, -79.7667	520
Jorupe	Loja	Macará	EC3	-4.3833, -79.95	700
Manglares-Churute	Guayas	Guayaquil	EC4	-2.4667, -79.65	50
Utuana	Loja	Sozoranga	EC5	-4.3667, -79.75	2600
Vilcabamba	Loja	Loja	EC6	-4.25, -79.21667	1575
El Empalme	Loja	El Empalme	EC7	-4.11667, -79.8333	760
Km 1047 Macará-Loja road	Loja	Celica	EC8	-4.1833, -79.8667	650
Km 1046 Macará-Loja road	Loja	Celica	EC9	-4.2, -79.8667	660
Km 1048 Macará-Loja road	Loja	Celica	EC10	-4.2, -79.8667	780
Km 45, Hwy 68, Celica-Macará	Loja	Celica	EC11	-4.1333, -79.91667	1600
Km 46, Hwy 68, Celica-Macará	Loja	Celica	EC12	-4.1333, -79.91667	1560
Km 49, Hwy 68, Celica-Macará	Loja	Celica	EC13	-4.15, -79.9	1320
Celica	Loja	Celica	EC14	-4.1, -79.95	2000
Isla de la Plata	Manabí	Puerto López	EC15	-1.2667, -81.0667	40
Km 1066 Macará-Loja road	Loja	Celica	EC16	-4.25, -79.8833	1120
Yunguilla	Azuay	Santa Isabel	EC17	-3.21667, -79.2667	1750
Humedal La Segua	Manabí	Chone	EC18	-0.7167, -80.1833	100
Isla Santay	Guayas	Guayaquil	EC19	-2.05, -79.85	30
Yangana-Tapichalaca Road	Loja	Loja	EC20	-4.4, -79.15	2300
Reserva Río Ayampe	Manabí	Puerto López	EC21	-1.6833, -80.7833	100
Alamor	Loja	Puyango	EC22	-4.01667, -80.0167	1260
Yangana	Loja	Loja	EC23	-4.3667, -79.1667	1900
Lagunas Ecuasal	Santa Elena	Salinas	EC24	-2.2461, -80.9471	0
South of Guayaquil	Guayas	Guayaquil	EC25	-2.2, -79.75	90
Small pond, San Vicente-Chone Road	Manabí	Chone	EC26	-0.65, -80.2667	50
Peru					
El Tutumo, Cuesta el Pitón	Tumbes	Zarumilla	TZA1	-3.75, -80.25	360
Manglares de Tumbes	Tumbes	Zarumilla	TZA2	-3.41667, -80.2667	0
Mirador de Angostura	Tumbes	Tumbes	TTU1	-3.75, -80.35	340

Quebrada Angostura camino al Caucho	Tumbes	Tumbes	TTU2	-3.7667, -80.3	370
Quebrada Angostura camino al Caucho	Tumbes	Tumbes	TTU3	-3.7667, -80.333	110–350
El Caucho	Tumbes	Tumbes	TTU4	-3.81667, -80.2667	420
Bocana Murciélagos	Tumbes	Tumbes	TTU5	-3.91667, -80.1833	378
Quebrada Jurupe	Tumbes	Tumbes	TTU6	-3.9667, -80.2667	477
Canoas	Tumbes	Contralmirante Villar	TCO1	-3.91667, -80.9	0
ACP Amotape	Tumbes	Contralmirante Villar	TCO2	-3.65, -80.61667	3
Punta Pico	Tumbes	Contralmirante Villar	TCO3	-3.75, -80.7833	5
Pueblo Blas-Lancones	Piura	Sullana	PSU1	-4.25, -80.35	300–550
Quebrada Gramadal, Coto de Caza El Angolo	Piura	Sullana	PSU2	-4.41667, -80.7833	500
Cerro Pindo, Suyo	Piura	Ayabaca	PAY1	-4.5, -80.0	420
Cerro El Poto, Suyo	Piura	Ayabaca	PAY2	-4.51667, -79.9833	450
Bosque de Chonta	Piura	Ayabaca	PAY3	-4.633, -79.7667	2260
Quebrada Ancha	Piura	Talara	PTA1	-4.6, -81.033	300
Punta Balcones	Piura	Talara	PTA2	-4.667, -81.31667	0
Paltashaco	Piura	Morropón	PMO1	-5.1, -79.8833	845
Quebrada Caracucho	Piura	Morropón	PMO2	-5.1333, -79.91667	350
Villla Batanes, Chulucanas	Piura	Morropón	PMO3	-5.1333, -80.1	95
Algodonal	Piura	Morropón	PMO4	-5.1333, -79.9	400
Cerro Pilán, Chulucanas	Piura	Morropón	PMO5	-5.15, -80.05	140–450
Comunidad Ignacio Távara Pasapera	Piura	Morropón	PMO6	-5.2333, -80.333	210
Quebrada Tumberos, Mangamanguilla, Salitral	Piura	Morropón	PMO7	-5.2833, -79.85	340
Quebrada La Peña, Dotor	Piura	Morropón	PMO8	-5.35, -79.71667	266–500
Quebrada El Garabo, Serrán	Piura	Morropón	PMO9	-5.45, -79.7833	340
Laguna Santa Julia	Piura	Piura	PPI01	-5.2, -80.65	30
Huabal, Canchaque	Piura	Huancabamba	PHU1	-5.4, -79.65	726
Chignia Alta, Huarmaca	Piura	Huancabamba	PHU2	-5.5833, -79.667	725
La Pachinga, Tocto	Piura	Huancabamba	PHU3	-5.75, -79.6833	450
Limón de Porculla	Piura	Huancabamba	PHU4	-5.8667, -79.51667	1400
Quebrada Overal, Túpac Amaru	Piura	Huancabamba	PHU5	-5.91667, -79.6	560
Manglares San Pedro de Vice	Piura	Sechura	PSE1	-5.5, -80.8833	3
Laguna Ñapique	Piura	Sechura	PSE2	-5.51667, -80.7	7
Bosque aledaño a la Laguna Ramón	Piura	Sechura	PSE3	-5.55, -80.61667	10
El Peñal, Rio Piura, Chutuque	Piura	Sechura	PSE4	-5.61667, -80.65	4
Camino a la bocana de estuario de Virrilá	Piura	Sechura	PSE5	-5.81667, -80.8667	5
Bosque Seco Aledaño al estuario de Virrilá	Piura	Sechura	PSE6	-5.85, -80.81667	3

Caserío Huacrupe, Olmos	Lambayeque	Lambayeque	LLA1	-5.7833, -79.9333	120
Caserio Huacrupe a Abra de Huacrupe, Olmos	Lambayeque	Lambayeque	LLA2	-5.8, -79.9333	125
Cerro Huacrupe, Olmos	Lambayeque	Lambayeque	LLA3	-5.81667, -79.95	265
Abra de Huacrupe, Olmos	Lambayeque	Lambayeque	LLA4	-5.81667, -79.95	135
Sarismusa	Lambayeque	Lambayeque	LLA5	-6.01667, -79.533	1100
Bosque Palacios	Lambayeque	Lambayeque	LLA6	-6.05, -79.55	800
Cruz de Motupe	Lambayeque	Lambayeque	LLA7	-6.0833, -79.733	85
La Viña	Lambayeque	Lambayeque	LLA8	-6.3833, -79.75	80
Bosque de Pomac	Lambayeque	Ferreñafe	LFE1	-6.4666, -79.76667	70
Pítipo	Lambayeque	Ferreñafe	LFE2	-6.5667, -79.7833	55
Chiclayo	Lambayeque	Chiclayo	LCH1	-6.7833, -79.8333	30
Puerto Eten	Lambayeque	Chiclayo	LCH2	-6.933, -79.866	0

Line-cheeked Spinetail *Cranioleuca antisiensis*

Most authors (Schulenberg *et al*., 2010; Dickinson & Christidis, 2014) have treated Baron's Spinetail *Cranioleuca baroni* as separate from Line-cheeked Spinetail *C. antisiensis* (but see Koepcke, 1961, 1970; Meyer de Schauensee, 1970). Seeholzer & Brumfield (2017), however, have suggested that the two are best considered conspecific. Regardless of their taxonomic status, however, the breeding biology of both taxa is poorly studied. The nest of Baron's Spinetail (subspecies *zaratensis*) was first described by Koepcke (1958, 1961), in rather general terms, as a large globular nest of moss with a side entrance. This description was slightly improved upon by Zyskowski & Prum (1999), who correctly noted that the entrance was a downward-facing tunnel, providing the same generalized description for *C. antisiensis* and, technically, providing the first nest description for the latter species. The first detailed, quantified description of the nest of *C. antisiensis* (nominate *antisiensis*) should be credited to Cisneros-Heredia (2006). This last description, however, might be called into question, given that the location where the data were collected (Mashpi Protected Forest) is outside the species' recognized range (Dickinson & Christidis 2014); Red-faced Spinetail *C. erythrops* is common at this locality. The following observations supplement this description and provide the first egg description for *C. antisiensis*. On 17 March 2005, at Yunguilla, we discovered a nest of nominate *C. a. antisiensis* containing two immaculate white eggs: 21.4 × 16.4 mm, 2.96 g, slight development; 21.2 × 16.3 mm, 2.86 g, addled. The nest was a bulky, teardrop-shaped nest of grasses, leaf strips, rootlets, and moss, hanging from tip of a low branch 2.4 m above the ground. The inner chamber was located within the bottom half of the structure, and was entered through short, downward-facing, tubular entrance. The internal chamber was lined with grass blades and leaf strips, while its lower portion (egg cup) was lined with fine grasses and lichens. Externally, the nest was 49 cm long (tall) and, at its widest point, was 33 cm wide. The entrance tunnel was 4 cm in diameter and 7.5 cm long, opening into a chamber 12 cm wide by 10 cm tall. Subsequently, at the same location, we examined a second nest, similar in form and composition to the first, attached at the end of a drooping branch, 4.5 m above the ground in a 15 m-tall tree. Its measurements were: external length 51 cm; maximum external width 35 cm; entrance diameter 4.5 cm; entrance tunnel length 9.5 cm; internal diameter 11 cm; internal height 10.5 cm. On 12 March 2009 this nest contained two immaculate white eggs, both measuring 21.0 × 16.0 mm. In addition to these two closely examined nests, we found an active nest on 23 February 2000, at Celica, that was *c*. 3–4 m above the ground and *c*. 60 cm long × 40 cm wide externally. On 11 April 2006, at Utuana we observed an adult singing while carrying insects through the canopy. The adult dropped down and returned without food, repeating the process in same place a few minutes later. We were unable to locate a nest in the foliage visited by the adult, and we suggest it was feeding a stationary fledgling hidden amongst the leaves. Finally, on 12 February 2007, along the Yangana-Tapichalaca road, we observed a pair of adults scolding an Emerald Toucanet *Aulacorhynchus prasinus* that was consuming the contents of their nest through a large hole torn in the side. We were unable to determine if *A. prasinus* consumed nestlings or eggs. As an additional record of *C. antisiensis* breeding in Ecuador, on 18 October 2016 Paúl Molina (IBC-1281660; hbw.com/ibc/1281660) videotaped a pair of adults at an active nest near Cuenca, Azuay. The behaviour of the adults suggests they were feeding nestlings.

Long-tailed Mockingbird *Mimus longicaudatus*

The nesting of this conspicuous member of western South America's arid coastal regions is fairly well documented (Taczanowski, 1884; Marchant, 1960a; Knowlton, 2010). On 7 March 2014, at Km 1046 on the Macará-Loja road, we examined a nest built 2.4 m up in a well-protected location amongst the branches of a spiny *Acacia* tree. The nest was a deep open bowl, loosely woven of long sticks externally (some spiny), and lined internally with light brown, think, flexible leaf petioles and mammal hairs. It measured: internal diameter 10 cm, internal depth 7.5 cm, external diameter *c*. 28, external height 19 cm. The nest contained two light blue eggs marked with spots and blotches of lavender and various shades of brown: 29.7 × 20.2 mm, 6.23 g, addled; 29.8 × 20.0 mm, 6.26g, *c*. 1/3 developed. Additional data in Table 2.

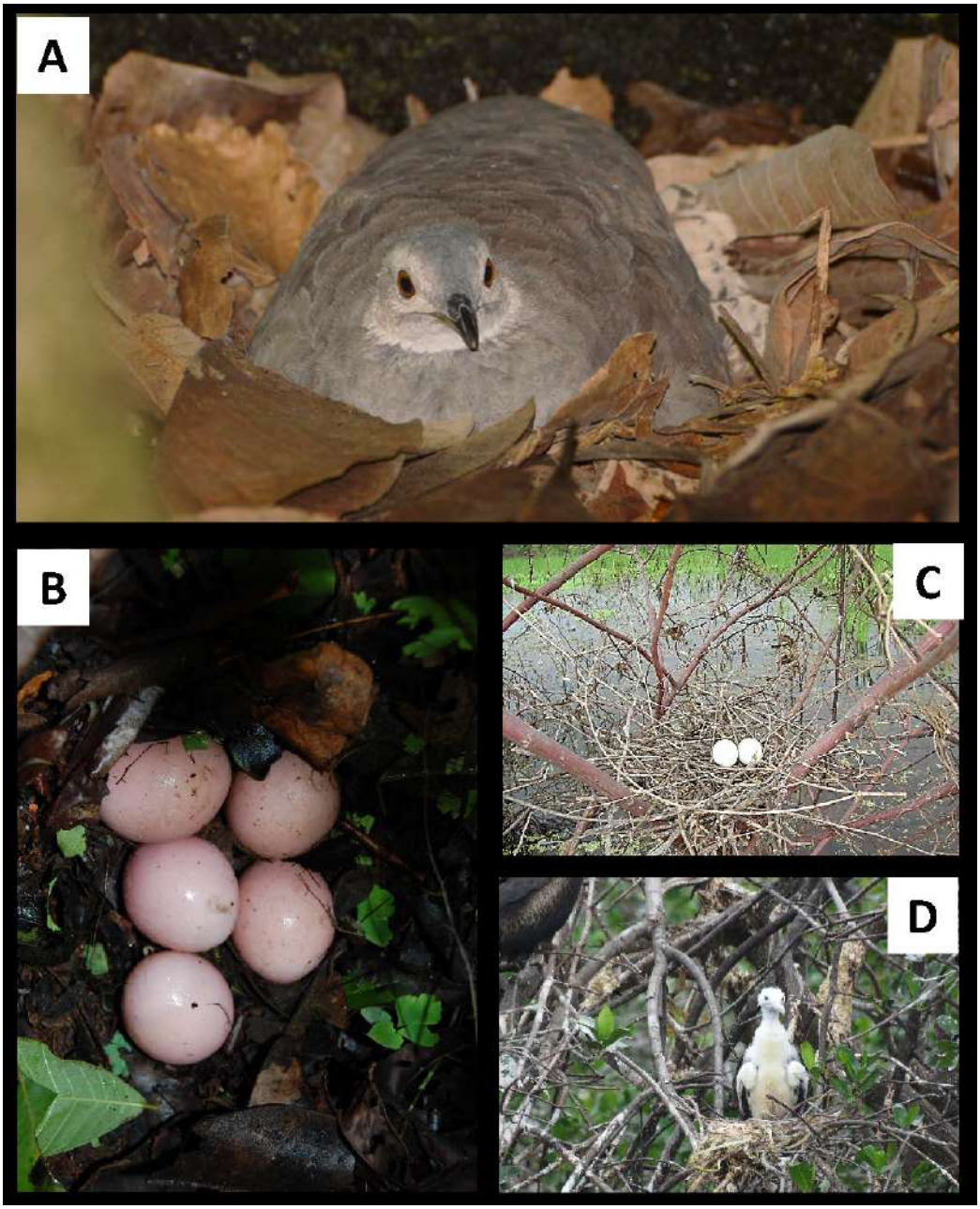

Figure 1: Nesting biology of birds of the Tumbesian Bioregion of Ecuador and Peru. For location details see Table 1. A) Adult Pale-browed Tinamou *Crypturellus transfasciatus* incubating four eggs, 25 March 2014, Jorupe (LASM); B) complete clutch of Pale-browed Tinamou, 14 February 2010, Jorupe (HFG); C) nest and eggs of Striated Heron *Butorides striata* 27 February 2006, east of Guayaquil (HFG); D) nestling of Magnificent Frigatebird *Fregata magnificens,* 26 January 2016, Manglares de Tumbes (FAP).

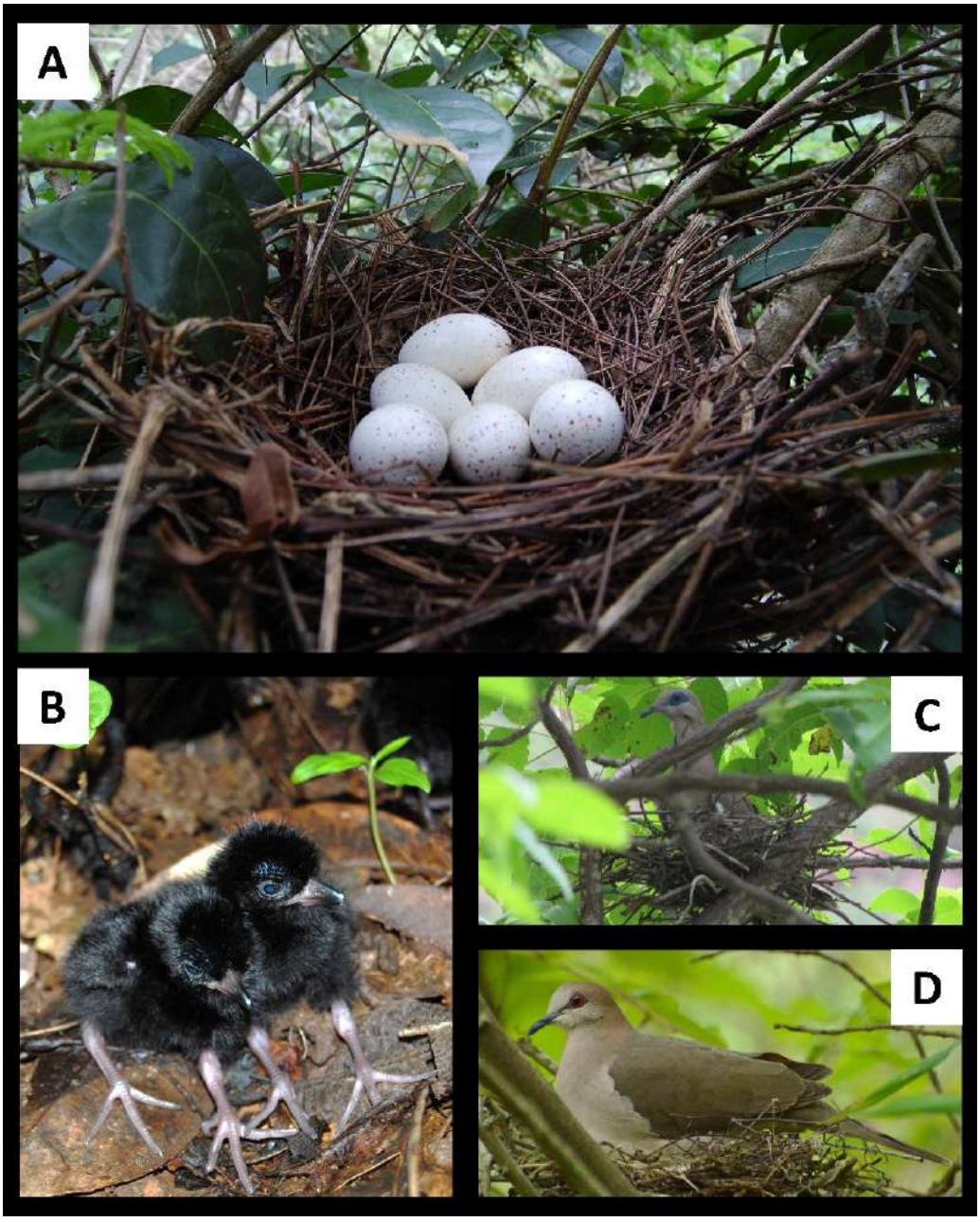

Figure 2: Nesting biology of birds of the Tumbesian Bioregion of Ecuador and Peru. For location details see Table 1. A) complete clutch of Rufous-necked Wood-Rail *Aramides axillaris*, 19 February 2010, Jorupe (HFG); B) newly hatched young of *A. axillaris*, 20 February 2010, Jorupe (HFG); C) adult West Peruvian Dove *Zenaida meloda* on its nest, 25 March 2009, Cerro Huacrupe (FAP); D) adult White-tipped Dove *Leptotila verreauxi* on its nest, 4 April 2014, Jorupe (LASM).

CONCLUDING REMARKS

The national systems of protected areas in both Peru and Ecuador offer protection to an important number of ecosystems and species within their respective countries (Fajardo *et al*., 2014; Espinosa *et al*., 2016; Ordóñez-Delgado *et al*., 2016; Cuesta *et al*., 2017; Escribano-Ávila *et al*., 2017). Nevertheless, the high level of endemism in the Tumbesian region and the severe pressure facing its natural habitats combine to make its avifauna one of the most threatened in South America (BirdLife International, 2019) and one of the least protected ecosystems in Ecuador and Peru (Fajardo *et al*., 2014; Lessmann *et al*., 2014; Cuesta *et al*., 2017). While a fair number of publications, mostly locality-based, have focused on distribution and conservation of the Tumbesian avifauna (Wiedenfeld *et al*., 1985; Robbins & Ridgely, 1990; Krabbe, 1992; Berg, 1994; Walker, 2002; Álava *et al*., 2007; Bonaccorso *et al*., 2007), and although the records presented here represent a significant addition to our knowledge of the reproductive biology of birds in the Tumbesian biome, the basic natural history of only a small

percentage of its avifauna could be considered well-studied, and further research is urgently needed (Freile & Santander, 2005; Freile *et al.,* 2006; Freile & Rodas, 2008).

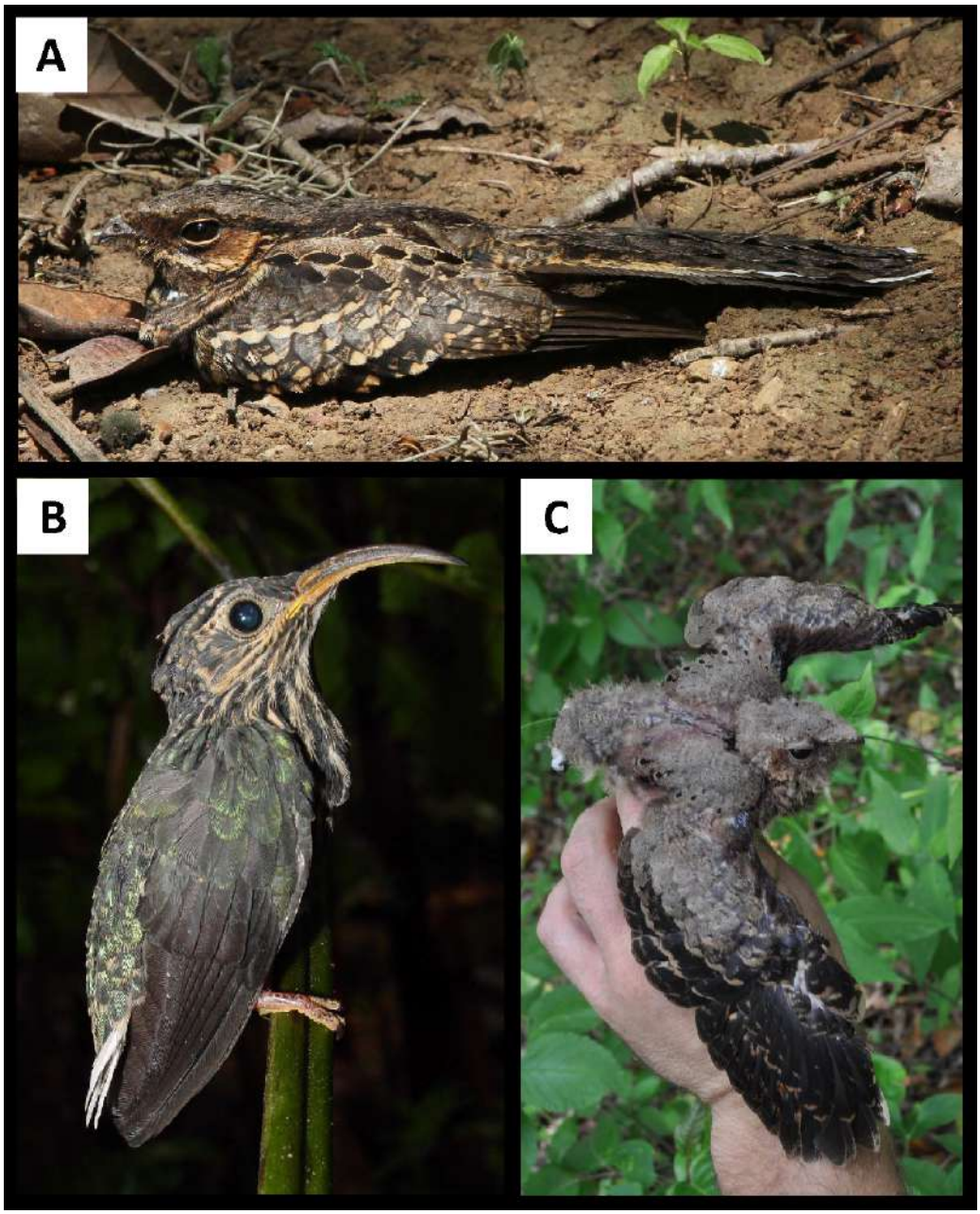

Figure 3: Nesting biology of birds of the Tumbesian Bioregion of Ecuador and Peru. For location details see Table 1. A) Adult Common Pauraque *Nyctidromus albicollis* incubating, 26 February 2014, Jorupe (HFG); B) fledgling White-tipped Sicklebill *Eutoxeres aquila*, 20 March 2004, Buenaventura (HFG); C) older nestling of *N. albicollis*, 18 January 2011, Cerro Blanco (HFG).

It comes as little surprise that our data support the previously recognized seasonality of reproductive activity in this seasonally arid region of South America (Marchant, 1959; Best *et al*..1993, 1996; Knowlton, 2010; Mischler, 2012; Barrionuevo-García & Montes-Torres, 2015), with most records derived from the rainy season (January–March). Climatic conditions in the Tumbesian biome, however, vary from year to year, especially in relation to the El Niño Southern Oscillation, with additional local climatic variation due to the region's topography and heterogeneous habitat mosaic (Munday & Munday, 1992; Best & Kessler, 1995). Thus, as has been pointed out by previous authors (Robbins *et al*., 1994; Best *et al*., 1996; Freile *et al*., 2003), we should consider our understanding of avian reproductive seasonality in the region as highly preliminary. Its true nature, and how it varies across species, and through space and time, should be a research priority for future studies.

The accumulation, dissemination, and analysis of quantitative natural history information, including reproductive seasonality, habitat use, and behavior, is critical to the formation and testing of sound hypotheses of ecological, evolutionary, taxonomic, and conservation significance (Morton, 1971; Ricklefs, 1977; Greene, 1994; Martin, 1996; Dayton, 2003; Greeney *et al*., 2008). It has not escaped our notice that similar such statements appear so frequently in the literature that the sentiment has taken on a mantra-like quality. Nevertheless, along with the authors of numerous papers lamenting the current academic devaluation of natural history research and the publication of descriptive results (Noss, 1996; Futuyma, 1998; Arnold, 2003; Dayton, 2003; Greene, 2005) we feel compelled to end with a similar message. We encourage others to gather and publish similar data to those presented here, for all regions of the world, but especially for the understudied and highly threatened Tumbesian biome.

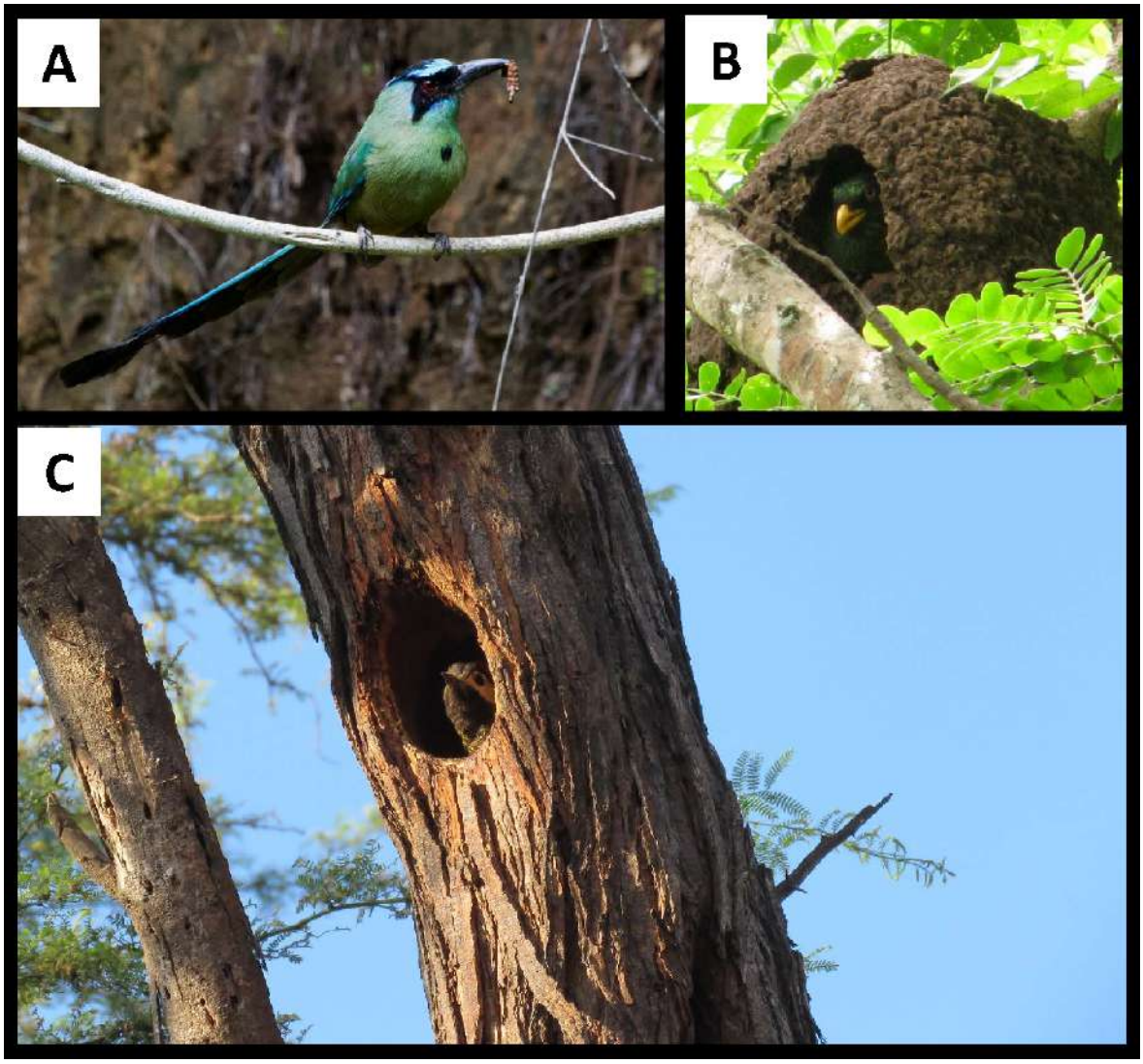

Figure 4: Nesting biology of birds of the Tumbesian Bioregion of Ecuador and Peru. For location details see Table 1. A) Adult Whooping Motmot *Momotus subrufescens* carrying food towards its nest, 7 March 2014, Jorupe (HFG); adult male Ecuadorian Trogon *Trogon mesurus* peering from its active nest, 6 March 2014, Jorupe (HFG); adult Golden-olive Woodpecker *Colaptes rubiginosus* peering from its nest cavity, 2 January 2016, Bosque de Pomac (FAP).

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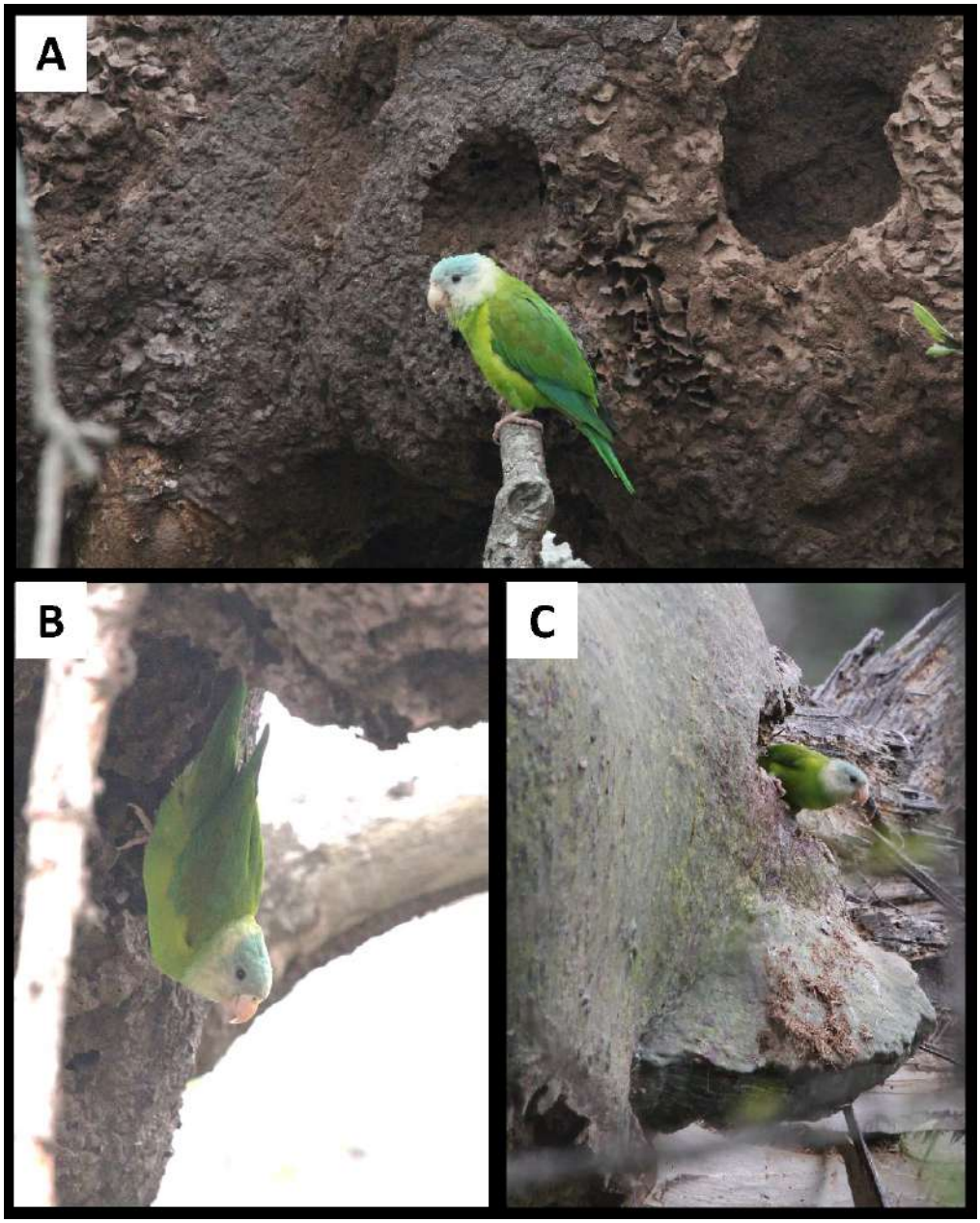

Figure 5: Nesting biology of birds of the Tumbesian Bioregion of Ecuador and Peru. For location details see Table 1. Adult Gray-cheeked Parakeets *Brotogeris pyrrhoptera* perched outside active nests at Jorupe. A) 28 February 2014; B-C) 27 February 2014 (HFG)

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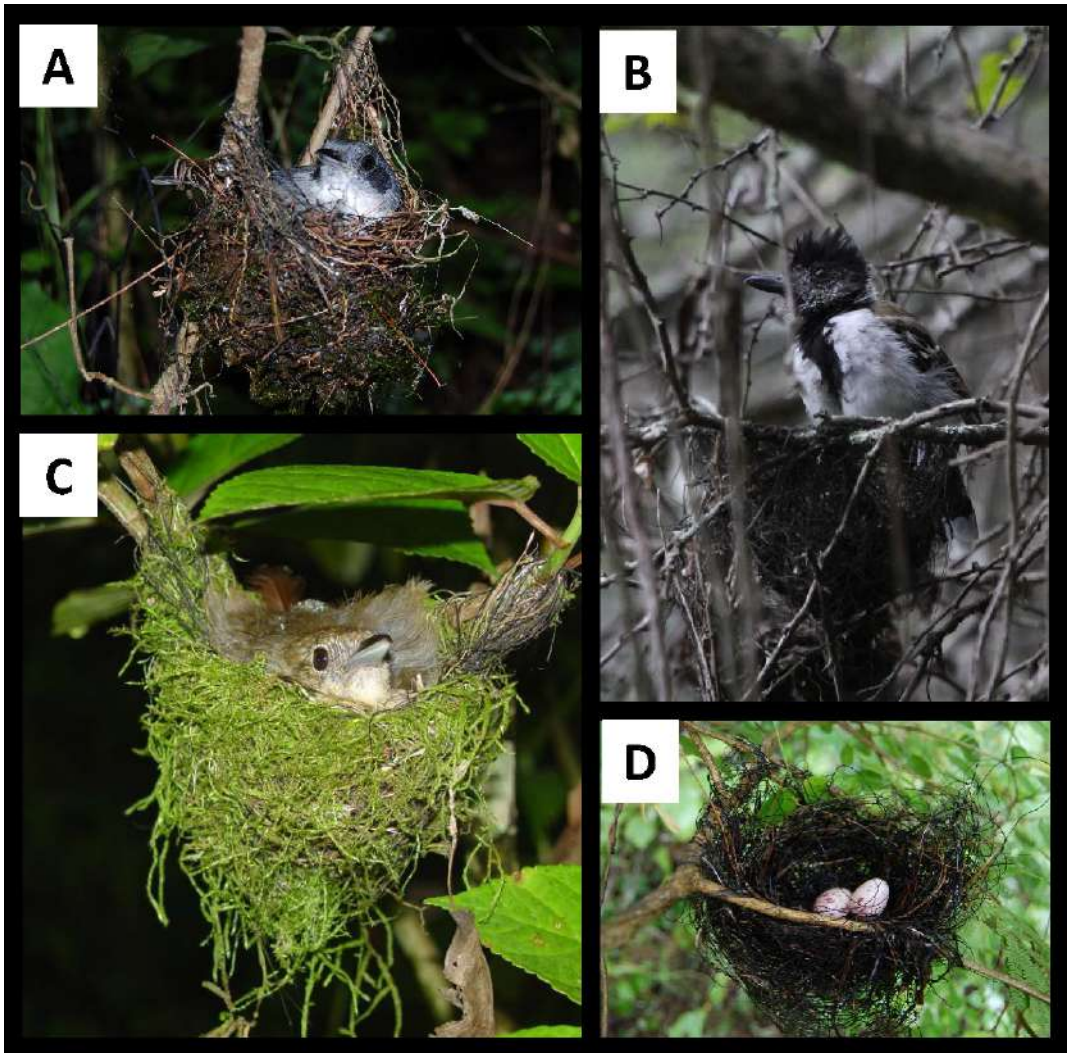

Figure 6: Nesting biology of birds of the Tumbesian Bioregion of Ecuador and Peru. For location details see Table 1. A) Adult male Plain Antvireo *Dysithamnus mentalis* incubating, 21 February 2010, Jorupe (HFG); B) adult male Collared Antshrike *Thamnophilus bernardi* perched on the rim of its nest, 2 March 2014, Jorupe (HFG); C) adult female Black-crowned Antshrike *Thamnophilus atrinucha*, 11 February 2004, Buenaventura (HFG); D) *T. bernardi* nest with complete clutch, 22 February 2010, Jorupe (HFG).

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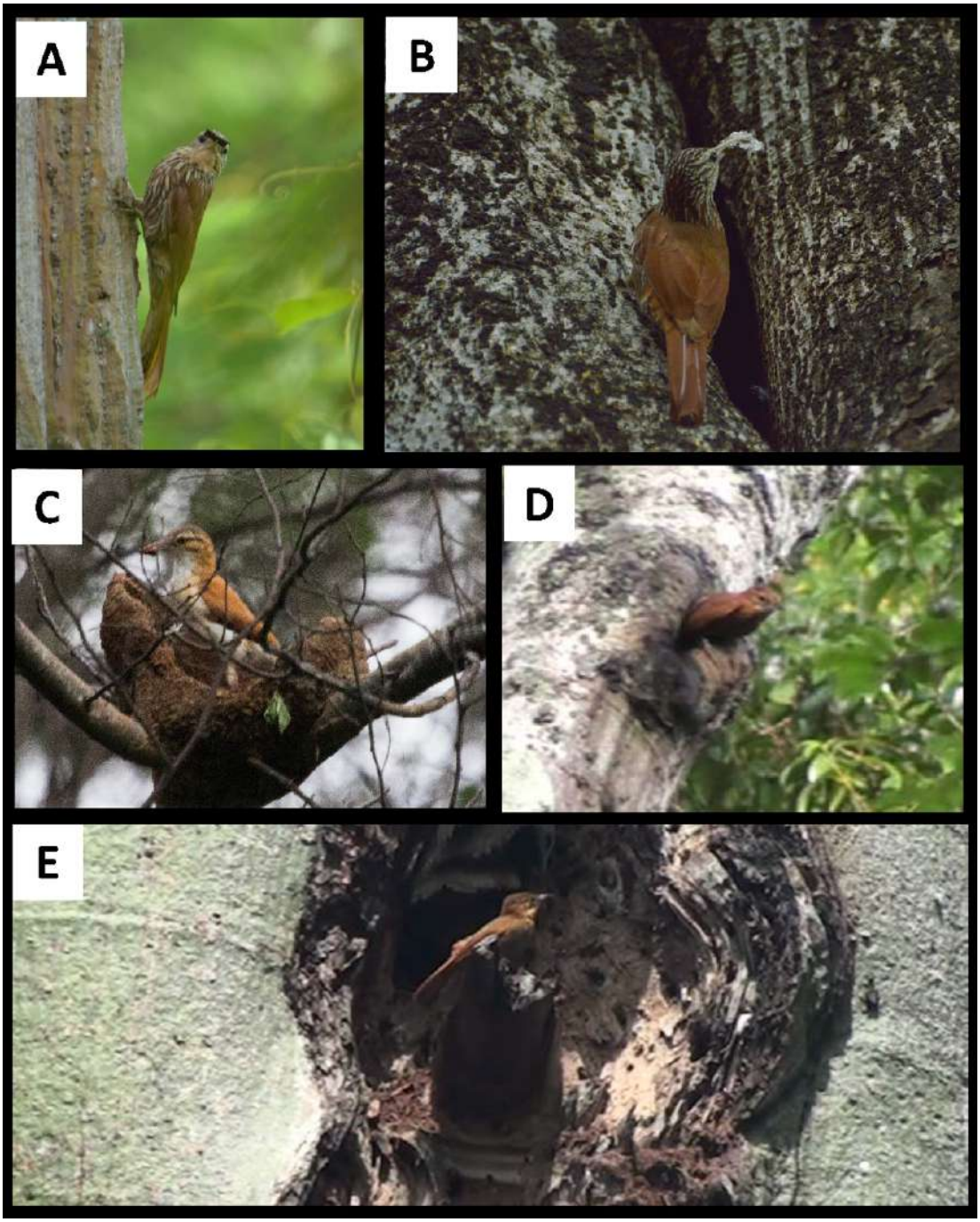

Figure 7: Nesting biology of birds of the Tumbesian Bioregion of Ecuador and Peru. For location details see Table 1. A-B) adult Streak-headed Woodcreepers *Lepidocolaptes souleyetii* carrying bark chips to their nests at Jorupe on 2 April 2014 and 26 March 2014 (LASM); C) adult Pale-legged Hornero *Furnarius leucopus* building its nest, 6 March 2014, Jorupe (HFG); D-E) adult Rufous-necked Foliage-gleaners *Syndactyla ruficollis* near their nest entrances at Jorupe, 5 March and 21 February 2010 (HFG).

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Figure 8: Nesting biology of birds of the Tumbesian Bioregion of Ecuador and Peru. For location details see Table 1. A) Adult Henna-hooded Foliage-gleaner *Clibanornis erythrocephalus* carrying a spider for its nestlings, 7 March 2014, Jorupe (HFG).

Figure 9: Nesting biology of birds of the Tumbesian Bioregion of Ecuador and Peru. For location details see Table 1. A) Adult Blackish-headed Spinetail *Synallaxis tithys* perched atop its nest, 1 March 2014, Jorupe (HFG); B) Nest of Necklaced Spinetail *Synallaxis stictothorax*, 24 March 2009, Abra de Huacrupe (FAP).

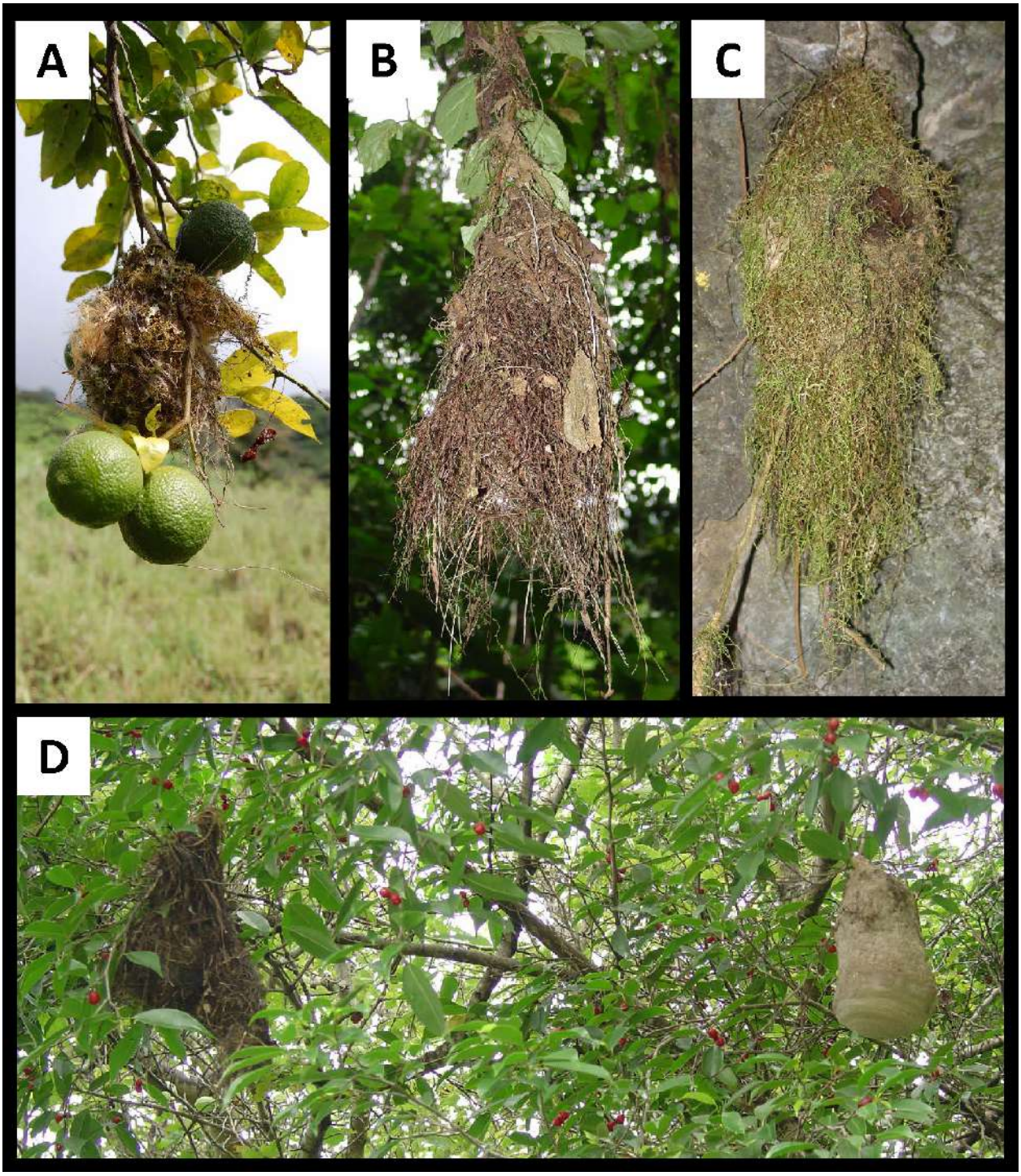

Figure 10: Nesting biology of birds of the Tumbesian Bioregion of Ecuador and Peru. For location details see Table 1. A) Nest of Southern Beardless-Tyrannulet *Camptostoma obsoletum*, 17 February 2010, Jorupe (HFG); B) Nest of Sulphur-rumped Flycatcher *Myiobius barbatus*, 31 January 2004, Buenaventura (HFG); C) Nest of Ochre-bellied Flycatcher *Mionectes oleagineus*, 31 January 2004, Buenaventura (HFG); D) Nest of Yellow-olive Flycatcher *Tolmomyias sulphurescens* near an active wasp (Vespidae) nest, 24 February 2006, Jorupe (HFG).

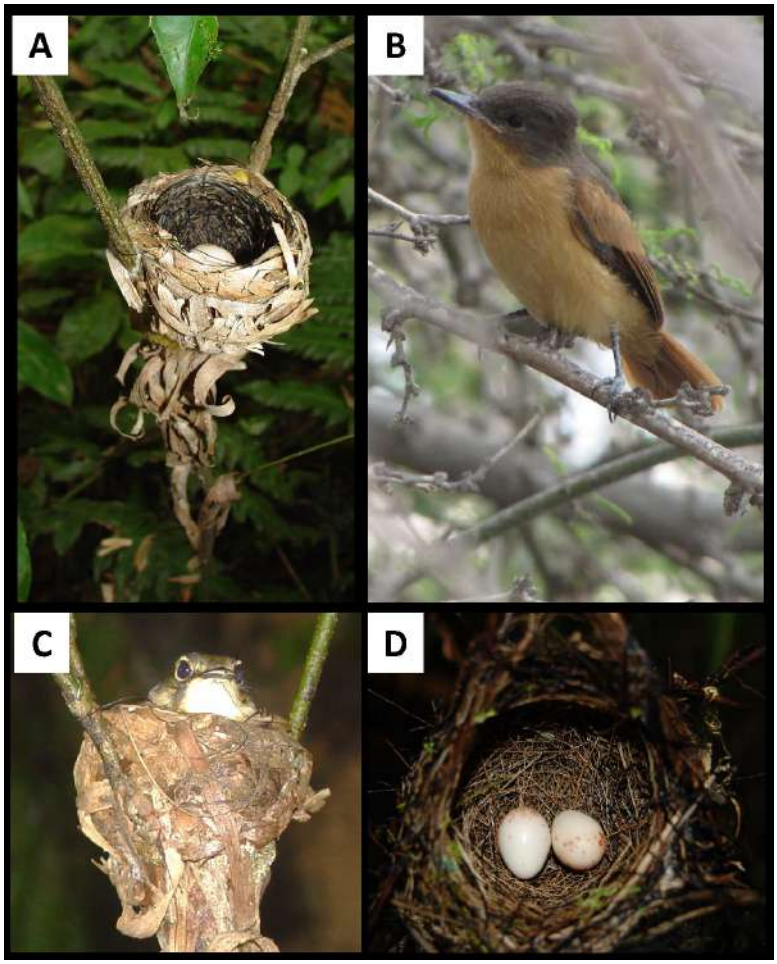

Figure 11: Nesting biology of birds of the Tumbesian Bioregion of Ecuador and Peru. For location details see Table 1. A) Nest and single-egg clutch of White-throated Spadebill *Platyrinchus mystaceus*, 1 February 2004, Buenaventura (HFG); B) Fledgling Rufous Flycatcher *Myiarchus semirufus*, 26 February 2009, Estuario de Virrila (FAP); C) Adult *P. mystaceus* on its nest, 12 February 2004, Buenaventura (HFG); D) Nest and complete clutch of Bran-colored Flycatcher *Myiophobus fasciatus*, 16 February 2010, Jorupe (HFG).

Figure 12: Nesting biology of birds of the Tumbesian Bioregion of Ecuador and Peru. For location details see Table 1. A) Nest and complete clutch of White-bearded Manakin *Manacus manacus*, 30 January 2004, Buenaventura (HFG); B) Adult female Club-winged Manakin *Machaeopterus deliciosus* on its nest, 6 February 2004, Buenaventura (HFG); C) Nest and complete clutch of *M. deliciosus*, 10 February 2004, Buenaventura (HFG).

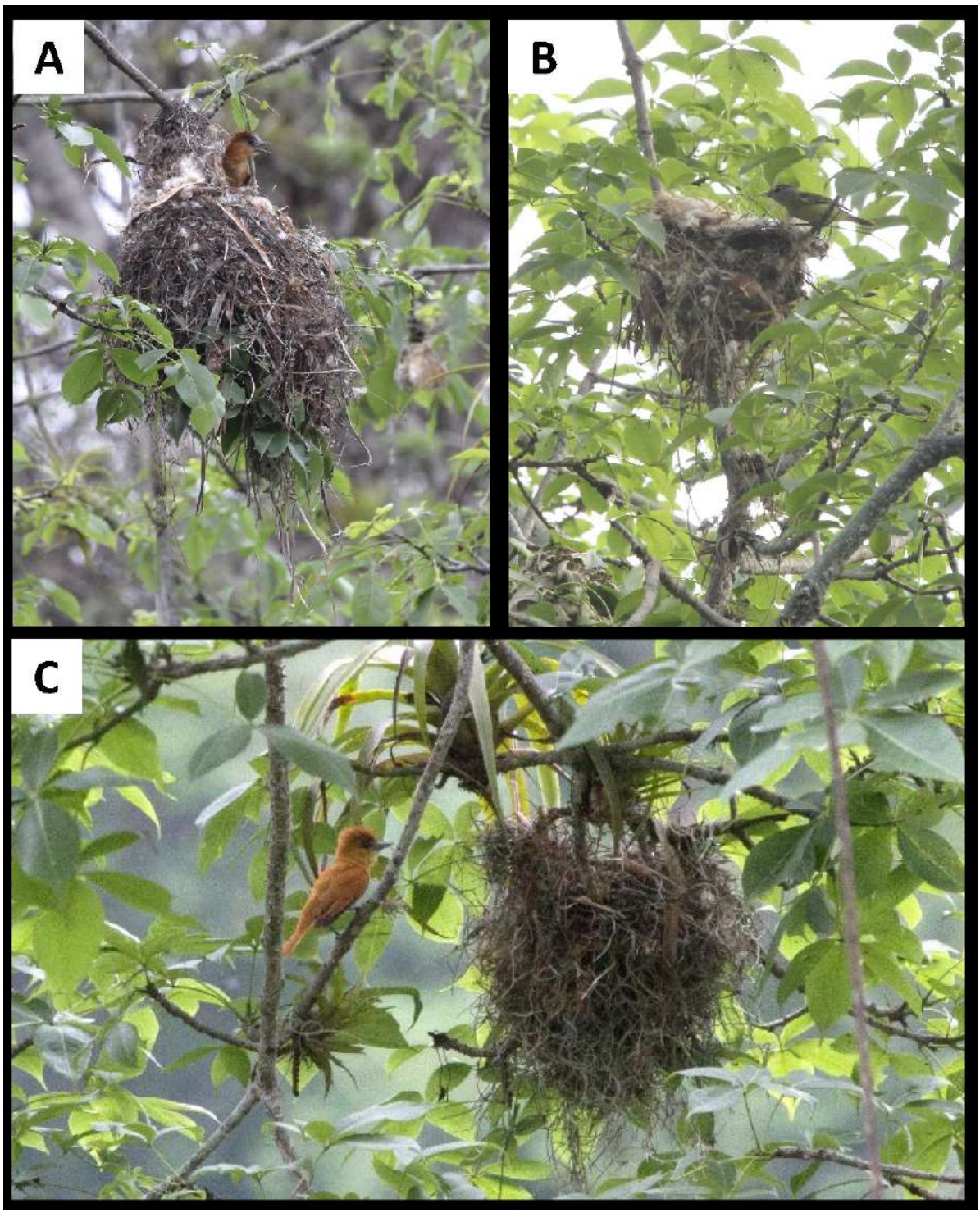

Figure 13: Nesting biology of birds of the Tumbesian Bioregion of Ecuador and Peru. For location details see Table 1. A) Adult female One-colored Becard *Pachyramphus homochrous* at nest, 26 February 2010, Jorupe; B) Adult female Black-and-white Becard *Pachyramphus albogriseus* at its nest, 7 March 2014, Jorupe; C) Adult female Slaty Becard *Pachyramphus spodiurus* at its nest, 25 February 2014 (HFG).

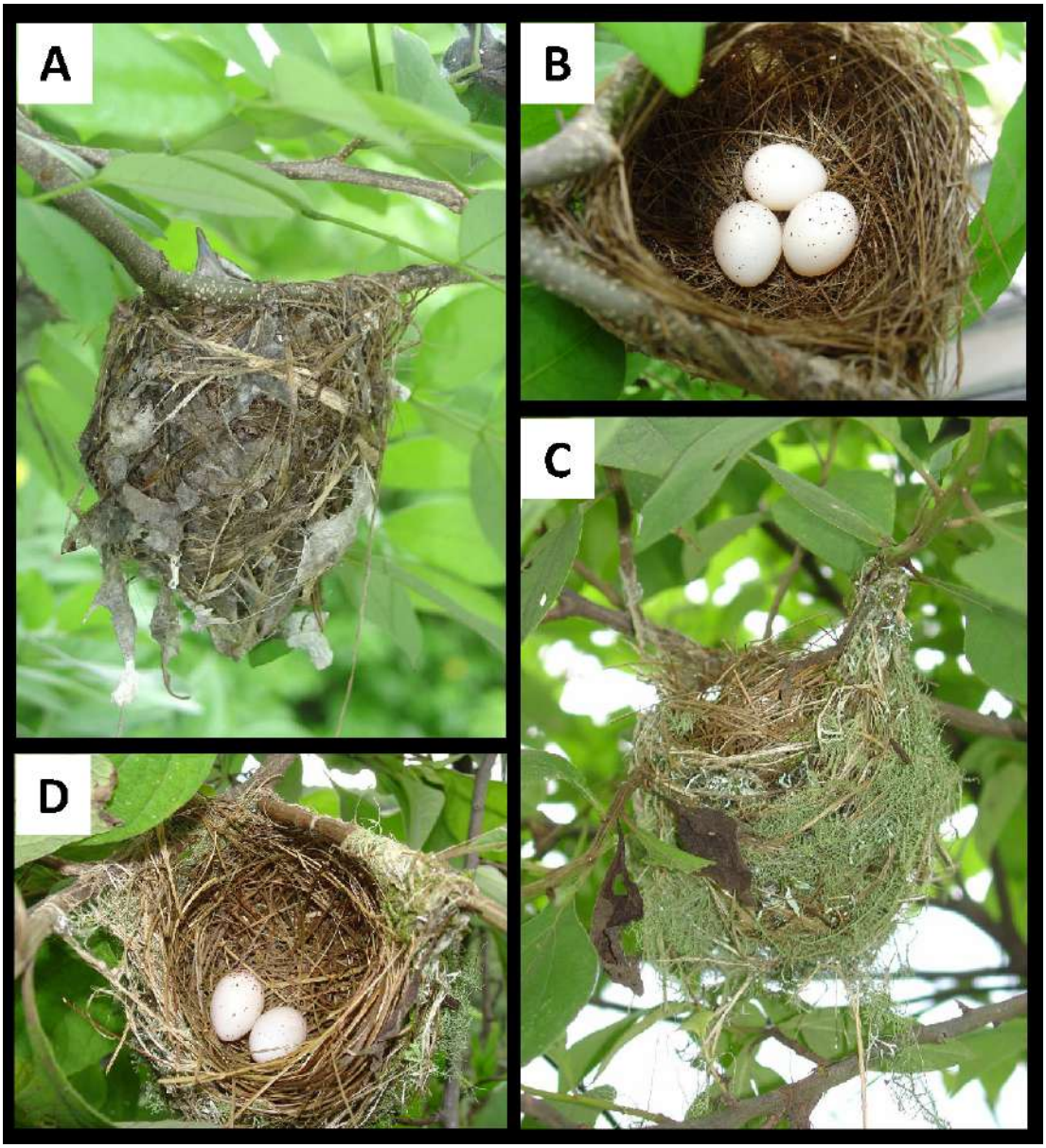

Figure 14: Nesting biology of birds of the Tumbesian Bioregion of Ecuador and Peru. For location details see Table 1. A-B) Nest and complete clutch of Red-eyed Vireo *Vireo olivaceus*, 26 February 2006, Cerro Blanco (HFG); C-D) Nest, with two fresh eggs, of Rufous-browed Peppershrike *Cyclarhis gujanensis*, 15 March 2005, Yunguilla (HFG).

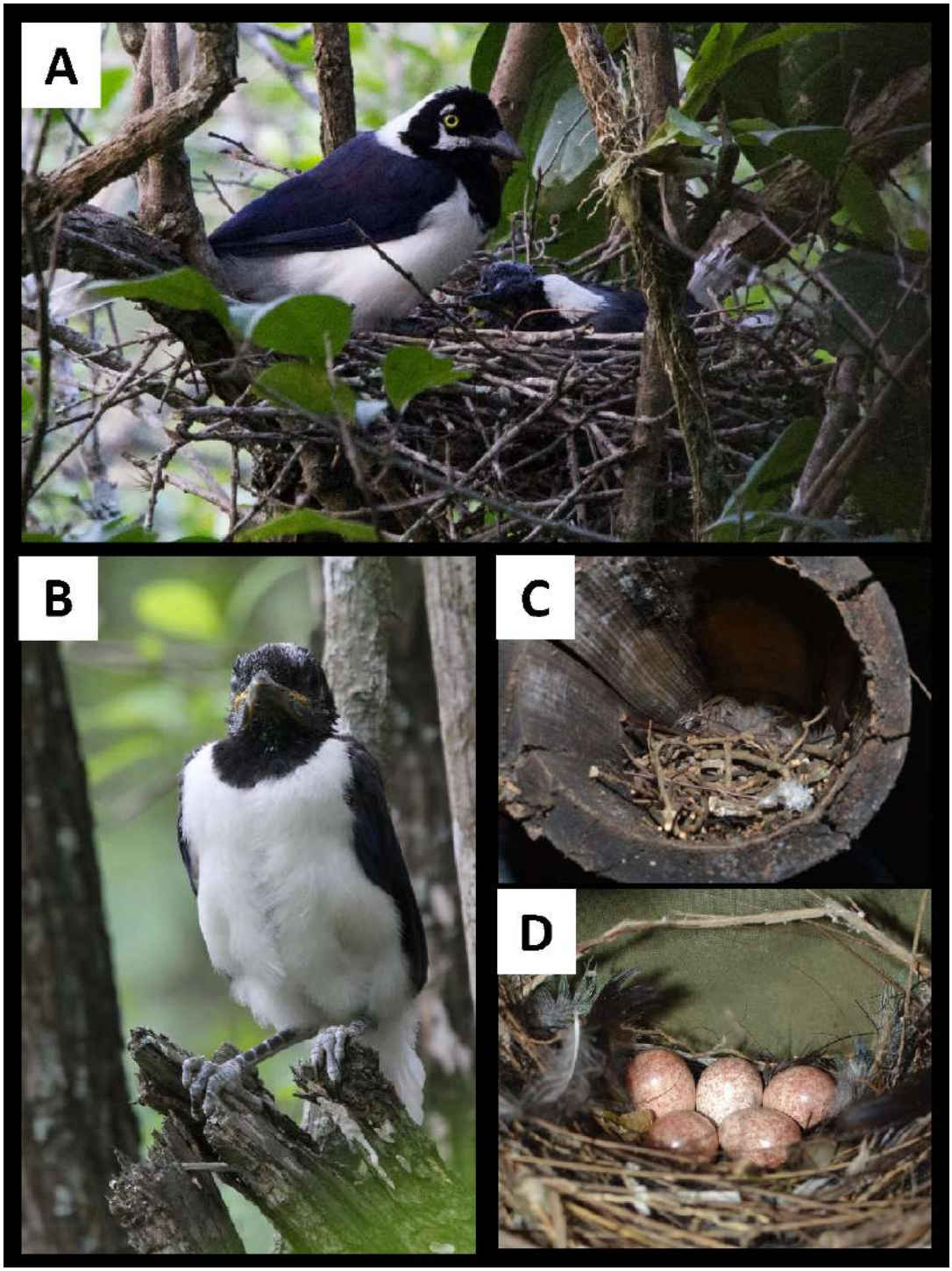

Figure 15: Nesting biology of birds of the Tumbesian Bioregion of Ecuador and Peru. For location details see Table 1. A) Adult White-tailed Jay *Cyanocorax mystacalis* attending older nestlings, 7 March 2014, Jorupe (HFG); B) Fledgling *C. mystacalis*, 7 March 2014, Jorupe (HFG); C) Nest of House Wren *Troglodytes aedon*, 28 March 2014, Jorupe (LASM); D) Nest and complete clutch of *T. aedon*, 11 February 2004, Buenaventura (HFG).

Figure 16: Nesting biology of birds of the Tumbesian Bioregion of Ecuador and Peru. For location details see Table 1. A) Nest of Bay Wren *Cantorchilus nigricapillus*, 24 February 2004, Buenaventura (HFG); B) Adult Fasciated Wren *Campylorhynchus fasciatus* outside its nest, 10 June 2009, Chignia Alta (FAP); C) Nest of *Campylorhynchus fasciatus*, 27 March 2014, Jorupe (LASM).

Figure 17: Nesting biology of birds of the Tumbesian Bioregion of Ecuador and Peru. For location details see Table 1. A) Adult Speckle-breasted Wren *Pheugopedius sclateri* just beginning nest construction, 2 March 2014, Jorupe (HFG); B) Tropical Gnatcatcher *Polioptila plumbea* attending nest with young nestlings, 25 March 2009, Abra de Huacrupe (FAP).

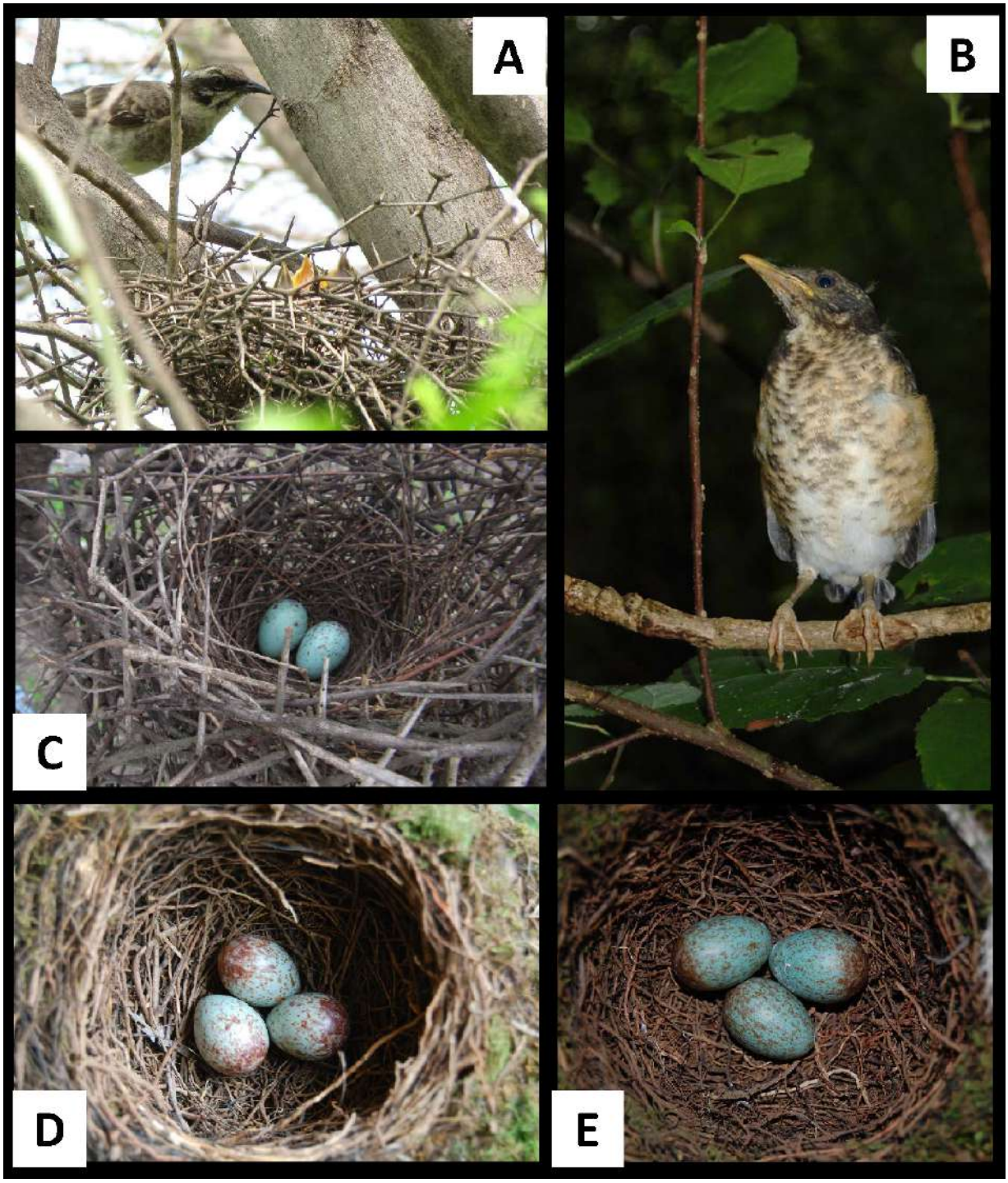

Figure 18: Nesting biology of birds of the Tumbesian Bioregion of Ecuador and Peru. For location details see Table 1. A) Adult Long-tailed Mockingbird *Mimus longicaudatus* feeding nestlings, 25 March 2009, Abra de Huacrupe (FAP); B) Recently fledged young of Plumbeous-backed Thrush *Turdus reevei*, 21 February 2010, Jorupe (HFG); C) Nest and complete clutch of *M. longicaudatus*, 7 March 2014, Macará-Loja road (HFG); D) Complete clutch of *T. reevei*, 11 February 2010, Jorupe (HFG); E) Complete clutch of Ecuadorian Thrush *Turdus maculirostris*, 11 February 2010, Jorupe (HFG).

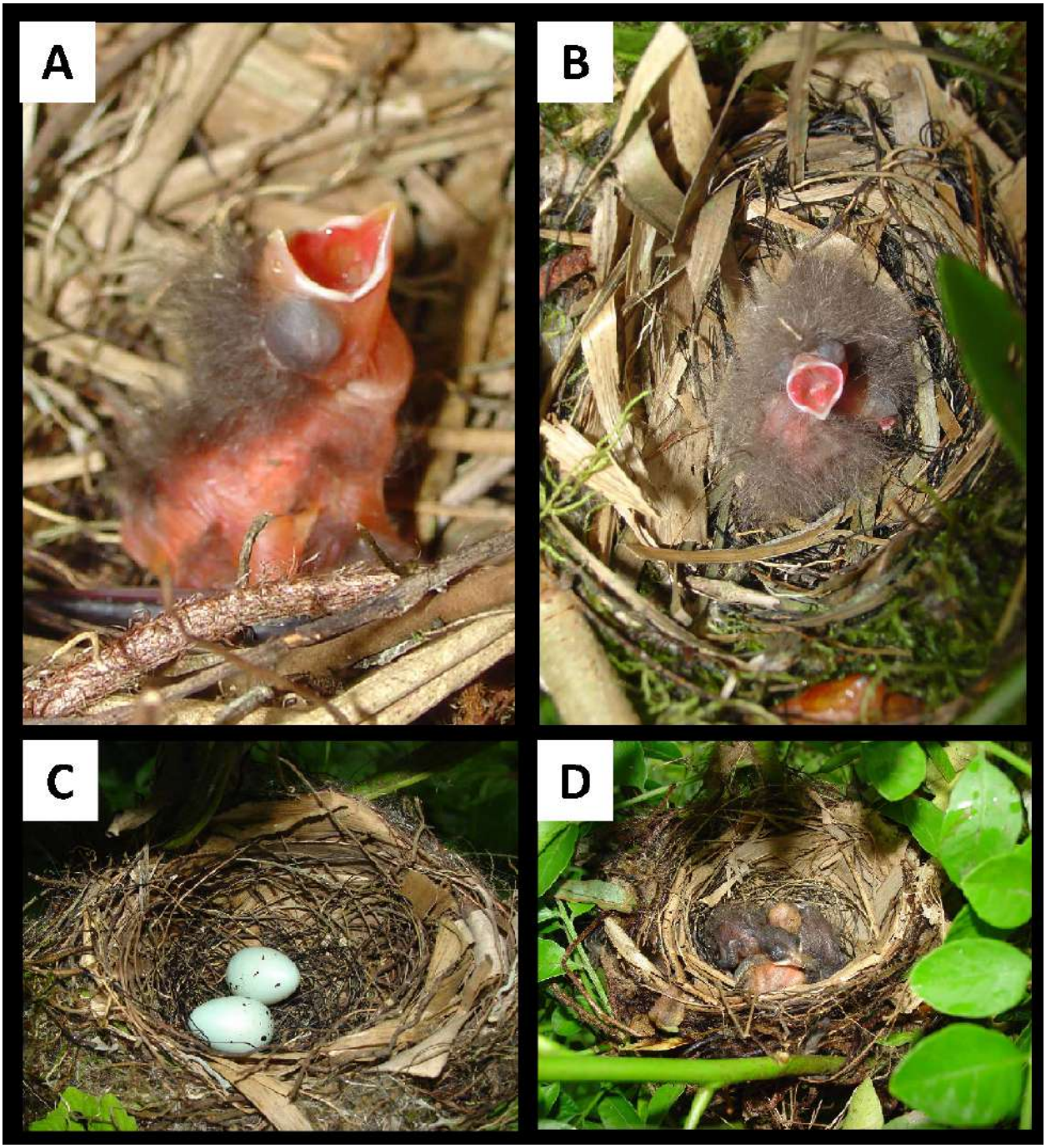

Figure 19: Nesting biology of birds of the Tumbesian Bioregion of Ecuador and Peru. For location details see Table 1. A) Newly hatched young of Palm Tanager *Thraupis palmarum*, 11 February 2004, Buenaventura (HFG); B) Nest and two newly-hatched young of Blue-gray Tanager *Thraupis episcopus*, 7 February 2004, Buenaventura (HFG); C) Nest and complete clutch of Flame-rumped Tanager *Ramphocelus flammigerus*, 15 February 2004, Buenaventura (HFG); D) Nest of *R. flammigerus* containing two young tanager nestlings and one of Shiny Cowbird *Molothrus bonariensis*, 15 February 2004, Buenaventura (HFG).

Figure 20: Nesting biology of birds of the Tumbesian Bioregion of Ecuador and Peru. For location details see Table 1. A) Newly hatched nestling and unhatched egg of Yellow-bellied Seedeater *Sporophila nigricollis*, 23 March 2004, Buenaventura (HFG); B) Newly hatched nestlings and unhatched egg of Thick-billed Seed-Finch *Sporophila funerea*, 3 February 2004, Buenaventura (HFG); C) Nest and complete clutch of Variable Seedeater *Sporophila corvina*, 11 February 2004, Buenaventura (HFG).

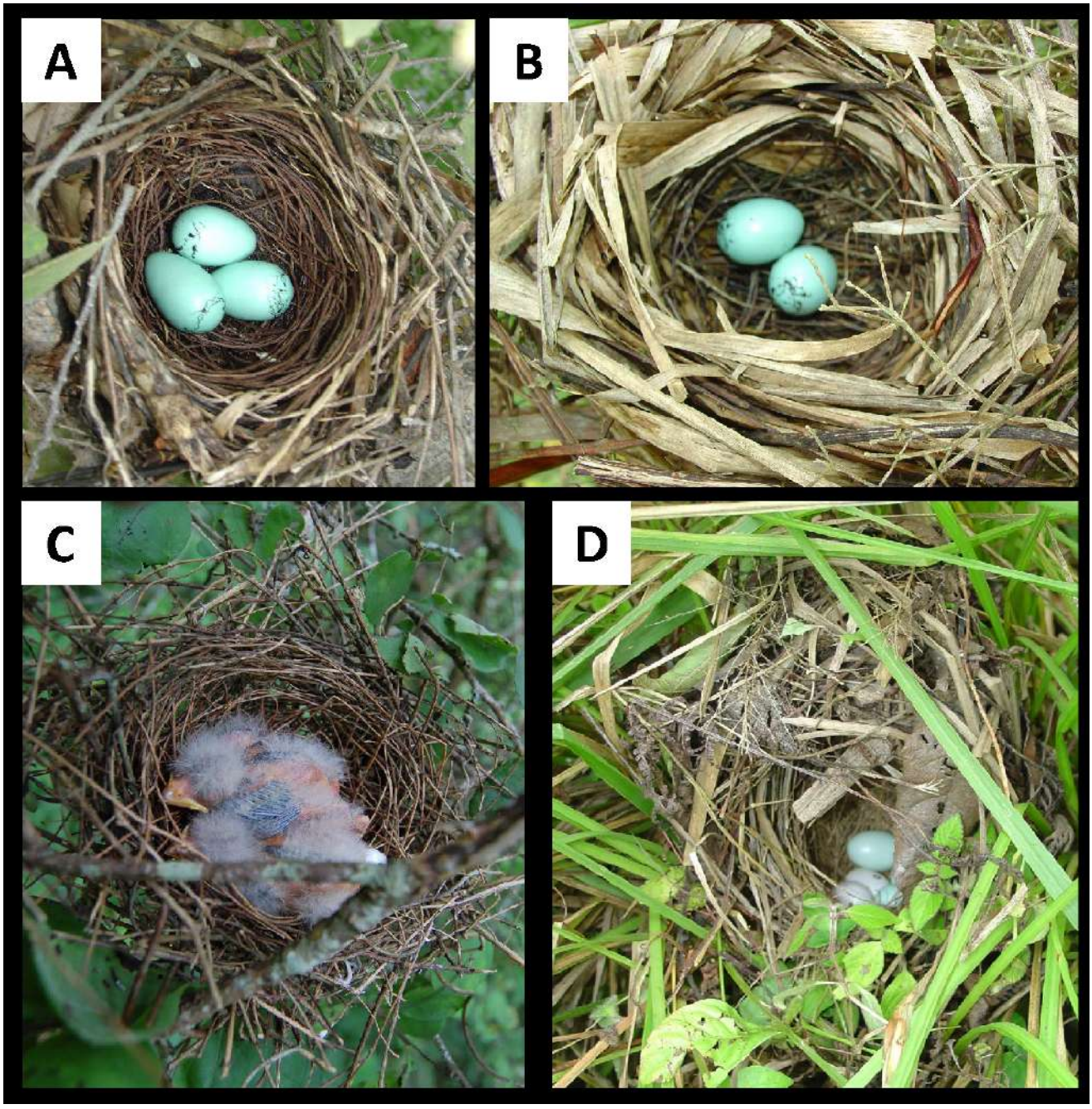

Figure 21: Nesting biology of birds of the Tumbesian Bioregion of Ecuador and Peru. For location details see Table 1. A) Nest and complete clutch of Streaked Saltator *Saltator striatipectus*, 25 February 2006, Cerro Blanco (HFG); B) Nest and complete clutch of Buff-throated Saltator *Saltator maximus*, 7 February 2004, Buenaventura (HFG); C) Nest with two young nestlings of Golden Grosbeak *Pheucticus chrysogaster*, 18 February 2010, Jorupe (HFG); D) Nest of Black-striped Sparrow *Arremonops conirostris* containing four sparrow eggs and two eggs of Shiny Cowbird *Molothrus bonariensis*, 11 February 2004, Buenaventura (HFG).

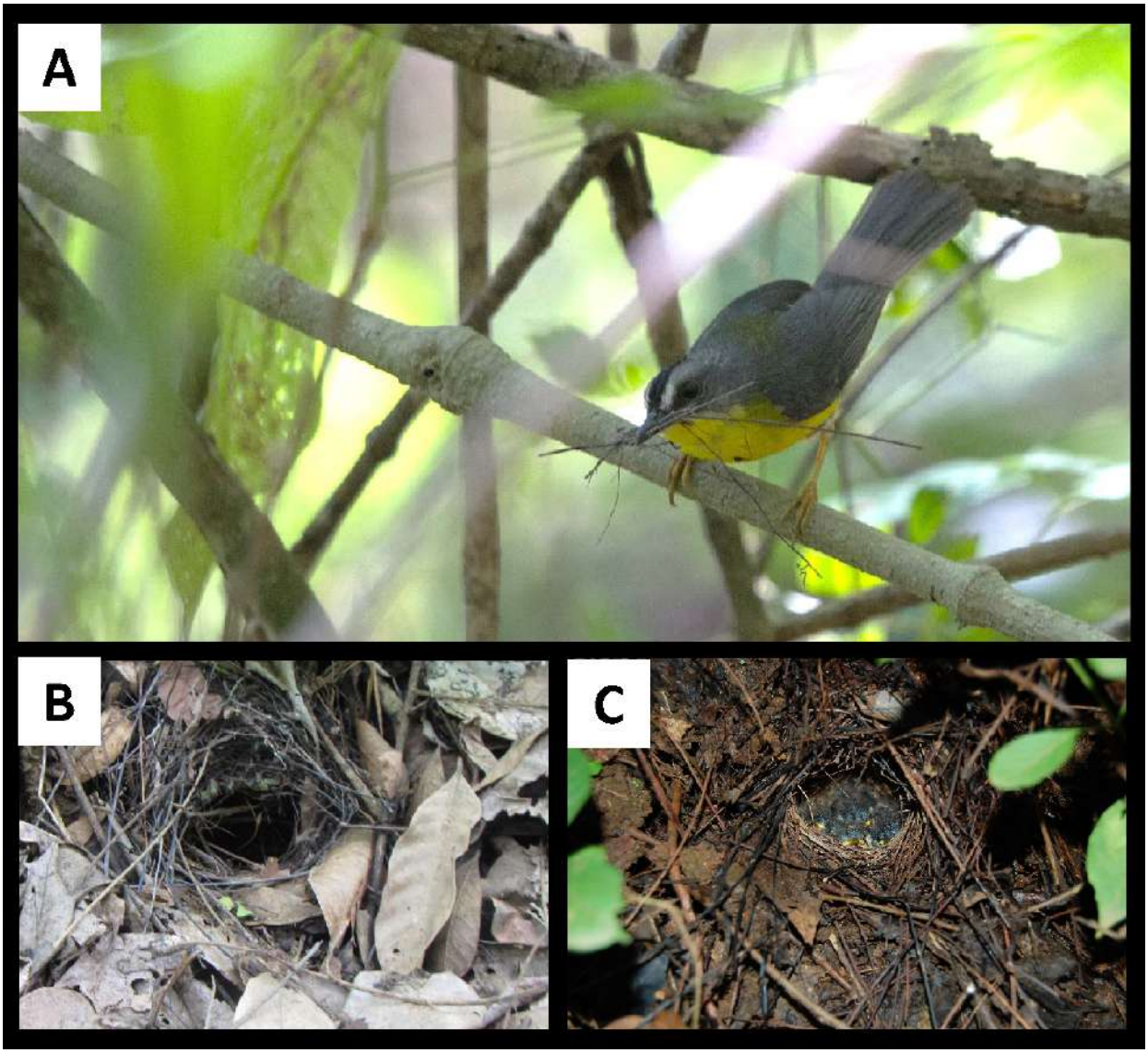

Figure 22: Nesting biology of birds of the Tumbesian Bioregion of Ecuador and Peru. For location details see Table 1. A-B) Adult Gray-and-gold Warbler *Myiothlypis fraseri* carrying nesting material to nearly completed nest, 6 March 2014, Jorupe (HFG); Nest of *M. fraseri* with four mid-aged nestlings, 14 February 2010, Jorupe (HFG).

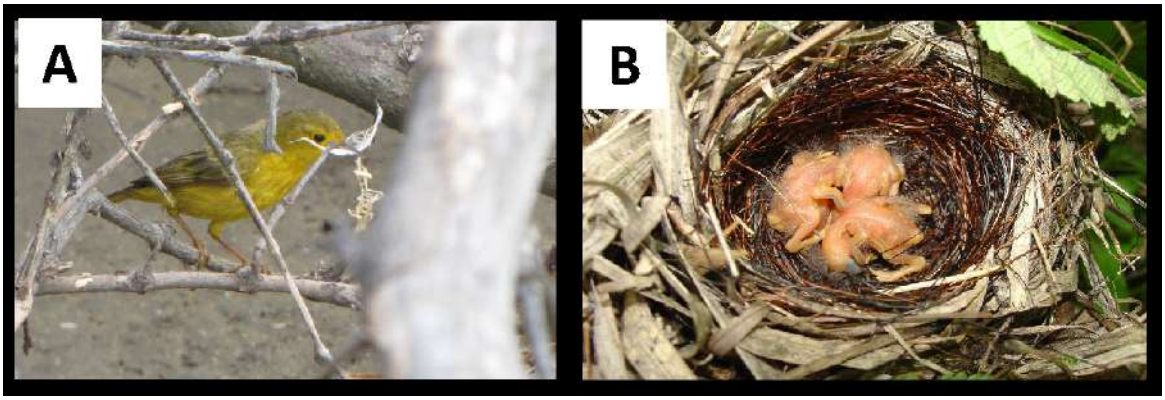

Figure 23: Nesting biology of birds of the Tumbesian Bioregion of Ecuador and Peru. For location details see Table 1. A) Adult Yellow Warbler *Setophaga petechia* carrying nesting material, 29 February 2009, Manglares San Pedro de Vice (FAP); B) Nest with three newly-hatched nestlings of Masked Yellowthroat *Geothlypis aequinoctialis*, 18 March 2005, Yunguilla (HFG).

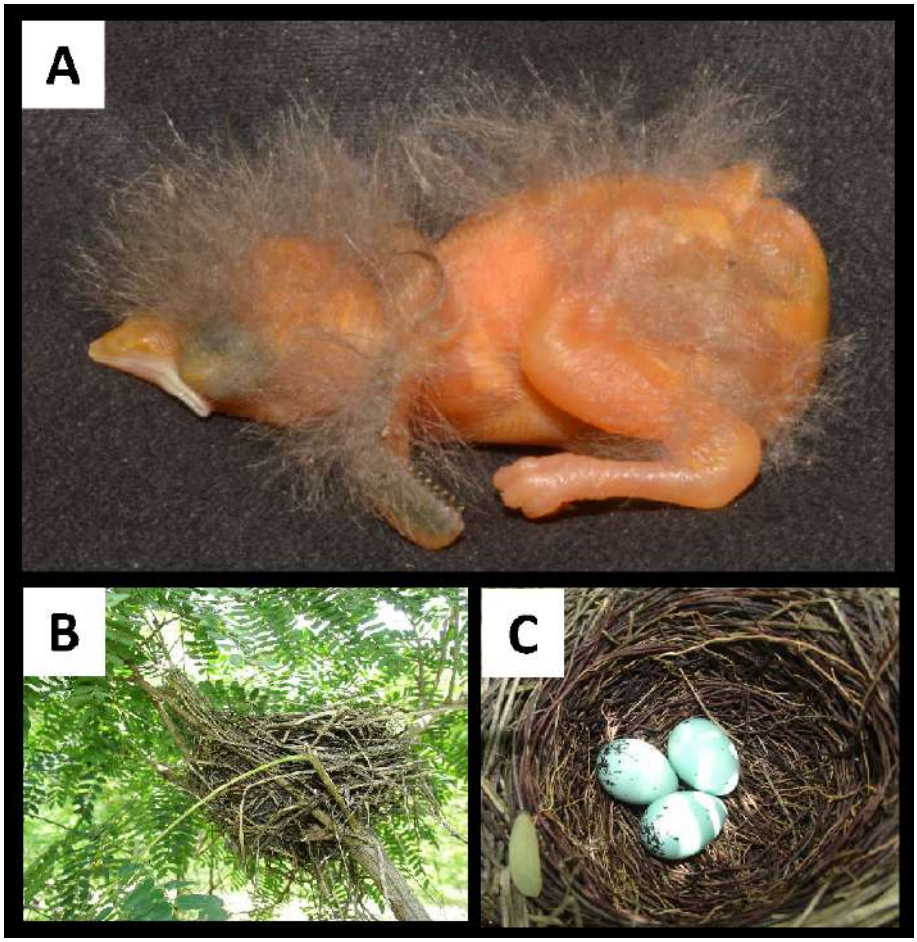

Figure 24: Nesting biology of birds of the Tumbesian Bioregion of Ecuador and Peru. For location details see Table 1. A) Recently-hatched nestling of Yellow-tailed Oriole *Icterus mesomelas*, 5 April 2014, Jorupe (LASM); B-C) Nest and completed clutch of Scrub Blackbird *Dives warczewiczi*, 28 February 2006, Jorupe (HFG).

Table 2: Summary of breeding observations for 197 species of birds in the Tumbesian region of southwest Ecuador and northwest Peru. See Table 1 for a list of locality abbreviations. In addition, we use the following abbreviations for reproductive activity: (B) building; (L) laying, clutch still being completed; (I) incubating; (N) nestlings; (F) fledglings; (J) juvenile; (AN) active nest at unknown stage; (CF) adult carrying food, but unknown if intended delivery was for a mate, nestlings, or fledglings; (CM) carrying nesting material but nest unseen.

English name Scientific name	Date	Breed. activ.	Locality	Observations
Pale-browed Tinamou *Crypturellus transfasciatus*	19 Apr 2006	J	EC3	immature individual with pink legs.
	18 Jun 2008	J	TTU6	
	25 Mar 2014	I	EC3	4 eggs (47 × 38 mm, 31.8 g; 46 × 36 mm, 29.8 g; 45 × 36 mm, 25.7 g; 46 × 35 mm, 28.2 g) (Fig. 1a).
	15 Apr 2009	F	TZA1	
	11 Feb 2010	I	EC3	5 eggs, last one laid 15 Feb (45.8 × 37.4 mm, 25.23 g; 45.4 × 38.0 mm, 36.49 g; 43.2 × 37.1 mm, 32.65 g; 44.5 × 37.7 mm, 34.16 g; 44.2 × 36.9 mm, 33.15 g) (Fig. 1b).
	5 Jul 2010	J	TTU4	
Fulvous-bellied Whistling-Duck *Dendrocygna bicolor*	6 Apr 2011	F	EC18	2 adults followed by 4 young ducklings.
Black-bellied Whistling-Duck *D. autumnalis*	16 Apr 2011	F	EC26	8 young, recently hatched, following adult, brood was attacked by an adult, biting they young.
	16 Apr 2011	F	EC26	7 young about half adult sized, following adult.
White-cheeked Pintail *Anas bahamensis*	5 Mar 2016	F	LCH2	many adults (*c*. 40), at least 30 older young on a small pond.
Chilean Flamingo *Phoenicopterus chilensis*	27 Jan 2016	J	PPI01	6 immature birds.
Least Grebe *Tachybaptus dominicus*	24 Feb 2006	F	EC1	4 fledglings following adults.
	22 May 2012	J	LLA8	at least 10 juveniles on a pond.
	16 Apr 2011	I	EC18	3 eggs.
	16 Apr 2011	I	EC18	3 eggs.
	16 Apr 2011	N	EC18	adult with recently hatched chick capable of swimming.
	16 Apr 2011	N	EC18	3 chicks, just hatched.
	16 Apr 2011	N	EC18	3 chicks in nest, maybe one day old.
	16 Apr 2011	F	EC18	adult with two young, estimated 1 week old.
	16 Apr 2011	F	EC18	adult with 2 young about half of adult size.
	16 Apr 2011	F	EC18	2 chicks, near adult size, following adult.
Pied-billed Grebe *Podilymbus podiceps*	16 Apr 2011	AN	EC18	adult sitting on floating nest, second adult nearby.
	16 Apr 2011	F	EC18	two young following adults.
	16 Apr 2011	F	EC18	adult followed by 2 chicks.
	24 Mar 2015	F	EC18	adult with 2 tiny, spotted young perched on its back.
White-tipped Dove *Leptotila verreauxi*	25 Feb 2006	N	EC1	2 eggs, one just hatched and other hatching.
	8 Jun 2009	L	PHU2	both eggs just starting development.
	8 Jun 2009	Copul.	PHU2	
	12 Feb 2010	I	EC3	2 buffy-white eggs 30.53 × 21.83 mm, 7.43 g and 28.04 × 21.18 mm, 6.57 g, hatched 21 Feb fledged 7 Mar.
	19 Feb 2010	I	EC3	2 buffy-white eggs 29.38 × 22.72 mm, 7.63 g and 28.98 × 23.13 mm, 7.95 g.
	27 Feb 2010	I	PAY2	1.6 m up in *Prosopis pallida* tree.
	17 Jan 2011	I	EC1	2 m up, 2 eggs.

	4 Apr 2014	I	EC3	4 m up, 2 eggs (Fig. 2d).
	30 Mar 2014	B	EC3	3 m up, 2 eggs laid between 30 Mar and 6 Apr.
	2 Apr 2014	I	EC3	20 m up.
	31 Mar 2006	N	EC6	
	1 Apr 2006	N	EC6	6 m up.
Pallid Dove *L. pallida*	8 Mar 2004	AN	EC2	
West Peruvian	25 Mar 2009	I	LLA3	nest 3 m up (Fig. 2c).
Dove *Zenaida meloda*	16 Dec 2015	N	TCO2	a fledgling on the ground being fed by an adult (ebird.org/view/checklist/S26327147).
	6 Nov 2015	I	LCH1	2 eggs, second laid 6 Nov.
	13 Mar 2016	I	LCH1	adult incubating.
	20 Mar 2016	F	LCH1	3 young in a tree in a city park.
	22 Jan 2017	I	TCO3	adult incubating (see https://ebird.org/view/checklist/S33872351).
	23 Aug 2017	C/I	LCH1	after copulating, one adult started incubation, suggesting the two eggs were recently laid (ebird.org/peru/view/checklist/S43808459)
Eared Dove *Z. auriculata*	29 Dec 2015	CM	LCH1	adult carrying nesting material in town.
Croaking Ground	25 Mar 2009	I	LLA3	2 white eggs, 1 m up in *Cordia lutea* bush (Boraginaceae).
Dove *Columbina cruziana*	27 May 2010	N	PMO3	adult regurgitating to fledgling.
	16 Apr 2011	N	EC18	nest built into the fruiting body of banana tree.
Groove-billed Ani	24 Feb 2006	B	EC1	copulations observed.
Crotophaga	24 Feb 2006	AN	EC1	
sulcirostris	21 Apr 2006	F	EC3	adult feeding fledgling a spider and its egg sac.
	1 Apr 2006	CF	EC6	adult carrying katydid towards grass, alarmed called but did not consume prey.
	4 Apr 2006	N	EC23	
Striped Cuckoo	11 Mar 2009	I	EC17	parasitized Azara's Spinetail *Synallaxis azarae*.
Tapera naevia				
Squirrel Cuckoo	13 Apr 2006	F	EC3	adult feeding very young fledgling.
Piaya cayana	1 Apr 2006	F	EC6	adult feeding fledgling.
Gray-capped	13 Feb 2010	B	EC3	still empty on 17 Feb.
Cuckoo *Coccyzus lansbergi*				
Common Potoo	18 Dec 2010	I	LFE1	1 egg (30 × 24 mm).
Nyctibius griseus				
Common Pauraque	2 Feb 2004	I	EC2	1 egg (29.0 × 20.8 mm), adult incubating (Fig. 3a).
Nyctidromus albicollis	24 Feb 2014	I	EC3	1 egg.
	18 Jan 2011	I	EC2	2 eggs.
	18 Jan 2011	N	EC2	2 large nestlings, almost able to fly short distances.
	5 Feb 2004	N	EC2	1 nestling.
	15 Feb 2004	I	EC2	1 egg (28.8 × 19.7 mm), male incubating.
	16 Feb 2004	I	EC2	1 egg (28.2 × 20.7 mm).
	23 Feb 2006	I	EC1	1 egg.
	12 Feb 2010	I	EC3	1 egg.
Scrub Nightjar *N. anthonyi*	16 Dec 2010	I	LFE1	adult incubating 1 egg, hatched 19 Dec.
White-tipped	1 Feb 2004	I	EC2	2 eggs.
Sicklebill *Eutoxeres aquila*	20 Mar 2004	F	EC2	fledgling fresh from the nest (Fig. 3b).
Gray-chinned Hermit *Phaethornis griseogularis*	1 Apr 2006	F	EC6	adult regurgitating for well-developed fledgling.

Rufous-tailed Hummingbird *Amazilia tzacatl*	21 Mar 2004	AN	EC2	3 m up, saddled over leaf petiole of unknown plant, well attached to stem and petiole with spider webs.
	18 Mar 2005	CM	EC17	adult carrying lichens.
Amazilia Hummingbird *A. amazilia*	10 Apr 2006	B	EC3	adult observed removing material from an abandoned *Pachyramphus* sp. nest.
	29 Mar 2014	B	EC3	3.5 m up saddled over a thin branch.
Purple Gallinule *Porphyrio martinica*	21 May 2012	F	LLA8	2 downy black chicks with an adult, walking on floating vegetation in a pond.
	16 Apr 2011	F	EC18	2 young with adult.
	16 Apr 2011	F	EC18	1 young with adult.
	16 Apr 2011	F	EC18	2 downy, black young with adult.
	16 Apr 2011	F	EC18	2 downy, black young with adult.
	16 Apr 2011	F	EC18	adult with two young, about half adult size.
	16 Apr 2011	F	EC18	adult with single, young juvenile.
White-throated Crake *Laterallus albigularis*	6 Apr 2011	B	EC18	see previous record.
	6 Apr 2011	N	EC18	at least 10 adults followed by young juveniles, many more followed by older young.
Rufous-necked Wood-Rail *Aramides axillaris*	9 Apr 2006	J	EC3	adult foraging with at least one juvenile.
	21 Apr 2006	J	EC3	flushed juvenile up into low branch, adult scolding nearby.
	12 Feb 2010	I	EC3	second egg laid 12 Feb, final (6th) egg laid 17 Feb (Fig. 2a), first hatch on 10 Mar, last on 11 or 12 Mar.
	18 Feb 2010	I	EC3	5.2 m up in tangle of branches, 6 eggs, eggs hatch 20-21 Feb (Fig. 2b).
	29 Feb 2010	B	EC3	found with 2 eggs, 6th (final) egg laid 6 Mar, 2.5 m up.
Common Gallinule *Gallinula galeata*	16 Apr 2011	F	EC18	2 adults bringing dead, brown grass or sedge leaves to a recently started nest, 15cm above wet ground, one adult followed by small chick with blackish down, at one point this chick climbed into new, on 16 Apr 2011 nest underwater and empty.
Wilson's Plover *Charadrius wilsonia*	6 Aug 2010	F	PSE1	
	21 Jan 2017	I	TZA2	adult incubating a single egg. We found a second egg, a few m away, possibly moved by rain water during the previous night. We placed the egg with that being incubated, and the adult immediately covered them both (see https://ebird.org/view/checklist/S33871390).
American Oystercatcher *Haematopus palliatus*	5 Mar 2016	F	LCH2	adult with two older young.
	18 Jan 2018	F	PTA2	2 different pairs, attending 1 and 2 fledglings each (ebird.org/view/checklist/S42044614).
Black-necked Stilt *Himantopus mexicanus*	24 Mar 2015	AN	EC18	nest composed of rotting vegetation, only a few cm above water.
Peruvian Thick-knee *Burhinus superciliaris*	23 Jan 2011	I	LFE1	2 eggs, hatched ca. 2 weeks later.
	18 Mar 2012	I	LFE1	2 eggs.
Wattled Jacana *Jacana jacana*	16 Apr 2011	N	EC18	2 young nestlings.
	16 Apr 2011	N	EC18	2 older nestlings.
	16 Apr 2011	N	EC18	1 older nestling.
	16 Apr 2011	N	EC18	1 young nestling.
	16 Apr 2011	M	EC18	1 newborn nestling.
Gray-hooded Gull *Chroicocephalus cirrocephalus*	12 Apr 2011	I	EC24	
	12 Apr 2011	AN	EC24	
	12 Apr 2011	AN	EC24	

	12 Apr 2011	AN	EC24	
	12 Apr 2011	AN	EC24	
Waved Albatross *Phoebastria irrorata*	15 Aug 2007	N	EC15	1 nestling about 2/3 adult size.
Magnificent Frigatebird *Fregata magnificens*	26 Jan 2016	N	TZA2	nest with one mid-aged nestling (Fig. 1d).
	21 Jan 2017	N	TZA2	nesting colony, 30+ active nests (ebird.org/view/checklist/S34612250).
Black-crowned Night-Heron *Nycticorax nycticorax*	29 Dec 2015	N	LCH1	many adults and at least 8 older juveniles seen, two recently dead young were found on the ground, one ca. 1 day old, one *ca*. 1 week old.
	13 Mar 2018	J	LCH1	several juveniles sitting along a water channel.
Striated Heron *Butorides striata*	22 May 2012	F	LLA8	3 fledglings seen along the margin of a pond.
	27 Feb 2006	I	EC25	2 eggs, 1 m above water level in flooded agricultural field (Fig. 1c).
Cattle Egret *Bubulcus ibis*	2 May 2017	I/N	LFE2	A nesting colony of four heron species (*Ardea alba, Egretta thula, E. caerulea* and *Bubulcus ibis*). There were multiple nests of this species with nestlings and adults incubating.
Great Egret *Ardea alba*	11 Feb 2017	C	LFE2	copula (ebird.org/view/checklist/S34325381).
	2 May 2017	I/N	LFE2	A nesting colony of four heron species (*Ardea alba, Egretta thula, E. caerulea* and *Bubulcus ibis*). There were multiple nests of this species with nestlings and adults incubating.
Snowy Egret *Egretta thula*	2 May 2007	I/N	LFE2	A nesting colony of four heron species (*Ardea alba, Egretta thula, E. caerulea* and *Bubulcus ibis*). There were multiple nests of this species with nestlings and adults incubating.
Little Blue Heron *E. caerulea*	2 May 2017	I/N	LFE2	A nesting colony of four heron species (*Ardea alba, Egretta thula, E. caerulea* and *Bubulcus ibis*). There were multiple nests of this species with nestlings and adults incubating.
Andean Condor *Vultur gryphus*	25 Mar 2009	J	LLA3	
	5 Jul 2010	J	TTU2	
Swallow-tailed Kite *Elanoides forficatus*	6 Feb 2004	CM	EC2	adult carrying stick.
Ornate Hawk-Eagle *Spizaetus ornatus*	19 May 2009	J	TZA1	
Snail Kite *Rostrhamus sociabilis*	16 Apr 2011	N	EC18	single young near fledging.
	27 Feb 2006	CM	EC25	adult carrying long stick.
Bicolored Hawk *Accipiter bicolor*	15 May 2009	F	TTU1	fledglings making loud begging calls.
	14 Feb 2011	F	LFE1	two juveniles, recently from the nest, tame.
Savanna Hawk *Buteogallus meridionalis*	11 Apr 2006	N	EC3	adults feeding single, mid-aged nestling snakes and lizards.
	1 Mar 2009	AN	PSE3	copulations observed.
	24 Apr 2009	N	PMO3	*c*. 1-week-old nestling brought to town by local resident.
	16 Jun 2009	J	PMO9	
	4 Jul 2009	J	PAY3	
	Aug 2009	J	PMO3	young recently from the nest.
	Oct 2009	J	PMO3	young recently from the nest.
	Sep 2009	J	PMO3	young recently from the nest.
	5 Apr 2014	CM	EC2	adult carry nest material in talons
Great Black Hawk *B. urubitinga*	12 Nov 2015	F	EC2	nest *c*. 15 m up in isolated pasture tree, fledgling arrived from another tree and received one small prey from and adult, consuming it while perched in nest.
	12 Apr 2006	AN	EC3	

Harris's Hawk *Parabuteo unicinctus*	11 Dec 2007	J	EC3	adult with juvenile, fully feathered, flying well.
	24 Feb 2009	J	PSE1	
Black-chested Buzzard-Eagle *Geranoaetus melanoleucus*	25 Feb 2009	J	LLA3	
	22 Jun 2009	J	LLA5	
	9 Mar 2009	F	EC17	recently fledged juvenile soaring in front of white-washed nest on rock ledge.
Gray-lined Hawk *Buteo nitidus*	18 May 209	J	TZA1	
Peruvian Pygmy-Owl *Glaucidium peruanum*	27 Feb 2006	N	EC4	
	23 Apr 2006	AN	EC3	nest in hollowed-out Pale-legged Hornero *Furnarius leucopus* nest.
Burrowing Owl *Athene cunicularia*	22 Dec 2010	AN	LFE1	2 adults observed attending the nest for several days.
	5 Mar 2016	N	LCH2	2 older nestlings.
Ecuadorian Trogon *Trogon mesurus*	17 Feb 2010	AN	EC3	female flushed from hole 6.8 m up in giant rotting *Ceiba* stump, 8.5 m tall.
	1 Mar 2014	AN	EC3	male flushed at 1530 from hole in giant *Ceiba* stump, 8 m up.
	6 Mar 2014	AN	EC3	5.5 m up in termitaria (Fig. 4b).
	6 Mar 2014	B	EC3	5 m up in termitarium, excavation just beginning.
	6 Mar 2014	B	EC3	6.5 m up in termitarium.
Whooping Motmot *Momotus subrufescens*	13 Apr 2006	B	EC3	excavating.
	14 Apr 2006	B	EC3	excavating.
	15 Apr 2006	AN	EC3	
	16 Apr 2006	B	EC3	excavating.
	18 Apr 2006	B	EC3	excavating.
	28 Apr 2006	I	EC3	excavating.
	12 Feb 2010	N	EC3	
	14 Feb 2010	N	EC3	4 mid-aged nestlings.
	17 Feb 2010	N	EC3	2 m up in road cut, 30 cm from top.
	21 Feb 2010	N	EC3	at least 2 nestlings, wing pin feathers emerging sheaths.
	7 Mar 2014	N	EC3	adult feeding nestlings (Fig. 4a).
	28 Feb 2010	J	PAY2	
Collared Araçari *Pteroglossus torquatus*	2 Mar 2004	N	EC2	
Ecuadorian Piculet *Picumnus sclateri*	8 Apr 2006	B	EC3	still excavating, 4 m up in dead trunk 30 cm from top, trunk c. 20 cm in diameter at nest.
Black-cheeked Woodpecker *Melanerpes pucherani*	3 Feb 2004	N	EC2	2 adults feeding at least one nestling from outside hole at 07h15, 12 m up in dead vertical branch of *Ochroma* tree.
Scarlet-backed Woodpecker *Veniliornis callonotus*	21 Dec 2010	I	LFE1	3 eggs.
	10 Jan 2011	N	LFE1	1 nestling, 2 eggs.
	10 Jan 2011	N	LFE1	2 nestlings.
	11 Jan 2011	I	LFE1	2 eggs.
Golden-olive Woodpecker *Colaptes rubiginosus*	10 Apr 2006	AN	EC3	male came in and fed female on nest, female stayed, presumably incubating, 5.5 m up in 30 cm diameter dead, 7.5 m-tall overall trunk.
	15 Mar 2005	N	EC17	2 nestlings, 2 m up in dead trunk out in field, nestlings 20 cm below opening, opening 10 cm wide by 8 cm tall.
	21 Dec 2010	B	LFE1	adult male excavating.

	16 Jan 2011	I	LFE1	1 adult sitting long periods in nest, possibly incubating.
	2 Jan 2016	B	LFE1	adults excavating (Fig. 4c).
Crested Caracara	28 Feb 2009	CM	PSE4	adult carrying material.
Caracara cheriway	6 Mar 2009	J	PAY3	juvenile accompanied by an adult.
	5 Mar 2011	N	PSE5	at least one older nestling.
Bat Falcon *Falco rufigularis*	10 Mar 2010	J	PMO8	fledgling, perched 12 m up in *Ceiba trichistandra* tree, begging and being fed by adults.
	26 Feb 2014	AN	EC3	12 m up in giant *Ceiba* stump.
Canary-winged Parakeet *Brotogeris versicolurus*	21 Jan 2015	AN	EC19	adult entering termite nest, *c*. 2.5 m up, second adult singing 5 m away.
Gray-cheeked	10 Aug 2008	AN	TTU5	
Parakeet	16 Dec 2009	J	PSU1	
B. pyrrhoptera	28 Jun 2010	AN	TTU6	
	27 Feb 2014	AN	EC3	5 m up in termitarium (Fig. 5b).
	28 Feb 2014	AN	EC3	6.5 m up in termitarium (Fig. 5a).
	27 Feb 2014	AN	EC3	12 m up in natural hole in *Ceiba* tree (Fig. 5c).
	27 Feb 2014	AN	EC3	16 m up in natural hole in *Ceiba*.
Rose-faced Parrot *Pyrilia pulchra*	25 Feb 2014	F	EC2	adults feeding begging fledgling.
Pacific Parrotlet *Forpus coelestis*	24 Feb 2006	B	EC1	adult excavating.
	9 Jun 2009	J	PHU2	
	Late-Dec 2010	AN	LFE1	2 adults entering and exiting abandoned woodpecker hole.
	Mid-Jan 2011	AN	LFE1	2 adults entering and exiting abandoned woodpecker hole.
	16 Apr 2011	N	E18	inside an inclined *Guadua* bamboo pole, entrance 1.6 m above ground.
Red-masked Parakeet *Psittacara erythrogenys*	22 Jun 2005	J	PHU3	2 fledglings taken from the nest by local residents.
	14 Jun 2009	J	PMO9	
Great Antshrike *Taraba major*	16 Apr 2006	J	EC3	not fully independent juvenile foraging independently near adults.
	30 Apr 2006	J	EC3	not fully independent juvenile foraging alone in underbrush.
	13 Feb 2010	N	EC3	
Collared Antshrike *Thamnophilus bernardi*	18 Apr 2006	CF	EC3	adult carrying food, alarm calling in response to observer presence, active nest suspected, possibly fledgling.
	10 Feb 2010	CM	EC3	male and female carrying leaves and thin fibers.
	17 Feb 2010	B	EC3	
	6 Mar 2014	B	EC3	male fed female as she carried material to a nearly completed nest, 1.6 m up.
	2 Mar 2014	B	EC3	nest nearly complete (Fig. 6b).
	25 Feb 2010	B	EC3	nest nearly complete.
	6 Mar 2010	I	EC3	3 eggs.
Black-crowned	4 Feb 2004	I	EC2	2 eggs (Fig. 6c).
Antshrike	15 Feb 2004	B	EC2	construction just beginning.
T. atrinucha	22 Feb 2004	B	EC2	adult with nesting material.
Uniform Antshrike *T. unicolor*	23 Feb 2000	N	EC14	2 adults at nest with 2 nestlings (pin feathers broken 2 mm). Nest open cup of small vines, moss; *c*. 2 m up in sapling.
Plain Antvireo	10 Feb 2010	I	EC3	2 eggs.
Dysithamnus mentalis	19 Feb 2010	B	EC3	2 eggs eventually (Fig. 6a).

Chestnut-backed Antbird *Poliocrania exsul*	13 Feb 2004	N	EC2	1 nestling.
Chestnut-crowned Antpitta *Grallaria ruficapilla*	1 Mar 2005	I	EC17	2 eggs, date and nest measurements in Greeney (2018).
Watkins's Antpitta *G. watkinsi*	6 Mar 2014	B	EC3	see text.
	4 Apr 2014	N	EC3	see text.
Coastal Miner *Geositta peruviana*	24 Jan 2011	N	LFE1	at least 2 nestlings and one adult delivering food, behavior two weeks earlier suggested incubation.
Olivaceous Woodcreeper *Sittasomus griseicapillus*	23 Apr 2006	F	EC3	juvenile foraging with adults, occasionally being fed.
Wedge-billed Woodcreeper *Glyphorynchus spirurus*	1 Mar 2004	F	EC2	fledgling following adults.
Red-billed Scythebill *Campylorhamphus trochilirostris*	25 Feb 2006	CM	EC1	Adult carrying material (bark strip).
	13 Feb 2010	I	EC3	
	15 Feb 2010	N	EC3	
Streak-headed Woodcreeper *Lepidocolaptes souleyetii*	31 Jan 2004	I	EC2	
	14 Feb 2004	B	EC2	
	24 Feb 2006	B	EC1	both sexes carrying bark strips into gap cabin wall, 3 m up.
	11 Apr 2006	F	EC3	at least one fledgling being fed.
	12 Feb 2010	B	EC3	
	21 Dec 2010	AN	LFE1	inside abandoned *F. leucopus* nest.
	18 Mar 2012	N	LFE1	three nestlings.
	25 Mar 2014	B	EC3	4.8 m up in natural cavity formed by overlapping *Ficus* roots.
	2 Apr 2014	B	EC3	0.6 m up in natural cavity in living *Ceiba* tree (Fig. 7a).
Plain Xenops *Xenops minutus*	7 Feb 2004	F	EC2	adults feeding fledgling.
Pale-legged Hornero *Furnarius leucopus*	2 Feb 2004	B	EC2	
	5 Feb 2004	B	EC2	9 m up, both adults building.
	4 Dec 2003	N	EC6	
	30 Mar 2006	AN	EC6	adult flushed from nest.
	30 Mar 2006	I	EC6	nest 4.5 m up in *Acacia*.
	3 Apr 2006	CM	EC6	adult carrying mud.
	24 Feb 2006	N	EC1	
	24 Feb 2006	B	EC1	
	25 Feb 2006	I	EC1	
	27 Feb 2006	CM	EC4	adult carrying material (straw).
	27 Feb 2006	I	EC4	
	8 Apr 2006	B	EC3	2 adults building with mud mixed with small fibers, 3 m up.
	10 Apr 2006	B	EC3	
	11 Apr 2006	AN	EC3	5.5 m up in thorny tree.
	11 Apr 2006	N	EC3	2 nestlings, 3.5 m up in spiny tree.
	14 Apr 2006	AN	EC3	adult sitting long periods, presumed incubation or early nestling.
	11 Feb 2010	B	EC3	dome complete, entrance not well formed, 8 m up.

	11 Feb 2010	AN	EC3	
	11 Feb 2010	B	EC3	
	13 Feb 2010	B	EC3	2 adults building, just a cup so far, 5.5 m up in spiny tree.
	18 Feb 2010	N	EC3	2 adults bringing food, 18 m up in 30 m-tall *Ceiba* sp.
	21 Feb 2010	N	EC3	3 nestlings ready to fledge, 3.6 m up.
	11 Jan 2011	B	LFE1	
	11 Feb 2010	AN	EC3	building, 5.5 m up over road (Fig. 7c).
	11 Feb 2010	B	EC3	6 m up near road.
Buff-fronted Foliage-gleaner *Philydor rufum*	18 Mar 2004	N	EC2	
Rufous-necked Foliage-gleaner *Syndactyla ruficollis*	17 Feb 2010	AN	EC3	adult arrives with material; remains inside for long periods, presumed incubation (Fig. 7e).
	5 Mar 2010	AN	EC3	Fig. 7d.
Henna-hooded Foliage-gleaner *Clibanornis erythrocephalus*	8 Apr 2006	AN	EC3	for the following records of this species, those marked with *** had the details (but not date) published previously (Miller *et al*. 2012).
	8 Apr 2006	B	EC3	***
	8 Apr 2006	B	EC3	***
	8 Apr 2006	AN	EC3	***
	9 Apr 2006	AN	EC3	***
	16 Apr 2006	I	EC3	***
	20 Apr 2006	AN	EC3	***
	21 Apr 2006	AN	EC3	***
	22 Apr 2006	AN	EC3	***
	18 Jan 2008	AN	TTU6	adult entering cavity.
	10 Feb 2010	I	EC3	***
	10 Feb 2010	AN	EC3	***
	10 Feb 2010	AN	EC3	***
	13 Feb 2010	B	EC3	***
	13 Feb 2010	AN	EC3	***
	13 Feb 2010	AN	EC3	***
	13 Feb 2010	AN	EC3	***
	14 Feb 2010	B	EC3	***
	14 Feb 2010	B	EC3	***
	15 Feb 2010	AN	EC3	***
	20 Feb 2010	AN	EC3	***
	1 Mar 2014	AN	EC3	1.7 m up in 2 m bank, under 35 cm overhang, oriented 65°. Brood depredated by *DryMaron* sp. snake (Colubridae).
	1 Mar 2014	N	EC3	2.5 m up in 2.8 m bank roadside, under 20 cm overhang, oriented 120°.
	2 Mar 2014	I	EC3	1.8 m up in 2.4 m bank, under 45 cm overhang, oriented 140°.
	3 Mar 2014	AN	EC3	1.4 m up in 1.6 m bank, under 40 cm overhang.
	4 Mar 2014	AN	EC3	1.4 m up in 1.6 m bank, under 20 cm overhang.
	7 Mar 2014	AN	EC3	1.6 m up in 1. 9 m bank, under 30 cm overhang (Fig. 8).
	1 Mar 2014	AN	EC3	5.2 m up on 5.3 m bank, under 25 cm overhang.
Line-cheeked Spinetail *Cranioleuca antisiensis*	23 Feb 2000	AN	EC14	see text.
	11 Apr 2006	CF	EC5	see text.
	12 Feb 2007	AN	EC20	see text.
	17 Mar 2005	I	EC17	see text.

	12 Mar 2009	I	EC17	see text.
Necklaced Spinetail	24 Mar 2009	AN	LLA4	Fig. 9b.
Synallaxis stictothorax	21 Dec 2010	B	LFE1	3 adults bringing material to nest.
Slaty Spinetail *S. brachyura*	7 Feb 2004	I	EC2	60 cm up, 3 fresh eggs: 20.8 × 16.1, 22.3 × 16.8, 22.1 × 16.2.
Azara's Spinetail *S. azarae*	17 Apr 2006	J	EC5	adults with at least one fledgling.
	17 Apr 2006	J	EC5	adults with at least one fledgling.
	17 Apr 2006	J	EC5	adults with at least one fledgling.
	11 Mar 2005	Laying	EC17	nest 1.7 m up, 1 very fresh, immaculate white egg (18.8 x 15.5 mm, 2.48 g), suspected incomplete clutch.
	18 Mar 2005	Laying	EC17	nest 1.1 m up, 1 very fresh, immaculate white egg (22.1 x 16.8 mm), suspected incomplete clutch.
	17 Mar 2005	CM	EC17	nest 2.1 m up, empty, adults nearby carrying sticks.
	4 Mar 2009	I	EC17	nest 1.9 m up, 1 egg, adult flushed, do not know if clutch complete.
Blackish-headed Spinetail *S. tithys*	9 Apr 2006	I	EC3	1.5 m up in thick tangle of *Barnadesia* sp. (Asteraceae), very spiny around nest, 5 eggs.
	12 Apr 2006	CM	EC3	adult traveling through understory carrying a long stick.
	24 Apr 2006	F	EC3	older fledgling foraging with adults.
	11 Feb 2010	B	EC3	nest ball forming, but no entrance tunnel formed.
	13 Feb 2010	AN	EC3	
	13 Feb 2010	AN	EC3	
	10 Mar 2010	F	PHU1	
	10 Mar 2010	CM	PHU1	adult carrying small stick.
	10 Mar 2010	N	PHU1	adults entering nests with food.
	28 Feb 2014	B	EC3	5 m up in tangle of vines and branches in 7 m tall tree, adults adding material to all portions, looks complete (Fig. 9a).
Sooty-headed Tyrannulet	9 Feb 2004	N	EC2	at least two young nestlings, 6 m up in horizontal fork with lots of moss.
Phyllomyias griseiceps	14 Feb 2004	B	EC2	
Pacific Elaenia	9 Apr 2006	B	EC3	
Myiopagis subplacens	12 Apr 2006	B	EC3	
Yellow-bellied	2 Feb 2004	B	EC2	
Elaenia *Elaenia flavogaster*	29 Feb 2004	CM	EC2	adult carrying moss.
	16 Dec 2013	B	EC21	adult moving nesting materials from an old nest to a new one.
Southern Beardless-Tyrannulet *Camptostoma obsoletum*	24 Feb 2006	B	EC1	
	24 Feb 2006	I	EC1	
	25 Feb 2006	B	EC1	
	25 Feb 2006	I	EC1	
	28 Feb 2009	CM	PSE3	adult carrying material.
	15 May 2009	F	TTU1	
	13 Feb 2010	AN	EC3	Fig. 10a.
White-banded Tyrannulet	29 Apr 2006	F	EC5	adult followed by two fledglings.

Mecocerculus stictopterus				
Yellow Tyrranulet	18 Feb 2004	B	EC2	adult carrying material.
Capsiempis flaveola				
Tawny-crowned Pygmy-Tyrant	26 Dec 2010	B	LFE1	nest nearly complete.
Euscarthmus meloryphus				
Gray-and-white	24 Mar 2009	I	LLA3	
Tyrannulet	24 Mar 2009	N	LLA3	
Pseudelaenia leucospodia				
Olive-striped	1 Feb 2004	I	EC2	
Flycatcher	2 Feb 2004	N	EC2	
Mionectes olivaceus				
Ochre-bellied	31 Jan 2004	I	EC2	
Flycatcher *M. oleagineus*	31 Jan 2004	N	EC2	Fig. 10c.
	1 Feb 2004	N	EC2	
	1 Feb 2004	N	EC2	
Slaty-capped Flycatcher	17 Mar 2004	B	EC2	construction just beginning.
Leptopogon superciliaris				
Rufous-crowned Tody-Flycatcher	26 Feb 2009	I	EC17	2 eggs, 1.9 m up, hanging from drooping tip of *Chusquea* bamboo shoot.
Poecilotriccus ruficeps				
Common Tody-	2 Feb 2004	B	EC2	
Flycatcher	10 Feb 2004	B	EC2	
Todirostrum cinereum	13 Feb 2010	B	EC3	5 m up, at least one adult building, other nearby, no wasp nest nearby.
Yellow-olive Flatbill *Tolmomyias sulphurescens*	24 Feb 2006	I	EC1	3 m up, 1.2 m from active wasp nest (Vespidae) (Fig. 10d), 3 eggs (23.0 × 9.4, 22.0 × 9.1, 21.9 × 9.4 mm).
	7 Apr 2006	N	EC3	3.5 m up, fledged at least two nestlings on 9 Apr.
	12 Apr 2006	B	EC3	15 m up in lower, outer branches of a large *Ceiba* tree, 1.5 m from active wasp nest (Vespidae).
	14 Apr 2006	F	EC3	fledgling following adults.
	14 Apr 2006	F	EC3	fledgling following adults.
	14 Apr 2006	N	EC3	two adults bringing food into nest.
	16 Apr 2006	F	EC3	fledgling following adults.
	11 Feb 2010	B	EC3	construction just beginning.
	13 Feb 2010	AN	EC3	20 m up in 35 m *Ceiba* tree, 2.5 m from active wasp nest (Vespidae).
	13 Feb 2010	AN	EC3	
	14 Feb 2010	N	EC3	5 m up, 30 cm from active wasp nest (Vespidae), both adults bringing food at 09h45.
	15 Feb 2010	N	EC3	10 m up, 2 m from active wasp nest (Vespidae).
	17 Feb 2010	AN	EC3	14 m up, 30 cm from wasp nest (Vespidae).
	17 Feb 2010	N	EC3	
	19 Feb 2010	AN	EC3	26 m up in 35 m *Ceiba* tree, 60 cm from active wasp nest (Vespidae).

	1 Mar 2010	N	EC3	7.5 m up.
	8 Mar 2010	N	EC3	10 m up over dry stream bed.
	26 Feb 2014	AN	EC3	5 m up, 70 cm from inactive wasp nest (Vespidae).
	26 Feb 2014	B	EC3	*ca*. 35 m up in crown of *Ceiba* tree, 30 cm from active wasp nest (Vespidae).
	26 Feb 2014	AN	EC3	over stream inside forest, 9 m up tip of a branch.
	1 Mar 2014	B	EC3	4 m up, 30 cm from active wasp nest (Vespidae).
	3 Mar 2014	B	EC3	adult gathering dark fibers from below a branch 6 m above ground.
	4 Mar 2014	AN	EC3	2.6 m, old nest nearby, no wasp nest.
	4 Mar 2014	AN	EC3	8 m up at tip of a vine, no wasp nest, inside forest, near a stream.
	6 Mar 2014	AN	EC3	40 cm from wasp nest (Vespidae), 7 m up inside forest.
	6 Mar 2014	B	EC3	adult gathering long dark fibers and flying to nest 25 m up in 30 m *Ceiba* tree, 1 m from wasp nest (Vespidae), *ca*. half finished.
	31 Mar 2014	B	EC3	10 m up.
White-throated Spadebill *Platyrinchus mystaceus*	1 Feb 2004	I	EC2	Figs. 11a, 11c.
Bran-colored Flycatcher *Myiophobus fasciatus*	17 Mar 2004	B	EC2	gathering rootlets and flying over hill at least 25 m.
	27 Feb 2006	I	EC4	
	11 Feb 2010	I	EC3	
	11 Feb 2010	I	EC3	
	16 Feb 2010	I	EC3	Fig. 11d.
	7 Mar 2014	B	EC3	1.9 m up at tip of drooping branch.
Sulphur-rumped Flycatcher *Myiobius barbatus*	30 Jan 2004	N	EC2	
	31 Jan 2004	I	EC2	Fig. 10b.
Tropical Pewee *Contopus cinereus*	12 Mar 2005	I	EC17	2 eggs.
	1 Apr 2010	B	PHU5	
	18 Dec 2013	B	EC21	nest in a large horizontal forking of thick branches, 27 m up in 29 m tree.
Black Phoebe *Sayornis nigricans*	30 Mar 2006	B	EC6	2 m up, about half way done, on ledge under a bridge.
	30 Mar 2006	I	EC6	2 eggs, one infertile, 1.4 m up on natural cliff-face.
Vermilion Flycatcher *Pyrocephalus rubinus*	24 Jan 2011	F	LFE1	2 fledglings following adults.
	23 Feb 2011	N	PMO3	2 nestlings.
	13 Mar 2012	N	LFE1	2 m up in *Prosopis* tree, three nestlings, nest composed largely of pale fibers.
Masked Water-Tyrant *Fluvicola nengeta*	16 Apr 2011	AN	EC18	2 adults entering and exiting a nest 1.6 m over water.
Social Flycatcher *Myiozetetes similis*	31 Jan 2004	I	EC2	
	3 Feb 2004	I	EC2	
	5 Feb 2004	B	EC2	6 m up in a bromeliad clump, nest ball forming.
	8 Feb 2004	AN	EC2	3.5 m up in an isolated *Citrus* tree.

Baird's Flycatcher *Myiodynastes bairdii*	13 Mar 2012	N	LLA7	nest in a hole in a rock wall, both adults bring food (including lepidopteran larvae).
Streaked Flycatcher *M. maculatus*	8 Apr 2006	F	EC3	
	14 Apr 2006	F	EC3	
	15 Apr 2006	F	EC3	
	18 Apr 2006	F	EC3	well-developed fledgling, still fed by adults.
	13 Feb 2010	CM	EC3	adult carrying material.
	13 Feb 2010	CM	EC3	adult carrying material.
	14 Feb 2010	AN	EC3	
	14 Feb 2010	N	EC3	
	18 Feb 2010	N	EC3	both adults provisioning, nest in abandoned *F. leucopus* nest, 16 m up, one adult feeding regularly but other spending a great deal of time chasing horneros from active nest 6 m away in same tree.
	27 Feb 2014	AN	EC3	20 m up at the broken end of a *Ceiba* branch.
	7 Mar 2014	B	EC3	8 m up in old woodpecker cavity.
Boat-billed Flycatcher *Megarynchus pitangua*	14 Feb 2004	B	EC2	nest just beginning to form.
	17 Feb 2004	CM	EC2	adult carrying material.
	20 Apr 2006	F	EC3	adult fed adult *Papilio* (Lepidoptera: Papilionidae) to one of 2 fledglings.
	18 Feb 2010	N	EC3	both adults feeding nestlings, 15 m up.
Tropical Kingbird *Tyrannus melancholicus*	6 Feb 2004	CM	EC2	adult carrying material.
	7 Feb 2004	B	EC2	7 m up in crown of isolated tree.
Rufous Flycatcher *Myiarchus semirufus*	26 Feb 2009	F	PSE6	adult followed by begging fledgling (Fig. 11b).
	31 Dec 2010	N	LFE1	3 chicks, adults provisioning with insects.
	31 Dec 2010	I	LFE1	3 eggs in abandoned woodpecker cavity.
	9 Jan 2011	L	LFE1	3 eggs.
Dusky-capped Flycatcher *M. tuberculifer*	1 Mar 2004	B	EC2	
	28 Feb 2006	CM	EC1	adult carrying material.
Sooty-crowned Flycatcher *M. phaeocephalus*	10 Apr 2006	B	EC3	subsequently laid a clutch of two eggs.
Red-crested Cotinga *Ampelion rubrocristatus*	11 Apr 2006	CM	EC5	adults regularly carrying material in same direction.
White-bearded Manakin *Manacus manacus*	30 Jan 2004	I	EC2	2 eggs (23.1 × 16.4, 23.1 × 15.9 mm) (Fig. 12a).
	3 Feb 2004	I	EC2	2 eggs, first egg laid 3 Feb (24.2 × 15.6 mm).
	3 Feb 2004	I	EC2	2 eggs (22.7 × 15.4, 22.6 × 15.9 mm) first laid 3 Feb, second laid 5 Feb.
	13 Feb 2004	I	EC2	2 eggs, 20.6 × 16.0 mm, 2.65 g; 20.8 × 15.7 mm, 2.56 g).
	3 Mar 2004	I	EC2	
	10 Mar 2004	F	EC2	adult feeding fledgling.
	18 Mar 2004	I	EC2	2 eggs (20.9 × 15.4, 22.0 × 15.6 mm).
Club-winged Manakin *Machaeropterus deliciosus*	30 Jan 2004	I	EC2	2 eggs (19.3 × 14.4, 19.9 × 14.6 mm), hatched 17 Feb, fledged 5 Mar.
	31 Jan 2004	I	EC2	2 eggs (19.7 × 13.9, 20.8 × 14.6 mm), hatched 14 Feb, both nestlings eaten, several hours after hatching, by Yellow-throated Toucan *Ramphastos ambiguus*.
	31 Jan 2004	I	EC2	2 eggs (20.0 x 14.3, 20.9 x 14.1 mm).

	2 Feb 2004	I	EC2	2 eggs, laid 2 and 4 Mar (20.6 x 14.3, 20.3 x 14.5 mm, respectively).
	5 Feb 2004	I	EC2	1 undeveloped egg (20.5 × 14.6 mm) (Fig. 12b).
	5 Feb 2004	B	EC2	
	8 Feb 2004	I	EC2	second egg laid 9 Feb (19.4 × 14.3, 19.1 × 14.2 mm) (Fig. 12c).
	19 Feb 2004	I	EC2	2 eggs, pipped.
	19 Feb 2004	B	EC2	supporting branch collapsed prior to nest completion.
	1 Mar 2004	I	EC2	2 eggs.
	2 Mar 2004	B	EC2	
	3 Mar 2004	N	EC2	2 nestlings.
	3 Mar 2004	I	EC2	2 eggs.
	17 Mar 2004	I	EC2	2 eggs, undeveloped (20.2 × 14.8, 20.4 × 15.0 mm).
	18 Mar 2004	N	EC2	2 nestlings.
Masked Tityra *Tityra semifasciata*	5 Feb 2004	B	EC2	
	2 Mar 2004	N	EC2	
Slaty Becard *Pachyramphus spodiurus*	16 Apr 2006	F	EC3	pair with at least one fledgling.
	24 Apr 2006	F	EC3	
	13 Feb 2010	AN	EC3	
	18 Feb 2010	N	EC3	both adults brining food to nest, 25 m up in 30 m *Ceiba* sp. tree, 1.5 from end, 13 m from trunk.
	5 Jul 2010	J	TTU3	
	25 Feb 2014	AN	EC3	Fig. 13c.
Black-and-white Becard *P. albogriseus*	25 Feb 2006	B	EC1	
	25 Feb 2006	B	EC1	
	18 Apr 2006	F	EC3	
	13 Feb 2010	AN	EC3	
	17 Feb 2010	B	EC3	
	21 Feb 2010	B	EC3	in small branches near crown, 18 m up in 20 m-tall tree, 30 cm from active wasp nest.
	1 Mar 2014	B	EC3	20 m up in *Ceiba*, just beginning construction when found (Fig. 13b).
One-colored Becard *P. homochrous*	24 Feb 2006	B	EC1	
	26 Feb 2006	B	EC1	Fig. 13a.
	27 Feb 2006	AN	EC4	
	8 Apr 2006	N	EC3	10 m up at lowest branch of *Ceiba* tree, male and female bringing food, male had delivered adult Lepidoptera.
	8 Apr 2006	AN	EC3	15 m up at outer edge of *Ceiba* tree, adults repelled a pair of Fasciated Wren *Campylorhynchus fasciatus*.
	8 Apr 2006	F	EC3	adult female feeding fledgling.
	10 Apr 2006	AN	EC3	
	15 Apr 2006	AN	EC3	female spending long periods inside nest, presumed incubation.
	16 Apr 2006	J	EC3	juvenile similar to adult female below, upper parts with large black patches.
	10 Feb 2010	B	EC3	active building during most of day.
	11 Feb 2010	I	EC3	adults spending long periods in nest, presumed incubation.
	13 Feb 2010	AN	EC3	
	13 Feb 2010	AN	EC3	
	14 Feb 2010	AN	EC3	30 m up in lowest branch of 35 m *Ceiba* tree.

	17 Feb 2010	N	EC3	
	18 Feb 2010	I	EC3	17 m up in 30 m *Ceiba* tree, female sitting long periods, male adding material to top of nest.
	25 Feb 2010	AN	PAY1	
	8 Mar 2010	AN	PHU1	
Rufous-browed Peppershrike *Cyclarhis gujanensis*	15 Mar 2005	I	EC17	2.5 m up, two undeveloped eggs (23.4 × 16.2 mm, 3.12 g; 23.7 × 15.7 mm, 3.05 g) (Figs. 14c, 14d).
	18 Mar 2005	B	EC17	nest went from skeletal scraps of material to completed nest in 6 days, 3.5 m up.
Red-eyed Vireo *Vireo olivaceus*	26 Feb 2006	I	EC1	3 eggs (Figs. 14a, 14b).
	17 May 2009	F	TZA1	begging fledgling following adult.
White-tailed Jay *Cyanocorax mystacalis*	8 Apr 2006	N	EC3	3 nestlings.
	10 Feb 2010	Courtship	EC3	group of *c*. 7 individuals, one fed a hairless, green lepidopteran larvae to another.
	15 Feb 2010	CM	EC3	adult dropped fine, pale nest-lining material as soon observer was detected.
	19 Feb 2010	I	EC3	
	23 Mar 2009	F	LLA4	fledgling following adult.
	8 Jun 2009	J	PHU2	
	13 Jun 2009	J	PMO9	
	4 Mar 2010	B	EC3	7 m up in vine tangle.
	18 Feb 2010	CM	EC3	pair of adults carrying material.
	27 Feb 2014	N	EC3	2 nearly fledged nestlings.
	3 Mar 2014	N	EC3	2 well-feathered nestlings (Fig. 15a).
	7 Mar 2014	F	EC3	1 stub-tailed fledgling being fed by several adults (Fig. 15b).
	7 Mar 2014	CF	EC3	group of four adults carrying food repeatedly to same location.
	28 Feb 2014	B	EC3	6.5 m up.
	27 Feb 2014	CF	EC3	group of five adults carrying food repeatedly to same location.
Blue-and-white Swallow *Pygochelidon cyanoleuca*	7 Mar 2014	AN	EC22	adults entering and exiting cavity under eaves of house in town (2.5 m up), likely feeding.
	7 Mar 2014	AN	EC22	adults entering and exiting cavity under eaves of house in town (8 m up), likely feeding.
	13 Feb 2000	F	EC14	
	7 Mar 2009	B	EC17	in rocky bank.
Southern Rough-winged Swallow *Stelgidopteryx ruficollis*	31 Jan 2004	I	EC2	
Brown-chested Martin *Progne tapera*	15 Jun 2002	AN	EC4	nest inside abandoned *F. leucopus* nest.
	8 Apr 2012	F	TCO1	fledglings being fed by adult.
Gray-breasted Martin *P. chalybea*	5 Feb 2004	AN	EC2	
	11 Jan 2011	I	LFE1	3 eggs (*c*. 27 × 24 mm).
	16 Dec 2015	J	TCO2	several juveniles with adults (https://ebird.org/view/checklist/S26327147)
Tumbes Swallow *Tachycineta stolzmanni*	11 Dec 2010	I	LFE1	2 eggs in a cavity old woodpecker cavity.
Chestnut-collared Swallow *Petrochelidon rufocollaris*	23 Jan 2011	I	LFE1	3 eggs.
	25 Jan 2011	N	LFE1	2 adults bringing food.
	Early-Jan 2011	L	LFE1	2 eggs.
	Early Jan 2011	AN	LFE1	

	Late-Dec 2010	I	LFE1	3 eggs.
	Mid-Dec 2010	I	LFE1	3 eggs.
	24 Mar 2010	AN	PMO1	*c*. 50 nests on an abandoned house.
	13 Feb 2000	AN	EC4	many active nests at various stages.
	2 Apr 2014	AN	EC14	*c*. 115 active nests in various stages under bridge, at least some building some with nestlings.
House Wren *Troglodytes aedon*	30 Jan 2004	I	EC2	Fig. 15d.
	14 Feb 2004	B	EC2	
	24 Feb 2006	AN	EC1	
	10 Mar 2010	N	EC3	1 m up in crevice in cabin wall, six nestlings, 5.5–6.5g.
	3 Mar 2014	B	EC3	same nest used in 2010 by *L. souleyetii*, 1 m up in crack-like cavity in living *Ceiba* tree trunk.
	28 Mar 2014	I	EC3	15 cm down from broken top of bamboo post, four eggs (Fig. 15c).
Fasciated Wren *Campylorhynchus fasciatus*	5 Feb 2004	B	EC2	
	17 Feb 2004	B	EC2	adult carrying material to well-formed nest.
	1 Mar 2004	B	EC2	
	11 Apr 2006	N	EC3	
	21 Apr 2006	N	EC3	3 adults simultaneously brought food into nest.
	28 Apr 2006	N	EC3	
	11 Feb 2010	N	EC3	
	11 Feb 2010	B	EC3	
	18 Feb 2010	N	EC3	20 m up in 30 m *Ceiba* tree, at least three individuals bringing food.
	19 Feb 2010	B	EC3	2 adults building, 6.3 m up over road.
	3 Feb 2011	I	PSE2	adult captured with active incubation patch.
	27 Mar 2014	I	EC3	4 eggs (Fig. 15c).
	10 Jun 2009	AN	PHU2	Fig. 15b.
	4 Dec 2003	AN	EC6	
	9 Feb 2010	B	EC6	2 adults bringing feathers to nest in town park, 8 m up in small branches of 25 m tall tree near tip of branch.
Speckle-breasted Wren *Pheugopedius sclateri*	16 Feb 2010	B	EC3	
Bay Wren *Cantorchilus nigricapillus*	2 Mar 2014	B	EC3	20 cm up in a branch tangle and overlapping sticks in dense undergrowth.
	6 Mar 2014	B	EC3	10 cm up in a branch tangle.
	7 Mar 2014	B	EC3	adult carrying material repeatedly into thicket.
	7 Mar 2014	CM	EC3	pair of adults carrying material.
	30 Jan 2004	I	EC2	
	3 Feb 2004	I	EC2	Fig. 16a.
Superciliated Wren *C. superciliaris*	24 Feb 2006	I	EC1	
	26 Feb 2006	I	EC1	
	28 Feb 2006	B	EC1	
	31 May 2010	F	PMO5	begging fledgling.
	4 Feb 2011	N	PSE2	
Gray-breasted Wood-Wren *Henicorhina leucophrys*	23 Feb 2000	I	EC14	3 eggs.

Song Wren *Cyphorhinus phaeocephalus*	6 Feb 2004	B	EC2	
Half-collared Gnatwren *Microbates cinereiventris*	11 Mar 2004	B	EC2	adult with nesting material.
Tropical Gnatcatcher *Polioptila plumbea*	24 Feb 2006	CM	EC1	
	24 Mar 2009	N	LLA4	Fig. 17b.
	8 Jun 2009	J	PHU2	
	31 May 2010	F	PMO5	begging fledgling following adults.
	7 Jan 2011	AN	LFE1	female sitting long periods, presumably incubating.
	3 Feb 2011	I	PSE2	
	27 Feb 2014	B	EC3	7.5 m up saddled over small horizontal branch in shady mid-story, incubating by 7 Mar.
	2 Apr 2014	I	EC3	15 m up saddled over tree (Euphorbiaceae) branch similar in diameter to nest.
Plumbeous-backed Thrush *Turdus reevei*	8 Apr 2006	J	EC3	numerous independent juveniles flocking at fruiting *Ficus* sp.
	15 Apr 2006	F	EC3	young fledgling, barely able to fly.
	16 Jun 2009	J	PMO7	
	10 Feb 2010	I	EC3	adult sitting long periods, presumed incubation.
	10 Feb 2010	I	EC3	adult sitting long periods, presumed incubation.
	10 Feb 2010	I	EC3	adult sitting long periods, presumed incubation.
	10 Feb 2010	I	EC3	3 eggs (Fig. 18d).
	11 Feb 2010	AN	EC3	8 m up in 10 m tall tree in small branches in area of dense foliage behavior suggested incubation.
	13 Feb 2010	N	EC3	
	16 Feb 2010	I	EC3	
	17 Feb 2010	I	EC3	
	17 Feb 2010	I	EC3	
	17 Feb 2010	AN	EC3	
	21 Feb 2010	F	EC3	2 young fledglings attended by adults (Fig. 18b).
	31 Mar 2010	J	PHU5	
	4 Mar 2014	B	EC3	3.2 m up in major fork of 8 m tall tree.
	6 Mar 2014	B	EC3	3 m up in large fork of a tree.
	6 Mar 2014	B	EC3	3.5 m up.
	6 Mar 2014	B	EC3	3.5 m up on a broken nubbin of a branch.
	7 Mar 2014	B	EC3	3.5 m up in major fork of tree.
	26 Mar 2014	N	EC3	4 m up under eaves of building, single nestling, 12.6 g.
	29 Apr 2000	N	EC14	
	7 Apr 2014	N	EC3	under awning of building.
	7 Apr 2014	N	EC3	under awning of building.
	7 Apr 2014	N	EC3	
Ecuadorian Thrush *T. maculirostris*	9 Apr 2006	J	EC3	juvenile foraging independently, with buff spots on wing coverts.
	4 Dec 2003	N	EC6	
	23 Feb 2014	I	EC2	4 m up on top of broken trunk, well hidden by bromeliads.
	8 Mar 2010	I	EC3	3 m up, three eggs.

	17 Jan 2011	I	EC1	3 eggs (28.7 × 20.9 mm, 6.2 g; 28.6 × 21.1 mm, 6.2 g; 30.3 × 21.1 mm, 6.4 g), 90 cm up, measurements: external diameter 14 cm; external height 9 cm; internal diameter 8 cm; internal depth 5.5 cm.
	17 Jan 2011	AN	EC1	5 m up.
	11 Feb 2010	I	EC3	3 eggs (Fig. 18e).
	13 Feb 2010	N	EC3	
	15 Feb 2010	F	EC3	at least one very young fledgling, just below nest, 2.3 m up in fork of 4.5 m sapling.
	11 Feb 2010	B	EC3	
	7 Mar 2014	B	EC3	8 m up in 15 m tall tree in thick fork.
Long-tailed	24 Mar 2009	N	LLA4	Fig. 18a.
Mockingbird	12 Apr 2006	B	EC3	
Mimus longicaudatus				
	31 May 2010	F	PMO5	begging fledgling.
	22 Jan 2012	F	LCH1	begging fledgling.
	7 Mar 2014	CM	EC7	adult carrying long stick.
	7 Mar 2014	AN	EC8	0.5 m up in *Acacia*.
	7 Mar 2014	AN	EC10	3.5 m up in *Acacia*.
	7 Mar 2014	I	EC9	see text (Fig. 18c).
	7 Mar 2014	CM	EC11	1.5 m up in major fork near center of spiny *Acacia* tree, both adults near nest, one carrying stick.
	7 Mar 2014	AN	EC12	adult sitting in nest.
	7 Mar 2014	AN	EC13	2.5 m up in *Acacia*.
House Sparrow	8 Apr 2012	N	TCO1	nest in crevice in a building.
Passer domesticus				
Thick-billed	3 Feb 2004	I	EC2	
Euphonia *Euphonia*	3 Mar 2004	I	EC2	
laniirostris				
	28 Feb 2006	CM	EC1	
	8 Apr 2006	F	EC3	male fed fledgling two different types of crushed fruits.
	12 May 2009	J	TTU4	
Orange-bellied	3 Feb 2004	I	EC2	
Euphonia *E.*	15 Feb 2004	CM	EC2	male and female carrying moss.
xanthogaster				
	27 Feb 2004	CM	EC2	male carrying material, female nearby.
Black-striped	3 Feb 2004	CM	EC2	
Sparrow	5 Feb 2004	B	EC2	in dense pasture grass, four sparrow eggs and two *M. bonariensis* eggs (Fig. 21d).
Arremonops conirostris	19 Feb 2004	I	EC2	found with a single, freshly laid egg.
	15 Mar 2004	B	EC2	adult with nesting material.
Orange-billed	26 Feb 2004	F	EC2	2 recently fledged young.
Sparrow *Arremon*	26 Feb 2004	F	EC2	
aurantiirostris	8 Mar 2004	B	EC2	
	16 Mar 2004	N	EC2	adults nearby with food, alarm calling.
	24 Mar 2004	F	EC2	fledglings can barely fly, feedings by adults observed.
Rufous-collared	24 Jan 2016	F	LCH1	fledgling following adult.
Sparrow	18 Mar 2016	F	LCH1	adult sparrow feeding fledgling *M. bonariensis*.
Zonotrichia capensis				
White-headed Brush-Finch	13 Mar 2012	Nest	LLA7	nest behind a big bromeliad, at the base, well hidden.

Atlapetes albiceps	18 Jun 2002	F	EC7	adult feeding fledgling.
	7 Mar 2014	CM	EC16	adult carrying pale fiber into a brush and branch tangle about 1 m above the ground.
Yellow-breasted Brush-Finch *A. latinuchus*	14 Feb 2000	F	EC14	fledgling following adults.
White-winged Brush-Finch *A. leucopterus*	18 Jun 2002	F	EC7	adult seen feeding fledgling.
	21 Apr 2015	F	PHU4	older fledgling.
Pale-headed Brush-Finch *A. pallidiceps*	11 Mar 2005	I	EC17	2 eggs (24.3 × 17.4, 25.0 × 17.5 mm).
	11 Mar 2005	I	EC17	2 eggs (23.6 × 17.1 mm, 3.62 g; 23.3 × 17.1 mm, 3.60 g).
	11 Mar 2005	I	EC17	2 eggs (23.5 × 17.5 mm, 3.79 g; 23.3 × 17.3 mm, 3.75 g).
	12 Mar 2005	I	EC17	2 eggs (24.5 × 17.5 mm, 3.97 g; 24.3 × 17.5 mm, 3.94 g).
	15 Mar 2005	N	EC17	2 nestlings.
	16 Mar 2005	I	EC17	2 eggs.
Bay-crowned Brush-Finch *A. seebohmi*	9 Apr 2012	F	PHU4	fledgling being fed by an adult, loudly begging for food.
Peruvian Meadowlark *Leistes bellicosa*	23 Mar 2009	N	LLA2	
	24 Mar 2009	J	LLA4	
	1 Aug 2009	J	PSU2	
Yellow-rumped Cacique *Cacicus cela*	24 Feb 2006	AN	EC1	most nests in a small colony were under construction.
	24 Feb 2006	B	EC1	
	25 Feb 2006	B	EC1	
White-edged Oriole *Icterus graceannae*	16 Jun 2009	J	PMO7	
	5 Jul 2010	J	TTU3	
Yellow-tailed Oriole *I. mesomelas*	22 Feb 2007	B	EC3	
	15 May 2009	J	TTU1	
	8 Jun 2009	J	PHU2	
	6 Apr 2014	N		3 nestlings weighing 4.8, 8.2, and 8.3 g, respectively (Fig. 24a).
Shiny Cowbird *Molothrus bonariensis*	15 Mar 2009	N	LCH1	nestling found on ground.
	3 Apr 2009	N	PMO3	fledgling fed by *C. fasciatus* for period of at least two weeks.
	16 May 2009	J	TTU1	
	17 Jun 2009	J	PMO7	
	10 Mar 2012	AN	LCH1	copulation observed.
	8 Feb 2004	I	EC2	2 cowbird eggs laid on same day in nest of *A. conirostris*.
	8 Feb 2004	I	EC2	single egg in nest of *R. flammigerus*.
	18 Mar 2016	F	LCH1	fed by adult *Z. capensis*.
Scrub Blackbird *Dives warczewiczi*	30 Jan 2004	N	EC2	
	24 Feb 2006	AN	EC1	
	24 Feb 2006	I	EC1	
	25 Feb 2006	I	EC1	
	26 Feb 2006	I	EC1	
	27 Feb 2006	I	EC4	
	27 Feb 2006	I	EC4	
	28 Feb 2006	I	EC1	3 eggs (Figs. 24b, 24c).
	10 Apr 2006	F	EC3	adults feeding at least one fledgling.
	11 Apr 2006	F	EC3	begging juvenile with adults, but no feeds seen.

	12 Apr 2006	F	EC3	pair feeding stub-tailed fledgling.
	30 Mar 2006	F	EC6	pair feeding 2 spotty-breasted fledglings.
	30 Mar 2006	F	EC6	
	7 Mar 2014	CF	EC22	adult carrying food into the top of vine covered tree, 6 m up.
	24 Feb 2014	AN	EC2	3.5 m up in spiny *Citrus* sp. tree in re-growing pasture.
	30 Mar 2006	CM	EC6	
	30 Mar 2006	B	EC6	
	4 Apr 2006	I	EC23	
	9 Feb 2010	I	EC3	
	11 Feb 2010	N	EC3	6.3 m up in an *Acacia* sp. tree, 9 m from center of tree, 1.5 from end, tree 10 m tall, both adults feeding.
	11 Feb 2010	AN	EC3	
	13 Feb 2010	AN	EC3	
	13 Feb 2010	I	EC3	
Masked Yellowthroat *Geothlypis aequinoctialis*	9 Jun 2009	N	PHU2	
	18 Mar 2005	N	EC17	3 newly-hatched nestlings (Fig. 23b).
Tropical Parula *Setophaga pitiayumi*	29 Feb 2004	AN	EC2	
	12 Apr 2006	B	EC3	male following female and singing as she builds.
	24 Mar 2010	J	PMO2	
Yellow Warbler *S. petechia*	25 Feb 2009	CM	PSE1	Fig. 23a.
Gray-and-gold Warbler *Myiothlypis fraseri*	10 Feb 2010	I	EC3	2 eggs about half-way developed.
	10 Feb 2010	B	EC3	ready to lay.
	10 Feb 2010	B	EC3	
	12 Feb 2010	B	EC3	
	12 Feb 2010	N	EC3	
	12 Feb 2010	N	EC3	4 mid-aged nestlings (Fig. 22c).
	14 Feb 2010	B	EC3	just starting to form ball.
	16 Feb 2010	CM	EC3	carrying material, female gathering fine dark fibers, male singing and following.
	18 Feb 2010	N	EC3	
	18 Feb 2010	N	EC3	
	28 Mar 2014	B	EC3	2 eggs laid by 3 Apr.
	6 Mar 2014	B	EC3	nest nearly complete (Figs. 22a, 22b).
	3 Apr 2014	N	EC3	2 older nestlings.
Three-banded Warbler *Basileuterus trifasciatus*	9 Apr 2012	F	PHU4	fledging being fed by an adult.
Slate-throated Redstart *Myioborus miniatus*	5 Feb 2004	B	EC2	5 m up in hanging clump of moss and epiphytes.
	28 Feb 2004	CM	EC2	
	4 Mar 2005	AN	EC17	2.5 m up in bromeliad clump.
	13 Mar 2005	B	EC17	
	1 Mar 2009	F	EC17	adult feeding older fledgling.
	6 Mar 2009	F	EC17	1 fledgling being fed by adult.
	6 Mar 2009	I	EC17	2 eggs, on ground in a bank cut.
Spectacled Redstart *M. melanocephalus*	7 Mar 2009	B	EC17	nest on a steep bank, nearly finished.
Hepatic Tanager *Piranga flava*	19 May 2009	J	TZA1	

Golden Grosbeak	24 Feb 2006	N	EC1	
Pheucticus	25 Feb 2006	I	EC1	
chrysogaster	8 Apr 2006	N	EC3	2 nestlings, died after apparent abandonment.
	8 Apr 2006	F	EC3	
	9 Jun 2009	F	PHU2	begging fledgling following adults.
	11 Feb 2010	I	EC3	Fig. 21c.
	13 Feb 2010	N	EC3	
	13 Feb 2010	AN	EC3	
	31 Mar 2006	I	EC6	
	17 Mar 2005	B	EC17	
	1 Mar 2009	F	EC17	adult feed older fledgling.
	27 Mar 2014	I	EC3	10 m up, at least one egg visible through bottom of nest.
	31 Mar 2014	I	EC3	5 m up, two eggs (28 × 19 mm, 5.3 g; 26 × 19 mm, 4.7 g).
	6 Mar 2014	B	EC3	3.8 m up saddled between two bromeliads on horizontal branch.
Green	3 Mar 2004	B	EC2	
Honeycreeper	18 Feb 2004	CM	EC2	adult female carrying large dead leaf.
Chlorophanes spiza				
Saffron Finch	13 Feb 2004	B	EC2	
Sicalis flaveola	16 Mar 2004	F	EC2	4 fledglings, no feed seen, but copious, loud begging.
	2 Apr 2006	F	EC6	
	18 Mar 2012	N	LFE1	4 young nestlings, 1 egg.
	20 Mar 2012	N	LFE1	6 nestlings.
	2 Dec 2015	F	LCH1	at least 4 juveniles seen.
	21 Jan 2016	F	LCH1	at least 5 older fledglings traveling with two pairs of adults.
Ash-breasted	7 Jun 2009	F	PMO3	
Sierra-Finch	6 Aug 2010	J	PMO3	
Phrygilus plebejus				
White-sided	11 Apr 2006	CM	EC5	female carrying bill-full of light green moss.
Flowerpiercer				
Diglossa albilatera				
Flame-rumped	4 Feb 2004	I	EC2	2 eggs, estimated hatch 6 Feb.
Tanager	4 Feb 2004	I	EC2	2 eggs, hatched 8 Feb.
Ramphocelus				
flammigerus				
	4 Feb 2004	N	EC2	
	4 Feb 2004	I	EC2	
	5 Feb 2004	I	EC2	
	7 Feb 2004	CM	EC2	female carrying material.
	7 Feb 2004	CM	EC2	female carrying material, male following (carrying piece of bark) at 07h45.
	7 Feb 2004	I	EC2	
	8 Feb 2004	I	EC2	2 tanager eggs, one of *M. bonariensis*, all hatched by 15 Feb (Fig. 19d).
	10 Feb 2004	CM	EC2	female carrying material at 10h00.
	11 Feb 2004	AN	EC2	female sitting on nest, contents not seen.
	14 Feb 2004	CM	EC2	female carrying material.
	15 Feb 2004	I	EC2	Fig. 19c.
	17 Feb 2004	B	EC2	
	19 Feb 2004	N	EC2	nest taken by Swallow-tailed Kite *E. forficatus* that swooped down and hit nest, picked up whole nest, carried it up and away, extracted one nestling, other dropped to ground.
	17 Mar 2004	B	EC2	
	21 Oct 2009	I	EC2	

Black-faced Dacnis *Dacnis lineata*	29 Feb 2004	B	EC2	female with nesting material.
Parrot-billed Seedeater *Sporophila peruviana*	24 Mar 2009	F	LLA4	1 begging fledgling with adults.
Thick-billed Seed-Finch *S. funerea*	2 Feb 2004	I	EC2	3 eggs, 2 hatched on 3 Feb (Fig. 20b).
	5 Feb 2004	I	EC2	
	19 Feb 2004	N	EC2	
	28 Feb 2004	I	EC2	
	3 Mar 2004	I	EC2	
Variable Seedeater *S. corvina*	1 Feb 2004	B	EC2	
	2 Feb 2004	B	EC2	
	8 Feb 2004	I	EC2	4 m up suspended in hanging clump of epiphytes in Guayaba tree (*Psidium* sp.), 2 eggs.
	8 Feb 2004	I	EC2	
	8 Feb 2004	I	EC2	Fig. 20c.
	9 Feb 2004	B	EC2	female building at 09h00, 5.5 m up in bromeliad clump in isolated pasture tree.
	17 Mar 2004	I	EC2	
	17 Mar 2004	I	EC2	
Yellow-bellied Seedeater *S. nigricollis*	1 Feb 2004	CM	EC2	female carrying seed down at 09h15, male chasing.
	20 Mar 2004	I	EC2	eggs hatch 23 Mar. Fig. 20a.
Buff-throated Saltator *Saltator maximus*	2 Feb 2004	B	EC2	clutch complete (2 eggs) by 7 Feb. Fig. 21b.
Streaked Saltator *S. striatipectus*	24 Feb 2006	I	EC1	3 eggs (Fig. 21a).
	26 Feb 2006	I	EC1	
	9 Apr 2006	B	EC3	building 3.7 m up in multiple small branches near outside of tree crown.
	11 Apr 2006	F	EC3	
	10 Feb 2010	B	EC3	actively building.
	16 Feb 2010	AN	EC3	
	31 Mar 2014	I	EC3	1.8 m up, 3 saltator eggs (29 × 18 mm, 5.2 g; 29 × 19 mm, 5.4 g; 29 × 19 mm, 5.4 g), one *M. bonariensis* egg (20 × 17 mm, 3.5 g).
	28 Mar 2014	I	EC3	6 m up, two 2–3 days old nestlings.
	6 Mar 2014	B	EC3	2 m up in branch tangle, almost complete.
Black-cowled Saltator *S. nigriceps*	17 Apr 2006	J	EC5	pair with older, begging fledgling.
Cinereous Finch *Piezorina cinerea*	23 Mar 2009	J	LLA4	
	3 Aug 2009	J	PTA1	
	13 Mar 2012	N	LFE1	
Collared Warbling Finch *Poospiza hispaniolensis*	23 Mar 2009	J	LLA4	
	8 Apr 2011	N	EC15	2 nestlings.
	1 Aug 2009	J	PSU2	
Bananaquit *Coereba flaveola*	1 Feb 2004	CM	EC2	adult carrying dead leaves and bromeliad seed down.
	1 Feb 2004	B	EC2	
	2 Feb 2004	B	EC2	
	10 Feb 2004	B	EC2	9 m up at end of branch.
	11 Feb 2004	B	EC2	8 m up in bromeliad clump.
	2 Mar 2004	B	EC2	
Dull-colored Grassquit	7 Feb 2004	I	EC2	

Asemospiza obscura				
Fawn-breasted Tanager	3 Feb 2004	B	EC2	1 adult bringing moss, fibers, and strips of dead leaves into moss hanging directly below horizontal branch.
Pipraeidea melanonota				
Blue-necked Tanager	3 Feb 2004	F	EC2	fledgling being fed by adults, traveling away from flock.
Stilpnia cyanicollis	4 Feb 2000	CM	EC14	
	9 Feb 2004	F	EC2	fledgling being fed by adults.
	2 Mar 2004	N	EC2	
Bay-headed Tanager	5 Mar 2004	AN	EC2	
Tangara gyrola				
Blue-gray Tanager	31 Jan 2004	I	EC2	
Thraupis episcopus	4 Dec 2003	N	EC6	
	3 Feb 2004	F	EC2	begging fledgling following adults.
	5 Feb 2004	F	EC2	fledgling fed by adults.
	6 Feb 2004	N	EC2	in bromeliad clump, two adults feeding.
	7 Feb 2004	N	EC2	Fig. 19b.
	8 Feb 2004	N	EC2	5 m up on side of trunk in bromeliad clump, both adults feeding at least one nestling.
	10 Feb 2004	I	EC2	
	17 Feb 2004	N	EC2	
	2 Mar 2004	I	EC2	
	5 Mar 2004	B	EC2	
	24 Feb 2006	B	EC1	
	1 Apr 2006	F	EC6	pair feeding 2 fledglings.
	2 Apr 2006	F	EC6	
	12 Apr 2006	F	EC3	adult gave masticated *Solanum* sp. fruit to one of two fledglings, retrieved it and then gave to other fledgling, then repeated.
	12 Apr 2006	F	EC3	
	21 Mar 2011	F	PMO3	adult feeding two fledglings.
Palm Tanager *T. palmarum*	31 Jan 2004	N	EC2	
	31 Jan 2004	N	EC2	
	1 Feb 2004	I	EC2	Fig. 19a.
Blue-capped Tanager	14 Feb 2000	B	EC14	adult carrying material.
Thraupis cyanocephala				
Rufous-throated Tanager	5 Feb 2004	F	EC2	fledgling fed small fruit by attending adult.
Ixothraupis rufigula				

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ARTÍCULO/ARTICLE

Observations on the parental care of the Yellow-bellied Elaenia *Elaenia flavogaster subpagana* (Tyrannidae)

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Observaciones del comportamiento parental de la Elenia Ventriamarilla *Elaenia flavogaster subpagana* (Tyrannidae)

Resumen

Observamos tres nidos de Elenia Ventriamarilla *Elaenia flavogaster subpagana* en La Selva, Costa Rica, uno de ellos con un solo pichón, observado por 21 h para documentar los comportamientos de incubación, crianza y alimentación. Cuantificamos el número de visitas por h por polluelo, las observaciones de traspaso de alimento y extracción del saco fecal, y podemos confirmar que dos adultos alimentaron a los polluelos. Los adultos visitaron el nido un promedio de 4,9 ± 0,6/h/polluelo. Observamos 18 eventos de alimentación entre los adultos. También observamos cinco casos de transferencia de alimentos del adulto que regresaba hacia el adulto que empollaba y finalmente al pichón. Los ítems alimenticios incluyeron Diptera, Coleoptera, Phasmatodea, Hymenoptera, Araneae y bayas.

Palabras clave: alimentación, Costa Rica, *Elaenia*, pichón, cuidado parental.

Abstract

We observed three nests of Yellow-bellied Elaenia *Elaenia flavogaster subpagana* in La Selva, Costa Rica. One nest had a single nestling, which was observed for 21 h in order to document incubation, breeding and feeding behaviors. We quantified number of visits per h to the nestling, as well as food transfer events and fecal sac removal, and confirmed that two parents fed the nestling. Adults visited the nest 4.9 ± 0.6/h/nestling on average. We observed 18 feeding events between adults, and five food transfer episodes of the incoming adult to the incubating adult, and then to the nestling. Food items brought to the nest included Diptera, Coleoptera, Phasmatodea, Hymenoptera, Araneae and berries.

Keywords: Costa Rica, *Elaenia*, feeding, nestling, parental care.

INTRODUCTION

Elaenia is a widespread tyrannid genus of tropical America represented by some 20 species. The Yellow–bellied Elaenia *Elaenia flavogaster* is a medium sized (16–17 cm; 21–29 g), widespread bird found from the southeastern parts of Mexico to northeastern Argentina (Hosner & Kirwan, 2019). Four subspecies are recognized, with *E. f. subpagana* (Brodkorb, 1943) found north of Panama to south-east Mexico (Hosner & Kirwan, 2019).

Elaenia flavogaster is relatively conspicuous, perching in the open and vocalizing frequently (Fitzpatrick *et al*., 2004). It inhabits a variety of woodland habitats as well as scrub and savanna, but generally not dense forest, and feeds on fruit and insects (Crowell, 1968). It has been reported feeding its nestlings both berries and small insects (Skutch, 1960) and both sexes are known to contribute to nest construction and parental care (Skutch, 1960; Stutchbury *et al*., 2007), but little additional work has been done on parental roles during reproduction. Adults are monomorphic in plumage, making it difficult to distinguish between sexes.

They are reported to live in pairs year–round and defend territories (ffrench, 1991; Stutchbury *et al*., 2007). Nests are compact, shallow cups built in a bifurcation or trifurcation of a horizontal, ascending, or erect branch, which may be either thin or thick (Skutch, 1960; Sherry, 1984; Chatellenaz & Ferraro, 2000). Firm, soft nest walls are composed of fine rootlets, vegetable fibers, bits of herbaceous stems and other fragments of vegetation, and lined with feathers and bark and held together with cobweb (Skutch, 1960; Fitzpatrick, 2004). Clutch size consists of two creamy white eggs, rarely one or three, and typically laid 2 days apart (Skutch, 1960). This study provides important observations on the frequency and duration of parental visitation during incubation and brooding, as well as limited identification of food items brought to the nestlings and observations on parental care.

METHODS

We studied nests of *Elaenia flavogaster* in the vicinity La Selva Biological Station, Puerto Viejo de Sarapiquí, Costa Rica (10.4220, -84.0150, 80 m a.s.l.) during March and April 2011. At one nest we recorded, at various intervals, the details of parental care during incubation and brood rearing, using a camouflaged video camera set on a tripod about 5 m from the nest. Mean time on nest and number of daily visits are reported as mean ± standard error (SE). Egg dimensions are given to the nearest 0.1 mm and weight to the nearest 0.01 g. We describe nestling growth and feather development following the terminology in Proctor & Lynch (1993).

RESULTS

A single nest was followed intermittently from nest construction through successful fledging, with a total of 2.8 h recorded during incubation, and 18.4 h recorded during the nestling period, all between 06h00–14h00 local time. Two additional nests, with two eggs each, were located and eggs were measured and weighed. Incubation at the single observed nest was 15–16 days and fledging occurred at 14 days.

Nest

Nests were built at heights of 1.2–4.8 m (N = 3), all saddled over horizontal branches smaller in diameter than the nest. Nests were composed of leaf rachides, leaves, and bits of flexible fibers, bound together with spiderwebs into a compact, fairly shallow cup. They were thinly lined with seed down, lepidopteran cocoons, and a few feathers. The inner lining was the last portion completed prior to laying of the eggs, though in some cases additional feathers were added during early incubation. Nests took between 3–5 days to complete and appeared to be constructed by only one individual, presumably the female, as this is the pattern typical of this species described by Skutch (1960).

Eggs and incubation

Egg measurements were taken from three nests (Table 1) within 1–2 days of laying. Fresh eggs had an average weight of 3.05 ± 0.13 g and measured 22.18 ± 0.25 × 16.16 ± 0.25 mm (N = 5). One nest was observed during early and mid-incubation for 2.8 h. On-bouts averaged 10.1 ± 4.2 min (N = 4) with off-bouts 8.2 ± 4.5 min (N = 3) and nest attendance was 56% overall. Only one adult was observed at the nest during incubation and, as we could not distinguish between the sexes, we can only presume that this was the female, as is well documented for other tyrannids (Fitzpatrick *et al*., 2004).

Table 1: Egg measurements collected from three Yellow–bellied Elaenia *Elaenia flavogaster subpagana* nests in La Selva, Costa Rica in March–April 2011.

Nest	Weight (g)	Dimensions (mm)	
		length	width
1- Egg 1	3.29	22.2	16.7
Egg 2	3.43	22.7	16.8
2- Egg 1	2.93	22.6	16.0
Egg 2	2.77	22.1	15.8
3- Egg 1	2.81	21.3	15.5
Mean	3.05 ± 0.13	22.18 ± 0.25	16.16 ± 0.25

Nestling development

One nest with a single nestling was measured during development, with the nestling weighed periodically until close to fledging. At hatching (weight = 3.3 g; Fig. 1), the nestling was pink skinned with a slightly orange cast. The tarsi and feet were similar in coloration, with white nails. The bill was dull yellow, the maxilla washed with dusky grey and bearing a small white egg-tooth. The gape was bright yellow and the mouth lining was bright orange-yellow. Dorsally, the nestling bore short, bright white tufts of natal down on the capital, spinal, femoral, cural, and alar tracts. Below, down coloration was similar, though sparser, and present on the cervical, submalar, ventral sternal, and ventral abdominal tracts. On all feather tracts, but especially on the capital and spinal tracts, individual nessoptiles were slightly more plumose basally, creating an overall spotted look to the nestling.

Two days later (weight = 5.8 g; Fig. 1), its appearance had changed little, but the bill had become more yellow, with reduced dusky coloration on the maxilla. The tarsi, and especially the toes, had become more yellowish. At 4 days old (weight = 9.2 g; Fig. 1) the nestling still had no visible contour feather development dorsally, but primaries and rectrices had just begun to emerge through the skin, and ventrally the emerging tips of contour feathers along the ventral sternal tract were visible as tiny white spots. The eyes remained closed. The most distinct visible change was a darkening of the skin dorsally, the dark reddish grey skin strongly contrasting with the dorsal down tufts. By 6 days of age (weight = 12.7 g; Fig. 1), nestling primaries had emerged through the skin *c*. 4–5 mm, secondary pins were emerged 2–3 mm, and wing coverts were 1–2 mm long. The rectrices had also emerged only 1–2 mm. Contour feathers were just emerging through the skin, whitish dorsally and yellowish ventrally. After this point, nestling feather development progressed much more rapidly. Eyes began opening between day 5 and 6, and feathers of the wing and tail ruptured their sheaths around day 8. By day 10 (weight = 15.8 g; Fig. 1), most contour feathers had broken their sheaths about 0.5 mm, with the exception of the capital tracts, which remained unbroken. Dorsally, contour feathers were olivaceous brown, ventrally they were olivaceous on the ventral sternal tracts, and bright yellow on the lower breast and abdomen. The bright white tufts of natal down remained along all feather tracts. The buffy tips of emerging wing coverts were beginning to form two visible wing bars. The bill was now largely dusky pink, darker along the culmen. The gape, the very tips of the mandible and maxilla, and the mandibular tomia remained bright yellow. The mouth lining had darkened to deep reddish orange, and the egg tooth was still attached.

By day 12 (mean weight = 17.3 g; Fig. 1), the nestling was well feathered, with coloration similar to that of 10-day-old nestlings. Natal down tufts had largely broken from the tips of emerging contour feathers, remaining only on some feathers of the capital and ventral abdominal tracts. The tips of the wing coverts were buffy white, forming two distinct wing bars. The tips and outer margins of the flight feathers and rectrices were buff. The basal halves of the secondary flight feathers and rectrices were still sheathed, as were the basal 1/3–1/4 portions of the primaries. The bill had become mostly black, contrasting strongly with the yellow gape and tomia of the mandible. The egg tooth remained attached. Eyes were now fully open and the nestling was now very alert, preening itself while alone in the nest and crouching low into the nest at the approach of observers. To avoid force-fledging young, it was not handled after 12 days of age. It left the nest with olive brown upperparts, no coronal patch, distinctly buffy wing bars, and tail about half the length of fully adult birds, generally similar to the description of immature birds given by Hosner & Kirwan (2019). At one nest, fledging occurred 14 days after hatching.

Parental care and feeding behavior

Behavioral observations were made at one nest on 2 days; the day of hatch (7.88 h) and day 5 post-hatch (10.43 h). Two individuals were observed simultaneously at the nest during brooding and feeding, although identification of individuals or sex was not possible. By day 5, one adult spent most of the time shading the nestling rather than brooding due to the exposed location of the nest and warm conditions. The average visit duration during the observed period was 12.7 ± 1.6 min (N = 174), with adults visiting the nest between 3 and 18 times per h to feed the single nestling. We observed 36 feeding events on the day of hatch (mean 4.5 ± 1.1 times/nestling/h) and 72 feedings on day 5 (mean 6.9 ± 0.7 times/nestling/h) (Table 2). There were 51 visits where the adult only brooded the nestling and an additional 15 visits where an adult visited but neither brooded nor fed. Nest attendance averaged 74% during the days observed after hatch.

While we could not confirm identity of the adults, one individual appeared to remain on the nest more frequently than the other. The second adult was observed bringing food items to the nest and either feeding the nestling directly or transferring the food item to the brooding adult (*i.e.*, allofeeding). In five of 106 feeding visits (4.7%),

the food item was transferred to the brooding adult before being fed to the nestling. In addition, on 18 occasions (16.9%) allofeeding occurred with the food ingested by the brooding adult rather than being fed to the nestling.

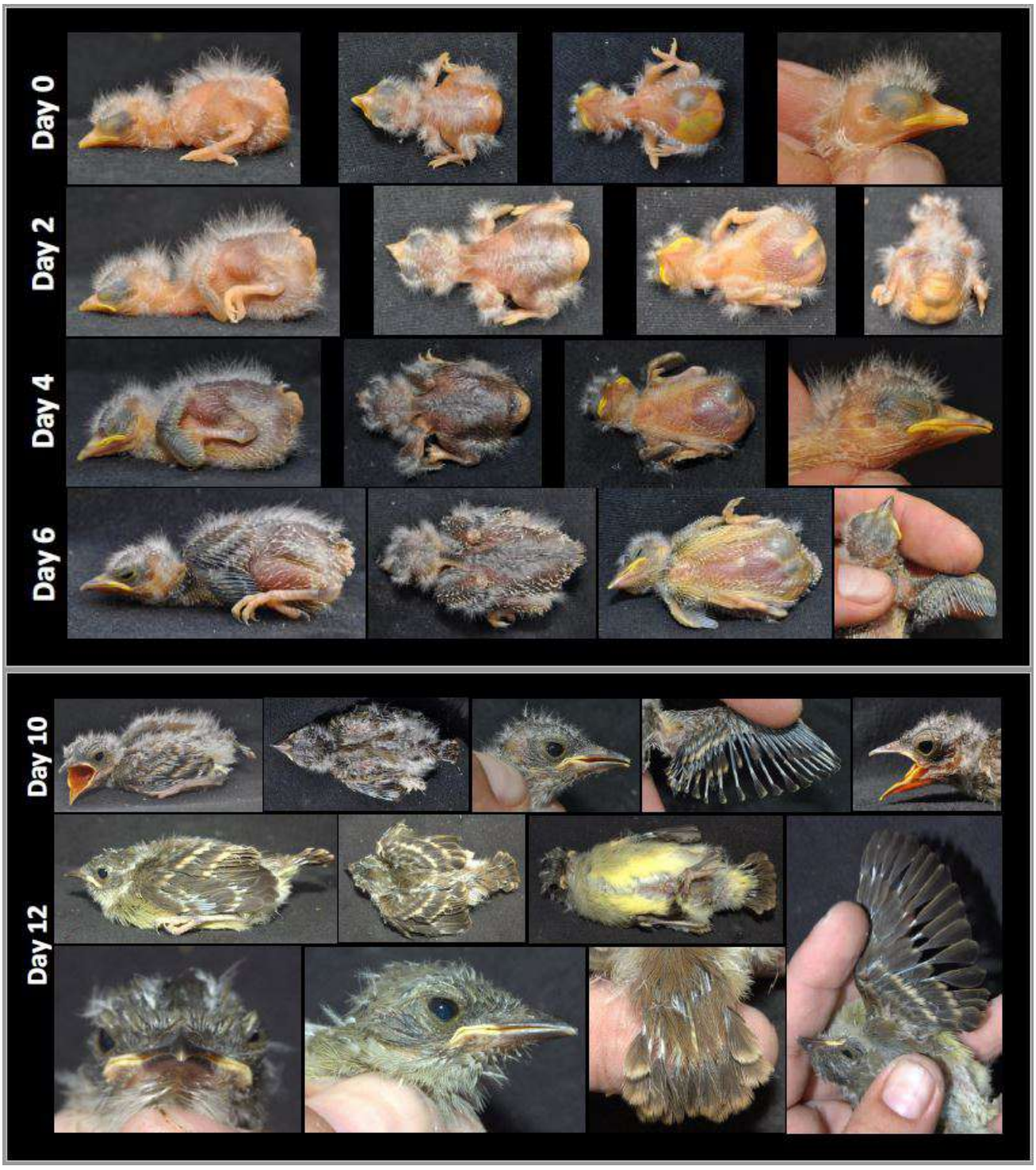

Figure 1: Growth and feather development of Yellow–bellied Elaenia *Elaenia flavogaster subpagana* at La Selva Biological Station, Costa Rica, in March–April 2011.

Food items

Most items brought to the nest were not identifiable due to the small size, condition of the item or video quality. A small percent of items was identified, and included invertebrates (Diptera, Coleoptera, Phasmatodea, Hymenoptera, and Araneae) and several types of berries. At least one bullet ant (*Paraponera clavata*) was fed to the nestling. On one occasion an adult was observed attempting to feed a berry to the nestling nine times over

the span of 40 s. The adult would place the berry in the nestling's mouth, remove it, replace it and then remove it again when the nestling had difficulty swallowing the item. Finally, the adult swallowed the berry and departed from the nest.

Table 2: Average number of feeding visits per h by two adult Yellow-bellied Elaenias *Elaenia flavogaster* near La Selva, Costa Rica during two days of nest attendance. Data from 18.4 h of observations that took place between 06h00–17h00 each day in March–April 2011.

Time of day	Feeding visits/h (mean)
06h00	4.5
07h00	7
08h00	2.5
09h00	7.5
10h00	5
11h00	3.5
12h00	6.5
13h00	7
14h00	7
15h00	10
16h00	4
Mean	5.9 ± 0.6

Nest maintenance behavior

Nest maintenance by removing fecal material was observed on 27 occasions (mean = 2.5 ± 0.2 /nestling/h). Adults ingested fecal sacs at the nest, often immediately after feeding the nestling. On other occasions, while one adult fed, the other adult ingested the fecal sac. Removal of the fecal material from the nest location was not observed.

DISCUSSION

This study adds to our understanding of *Elaenia flavogaster* nestling growth and parental behavior, including visit duration during incubation and brooding, feeding behaviors, and fecal sac removal. Biparental care occurs in this species, with both parents providing food to a single nestling in the nest we observed. Skutch (1960) describes both male and female provisioning a single nestling at a rate of 11–12 times/h for a nestling of comparable age, and elsewhere notes rates between 4–20 times/h (Skutch, 1947). Our rates were comparable to those described by Skutch, with as many as 18 visits/h when the nestling was 5 days old. We were unable to identify the sex of the adults at our nest, but circumstantial evidence suggests that female incubated and brooded, as described by Skutch (1960). One of the individuals appeared to stay at the nest in the days following hatch while the other (the putative male) would bring food items and depart. Nest attendance increased during brooding compared to incubation, with longer and more frequent bouts.

Elaenia species have been described as largely frugivorous (Foster, 1987), while *E. flavogaster* has been reported consuming *Cecropia* catkins (Oniki *et al*., 1994) and had 95.8% fruit by volume in their stomachs, comprising a wide variety of seeds and fruits like *Conostegia*, *Ficus*, *Hampea*, *Viburnum*, and *Sapium* sp. (Marini & Cavalcanti, 1998). We observed adults feeding a variety of berries to the nestling. In addition, we documented a variety of invertebrates, including insects and spiders, fed to the nestling, although the identified items represented only a small percentage of the total food items brought to the nest. Allofeeding and transfer feeding were common while observing this pair. While not previously documented for *E. flavogaster*, allofeeding is common among highly sociable birds and has been reported in other Tyrannidae (Fitzpatrick *et al*., 2004), as well as in Old World flycatchers (*e.g*., Narcissus Flycatcher *Ficedula narcissina*; Wang *et al*., 2008). Feeding during the reproductive cycle has been linked to increased nest attendance in a number of bird species (Matysioková & Remeš, 2014).

We did note a trend toward increased nest attendance during breeding compared to our observations during incubation (74% and 56%, respectively) and this may reflect the need to shield the nestlings from the sun and heat of the day. The exposed location of the nest on a horizontal branch may require higher levels of parental care compared to species nesting in more sheltered areas. Skutch (1960) noted this behavior commonly within his observations of *E. flavogaster* as well, and it may be a widespread behavioral trait, as this species has been frequently reported to nest in exposed locations.

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REVISTA ECUATORIANA DE ORNITOLOGÍA

COMUNICACIÓN CORTA/SHORT COMMUNICATION

Depredación del Tucán Andino Piquilaminado *Andigena laminirotris* (Ramphastidae) a una serpiente del género *Chironius* (Colubridae)

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Plate-billed Mountain Toucan *Andigena laminirostris* (Ramphastidae) depredation on a *Chironius* snake (Colubridae)

Resumen

El Tucán Andino Piquiliaminado *Andigena laminirostris* es una especie principalmente frugívora que complementa su dieta con invertebrados, vertebrados pequeños, huevos y pichones de otras aves. En esta nota reportamos el primer evento de depredación de *A. laminirostris* a una serpiente del género *Chironius* (Colubridae). Este reporte presenta aspectos ecológicos anteriormente desconocidos de *A. laminirostris*.

Palabras clave: *Andigena laminirostris*, *Chironius*, Colombia, depredación, dieta.

Abstract

Plate-billed Mountain-Toucan *Andigena laminirostris* is primarily frugivorous, but complements its diet with invertebrates, small vertebrates, eggs and nestlings of other birds. In this note, we present the first record of *A. laminirostris* preying upon a snake of the genus *Chironius* (Colubridae). This note presents behavioral data previously unknown for *A. laminirostris*.

Keywords: *Andigena laminirostris*, *Chironius*, Colombia, depredation, diet.

Existen cuatro especies de tucanes andinos del género *Andigena*, todas confinadas al norte de los Andes (Remsen *et al*., 2019), con un patrón de reemplazo geográfico o altitudinal entre especies (Fjeldså & Krabbe, 1990; Schulenberg *et al*., 2010; Ayerbe-Quiñones, 2018; Freile & Restall, 2018). La distribución geográfica de dos de estas especies de tucanes andinos se restringe a dos Áreas de Endemismo de Aves: el Tucán Andino Encapuchado *A. cucullata*, en las partes superiores de Yungas, en el sureste de Perú y noroeste de Bolivia, y el Tucán Andino Piquilaminado *A. laminirostris* en el Chocó, en el suroeste de Colombia y noroeste de Ecuador (Fjeldså & Krabbe, 1990; Stattersfield *et al*., 1998; BirdLife International, 2019).

Andigena laminirostris se considera como Vulnerable en Ecuador (Freile *et al*., 2019), En Peligro en Colombia (Renjifo *et al*., 2014) y Casi amenazado globalmente (BirdLife International, 2019), debido principalmente a la fragmentación y pérdida de hábitats. Habita bosques nublados subtropicales, primarios y secundarios maduros, entre 1600–2600 m s.n.m., donde se mueve principalmente en parejas por el subdosel (Ridgely & Greenfield, 2006). Aunque es localmente común, de tamaño relativamente grande, plumaje conspicuo y bastante vocal, se ha documentado poco sobre su historia natural (Renjifo *et al*., 2014).

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Su dieta es primordialmente frugívora (Beltrán, 1994; Short & Sharpe, 2019). Cumple un rol ecológico importante como dispersor de semillas, debido a que se mueve largas distancias entre parches de bosque (Holbrook, 2011). Además, se han documentado pocas observaciones anecdóticas de depredación de vertebrados (Beltrán, 1994; Solano-Ugalde, 2011; V. Portillo com. pers., 2019). En esta nota presentamos el primer registro de depredación de una serpiente por parte de *A. laminirostris*.

El 14 de Octubre de 2017, mientras observábamos aves en el sendero El Mirador-Las Piñas (1,16108, -77,97539, 1850 m s.n.m.), en la Reserva Natural La Planada, departamento de Nariño, vertiente occidental de los Andes de Colombia, observamos a un individuo de *A. laminirostris* capturar y alimentarse de una serpiente. A las *c.* 11h00 este individuo se movía rápidamente de una rama a otra en el dosel, a unos 10 m del suelo. De pronto, realizó un ataque directo y atrapó algo con su pico. Al momento de la observación pudimos determinar que se trataba de un probable colúbrido por la forma de la cabeza, forma del cuerpo, coloración verde oscura y cola delgada y larga (Torres-Carvajal *et al.,* 2019). El tucán sostuvo a la culebra de forma transversal con su pico, y la golpeó contra el tronco. La serpiente se envolvía en el cuello y pico del tucán. El tucán la dejó caer, pero la capturó nuevamente unos 3 m antes de que llegara al suelo (Fig. 1A).

Cautelosamente nos acercamos hasta *c.* 4 m para observar mayores detalles. Determinamos que la culebra medía aproximadamente 1,20 m de longitud. El tucán no huyó ante nuestra presencia, y tampoco abandonó a su presa. La sostenía firmemente con el pico, y la sacudió nuevamente. Usando sus patas alternadamente, la presionó contra el tronco y la mantuvo inmóvil. Continuó picoteando fuertemente hasta matarla. Los picotazos se enfocaron principalmente en la sección del cuerpo en donde se encuentran los principales órganos (e.g., pulmones y corazón), no en la cabeza. Empezó a rasgar y sacar trozos pequeños de carne con su pico, sujetando a la culebra con una pata. Los órganos fueron las primeras partes que ingirió. Después arrancó la cabeza, parte del cuello yparte del cuerpo, y los tragó (Figs. 1B y 1C). Por último, intentó tragarse la mitad restante de la culebra, pero no lo consiguió y la dejó caer. Todo este evento de depredación duró aproximadamente 30 min. El colúbrido fue identificado posteriormente, a partir de los registros fotográficos, como una especie indeterminada del género *Chironius* (Colubridae).

Al igual que todas las especies de Ramphastidae, *A. laminirostris* se considera principalmente frugívora (Remsen *et al*., 1993). Sin embargo, Beltrán (1994) y Short & Sharpe (2019) incluyen en la dieta de esta especie a insectos, caracoles, huevos, pichones y roedores. Solano-Ugalde (2011) documentó a una pareja de *A. laminirostris* alimentándose de un ilulo *Caecilia* sp. (Amphibia, Caecilidae) en la Reserva Bellavista, provincia de Pichincha, Ecuador. En esta misma localidad, el 3 de marzo de 2019, Juan Carlos Figueroa (com. pers., 2019) observó a una pareja de *A. laminirostris* alimentarse de una lombriz gigante en el suelo. Además, en la Reserva El Bosque, departamento de Nariño, Colombia, Verónica Portillo (com. pers., 2019) observó un *A. laminirostris* sujetando con sus patas a un colúbrido y dándole picotazos. Sin embargo, el tucán voló con el colúbrido en su pico, por lo que no se pudo determinar si fue un evento completo de depredación.

Se ha documentado que durante el cuidado parental, *A. laminirostris* alimenta a sus crías con insectos (Coleoptera), caracoles (*Isomeria* sp. y *Drymaeus* sp.), huevos, polluelos de otras aves y micromamíferos, que constituyen cerca del 20% de la dieta de origen animal (Beltrán, 1994). De igual manera, se han encontrado lombrices entre los alimentos entregados a un nido de un Tucán Andino Piquinegro *A. nigrirostris* (Solano-Ugalde, 2011). Muchas aves mayormente frugívoras incluyen vertebrados en las dietas de sus crías por el aporte de proteínas para su desarrollo (Morton, 1973), pero los eventos de depredación por parte de individuos adultos son escasos.

Las serpientes del género *Chironus* son generalmente diurnas, terrestres y arbóreas, y se encuentran en diversos pisos altitudinales (Torres-Carvajal *et al.,* 2019). Estas culebras se han documentado en la dieta de aves rapaces diurnas (e.g., Gavilán Coliblanco *Geranoaetus albicaudatus* y Halcón Reidor *Herpetotheres cachinnans*; Motta-Junior *et al.,* 2010; Costa *et al.,* 2014) y nocturnas (e.g., Búho Terrestre *Athene cunicularia*; Vieira & Teixeira, 2008), sin reportes previos de depredación por tucanes.

El presente reporte constituye el primer registro de depredación de *A. laminirostris* a un colúbrido, y podría tratarse del ítem alimenticio más grande registrado hasta el momento para la especie y el género *Andigena* en general. Aunque esta observación puede representar un comportamiento alimenticio accidental, la estrategia de caza y la precisión para matar al colúbrido sugieren que *A. laminirostris* podría incluir en su dieta a colúbridos de manera oportunista.

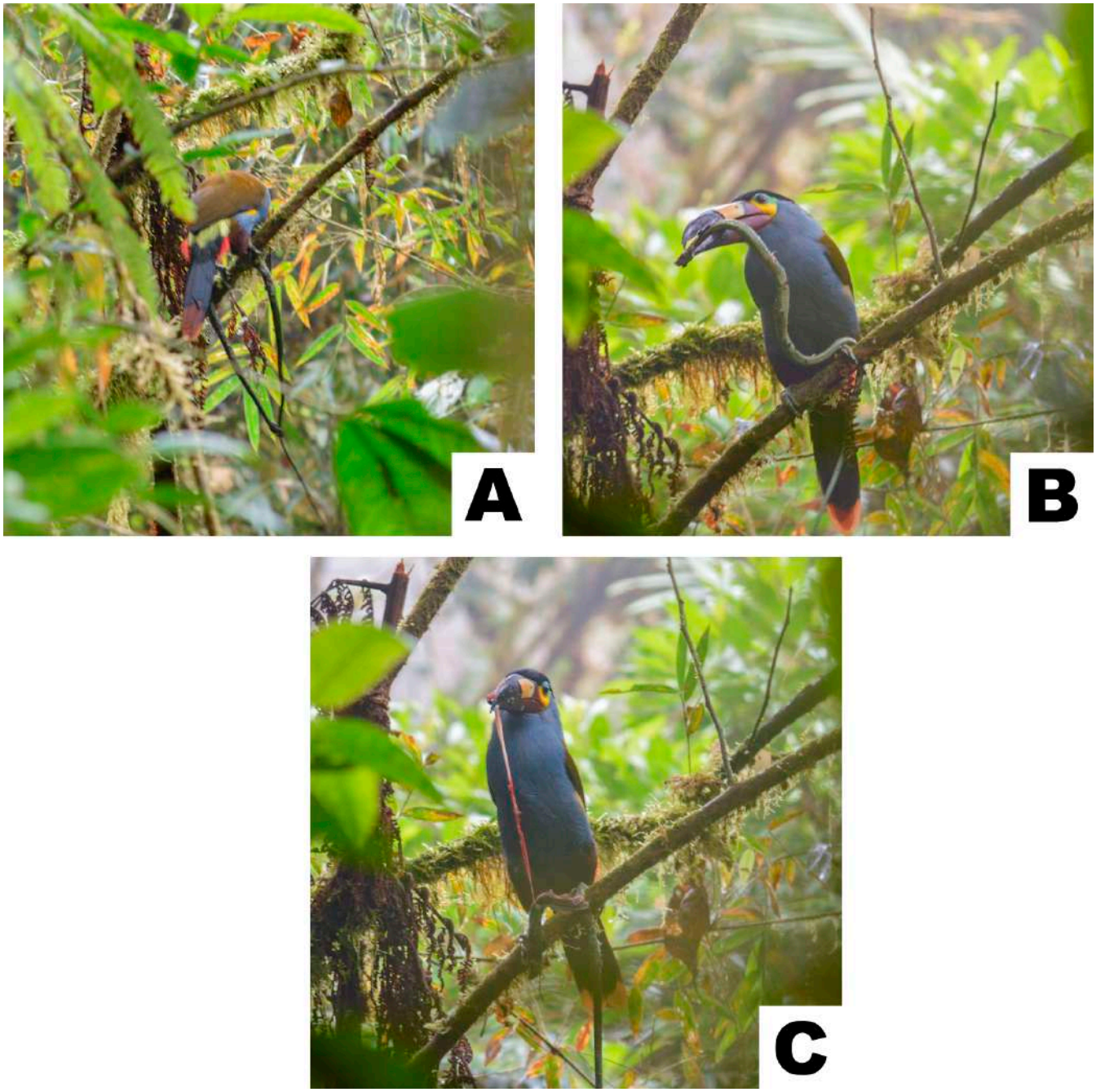

Figura 1: Tucán Andino Piquilaminado *Andigena laminirostris* alimentándose de una culebra del género *Chironius* (Colubridae), en la Reserva Natural La Planada, Nariño, Colombia. A) culebra recapturada después de haber intentado escapar. B) tucán sujeta el resto del cuerpo después de haberse comido los órganos, la cabeza y el cuello. C) tucán desgarra con el pico y come el resto del cuerpo (William A. Arteaga-Chávez y Dayana P. Togán-Murillo).

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REVISTA ECUATORIANA DE ORNITOLOGÍA

COMUNICACIÓN CORTA/SHORT COMMUNICATION

The nest, egg, and nestling of Many-striped Canastero *Asthenes flammulata flammulata* (Furnariidae) in northeastern Ecuador

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Nido, huevo y pichón del Canastero Multilistado *Asthenes flammulata flammulata* (Furnariidae) en el noreste de Ecuador

Resumen

El género *Asthenes* incluye alrededor de 27–30 especies de furnáridos predominantemente distribuidos en áreas montanas. Durante trabajo de campo en los altos Andes del noreste de Ecuador, descubrí cuatro nidos del Canastero Multilistado *Asthenes flammulata flammulata*. Todos los nidos eran estructuras musgosas, casi esféricas, con una entrada lateral y toda la cámara interior forrada con una gruesa capa de envolturas de semillas y pelaje. Todos los nidos fueron construidos en cavidades naturales formadas por vegetación densamente enredada, en o muy cerca del suelo. Dos puestas consistían en dos huevos cada una. Los huevos eran de color blanco inmaculado, de forma corta, ovalada. Los polluelos tenían piel de color naranja-rosado, con plumón de color gris en todas las áreas dorsales. Los picos de los polluelos eran de color naranja-opaco, con comisuras amarillo brillante y el interior de la boca era amarillo-anaranjado brillante. En forma general, los nidos y huevos descritos aquí son similares a otros miembros del género. Sin embargo, una revisión exhaustiva de la literatura indicó que más de la mitad de las especies de *Asthenes* actualmente reconocidas aún carecen de descripciones de sus nidos. Entre ellas se encuentran tres especies de interés para la conservación a nivel mundial.

Palabras clave: Andes, *Asthenes flammulata*, biología reproductiva, Canastero Multilistado, Furnariidae, historia natural, nido, pichón.

Abstract

The genus *Asthenes* includes around 27–30 species of slender, long-tailed furnariids, predominantly montane in distribution. During fieldwork in the high Andes of northeastern Ecuador, I discovered four nests of Many-striped Canastero *A. flammulata flammulata*. All nests were mossy, nearly spherical balls, with a centrally placed side entrance, and with the entire inner chamber lined with a thick layer of seed down and fur. All were built into natural cavities formed by densely tangled vegetation, on or very near the ground. Two clutches consisted of two eggs each. Eggs were immaculate white, oval to short-oval in shape. Nestlings had orange to pinkish skin at hatch, with sparse gray down plumes on all dorsal feather tracts. Their bills were dull orange with bright yellow rictal flanges, and their mouth linings were bright orange-yellow. In general form, the nests and eggs described here are similar to other members of the genus. A thorough review of the literature, however, indicates than half of the currently-recognized *Asthenes* species have yet to have their nests described. Among these, three species of global conservation concern.

Keywords: Andes, *Asthenes flammulata*, breeding biology, life history, Many-striped Canastero, natural history, paramo, reproduction.

Members of the genus *Asthenes*, as currently defined, have been historically placed in numerous other genera including *Siptornis*, *Schizoeca*, *Thripophaga*, and *Synallaxis* (Cory & Hellmayr, 1925; Peters, 1951). Recently, several additional genera have been merged with *Asthenes* (e.g., *Schizoeca*, *Oreophylax*), and several species have been placed in the newly-erected genus *Pseudoasthenes* (Irestedt *et al*., 2006, 2009; Moyle *et al*., 2009; Derryberry *et al*., 2010, 2011; Remsen *et al*., 2018). Thus, there are currently 27–30 species in the genus

(Dickinson & Christidis, 2014; del Hoyo & Collar, 2016; Remsen *et al*., 2018). Many-striped Canastero *Asthenes flammulata* lives at elevations above 2800 m a.s.l., in the high Andes from northern Colombia to southern Peru (Remsen, 2003; Ridgely & Tudor, 2009). In Ecuador, it occurs at 3200–4500 m a.s.l., and is fairly common where it occurs (Ridgely & Greenfield, 2001; Freile & Restall, 2018). Despite this, its nesting biology remains completely unstudied, apart from a single report of an active nest in Ancash, Peru (Fjeldså & Krabbe, 1990). Here I provide a description of the nest, eggs, and nestlings of this species based on four nests found in northeast Ecuador, and include a thorough review of the literature on *Asthenes* nesting biology.

I studied four nests in the vicinity of the pass above Papallacta, Napo, Ecuador (-0.332756, -78.200326). Habitat in this area is mostly humid paramo interspersed with patches of elfin forest covering those areas most sheltered from the wind. For more detailed habitat descriptions see Greeney & Harms (2008) and Greeney *et al*. (2011). I found nests opportunistically, during the course of other fieldwork, and was not able to revisit them with any regularity. The first nest was located at 4200 m a.s.l. On 13 December 2004 it contained two nestlings, approximately one day after their primary pin feathers ruptured their sheaths. On 29 September 2005, at 4000 m a.s.l., a second nest contained two eggs, one that was addled and one that hatched on 1 October. At this same elevation, a third nest contained two nestlings on 1 November 2006. The primaries of both nestlings appeared to have broken their sheaths *c*. 1–2 days previously. The fourth nest contained two eggs on 18 October 2006 at 3950 m a.s.l. One of these eggs was also addled, but the second egg was pipped when I examined them on 25 October. My only other observation on breeding activity in this area was a pair of adults feeding a stub-tailed juvenile on 26 November 2011, at 3950 m a.s.l. in the same area.

All four nests (Figs. 1, 2a, 2b) were thick, mossy balls, nearly spherical and with a centrally placed side entrance. All were built into natural, above-ground cavities formed by densely tangled bunch grass (*Festuca* sp.). The height of nests above the ground was difficult to assess, but was never more than 20 cm. Most nests would likely have been categorized as being on the ground by the casual observer. Mean dimensions of three nests (cm ± SD) were: outer diameter perpendicular to entrance, 15.8 ± 1.0; outer diameter front-to-back, 15.3 ± 1.5; outer height, 15.7 ± 1.2; entrance width, 4.8 ± 0.2; entrance height, 4.4 ± 7.7; internal chamber width, 7.3 ± 0.3; internal height from bottom of egg-cup, 7.5 ± 0.5, egg-cup diameter, 5.8 ± 0.8; and egg-cup depth, 4.3 ± 0.8.

Nests were all similar in composition. Their external portions were composed of a mixture of moss, small sticks, and grass stems, with the relative proportion of moss much reduced closer to the center. Within this outer shell, the entire nesting chamber was lined with a 1-1.5 cm thick layer of *Puya* sp. seed down (Bromeliaceae) and mammal fur, thickest in the lower portions of the nest. The egg-cup was further insulated with an additional 0.5-1 m of these same materials, with the inner portion of the cup also including a few feathers and, in some cases, a few short, flexible pieces of grass stems. The feathers appeared to be those of other species, but it seems possible that the grass stems in some nests fell in accidentally or perhaps came loose from the inner wall of the nest chamber.

The four eggs I examined were immaculate white (Fig. 2c), oval to short-oval in shape (following Harrison, 1984). Mean measurements (mm) were: 23.5 ± 0.8 × 17.8 ± 0.4. Nestlings were orange to pinkish-skinned at hatch (Fig. 2d), with sparse gray down plumes on all dorsal feather tracts. Their bills were dull orange with bright yellow rictal flanges, and their mouth linings were bright orange-yellow. The two half-grown nestlings (just prior to the emergence of primary pin feathers from their sheaths) weighed 19.4 and 17.3 g. Another two nestlings, 1–2 days after primaries broke their sheaths weighed 23.5 and 22.8 g.

As expected, the eggs of *A. f. flammulata* are immaculate white, as those of its congeners (Nehrkorn, 1899, 1910, 1914; Oates & Reid, 1903; Hartert & Venturi, 1909; Smyth, 1928; Hellmayr, 1932; Kreuger, 1967; Schönwetter, 1979; Remsen, 2003). A clutch of two eggs is also similar to the more equatorial *Asthenes* species. Previous nest descriptions within *Asthenes sensu lato* (Derryberry *et al*., 2010, 2011; Dickinson & Christidis, 2014) are available for 20 taxa (Table 1). Nests of Hudson's Canastero *A. hudsoni*, Streak-throated Canastero *A. h. humilis*, and Cipo Canastero *A. luizae* all appear particularly similar to the nests of *A. f. flammulata* described here. Even with the description of the nest of *A. f. flammulata*, the nest architecture and placement of more than half of the recognized species of *Asthenes* remain unavailable for comparison. Furthermore, breeding biology of the 14 species lacking nest descriptions, including three species of conservation concern (BirdLife International, 2019), remains almost entirely unknown: Berlepsch's Canastero *A. berlepschi* (Near Threatened); Line-fronted Canastero *A. urubambensis*, Junín Canastero *A. virgata*, Scribble-tailed Canastero *A. maculicauda*,

Puna Thistletail *A. helleri* (Vulnerable), Ayacucho Thistletail *A. ayacuchensis*, Vilcabamba Thistletail *A. vilcabambae*, Canyon Canastero *A. pudibunda*, Rusty-fronted Canastero *A. ottonis*, Maquis Canastero *A. heterura*, Eye-ringed Thistletail *A. palpebralis*, Ochre-browed Thistletail *A. coryi*, Perija Thistletail *A. perijana* (Endangered), and Mouse-colored Thistletail *(A. griseomurina)*.

Figure 1: Nests of Many-striped Canastero *Asthenes f. flammulata* near Papallacta, Napo, Ecuador (H. F. Greeney).

Despite the ever-growing body of literature available on the biology of Neotropical birds (Freile *et al*., 2014), our knowledge of their reproductive ecology, particularly in megadiverse countries such as Ecuador (Greeney, 2015), remains far from complete (Heming *et al*., 2013). On the bright side, both historical and current nesting records can now be searched and acquired with increasing ease via online resources like Scopus (https://www.scopus.com/home.uri) and Biodiversity Heritage Library (https://www.biodiversitylibrary.org/). Nevertheless, the volume of available ornithological literature is vast and is expanding exponentially, making the compilation and organization of information a daunting and time-consuming task. As scientists and academic authors, we all stand upon the shoulders of those who came before us, just as future generations should rely on our own published works. Work we carry out now will be, and should be, a benefit to future authors. I therefore encourage not only the publication of breeding information on Neotropical birds, but also the inclusion of a well-researched bibliography relating to the taxa and topics covered in each publication.

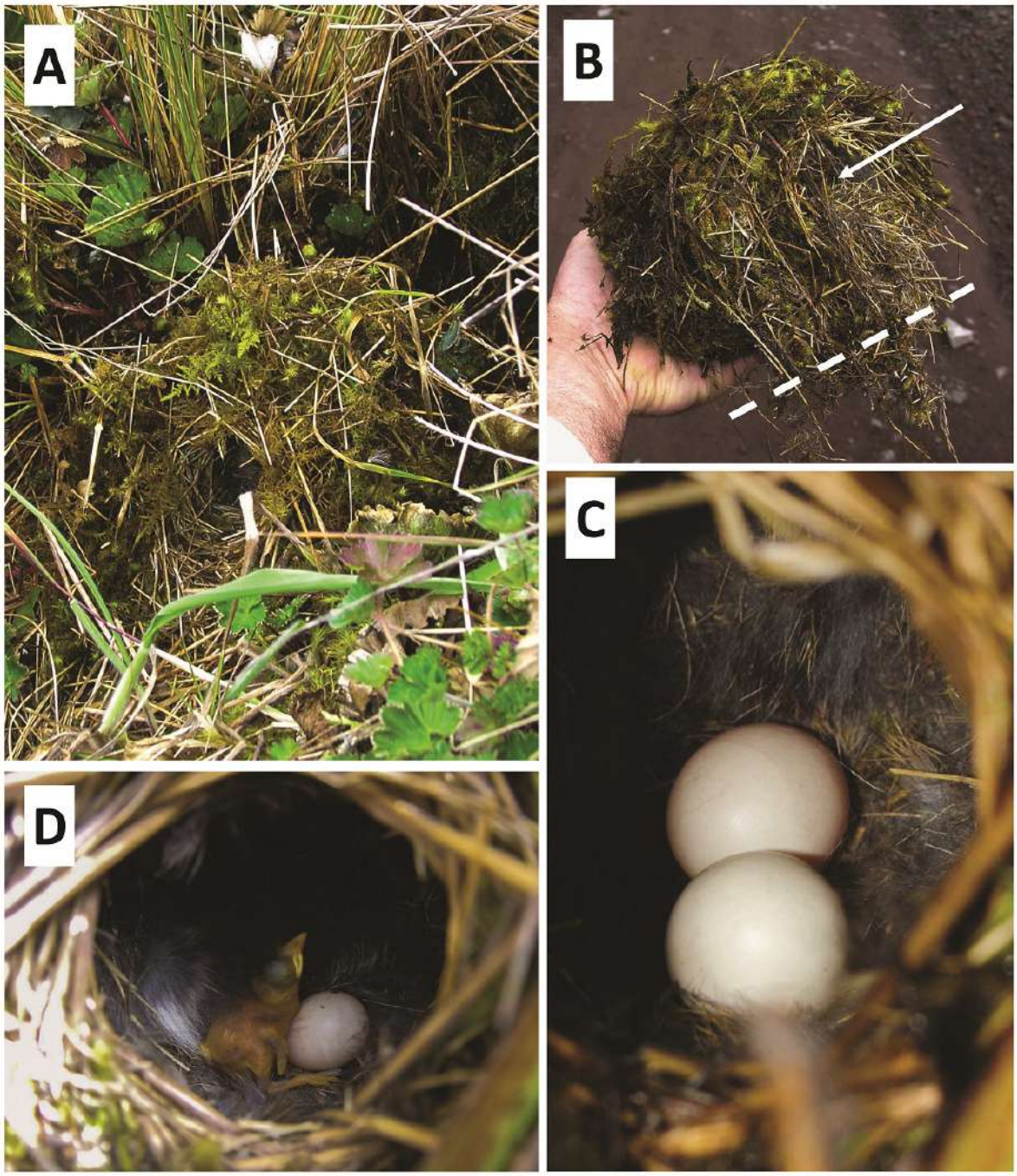

Figure 2: Breeding biology of Many-striped Canastero *Asthenes f. flammulata* near Papallacta, Napo, Ecuador. A) Nest, *in situ*, with surrounding vegetation removed; B) lateral view of a nest (held at an upward-tilted angle), *ex situ*. The white arrow indicates location of entrance and dashed white line shows the orientation of the ground below the nest; C) complete clutch of two immaculate white eggs. Note the thick layer of mammalian fur within the nest chamber; D) egg and newly-hatched nestling inside nest.

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Table 1: Published nest descriptions for the genus *Asthenes* (Furnariidae).

English name	Latin name	Source
Creamy-breasted Canastero	*A. dorbignyi dorbignyi*	Lönnberg, 1903; Narosky *et al.*, 1983; Salvador, 2015.
Dark-winged (Arequipa) Canastero	*A. dorbignyi arequipae*	Dorst 1956, 1957; Fjeldså & Krabbe, 1990; Lüthi 2011.
Pale-tailed (Huancavelica) Canastero	*A. dorbignyi huancavelicae*	Morrison, 1939.
White-tailed Canastero	*A. dorbignyi usheri*	Fjeldså & Krabbe, 1990.
Short-billed Canastero	*A. baeri baeri*	Hartert & Venturi, 1909; Pereyra, 1937; de la Peña, 1987; Mezquida, 2000, 2001.
Cipo Canastero	*A. luizae*	Studer & Teixiera, 1993; Gomes & Rodriguez, 2010.
Hudson's Canastero	*A. hudsoni*	Dalgleish, 1881; Sclater & Hudson, 1888; Hartert & Venturi, 1909; Grant, 1911; Hudson, 1920; Wetmore, 1926; Wilson, 1926.
Austral Canastero	*A. anthoides*	Pässler, 1922; Hellmayr, 1932; Philippi *et al.*, 1954; Narosky *et al.*, 1983.
Many-striped Canastero	*A. f. flammulata*	This study.
Streak-backed Canastero	*A. wyatti graminicola*	Dorst, 1963.
	A. w. aequatorialis	Phelps, 1977.
Puna Canastero	*A. s. sclateri*	Narosky *et al.*, 1983; de la Peña, 1987.
	A. sclateri punensis	Höy, 1975.
Streak-throated Canastero	*A. h. humilis*	Vaurie, 1980.
Cordilleran Canastero	*A. m. modesta*	Goodall *et al.*, 1957; Johnson & Goodall, 1967; de la Peña, 1987.
	A. m. australis	Goodall *et al.*, 1957; Johnson & Goodall, 1967; Narosky *et al.*, 1983.
Itatiaia Spinetail	*A. moreirae*	Sick, 1970, 1993.
Sharp-billed Canastero	*A. p. pyrrholeuca*	Wetmore, 1926; Pereyra, 1937; Nores & Yzurieta, 1975; Narosky *et al.*, 1983.
Sharp-billed Canastero	*A. p. sordida*	Goodall *et al.*, 1957; Johnson & Goodall, 1967.
Black-throated Thistletail	*A. harterti bejaranoi*	Vuilleumier, 1969.
White-chinned Thistletail	*A. f. fuliginosa*	Hilty & Brown, 1986.

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REVISTA ECUATORIANA DE ORNITOLOGÍA

COMUNICACIÓN CORTA/SHORT COMMUNICATION

El Caracara Montañero *Phalcoboenus megalopterus* (Falconiformes: Falconidae), registro de una nueva localidad al occidente de la provincia de Azuay

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Mountain Caracara *Phalcoboenus megalopterus* (Falconiformes: Falconidae), a new locality in western Azuay Province

Resumen

En Ecuador, el Caracara Montañero *Phalcoboenus megalopterus* se distribuye en los Andes del extremo sur. Los registros mayoritariamente se concentran en las provincias de Loja y Zamora Chinchipe. Sin embargo, al norte del límite conocido, en la provincia de Azuay, los registros de *P. megalopterus* son escasos y sin documentación. En esta nota se presenta el primer registro fotográfico en la provincia de Azuay. Un individuo adulto fue observado en agosto de 2018 en San Gerardo, cantón Girón, en los Andes occidentales de la provincia. Este registro representa una nueva localidad, las más septentrional, y sugiere que la especie podría distribuirse localmente hacia el norte del límite de su distribución conocido en Ecuador.

Palabras clave: Andes, bosque altoandino, Girón, distribución, Ecuador, *Phalcoboenus megalopterus*.

Abstract

In Ecuador, the Mountain Caracara *Phalcoboenus megalopterus* ranges in the southernmost Andes. Records come mainly from the provinces of Loja and Zamora Chinchipe. However, there are a few visual records north of the known distributional limit, in the province of Azuay, all undocumented. We present the first photographic record for Azuay Province. In August 2018, we observed and photographed one adult at San Gerardo, canton Girón, western Andes of Azuay. This record represents a new, northernmost locality, and suggests that the species may be locally distributed north of its current known distribution.

Keywords: Andes, Andean montane forest, Girón, distribution, Ecuador, *Phalcoboenus megalopterus*.

El Caracara Montañero *Phalcoboenus megalopterus* se distribuye principalmente en regiones andinas (>3500 m s.n.m.) de Perú, Bolivia, Chile y Argentina. En Ecuador ocupa la región altoandina al sur del país, en las provincias de Zamora Chinchipe y Loja (Fjeldså & Krabbe, 1990; Bierregaard & Kirwan, 2019). Esta especie ocupa predominantemente el ecosistema de páramo entre 2900–3800 m s.n.m. (McMullan & Navarrete, 2013; Freile & Poveda, 2019) (Fig 1). Es posible encontrarla en áreas abiertas forrajeando sola o en parejas.

Esta especie puede ser confundida con el Caracara Curiquingue *P. carunculatus* (Ridgely & Greenfield, 2001), especie endémica de los páramos andinos centrales (Stattersfield *et al*., 1998), que en Ecuador se distribuye desde la provincia de Azuay hacia el norte (Fjeldså & Krabbe, 1990; Freile & Poveda, 2019). La zona limítrofe entre Loja y Azuay se ha sugerido como posible zona de contacto entre *P. megalopterus* y *P. carunculatus* (Poulsen, 1993), lo cual sugiere una estrecha zona de simpatría entre estas dos especies (Ridgely & Greenfield, 2001).

El 30 de agosto de 2018 se fotografió un individuo adulto (Fig. 2) perchado por *c*. 15 min en la copa de un pino (*Pinus patula*) (-3,140737, -79,186678, 2839 m s.n.m). El hábitat era un mosaico de cultivos con remanentes de bosque montano en San Gerardo, cantón Girón, Andes suroccidentales de Azuay (Fig. 1). El individuo fue

identificado por su plumaje: garganta inferior y pecho negro entero sin listas blancas, rostro con una ligera proporción de piel roja implume y escasa detrás del ojo (Ridgely & Greenfield, 2006) (Fig. 2).

En Ecuador existen numerosos reportes de *P. megalopterus*, pero solamente 13 registros reportados en eBird disponen de evidencia fotográfica, todos ellos en la provincia de Loja (e.g., Davies, 2010; Miller, 2017; Ahlman, 2018; Vanegas, 2018). En la provincia de Azuay existen tres registros recientes: 1) Llaviucu, 16 km al noroeste de Cuenca; 2) cerca de la parroquia Jima, 29 km al sur de Cuenca; y 3) La Ramada, 43 km al sur de Cuenca (Black, 2015; Caddy, 2018; Licharson, 2019). No obstante, estos registros no presentan evidencia fotográfica u otro tipo de documentación, por lo que no es posible verificar si la identificación es acertada. Esto pone en evidencia la necesidad de documentar las observaciones de *P. megalopterus* fuera de su área regular de distribución.

Este reporte constituye el primer registro fotográfico de *P. megalopterus* en la provincia de Azuay, al norte del límite conocido de distribución de la especie. Los registros documentados más próximos son en Cerro de Arcos, *c*. 57 km al suroeste, provincia de Loja (Ahlman; 2018; Vanegas; 2018). Esta nueva localidad sugiere que su área de distribución podría ampliarse hacia el norte, con posibles registros localizados en los Andes del centro-sur de Ecuador. El registro de *P. megalopterus* dentro del rango de distribución conocido de *P. carunculatus* y los registros de *P. carunculatus* reportados por Poulsen (1993) dentro del rango de distribución conocido de *P. megalopterus* podrían sugerir que la zona de contacto entre estas dos especies es más amplia y se extiende más hacia el norte de lo reportado anteriormente (Poulsen, 1993). Es necesario desarrollar más estudios para comprender la distribución y las relaciones ecológicas entre estas dos especies en la aparente zona de contacto.

La identificación de campo entre *P. megalopterus* y *P. carunculatus* (los juveniles son casi indistinguibles; Ridgely & Greenfield, 2001, 2006) podría dificultar la determinación de los límites de distribución y zona de contacto de estas especies, y generar información errónea sobre nuevos registros para ambas especies. Por lo tanto, los registros al norte del área de distribución conocida de *P. megalopterus* deben ser sustentados con evidencia.

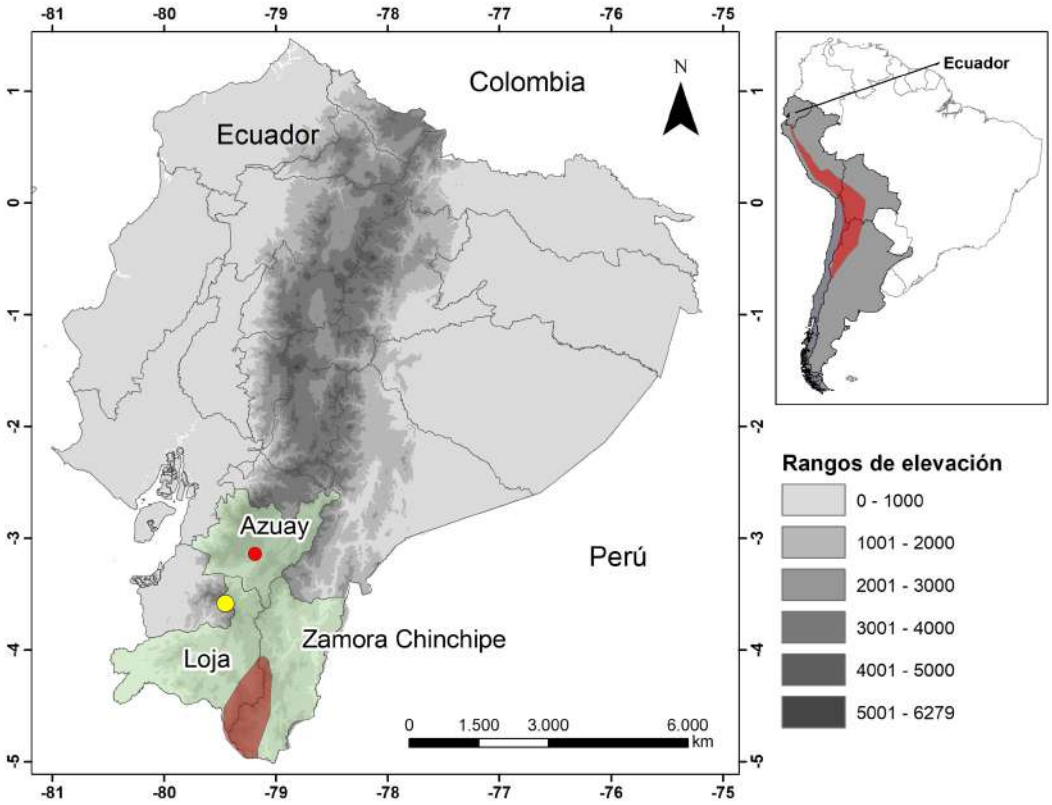

Figura 1: Nueva localidad del Caracara Montañero *Phalcoboenus megalopterus* en Ecuador (círculo rojo); registro documentado más cercano (Cerro de Arcos, provincia de Loja) (círculo amarillo); área de distribución de la especie en Sudamérica y Ecuador (polígono rojo; BirdLife International, 2016).

Figura 2: Caracara Montañero *Phalcoboenus megalopterus* en San Gerardo, cantón Girón, provincia del Azuay, 30 de Agosto de 2018 (Boris Landázuri).

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REVISTA ECUATORIANA DE ORNITOLOGÍA

COMUNICACIÓN CORTA/SHORT COMMUNICATION

Primeros registros de *Oxyura jamaicensis andina* en Ecuador

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First records of *Oxyura jamaicensis andina* in Ecuador

Abstract

Ruddy Duck *Oxyura jamaicensis andina* occurs in the Central Andes and the Altiplano Cundiboyacense, in Colombia. It represents an intermediate plumage between *O. j. jamaicensis* and *O. j. ferruginea*, with a marked individual variation in plumage pattern throughout its range, which has resulted in uncertainty about its taxonomic validity. In this note, I report the first records of *O. j. andina* in Ecuador, extending its distribution range by *c*. 250–650 km southwards, within the distribution range of *O. j. ferruginea*.

Keywords: Andes, distribution, hibridization zone, *Oxyura jamaicensis ferruginea*, range overlap.

Resumen

El Pato Rojizo *Oxyura jamaicensis andina* se distribuye en los Andes Centrales y el Altiplano Cundiboyacense, en Colombia. Representa un plumaje intermedio entre *O. j. jamaicensis* y *O. j. ferruginea*, con una marcada variación individual en el patrón de plumaje en toda su área de distribución, que ha derivado en que se cuestione su validez taxonómica. En esta nota informo sobre los primeros registros de *O. j. andina* en Ecuador, extendiendo su área de distribución en *c*. 250–650 km hacia el sur, dentro del ámbito de distribución de *O. j. ferruginea*.

Palabras clave: Andes, distribución, zona de hibridación, *Oxyura jamaicensis ferruginea*, solapamiento de distribución.

El Pato Rojizo *Oxyura jamaicensis* comprende tres subespecies distribuidas desde Canadá hasta Tierra de Fuego (Chile), en humedales desde el nivel del mar hasta 4500 m de altitud (Adams & Slavid, 1984; Fjeldså & Krabbe, 1990; Brua, 2001). La subespecie *O. j. jamaicensis* se encuentra desde el sur de Canadá hasta América Central y el Caribe, *O. j. ferruginea* se encuentra desde el sur de Colombia hasta Tierra del Fuego y *O. j. andina* es endémica de los Andes Centrales y el altiplano Cundiboyacense de Colombia (Lehmann, 1946; Muñoz-Fuentes *et al.,* 2013; Lozano-Jaramillo *et al.,* 2018).

El estatus taxonómico de *O. j. andina* ha sido cuestionado, considerándose una forma intermedia o híbrida entre *O. j. jamaicensis y O. j. ferruginea* por su plumaje facial intermedio entre las mejillas blancas de *O. j. jamaicensis* y las mejillas negras de *O. j. ferruginea* (Todd, 1979; Fjeldså, 1986). La variación individual en todo el rango de *O. j. andina* sugiere que su área de distribución es una zona de hibridación antigua y amplia (Fjeldså, 1986; Livezey, 1995). Por este patrón de plumaje intermedio entre *O. j. jamaicensis* y *O. j. ferruginea*, se ha argumentado que las tres formas representan una sola especie (McCracken & Sorenson, 2005; Muñoz-Fuentes *et al.,* 2013; Donegan *et al.,* 2015). Otros autores han sugerido separar *O. jamaicensis* y *O. ferruginea*, pero invalidar la subespecie *O. j. andina* debido a su supuesto origen híbrido (Livezey, 1995; Carboneras & Kirwan, 2019; del Hoyo *et al.,* 2019). Por el contrario, Lehmann (1946) y Clements *et al*. (2018) consideran a *O. j. andina* como una subespecie válida de *O. jamaicensis* por sus características morfológicas. Sin embargo, un estudio genético concluyó que *O. j. andina* podría ser considerada como una especie completa, debido a que la población de *O. j. andina* es genéticamente distinta de las poblaciones de *O. j. jamaicensis* y *O. j. ferruginea*

(Lozano-Jaramillo *et al.,* 2018). Debido a esta controversia taxonómica es importante colectar y publicar nueva información de campo sobre la distribución en las zonas de contacto entre *O. j. andina* y *O. j. ferruginea*. En este manuscrito se adopta el tratamiento de subespecie para *O. j. andina* (Lehmann, 1946; Todd, 1979; Fjeldså, 1986; Clements *et al.,* 2018).

Los machos de *Oxyura jamaicensis andina* se distinguen de *O. j. jamaicensis* y *O. j. ferruginea* por presentar una marcada variación de plumaje facial en toda su área de distribución. Los machos presentan patrones individuales en el plumaje de las mejillas, que varía entre diseños de líneas oblicuas que pueden formar una mancha blanca casi sólida en algunos individuos, mientras que otros muestran manchas irregulares pequeñas y dispersas (Adams & Slavid, 1984, Fjeldså & Krabbe, 1990).

Oxyura jamaicensis andina se distribuye entre 2500–4000 m s.n.m (Ayerbe-Quiñones, 2018). Habita principalmente en humedales y lagunas con delgadas capas de vegetación flotante (e.g., Salviniaceae y Araceae; Van der Hammen *et al.,* 2008). Se alimenta de semillas, raicillas, insectos, crustáceos y otros invertebrados acuáticos (del Hoyo *et al.,* 2019). Actualmente se considera En Peligro de extinción en Colombia, debido principalmente a la pérdida de hábitat, cacería y contaminación (Renjifo *et al.,* 2016).

En esta nota presento los primeros registros de *O. j. andina* en Ecuador (cf. Freile *et al*., 2019), obtenidos entre septiembre de 2016 y agosto de 2018 en siete humedales andinos (Figura 1). A continuación, se presentan los registros por localidad y en orden cronológico, con un total de 10 observaciones obtenidas a partir de visitas esporádicas de campo y mediante información que ha sido compartida por otros observadores de aves. La identificación de hembras se basó en el macho acompañante, por lo que es posible que correspondan también a *O. j. ferruginea* (ver más adelante).

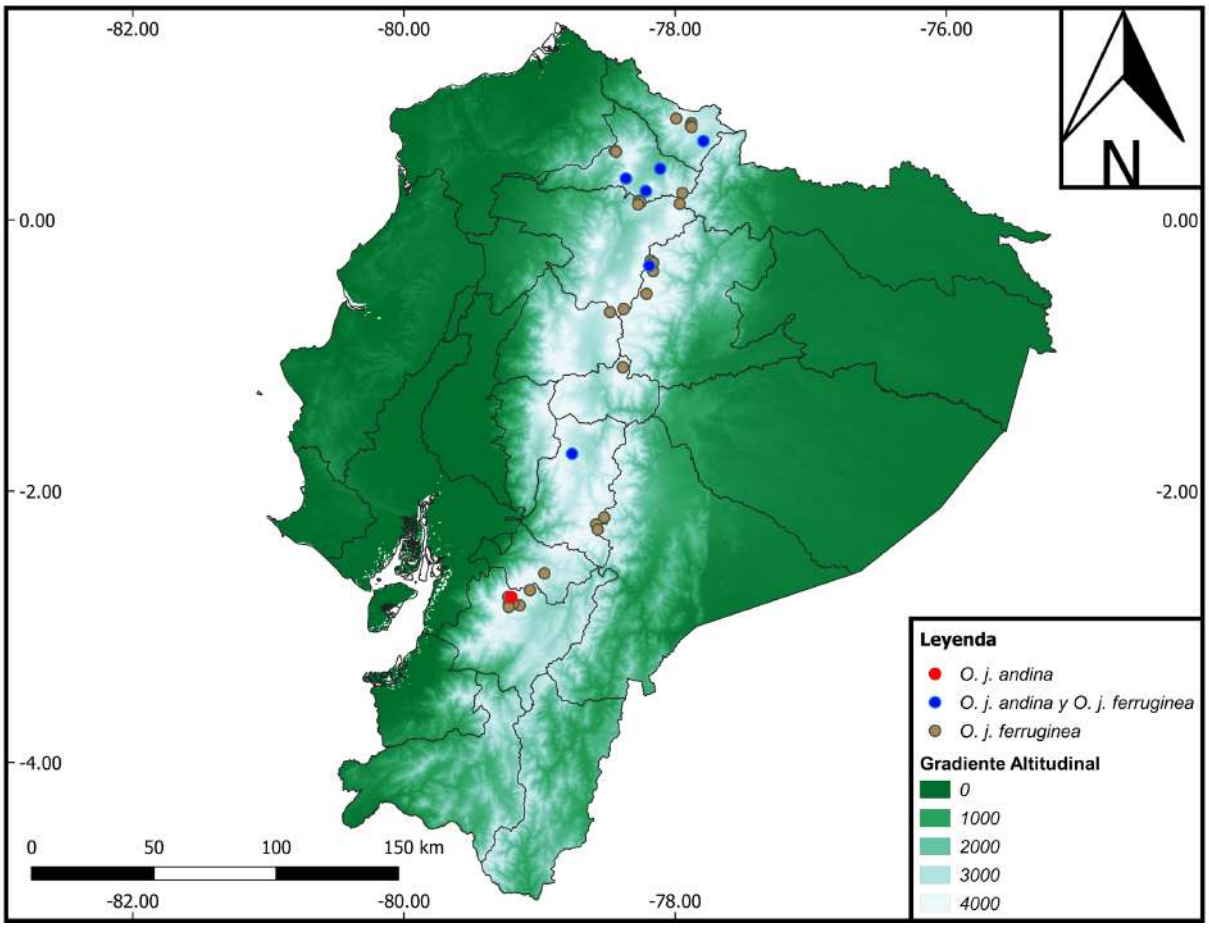

Figura 1: Localidades de observación y solapamiento de *Oxyura jamaicensis andina* y *O. j. ferruginea* en los Andes del Ecuador.

Yahuarcocha, provincia de Imbabura (0,37756, -78,11015; 2210 m s.n.m.)
El 4 de septiembre de 2016 se observó una pareja de *O. j. andina* descansando en el espejo de agua en la orilla oeste de la laguna, cerca de totorales (*Schoenoplectus californicus*). Mantenían su cuello y cabeza recogidos hacia un costado y permanecían aislados de otros grupos de aves acuáticas. Dos días más tarde, se encontró cuatro individuos en el mismo lugar (tres machos y una hembra), que nadaban y se zambullían junto a un grupo de *O. j. ferruginea.* Dos machos tenían una pequeña mancha blanca poco definida en la región malar y otro presentaba un parche blanco conspicuo en sus mejillas. La documentación fotográfica y de vídeo de este registro fueron reportados al Comité Ecuatoriano de Registros Ornitológicos (CERO; Freile *et al.,* 2019) (Figura 2A).

El 9 de julio de 2017, se registraron cinco individuos (una pareja con una cría y dos machos) 300 m al norte de las primeras observaciones, cerca de la orilla, en pequeños parches de totora. Dos machos se movían entre un grupo disperso de *O. j. ferruginea*, mientras que la pareja con una cría permanecía aislada. Los adultos vigilaban de cerca a su cría mientras se zambullía y forrajeaba bajo el agua (Figura 2B). Posteriormente, se observó a un macho de *O. j. ferruginea* acercarse hacia la pareja, pero este fue desplazado por el macho adulto de *O. j. andina.* El 7 de abril de 2018 se observaron dos machos de *O. j. andina* en el mismo lugar de la anterior observación. Se movían solos entre un grupo de *O. j. ferruginea*, mostrando un comportamiento de confrontación o rechazo ante individuos de *O. j. ferruginea* con movimiento de cabeza hacia arriba y abajo. El 21 de abril de 2018, se observaron tres individuos machos de *O. j. andina* en el mismo sector, descansando junto a dos hembras. Dos de estos individuos correspondían a registros previos. Una hembra cuya identidad subespecífica no pude determinar se acercó al grupo, pero fue rechazada por un macho en dos ocasiones (Figura 2C). El 10 de mayo de 2018, Y. Luna (com. pers.) registró en esta localidad una pareja de *O. j. andina* descansando con el cuello y cabeza recogidos a un costado cerca de un grupo de *O. j. ferruginea*. Un macho de *O. j. ferruginea* se acercó agresivamente a confrontar a los dos individuos de *O. j. andina*, los cuales respondieron con sonidos nasales mientras abrían y cerraban el pico y movían la cabeza hacia adelante y atrás. Ante el aparente dominio de *O. j. ferruginea*, los individuos de *O. j. andina* se zambulleron y buscaron refugio en los totorales (Figura 2D).

El Salado, provincia del Carchi, (0,58159, -77,79111; 2760 m s.n.m.)
En marzo de 2017, J. M. Loaiza (com. pers.) observó un individuo macho de *O. j. andina* moviéndose cerca de individuos de *O. j. ferruginea*.

San Pablo, provincia de Imbabura (0,21324, -78,21561; 2650 m s.n.m.)
El 7 de abril de 2018 se observó un macho de *O. j. andina* cerca de un grupo de *O. j. ferruginea* que se encontraban descansando en un parche de jacintos de agua (*Eichhornia crassipes*) en la orilla este del lago. Posteriormente, el grupo fue ahuyentado por unos pescadores y empezó a dispersarse. El individuo de *O. j. andina* se aproximó directamente a una pareja de *O. j. ferruginea*, pero el macho reaccionó irguiendo su cola, encorvando su cuello y cabeza, y confrontándolo. En respuesta a estos ataques, el individuo de *O. j. andina* se zambulló y se alejó.

El 5 de mayo de 2018, J. Chandi y Y. Luna (com. pers.) registraron tres machos de *O. j. andina* entre un grupo disperso de *O. j. ferruginea*. Observaron que los individuos de *O. j. ferruginea* mostraban un comportamiento de rechazo ante *O. j. andina*, similar al descrito anteriormente (Figura 2E).

Cuicocha, provincia de Imbabura (0,30548, -78,36293; 3068 m s.n.m)
El 29 de abril de 2018 se observó un macho de *O. j. andina* moviéndose en el canal El Ensueño, que separa los islotes Wolf y Yerovi. Estuvo alimentándose cerca a individuos de Focha Andina *Fulica ardesiaca,* aislado de individuos de *O. j. ferruginea*, que también se encontraban en este humedal (Figura 2F).

Sucus, provincia de Napo (-0,33841, -78,19063; 3930 m s.n.m)
El 25 y 26 de mayo de 2018 se observó un individuo macho de *O. j. andina* junto a un grupo disperso de *O. j. ferruginea*. En ambos días, se observaron dos individuos de *O. j. andina* que en ocasiones permanecían con algunas hembras, mismas que también se juntaban con machos de *O. j. ferruginea*. Este comportamiento, no permitió determinar si había una pareja de *O. j. andina* en esta laguna (Figura 2G).

Colta, provincia de Chimborazo (-1,72504, -78,75975; 3180 m s.n.m.)
El 28 de febrero de 2018 se observaron cinco individuos de *O. j. andina*: dos machos cerca de un grupo de *O. j. ferruginea* en la orilla norte de la laguna, y una pareja con una cría, que permanecía aislada en la orilla noreste (Figura 2H).

Laguna Patoquinoas, provincia de Azuay (-2.782045, -79.208416; 3810 m s.n.m.)
El 7 de agosto de 2018, J. Chandi (com. pers.) observó y fotografió a dos individuos machos de *O. j. andina* que se encontraban descansando en el espejo de agua (Figura 2I). Durante el tiempo de observación no se registró a *O. j. ferruginea*.

Figura 2: Registros fotográficos de *Oxyura jamaicensis andina* en humedales andinos de Ecuador. Los fotografos se mencionan junto a la fecha de cada registro. Yahuarcocha, provincia de Imbabura: (A) 6 de septiembre de 2016, Eduardo Obando; (B) 9 de julio de 2017, William Arteaga-Chávez; (C) 21 de abril de 2018, Dayana Togán; (D) 10 de mayo de 2018, Yolanda Luna. Cuicocha, provincia de Imbabura: (E) 29 de abril de 2018, William Arteaga-Chávez. San Pablo, provincia de Imbabura: (F) 5 de mayo de 2018, Yolanda Luna. Sucus, provincia de Napo: (G) 25 de mayo de 2018, Dayana Togán. Colta, provincia de Chimborazo: (H) 28 de febrero de 2018, William Arteaga-Chávez. Patoquinoas, provincia de Azuay: (I) 6 de agosto de 2018, Javier Chandi.

Los machos observados de *O. j. andina* en las siete localidades de Ecuador mostraron una marcada variación individual en el diseño de mejillas blancas. En el norte (Yahuarcocha, San Pablo y Cuicocha) presentaron parches blancos más conspicuos, de formas irregulares, mientras que los individuos más australes (Sucus, Colta y Patoquinoas), presentaron manchas pequeñas dispersas. Esta variación es similar a lo que ocurre en los Andes Centrales y Orientales de Colombia (Adams & Slavid, 1984; Fjeldså, 1986), aunque en Colombia también existen machos de *O. j. andina* que tienen parches blancos grandes y uniformes, similares a los machos de *O. j. jamaicensis*.

Se ha propuesto que *O. j. andina* podría considerarse como una especie y que la variabilidad fenotípica existente en la población no es el resultado de la afluencia reciente de individuos de otras poblaciones (Lozano-Jaramillo *et al.,* 2018). Sin embargo, los individuos registrados en Ecuador reflejan evidente variación, con fenotipos más cercanos a *O. j. ferruginea*, que tiene cabeza y cuello completamente negros y es la subespecie previamente registrada en Ecuador (Ridgely & Greenfield, 2006; McMullan & Navarrete, 2017). La variabilidad en el patrón de manchas blancas podría reflejar que hacia los extremos de su área de distribución muestran características más parecidas a las formas parentales. Así, las poblaciones de Colombia, hacia el norte, mantienen características más puras de *O. j. andina*, mientras que en las poblaciones más al sur, estas características empiezan a perderse gradualmente, adquiriendo características fenotípicas de *O. j. ferruginea* (Fjeldså, 1986; McCracken & Sorenson, 2005).

Estos registros de *O. j. andina* son los primeros en Ecuador, extienden su área de distribución en *c*. 250–650 km hacia el sur, tomando en cuenta el registro más norteño en El Salado y el más austral en Patoquinoas. Esta nueva área de distribución, y probable zona de hibridación, se sobrepone en gran parte con el área de distribución de *O. j. ferruginea* en Ecuador (Freile & Restall, 2018). Además, los reportes de Yahuarcocha, a 2200 m s.n.m, representan el registro a menor altitud (ver Ayerbe-Quiñones, 2018). La regularidad de los muestreos realizados en Yahuarcocha entre 2016 y 2018 sugiere que existe una población residente de *O. j. andina* que coexiste con *O. j. ferruginea.*

Dada la coexistencia de las dos subespecies en Ecuador, es probable que individuos de *O. j. andina* estén reproduciéndose con individuos de *O. j. ferruginea*. Se observaron dos parejas con una cría, integradas por un macho de *O. j. andina* y una hembra que podría corresponder a cualquiera de las dos subespecies, una en Yahuarcocha (Figura 2B) y otra en Colta (Figura 2H). La diferenciación entre subespecies en los machos es evidente, pero las hembras son muy parecidas (Fjeldså, 1986), por lo que estas crías podrían corresponder a una generación híbrida entre las dos subespecies. Esta similitud no permitió determinar si existía una preferencia selectiva de pareja por parte de los machos de *O. j. andina*.

Existen registros de *O. j. andina* en el sur de Colombia, en el área de distribución regular de *O. j. ferruginea* en ese país. En la laguna La Cocha, departamento de Nariño (1,10204, -77,14946; 2760 m.s.n.m), A. Mendoza y R. Fernández (com. pers.) fotografiaron un macho. Es probable que estos individuos provengan de poblaciones que ocurren regularmente en el sur de los Andes Centrales de Colombia, cuyo desplazamiento hacia el sur se deba a un posible crecimiento lento de la población. La Cocha se encuentra en la vertiente oriental del nudo de Los Pastos o Macizo Colombiano, donde divergen los Andes colombianos hacia el norte, y hacia el sur continúan los Andes ecuatorianos (Kattan *et al.,* 2004), que podría ser la ruta más favorable de dispersión.

Los datos recopilados en esta nota abren la oportunidad de estudiar las interacciones de estas dos subespecies ahora sintópicas, para determinar si existe dominancia de individuos de mejillas negras hacia individuos de mejillas blancas. En general, se observaron individuos de *O. j. andina* con grupos pequeños de *O. j. ferruginea*, aunque sin formar congregaciones, más bien forrajeando y descansando aisladamente. También se observaron interacciones agresivas de machos de *O. j. ferruginea* hacia machos de *O. j. andina.* Estos comportamientos podrían darse en respuesta a disputas territoriales (Siegfried, 1976). También es importante investigar si *O. j. andina* está ampliando su área de distribución, estableciendo poblaciones residentes en Ecuador y, por tanto, hibridando con *O. j. ferruginea*, o si se trata de una expansión temporal debido a un eventual crecimiento poblacional o a una posible migración a Ecuador en respuesta a la pérdida de hábitat en Colombia.

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REVISTA ECUATORIANA DE ORNITOLOGÍA

COMUNICACIÓN CORTA/SHORT COMMUNICATION

Observaciones sobre la fidelidad de territorio y expectativa de vida del Azulito Altoandino *Xenodacnis parina* (Thraupidae)

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Observations on territory fidelity and life expectancy of the Tit-like Dacnis *Xenodacnis parina* (Thraupidae)

Abstract

Little is known about the life expectancy of Andean birds. The Tit-like Dacnis *Xenodacnis parina*, distributed in Ecuador and Peru, is an Andean specialist found in patches of *Polylepis* characterized by the presence of *Gynoxys* shrubs. Several individuals were color banded at Cajas National Park in 2010. Three banded birds were recorded at the same locality 7 years after being banded. This study provides the first information on territory fidelity, social behavior, and longevity for the species, briefly evaluating the impact of road-killings. This information might prove important to support conservation actions for *X. parina*.

Keywords: Andes, behavior, color banding, fidelity, longevity, territories, threats.

Resumen

Se conoce poco sobre la expectativa de vida de las aves andinas. El Azulito Altoandino *Xenodacnis parina*, distribuido en Ecuador y Perú, es un ave especialista de los Andes que se encuentra en parches de *Polylepis* caracterizados por la presencia de arbustos del género *Gynoxys*. Se anillaron varios individuos de *X. parina* en el Parque Nacional Cajas, en 2010, con anillos de colores. Tres individuos fueron registrados en la misma localidad 7 años después de haber sido anillados. Este trabajo brinda la primera información de fidelidad de territorio, comportamiento social y longevidad de esta especie, y brevemente evalúa la mortalidad causada por atropellamientos. Estos datos pueden apoyar acciones de conservación para *X. parina*.

Palabras clave: Amenazas, Andes, anillamiento, comportamiento, fidelidad, longevidad, territorios.

Los Andes tropicales son un área importante en diversidad y endemismo (Myers *et al*., 2000). En los altos Andes tropicales se encuentran los bosques de *Polylepis* (Rosaceae) que, si bien no tienen una alta diversidad de aves, son hábitat de especies raras y especialistas que usualmente tienen distribuciones fraccionadas y están amenazadas por fragmentación de hábitat (Fjeldså, 1993; Donald *et al*., 2010). Una de estas especies es el Azulito Altoandino *Xenodacnis parina* (Thraupidae), distribuido discontinuamente en Ecuador y Perú, entre 3000–4400 m s.n.m. Esta especie muestra marcada predilección por zonas con presencia de arbustos de *Gynoxys* (Asteraceae), en donde se alimenta de áfidos y néctar extrafloral que se genera en el envés de las hojas de esta planta (Vuilleumier, 1984; Fjeldså, 1992; Fjeldså, 1993; Aguilar & Iñiguez, 2015).

En septiembre de 2010, Aguilar & Iñiguez (2015) colocaron anillos de colores a 20 individuos de *Xenodacnis parina* (nueve hembras, ocho machos y tres juveniles) en Illincocha, dentro del Parque Nacional Cajas (-2,766, -79,216; 4000 m s.n.m.). Mediante observaciones individuales de las aves anilladas, estos autores establecieron los ámbitos de hogar de seis de estos individuos en 680–7243 m^2, dependiendo de la abundancia de arbustos de

Gynoxys. Desde entonces, varios de los individuos anillados fueron observados casualmente en la misma localidad luego de ser monitoreados.

En febrero y septiembre de 2017 se observaron en la misma localidad tres individuos (dos machos y una hembra) que fueron anillados como juveniles en 2010. La observación tuvo lugar a pocos metros de donde fueron anillados, y estos individuos estaban acompañados de otros sin anillos. Esto indica que los individuos observados tenían al menos 7 años.

Xenodacnis parina es usualmente abundante (Fjeldså, 1993). Es probable que forme grupos familiares territoriales para disminuir la agresión intra-específica y aumentar el éxito reproductivo dado por este comportamiento cooperativo (Beletsky & Orians, 1989; Armstrong, 1995). Estas observaciones reflejan que *Gynoxys* provee suficientes recursos para que estos grupos familiares permanezcan en su territorio. Incluso se ha registrado a la especie con normalidad durante una caída inusual de nieve (O'Neill & Parker, 1978), lo que refleja su especialización a este recurso aun cuando los requerimientos energéticos para la termorregulación son altos (Londoño *et al*., 2015).

Aguilar (2016) encontró que los machos de la población del Parque Nacional Cajas son más pesados (media = 19,56 g; DS = 0,9; N = 8) que las hembras (media = 16,88 g; DS = 1,36; N = 9). Algunas aves de similar tamaño, también con dimorfismo sexual en masa corporal, tienen una expectativa de vida de 4–16 años (Lentino *et al*.; 2003; Wasser & Sherman, 2010), por lo que el registro de al menos 7 años de longevidad reportado en este trabajo se encuentra dentro de un rango esperado.

Conocer la longevidad de una especie es importante en estudios demográficos, y contribuye a entender la evolución de los patrones de senescencia (Bornschein *et al*., 2015). Se ha propuesto que la longevidad está relacionada a la masa corporal, la dieta y la sociabilidad de las especies (Wasser & Sherman, 2010). También, el clima de las altas elevaciones al parecer influye en la expectativa de vida de una población (Wasser & Sherman, 2010), debido a que induce una menor carga parasitaria y menos competidores (Finch 1998).

Por otra parte, el 10 de mayo de 2012 un macho adulto anillado en 2010 fue encontrado muerto en la carretera que cruza por el Parque Nacional Cajas, a 60 m de donde había sido registrado dos años antes. *Xenodacnis parina* es una de las especies con mayor mortalidad por colisiones con vehículos (Aguilar *et al*., 2019), por lo que esta carretera podría ser una fuente importante de mortalidad para poblaciones cercanas a la vía. Desde septiembre de 2017 no se han registrados individuos anillados en esta localidad. Aunque aún se conoce poco de su historia natural, las observaciones de tres individuos anillados en sus mismos territorios al menos 7 años después de ser anillados demuestran fidelidad territorial y de hábitat. Se espera que esta información contribuya para la conservación de la especie.

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REVISTA ECUATORIANA DE ORNITOLOGÍA

COMUNICACIÓN CORTA/SHORT COMMUNICATION

Notas sobre reproducción y dieta del Zamarrito Canoso *Haplophaedia lugens* (Apodiformes: Trochilidae) en Carchi, Ecuador

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Notes on breeding and diet of Hoary Puffleg *Haplophaedia lugens* (Apodiformes: Trochilidae) in Carchi, Ecuador

Abstract

Hoary Puffleg *Haplophaedia lugens* occurs in Ecuador and Colombia. It is rare, localized, and ranked as Near Threatened. At Cerro Golondrinas, Carchi, in May 2019, we observed a hanging cup nest adhered to the back of a tree fern frond. The nest was covered in moss and cobwebs on its outer side, while inside it was lined with ramenta (tree fern scales) and contained two nestlings. Besides nest description, we provide an account of plants on which this hummingbird fed.

Keywords: Chicks, juvenile, Near Threatened, nest, behavior, reproduction.

Resumen

El Zamarrito Canoso *Haplophaedia lugens* se distribuye en Ecuador y Colombia. Es considerado raro, localista y está catalogado como Casi Amenazado. En Cerro Golondrinas, Carchi, en mayo de 2019, observamos un nido en forma de taza colgante adherido al reverso de una fronda de un helecho arborescente. El exterior del nido estaba recubierto de musgo y telarañas, mientras que en su interior estaba forrado con ramenta (escamas de helecho arborescente), y contenía dos pichones. Además de la descripción del nido, se provee un recuento de las plantas en las que forrajeó este colibrí.

Palabras clave: Casi Amenazada, comportamiento, joven, nido, pichones, reproducción.

El Zamarrito Canoso *Haplophaedia lugens* está restringido a las laderas occidentales de los Andes del sur de Colombia y norte de Ecuador, y está evaluado como Casi Amenazado (BirdLife International, 2020). En Ecuador es raro y localista, y habita en bosques húmedos montanos (Ridgely & Greenfield, 2006; Freile & Restall, 2018).

Existe poca información sobre la reproducción de *H. lugens*. Sclater & Salvin (1879), sin especificar el tamaño de la muestra, detallan que el nido está compuesto principalmente de musgo y forrado por pubescencia de helechos. Oates & Reid (1903) mencionan las medidas de dos huevos en Antioquia, Colombia (0.54 × 0.35, 0.55 × 0.35; aunque no mencionan unidades, por el origen y año de la revista y por ser una medida razonable de huevos de colibrí, se interpreta que son pulgadas). Finalmente, Heynen & Boesman (2019) mencionan reproducción de *H. lugens* en agosto, con nido en forma de bola, compuesto principalmente de musgo y otro material vegetal unido con telarañas, adherido a la parte inferior de un helecho o una hoja grande a 0,5–2 m del suelo. Además, mencionan una puesta de dos huevos blancos que fueron incubados durante 15–17 días, solo por la hembra. Describen un pichón color carne con dos hileras de dorado grisáceo en la parte baja dorsal y un período de dependencia 20–24 días (Heynen & Boesman, 2019).

Monitoreamos un nido de *H. lugens* encontrado en el Bosque Protector Cerro Golondrinas, un área protegida comunitaria de ~135 000 ha, al noroccidente de Carchi. El área tiene bosques muy húmedos, terreno escarpado, árboles con alta densidad de epifitas y sotobosque dominado por *Chusquea* sp. (Palacios, 2012).

El 19 de mayo de 2019 se observó un adulto de *H. lugens* inusualmente activo; atacó y sacó del área a varias aves que pasaban cerca de su percha. Posteriormente, voló hacia un nido con dos pichones a los que alimentó. El nido estaba localizado en un área de terreno plano (0,835827, -78,227132; 2360 m s.n.m.), rodeado de pendientes pronunciadas y vegetación achaparrada, cerca del borde de bosque. El nido estaba adherido al envés y en la parte distal de una pinna (cada división de la fronda del helecho), en la sección media de la fronda de un helecho arborescente (Cyatheaceae). El nido se sujetaba con telarañas a tres pares de pínnulas y colgaba hasta el final de la pinna, sin sobrepasarla; en el haz de la pinna no se evidenciaba mayor modificación en su forma, por lo que pasaba inadvertido adherido en su envés (Fig. 1). El nido estaba construido a 1,30 m del suelo, mientras todo el helecho medía ~1,5 m de altura. Tenía forma de copa ligeramente achatada, con 7 cm de alto en la parte posterior y 6 cm en la parte anterior; 7 × 7 cm de diámetro externo; 4 × 3 cm de diámetro interno (medidas tomadas en cruz); y 4 cm de profundidad en el centro de la taza. La estructura externa consistía de musgos y telas de araña, e internamente de ramenta.

Figura 1. Ubicación del nido de Zamarrito Canoso *Haplophaedia lugens* en el envés de una pinna de helecho (Cyatheaceae), en Cerro Golondrinas, Carchi, mayo de 2019. (Daniel Valencia).

Heynen & Boesman (2019) mencionan, sin referencias, que el nido de *H. lugens* es en forma de bola. Esto no coincide con nuestro nido en forma de taza colgante. En realidad, no existen descripciones detalladas de la forma del nido de *H. lugens*. Sin embargo, las descripciones, fotografías e ilustraciones del nido de *H. aureliae*, coinciden con la nuestra (Miller, 1963; Schuchmann, 1979, 1990). En esta especie, el nido tiene forma de taza colgante, adherido al reverso de una fronda de helecho (Miller, 1963; Schuchmann, 1979, 1990).

El 19, 24 y 28 de mayo de 2019 se observó el nido por *c*. 1 hora al medio día, registrándose cada día entre 2–3 visitas del adulto para alimentar los pichones en el nido (Fig. 2). El vuelo de acceso al nido fue característico: perchaba a *c*. 4 m del nido y *c*. 1 m del suelo por unos segundos, y emprendía luego un vuelo muy rápido, en ascenso, para realizar un vuelo en forma de lazo antes de entrar al nido (Fig. 3). El 2 de junio de 2019 ya no se

encontraron pichones en el nido. A pesar de hacer una búsqueda minuciosa por el área, no se observó a los volantones. Se registraron tres individuos adultos de *H. lugens* en las cercanías, cada uno separado por al menos 100 m.

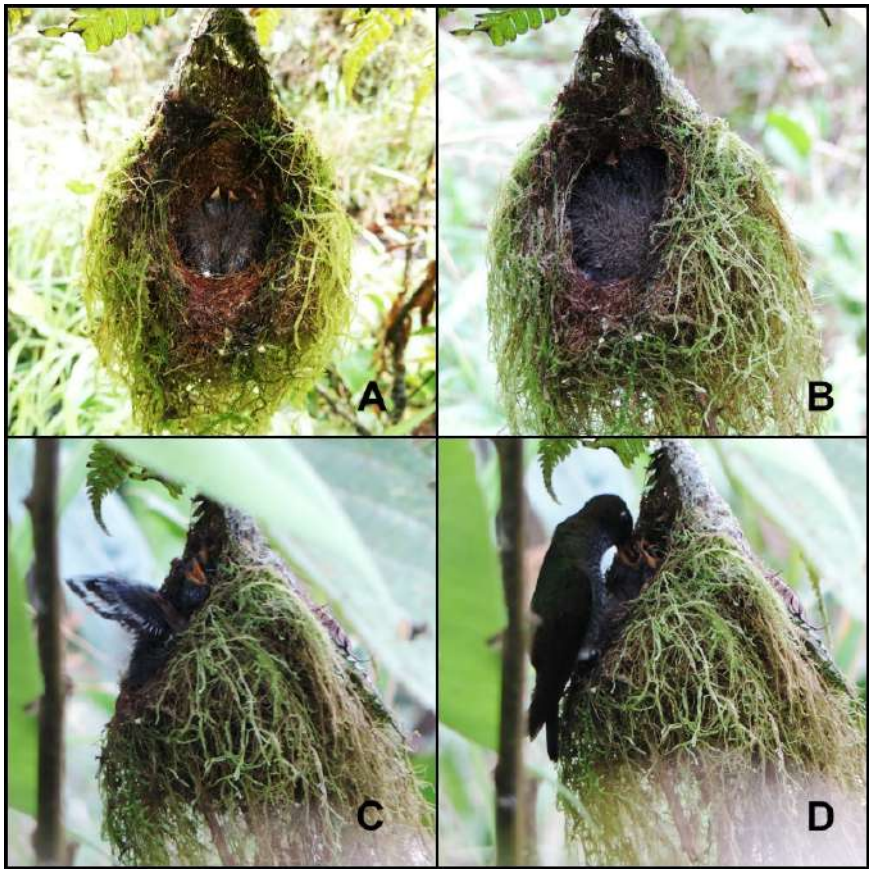

Figura 2. Nido y pichones Zamarrito Canoso *Haplophaedia lugens* en Cerro Golondrinas, Carchi. A) Pichones, 19 de mayo de 2019; B) pichones, 24 mayo de 2019; C) pichones, 28 de mayo de 2019; D) adulto alimentando pichones, 28 mayo de 2019. (Daniel Valencia).

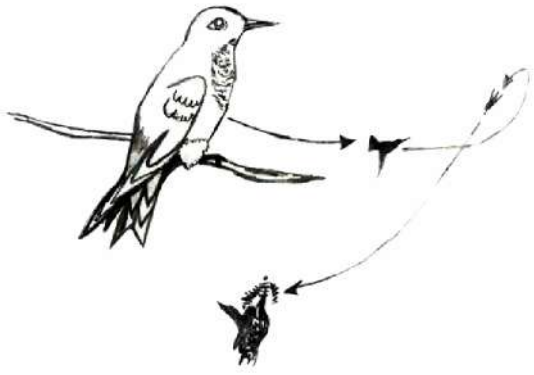

Figura 3. Vuelo de acceso al nido de Zamarrito Canoso *Haplophaedia lugens*, monitoreado en Cerro Golondrinas, Carchi, mayo de 2019. (Daniel Valencia).

Adicionalmente, el 19–20 de febrero de 2020, a *c*. 700 m del nido, se observó a un individuo joven con la base del pico color amarillo. Este fue alimentado por un individuo adulto, mismo que previamente forrajeó en flores de *Guzmania* sp. (Bromeliaceae). El 20 de febrero se contabilizaron siete visitas del adulto para alimentar al joven en el lapso de 90 min, al medio día (Fig. 4).

Figura 4. Zamarrito Canoso *Haplophaedia lugens* alimentándose de *Guzmania* sp. (Bromeliaceae) (izq.), previo a alimentar a un individuo joven (der.), en Cerro Golondrinas, Carchi, febrero de 2020. (Daniel Valencia).

En el área del nido se observó que *H. lugens* defiende un territorio con abundantes floraciones de *Palicourea* sp. (Rubiaceae), *Miconia* sp. (Melastomataceae) y *Thibaudia* sp. (Ericaceae), de las que se alimentó (Fig. 5). Se observó interacciones de defensa territorial contra Silfo Colivioleta *Aglaiocercus coelestis*, Inca Collarejo *Coeligena torquata*, Coronita Colianteada *Boissonneaua flavescens*, Colaespátula Zamarrito *Ocreatus underwoodii* y Tangara Golirrufa *Ixothraupis rufigula*.

Figura 5. Flores de las que se alimentó el Zamarrito Canoso *Haplophaedia lugens* en Cerro Golondrinas, Carchi. A) *Miconia* sp. (Melastomataceae); B y C) *Palicourea* sp. (Rubiaceae); D) *Thibaudia* sp. (Ericaceae). (Daniel Valencia).

Los eventos reproductivos de *H. lugens* (nido en mayo y joven en febrero), coinciden con la temporada lluviosa en la zona, que usualmente es entre octubre a mayo. Se requieren más estudios para determinar si existe una temporalidad de reproducción y también determinar con qué otras especies vegetales tiene interacciones a lo largo del año.

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REVISTA ECUATORIANA DE ORNITOLOGÍA

NOTAS DE CAMPO/FIELD NOTES

Tucanete Lomirrojo *Aulacorhynchus haematopygus* depredando a un colibrí

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Usualmente, los tucanes (Ramphastidae) son considerados frugívoros. Sin embargo, existen reportes de otros ítems alimenticios en su dieta, incluyendo insectos grandes, vertebrados pequeños, huevos y pichones de otras aves (Remsen *et al*., 1993).

El 22 de abril de 2017, alrededor de las 9h00, fotografié un individuo de Tucanete Lomirrojo *Aulacorhynchus haematopygus* en Tandayapa Bird Lodge (0,000069, -78,677751, 1740 m s.n.m.), provincia de Pichincha, depredando a una Coronita Colianteada *Boissonneaua flavescens* (Fig. 1). Este tucanete saltaba en las ramas alrededor de los bebederos para colibríes, y de manera rápida se lanzó y atrapó con el pico al colibrí en vuelo. Este luchó por liberarse, sin éxito. El tucanete se perchó en una rama cercana a *c*. 1,5 m del suelo, donde compactó a su presa usando patas y pico, y la engulló entera. Todo el evento duró menos de un minuto.

Remsen *et al*. (1993) encontraron restos de artrópodos, huevos y vertebrados en únicamente 6,7% de 326 contenidos estomacales de 32 especies de tucanes. Por su amplio muestreo, sugieren que la no frugivoría en tucanes está sobredimensionada. No obstante, otros autores sugieren que los tucanes son más oportunistas de lo esperado con base en varios eventos de depredación de nidos por diferentes especies de tucanes (Menezes & Marini, 2017; Cove *et al*., 2017). Incluso se ha reportado la depredación de *A. haematopygus* a una nidada de tres huevos de Tinamú Grande *Tinamus major* (Arias-Alzate *et al*., 2012), así como la depredación de varios huevos de Perico de El Oro *Pyrrhura orcesi* (Garzón-Santomaro *et al*., 2020). Con todo, este parece ser el primer reporte de un tucán depredando un ave en vuelo.

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Figura 1: Tucanete Lomirrojo *Aulacorhynchus haematopygus* depredando a una Coronita Colianteada *Boissonneaua flavescens*, 22 de abril de 2017, Tandayapa Bird Lodge, Pichincha, Ecuador (Hans Heinz).

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REVISTA ECUATORIANA DE ORNITOLOGÍA

NOTAS DE CAMPO/FIELD NOTES

Chungüi Alicastaño *Cinclodes albidiventris* comiendo flores

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La dieta de los chungüis, horneros, mineros y otros Furnariidae terrestres comprende pequeños invertebrados (escarabajos, hemípteros, larvas de mariposas, caracoles, moluscos, hormigas, arácnidos, lombrices), pequeños invertebrados en menor proporción y ocasionalmente semillas (Remsen, 2003).

En 14 abril 2010 observé un individuo de Chungüi Alicastaño *Cinclodes albidiventris* ingiriendo una flor de *Disterigma* sp., una ericácea terrestre de flores rastreras color rosa. La flor es coriácea y redonda, similar a una fruta. No existen reportes en la literatura de *Cinclodes* spp. alimentándose de flores, aunque Remsen (2003) menciona unas pocas especies en las que se ha reportado frutas en su dieta. Existe tan solo una observación adicional de un furnárido alimentándose de frutos: un Colaespina de Azara *Synallaxis azarae* comiendo frutos de *Coriaria ruscifolia* (N. Krabbe, no publ. 2019). De hecho, Remsen (2003) considera a Furnariidae como una de las familias con dietas más restringidas a invertebrados. En estudios de dietas de aves neotropicales se ha reportado el consumo de flores o frutas en proporciones muy bajas en especies primordialmente insectívoras (Durães & Marini, 2005), pero su función en la dieta de estas especies ha sido poco estudiada.

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REVISTA ECUATORIANA DE ORNITOLOGÍA

NOTAS DE CAMPO/FIELD NOTES

Gavilán de Harris *Parabuteo unicinctus* depredando una serpiente

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Registrar eventos de depredación en la naturaleza es poco común, y el conocimiento de ítems alimenticios específicos es útil para vislumbrar la ecología trófica de las especies (Fierro-Calderón *et al*., 2006). Para el Gavilán de Harris *Parabuteo unicinctus* existen reportes de alimentación basada principalmente en mamíferos, y se asume como raro que consuma serpientes (Dwyer & Bednarz, 2020).

En un camino vecinal poco transitado y rodeado de parches de vegetación ribereña, sembríos y casas dispersas en Taura (-2,3107, -79,7289; 3 m s.n.m.), provincia de Guayas, Ecuador, observé y fotografié el 17 de julio de 2019, a las 08h30, un individuo adulto de *Parabuteo unicinctus* depredando una serpiente (Fig. 1). El reptil medía *c*. 70 cm de longitud y *c*. 2 cm de diámetro, era de color verde con el vientre más claro; probablemente se trataba de un adulto de *Leptophis ahaetulla* (Colubridae). El gavilán sujetaba con las garras la parte media de la serpiente, que aun se movía. Con el pico desgarraba trozos de carne con piel y los ingería. Durante todo el tiempo de observación, el gavilán mantuvo las alas abiertas asentadas en el suelo, cubriendo a la presa, dando la espalda a un Gavilán Sabanero *Buteogallus meridionalis* que vocalizaba desde un árbol cercano. Después de *c*. 20 min de desgarrar a la presa, a un movimiento del observador, el individuo de *P. unicinctus* tomó la parte anterior de la serpiente, ya partida en dos, y voló.

Se ha reportado consumo de serpientes por *P. unicinctus*, basado en presas llevadas a nidos, pero no hay una descripción de su captura (Jaksić *et al*., 1980; Salvador, 2012; Dwyer & Bednarz, 2020). Por su parte, el comportamiento de cubrir la presa con las alas mientras la consume, proceso descrito como natural en las rapaces para evitar que el robo de la presa (Jones, 2001), fue al parecer dirigido al individuo cercano de *B. meridionalis*, ya que existen reportes previos de ataques a *P. unicinctus* por parte de rapaces de mayor tamaño (Jiménez & Jaksic, 1993).

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Figura 1: Gavilán de Harris *Parabuteo unicinctus* depredando una serpiente (cf. *Leptophis ahaetulla*) en Taura, Guayas, el 17 de julio de 2019 (Héctor Cadena).

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REVISTA ECUATORIANA DE ORNITOLOGÍA

NOTAS DE CAMPO/FIELD NOTES

Rusty-belted Tapaculo *Liosceles thoracicus*, nest and eggs

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To date, only a single nest of Rusty-belted Tapaculo *Liosceles thoracicus* has been described in the literature (Rosenberg, 1986). This nest was found in northeastern Peru (subspecies *L. t. erithacus*) containing two nearly fledged young, and the eggs remain undescribed. Here I describe a nest and the clutch of two eggs, found near Gareno Lodge, Province of Napo, eastern Ecuador (-1.0175, -77.3922; 430 m a.s.l.).

On 12 February 2013, at 13h00, I flushed an adult *L. thoracicus erithacus* from a nest containing a single egg. The adult flushed only after I paused for about 2 min while standing 1 m in front of nest. The adult shot out of the nest, remaining at ground level, and silently disappeared into nearby undergrowth. The single egg was immaculate white, showed no signs of embryonic development when held up a light, and weighed 6.15 g. It was cool to the touch, suggesting that the adult had only recently entered the nest. At 16h15, the nest still contained a single cold egg. The following day, at 08h45, the adult was again on the nest (Fig. 1a), flushing as described previously, but only after I remained standing for over a minute, 1.5 m from the nest. It likely would not have flushed had I passed close to the nest without pausing. The nest contained two eggs, both warm and dry (Fig.1b). The second egg was also immaculate white and weighed 6.02 g at this time. Linear measurements of the first and second eggs were 27.1 × 20.2 mm and 26.8 × 20.2 mm, respectively.

Overall, the nest I found was similar to Rosenberg's (1986) nest. It was extremely cryptic, built on the ground, nestled into a shallow cavity that was likely naturally formed amongst the earth, roots, and leaf litter, the rear portion of the nest backed up against a partially exposed buttress root. Small roots from surrounding soil were grown into the thick nest walls, suggesting it had been there for at least several months and was perhaps used for previous breeding attempts. It was situated on a gentle slope at the top of a narrow ridge, *c*. 30 m high, surrounded by low, swampy patches of *terra firme* forest in most directions. The ball-shaped nest was almost perfectly spherical, with a *c*. 14 cm external diameter. It was entered through a lateral opening, situated just above the midline (in the upper half). Based on my examination of Rosenberg's nest (currently at the Western Foundation of Vertebrate Zoology; EN-168902), I suggest that the entrance "located at the top" of the nest described by Rosenberg (1986) was similarly located. The round entrance was 4 cm in diameter and oriented 270°. Externally, the nest was tightly woven of dark (old) moss and very fine, dark rootlets, with a few thicker rootlets and fern leaves intermixed. There was a well-established colony of minute ants (Formicidae) living in the lower portion of the nest and the ground below. Though small, the ants had a powerful sting, but it appeared that they were not entering the nest chamber. The internal nest chamber was slightly taller than wide, measuring 10 cm tall and 8–9 cm wide. The egg cup (lower half) of the inner chamber was covered with a 1–1.5 cm thick layer of pale, thin, flexible fibers, and was 4 cm deep from the lip of the entrance. The aged appearance of the external nest material, presence of an ant colony in/below the nest, growth of rootlets into the nest, and general condition of the nest suggest to me that the nests of *L. thoracicus erithacus* may be used for multiple breeding attempts, during which only the nest lining is replaced, much like the thick-walled, well-hidden nests of Spotted Barbtail *Premnoplex brunnescens* (Greeney, 2008a,b).

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Figure 1: Rusty-belted Tapaculo *Liosceles thoracicus erithacus*, adult peering from the nest entrance while incubating, 13 February 2013, Gareno Lodge, Napo, Ecuador (Harold F. Greeney).

Figura 2: Rusty-belted Tapaculo *Liosceles thoracicus erithacus*, nest containing two eggs that are partially visible through the well-hidden lateral nest entrance, 13 February 2013, Gareno Lodge, Napo, Ecuador (Harold F. Greeney).

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REVISTA ECUATORIANA DE ORNITOLOGÍA

ARTÍCULO/ARTICLE

Fifth report of the Committee for Ecuadorian Records in Ornithology (CERO), with comments on some published, undocumented records

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Quinto reporte del Comité Ecuatoriano de Registros Ornitológicos (CERO), con comentarios sobre algunos registros publicados no documentados

Resumen

Presentamos nuevos registros de distribución de aves del Ecuador que han sido evaluados por el Comité Ecuatoriano de Registros Ornitológicos (CERO) entre noviembre 2017 y junio 2019. Incluimos reportes de tres especies nuevas para Ecuador (*Pelecanoides garnotii*, *Conirostrum margaritae*, *Piranga ludoviciana*), cinco especies con primera documentación en Ecuador (*Thaumastura cora*, *Anous minutus*, *Setophaga pensylvanica*, *S. virens*, *Spiza americana*), dos especies con primera documentación en Galápagos (*Oceanodroma hornbyi*, *Egretta tricolor*), extensiones considerables de distribución de 15 especies (*Amazilia amazilia*, *Aramus guarauna*, *Vanellus chilensis*, *Attagis gayi*, *Anous stolidus*, *Sterna hirundo*, *Thalasseus elegans*, *T. sandvicensis*, *Eurypyga helias*, *Mycteria americana*, *Plegadis falcinellus*, *Gampsonyx swainsonii*, *Rostrhamus sociabilis*, *Glaucidium peruanum*, *Thlypopsis sordida*), nuevos reportes de 16 especies raras (*Oressochen jubatus*, *Spatula cyanoptera*, *Podiceps major*, *Stercorarius longicaudus*, *Larus belcheri*, *Pelagodroma marina*, *Oceanodroma markhami*, *Egretta rufescens*, *Plegadis ridgwayi*, *Buteo swainsonii*, *Megascops koepckeae*, *Tyrannus albogularis*, *Setophaga castanea*, *Dolichonyx oryzivorus*, *Icterus chrysater*, *I. galbula*) y registros adicionales de otras ocho especies. Se presentan los primeros registros en los Andes de *Sterna hirundo* y *Thalasseus elegans*, el primer registro de *T. sandvicensis* en el interior de la Amazonía y el primer registro de *Piranga ludoviciana* en Sudamérica. Finalmente, invalidamos registros previos de una especie (*Pyrilia pyrilia*) que aparecen en distintas publicaciones, rechazamos registros de seis especies sometidos a CERO en este periodo y discutimos seis registros previos publicados, no documentados, que podrían ser errados. CERO revisa y actualiza el listado nacional de aves, que en la actualidad alcanza las 1699 especies (1645 confirmadas y documentadas, 54 no documentadas).

Palabras clave: Comité Ecuatoriano de Registros Ornitológicos, extensiones de distribución, nuevos registros, registros hipotéticos.

Abstract

We present new distributional records of birds in Ecuador evaluated by the Committee for Ecuadorian Records in Ornithology (CERO), from November 2017 through June 2019. This report includes three species new to Ecuador (*Pelecanoides garnotii*, *Conirostrum margaritae*, *Piranga ludoviciana*), five species with first documented country records (*Thaumastura cora*, *Anous minutus*, *Setophaga pensylvanica*, *S. virens*, *Spiza americana*), two species with first documented Galápagos records (*Oceanodroma hornbyi*, *Egretta tricolor*), remarkable range extensions for 15 species

Freile, J.F., Olmstead, O., Athanas, N., Brinkhuizen, D.M., Navarrete, L., Nilsson, J., Sánchez-Nivicela, M., Solano-Ugalde, A., & Greenfield, P.J. (2020). Fifth report of the Committee for Ecuadorian Records in Ornithology (CERO), with comments on some published, undocumented records. *Revista Ecuatoriana de Ornitología*, 6, 103–133.

(*Amazilia amazilia*, *Aramus guarauna*, *Vanellus chilensis*, *Attagis gayi*, *Anous stolidus*, *Sterna hirundo*, *Thalasseus elegans*, *T. sandvicensis*, *Eurypyga helias*, *Mycteria americana*, *Plegadis falcinellus*, *Gampsonyx swainsonii*, *Rostrhamus sociabilis*, *Glaucidium peruanum*, *Thlypopsis sordida*), new records of 16 rare species (*Oressochen jubatus*, *Spatula cyanoptera*, *Podiceps major*, *Stercorarius longicaudus*, *Larus belcheri*, *Pelagodroma marina*, *Oceanodroma markhami*, *Egretta rufescens*, *Plegadis ridgwayi*, *Buteo swainsonii*, *Megascops koepckeae*, *Tyrannus albogularis*, *Setophaga castanea*, *Dolichonyx oryzivorus*, *Icterus chrysater*, *I. galbula*) and additional records for eight species. We present the first records in the Andes of *Sterna hirundo* and *Thalasseus elegans*, the first record of *T. sandvicensis* in the inner Amazon basin, and the first South American record of *Piranga ludoviciana*. Finally, we invalidate previous records of *Pyrilia pyrilia* published in different sources, reject records of six species submitted to CERO, and discuss six previously published, undocumented records that might prove erroneous. CERO revises and updates the country bird list, which currently stands at 1699 species (1645 confirmed and documented; 54 undocumented).

Keywords: Committee for Ecuadorian Records in Ornithology, hypothetical records, new country records, range extensions.

INTRODUCTION

The unprecedented volume of information being compiled in publicly-accessible online archives provides exciting opportunities for rapid advances in knowledge on species distribution, especially in poorly studied regions. However, the public nature of such databases poses risks related to the accumulation and propagation of erroneous or imprecise data (Ball-Damerow *et al*., 2019; Bayraktarov *et al*., 2019). While large global records repositories such as www.macaulaylibrary.org and www.ebird.org provide increasingly convenient access for a range of data contributors and consumers, this same ease of use presents significant challenges for review and validation of reports. To preserve high-quality ornithological records, increased collaboration between these global data-managing initiatives and local, national and/or regional committees is needed (Freile *et al*., 2018).

The growing popularity and accessibility of online archives also create a need for records committees to re-evaluate their processes and guidelines. To remain relevant, records committees must keep pace with rapid data accumulation and embrace an increasing number of observers in megadiverse countries like Ecuador, where ornithology and bird-observation are growing. The Committee for Ecuadorian Records in Ornithology (CERO), which aims to review novel records in this country, is paying increased attention to records broadcasted or archived online only. With four reports published to date (Freile *et al*., 2013, 2017, 2019a; Nilsson *et al*., 2014), CERO has presented 29 new country records (23 species and 6 subspecies) and first documented records for 27 species, alongside significant range extensions for more than 100 species, including new records of several country rarities. Likewise, the committee has made a concerted effort to remove species previously included in Ecuador's species list as a result of erroneous or imprecise information (see Freile *et al*., 2019a). We hope that by establishing a single, validated, and standardized species list, we can facilitate further development of ornithology, education, birding, and conservation alike (Freile *et al*., 2018).

This report presents new records evaluated by CERO since its fourth report, as well as a brief revision of some previously published, undocumented records. The result is a newly updated official checklist containing a total of 1699 species (54 undocumented) (Freile *et al*., 2020). The complete list is published on CERO's webpage: www.ceroecuador.wordpress.com.

METHODS

CERO receives and reviews records of rare species, new country records, and/or significant range extensions submitted voluntarily by their authors through CERO's webpage or e-mail address (cero.ecuador@gmail.com). Further, committee members regularly discover reports of 'rarities' at social media and public databases such as eBird, and then requests observers to submit their records for review, or to authorize CERO to evaluate them.

The national country checklist and a list of 'most-wanted' species are published on CERO's webpage, allowing observers to determine the status of the birds of Ecuador (www.ceroecuador.wordpress.com). New country records are evaluated and accepted by unanimous vote, while first documentation, undocumented records of

previously hypothetical species, and significant range extensions are accepted by majority vote. For this report, CERO reviewed 74 reports submitted from November 2017 through June 2019, of records dating from October 1992 through June 2019.

Reports evaluated in this compilation were generated using varied survey protocols and documentation techniques, including sounds, and photographs, but some include undocumented observations (*i.e.*, records lacking voucher documentation like specimens, photographs, video-recording, audio-recording, or field sketches and notes). Most sound-recordings were deposited by observers in Xeno-Canto or Macaulay Library online archives (www.xeno-canto.org; http://www.macaulaylibrary.org), for which a XC or ML code (respectively) and appropriate citation are provided in the species accounts. Photographs are stored in the CERO archives, some are published online, and the most relevant are published in this report. Locality coordinates and elevation are provided in Table 1; Figures 1–6 show documentary evidence for these records. New country records are marked with an asterisk in the species accounts. Taxonomy and species sequence follow the August 2019 version of the Clements checklist of the birds of the world (Clements *et al*., 2019).

RESULTS AND DISCUSSION

Orinoco Goose *Oressochen jubatus*
Orellana Province, near Yasuní National Park's clay licks, on the south bank of Río Napo, 15 January 2015, P. Petrus (photo).

Two birds were observed and photographed on a sandy river bank (Fig. 5a; Petrus, 2015). There are few records of this species in Ecuador, mostly confined to the lower portion of the Río Pastaza (Freile & Restall, 2018), with even sparser records along the Río Napo, the last known to us dating back to 1992–1993 (L. Navarrete, pers. observ.). There is one exceptional record at Ecuasal Pacoa, of a single individual observed by B. Haase on an undetermined date between 1992–1995 (B. Haase, *in litt*., July 2020).

Cinnamon Teal *Spatula cyanoptera*
Imbabura Province, Lago San Pablo, 4 January 2017, C. Vogt (photo).

One adult male was observed and photographed (Fig. 5b; Vogt, 2017) at a water treatment pond adjacent to Lago San Pablo. As the drake is shown swimming with its belly submerged, we cannot determine with 100% certainty whether it belongs to the boreal migrant subspecies *Spatula cyanoptera septentrionalium* or the very rare and declining Andean subspecies *S. c. borreroi*. The latter subspecies differs from the former by its large blackish spots mainly on the belly. However, the visible portion of the lower breast is plain cinnamon, suggesting that it belongs to the boreal migrant subspecies (Fjeldså & Krabbe, 1990); the January date also fits for a boreal migrant.

The Andean subspecies is considered extinct in Ecuador (Freile *et al*., 2019b), where it presumably bred (Fjeldså & Krabbe, 1990). The number of records of *S. cyanoptera* in Ecuador has increased steadily in recent years (Camacho & Wilson, 2011; Freile *et al*., 2013; Nilsson *et al*. 2014; Haase, 2019), all pertaining to boreal/austral migrants or vagrants.

Northern Pintail *Anas acuta*
Esmeraldas Province, Las Peñas, 24 November 2016, R. Ahlman (photo).

Manabí Province, La Segua, 30 December 2016, R. Ahlman (photo).

The Las Peñas record involved two adults of undetermined sex observed and photographed resting on a muddy bank, along with other migratory waterfowl and waders (Fig. 5c). The La Segua record involved a single adult observed one month later, swimming in open water (Ahlman, 2016). This boreal species was recorded for the first time in Ecuador as recently as June 2012 (Freile *et al*., 2013). Ecuador's southernmost record corresponds to a female photographed by E. Reyes at Pacoa (Haase, 2019).

Table 1: Localities of records submitted to the Committee for Ecuadorian Records in Ornithology (CERO) between November 2017 and June 2019. Asterisk indicates localities mentioned in the text accounts, not locality records.

Locality, province	**Coordinates**	**Elevation (m)**
Aguayacu Ecolodge, Napo*	-0.8963/ -77.7679	710
Borja bypass, Napo	-0.4375/ -77.8517	1770
Cerro Mongus, Carchi*	0.4373/ -77.859	*c*. 3300
Charco Vicente, Esmeraldas*	0.683/ -78.917	*c*. 300
Colonia 24 de Mayo, Pastaza	-1.40025/ -78.059	1277
Cristóbal Colón, Esmeraldas*	0.454/ -79.158	150
Ecuasal Mar Bravo, Santa Elena	-2.2167/ -80.967	0
Ecuasal Pacoa, Santa Elena	2.1008/ -80.7435	0
El Carmen de Putumayo, Sucumbíos	0.118/ -75.856	220
El Carrizal, parroquia Urbina, Carchi	0.7866/ -77.71135	2950
El Empalme, Loja*	-4.1478/ -79.8569	760
Estero Capulí, Río Ónzole, Esmeraldas*	*c*. -0.771/ -79.075	*c*. 50
Estero Pote, Esmeraldas*	0.8284/ -78.72201	200
Isla Española, near, Galápagos	-1.3391/ -89.6570	0
Isla de la Plata, Manabí	-1.2687/ -81.0652	0
Isla Floreana, off south, Galápagos	-1.6782/ -90.5412	0
Isla San Cristóbal, near, Galápagos	-1.2030/ -89.6538	0
Isla San Cristóbal, pelagic to Isla Española, Galápagos	-1.11623/ -89.6547	0
Jardín Botánico de Quito, Pichincha	-0.183/ -78.483	2800
Jimbura, 3-4 km W, Loja	-4.6134/ -79.472	2250
Kapawi, Pastaza*	-2.75/ -76.75	200
Lago San Pablo, Imbabura	0.2183/ -78.2351	2660
Laguna Yaguarcocha, Imbabura	0.3666/ -78.0833	2200
La Chocolatera, Santa Elena	-2.189/ -81.011	0
La Josefina, Pichincha	-0.0011/ -78.1411	2890
La Segua, Manabí	-0.713/ -80.201	2
La Selva, Sucumbíos*	-0.416/ -76.133	250
La Tembladera, El Oro	-3.4904/ -79.9967	13

Las Peñas, 10 km N, Esmeraldas	1.0996/ -79.15205	0
Limpiopungo, Pichincha	-0.6428/ -78.4848	3890
La Lobería, San Cristóbal, Galápagos	-0.9221/ -89.612	0
Loja, campus UTPL, Loja	-3.987/ -79.1995	2200
Los Laurales de Guasaganda, Cotopaxi	-0.8357/ -79.2053	600
Manantiales, Manabí	-1.24042/ -80.7529	*c*. 50
Manta-Montecristi area, Manabí	-1.0274/ -80.656	100
Maxus road, Orellana*	-0.473/ -76.574	250
Meseta de Gualpi, Carchi	0.8612/ -78.2247	2150
Milagro, Guayas	-2.119/ -79.6002	3
Mindo, Pichincha	-0.054/ -78.7786	1250
Nuevo Paraíso Road, Zamora Chinchipe*	-4.26001/ -78.6474	*c*. 1000
Nuevo Rocafuerte, Orellana	-0.92677/ -75.4017	190
Nuevo Rocafuerte (river islands), Orellana	-0.92105/ -75.3866	190
Pachijal, Pichincha	0.1607/ -78.9351	520
Paquisha, Zamora Chinchipe	-3.9326/ -78.6764	820
Parque Guápulo, Pichincha	-0.1978/ -78.4726	2600
Perucho, Pichincha*	0.10917/ -78.4242	1800
Pedro Vicente Maldonado, near, Pichincha*	0.133/ -79.133	*c*. 500
Playa de Oro, Esmeraldas	0.84847/ -78.7822	*c*. 150
Puerto Engabao, Guayas	-2.5781/ -80.48406	0
Puerto López, Manabí	-1.56194/ -80.8164	0
Puerto Quito, Pichincha*	0.1188/ -79.2666	145
Puembo Birding Garden, Pichincha*	-0.1657/ -78.3612	2430
Punta Cormorant, Galápagos	-1.22744/ -90.4257	0
Punta Galera, off, Esmeraldas	0.81627/ -80.0471	0
Represa Tahuín, El Oro*	-3.6354/ -80.0017	110
Reserva Buenaventura, El Oro	-3.6492/ -79.7615	*c*. 500
Reserva Copalinga, Zamora Chinchipe	-4.0915/ -78.9581	950
Reserva Jatun Sacha, Napo*	-1.0665/ -77.6183	430
Reserva Mashpi Shungo, Pichincha	0.1824/ -78.91215	520
Reserva Otongachi, Pichincha	-0.32125/ -78.9516	850

Reserva Tamandua, Pastaza*	-1.315/ -77.9695	950
Reserva Yanacocha, Pichincha	-0.1119/ -78.5848	*c*. 3500
Río Bigal, near, Orellana*	-0.5235/ -77.4198	*c*. 900
Río Napo, 10–15 km downriver from Coca, Orellana	-0.444/ -76.7323	275
Río Napo, clay licks near Yasuni National Park control, Orellana	-0.52736/ -76.3776	220
Río Quijos Ecolodge, Napo	-0.3925/ -77.81619	1500
Río Silanche, Pichincha*	0.144/ -79.141	400
Sabanillas, Zamora Chinchipe	-3.976/ -79.026	*c*. 1600
Salto del Bravo, Esmeraldas*	0.667/ -78.967	*c*. 200
Same, Esmeraldas*	0.8491/ -79.9269	0
Shiripuno, Orellana	-1.10368/ -76.7317	240
Siguin, Pastaza*	-1.63804/ -77.8406	1040
Sumaco Road, Napo*	-0.6843/ -77.6023	*c*. 1200
Volcán Cayambe, Pichincha*	0.025/ -78.025	*c*. 4000
Volcán Chiles, s slope, Carchi	0.8059/ -77.9349	4282

Great Grebe *Podiceps major*
El Oro Province, La Tembladera, 12 June 2015, A. Solano-Ugalde, J. Freile, M. Sánchez-Nivicela, R. Ahlman (photo).

Manabí Province, Isla de la Plata, 17 December 2017, B. Wilcox (photo).

A single adult of undetermined sex was observed and photographed (Fig. 5d) in calm water at Isla de la Plata's arriving bay, where water is calm (Wilcox, 2017). The La Tembladera record involved one adult male photographed once, and observed during the remainder of the day swimming and diving in open waters at the eastern end of this freshwater wetland. There are previous published records from La Tembladera (Pozo-Zamora *et al*., 2015).

The number of records of *P. major* in Ecuador has increased in recent years, even though it was first observed as recently as 2005 (Haase, 2011). Most records have involved non-breeding individuals, but breeding has now been reported at Tahuín dam, El Oro province (Pozo-Zamora *et al*., 2015).

Peruvian Sheartail *Thaumastura cora*
Loja Province, 3 km west of Jimbura, 12 June 2018, R. Ahlman, D. Jumbo (photo).

One adult male and one adult female were observed in a patch of semi-humid scrub surrounded by degraded land (Fig. 2a; Ahlman, 2018b). This observation represents the first documented Ecuadorian record, where a single previous sighting in presumably similar habitat existed (Ridgely & Greenfield, 2001). Two adult males and one female-plumaged bird were observed at the same scrub patch on 21 April 2019 by J. Freile and B. Tinoco (Tinoco, 2019), and on 24 May 2019 by D. Pacheco and A. Carrasco (Pacheco, 2019), with additional recent records from the same general area (eBird, 2020).

Amazilia Hummingbird *Amazilia amazilia*
Zamora Chinchipe Province, Copalinga, 10 November 2017, A. Solano-Ugalde.

One adult was observed feeding on *Stachytarpheta* (Verbenaceae) flowers and then being actively chased away by one Sparkling Violetear *Colibri coruscans*. There are a handful of additional records of this species from Copalinga, in December 2007 and November 2011 (as reported in the submission form; Fig. 4a), and March 2012 (Geoffray, 2012) and October 2015 (Hertzog, 2015).

There are very few previous records from the eastern slope of the Andes, including observations above Zamora and nearby Sabanilla (Ridgely & Greenfield, 2001). These records may have involved wanderers from nearby highlands. Although most previous records do not indicate subspecific identity, the photographic record from 2011 corresponds to *A. amazilia alticola*, which ranges in the drier valleys and highlands of Loja and El Oro provinces. *Amazilia a. alticola* was suggested to be a separate species by Weller (2000), but this possibility was rejected by Krabbe & Ridgely (2010). The species is transferred to the genus *Amazilis* by Remsen *et al*., (2020).

Limpkin *Aramus guarauna*
Pichincha Province, Reserva Mashpi Shungo, 18 September 2017, A. Solano-Ugalde (photo).

Zamora Chinchipe Province, Paquisha, 20 July 2017, F. Castillo (photo).

A single individual was observed at a fish pond in Mashpi Shungo, where it remained for *c*. 1 week before departing (Fig 4b). Additionally, one adult was observed in tall marshy grassland adjacent to the Nangaritza River, on the outskirts of Paquisha (Fig. 4c). These records are the highest in elevation (520 and 820 m a.s.l., respectively) known to date, on either slope of the Andes, and fall outside the core distributional range of this species that, notwithstanding, is highly prone to wandering (Freile & Restall, 2018). This species might be spreading towards the northern lowlands and Andean foothills of western Ecuador, considering the number of recent records (eBird, 2020).

Southern Lapwing *Vanellus chilensis*
Zamora Chinchipe Province, Paquisha, 5 August 2017, F. Castillo (photo).

Up to eight individuals dwell at various sites in and around Paquisha, suggesting a small established population in this recently colonized location. It seems unlikely that this vocal and conspicuous species might have remained overlooked in the area (Ridgely & Greenfield, 2001), and in fact, there were no records along the Río Nangaritza drainage until at least 2012 (Freile *et al*., 2014). The Paquisha outpost is representative of the rapid spread of this species into the Amazonian foothills of Ecuador (Ridgely & Greenfield, 2001; McMullan & Navarrete, 2017; Freile & Restall, 2018). This species is also rapidly spreading throughout the Pacific lowlands and locally up into the Interandean valleys (Freile & Restall, 2018). There are a handful of more recent (2017–2020) records from the Río Zamora and Río Upano basins in southern Ecuador (eBird, 2020), including a record that predates the one reported to CERO by F. Castillo (Rasmussen, 2017).

Rufous-bellied Seedsnipe *Attagis gayi*
Carchi Province, southern part of Volcán Chiles, 12 April 2018, E. Taimal (photo).

One pair was observed at close range in a transitional habitat between paramo and barren rocky areas with sparse vegetation (Fig. 4e). This represents the northernmost record of this species in the Andes (Fjeldså & Krabbe, 1990), 90 km north of its nearest known locality (Volcán Cayambe). *Attagis gayi* is represented in Ecuador by the highly isolated, endemic subspecies *A. gayi latreillii* (Fjeldså & Krabbe, 1990; Freile & Restall, 2018). Volcán Chiles is situated on Ecuador's border with Colombia. Thus, the species undoubtedly occurs on its Colombian slopes as well.

Long-tailed Jaeger *Stercorarius longicaudus*
Santa Elena Province, La Chocolatera, 6–7 November 2015, 30 October 2017, R. Ahlman.

Three individuals were observed on 2 consecutive days; two adults and one dark-morph juvenile on November 2015, and one dark-morph juvenile on October 2017. Two of the jaegers were harassing or attacking terns and

obtaining prey on one occasion (Ahlman, 2015c). Details provided by the author are brief, but the description of small size, slender shape, white shafts on outer primaries, rather short bill, and two-toned upperparts are adequate to rule out Parasitic Jaeger *Stercorarius parasiticus*, which was also observed (Ahlman, 2015c; 2015d; 2017).

There are few records of *S. longicaudus* from coastal Ecuador, including previous observations at La Chocolatera (Freile & Restall, 2018) and the Santa Elena peninsula area (Haase, 2011), where the first documented record from mainland Ecuador was obtained by R. Ahlman in September 2014 (Freile *et al*., 2017).

Figure 1: New country records for Ecuador. a) *Pelecanoides garnotii*, Puerto Engabao, Guayas province (F. Pásara); b) *Piranga ludoviciana*, Reserva Otongachi, Pichincha province (A. G. Simbaña); c) *Conirostrum margaritae*, island near Nuevo Rocafuerte, Río Napo, Orellana province (R. Ahlman; ML 100220791).

Belcher's Gull *Larus belcheri*
Manabí Province, Puerto López, 19 November 2017, S. M. Plúa, A. Plaza (photo).

Santa Elena Province, Lagunas de Ecuasal at Mar Bravo, 24 June 2018, P. Bourdin (photo).

One adult in breeding plumage was observed and photographed at Puerto López on the beach near the fish market (Fig. 5e). Another adult in non-breeding/basic plumage was photographed in a sandy ditch at Ecuasal Mar Bravo (Fig. 5f; Bourdin, 2018). The species has been recorded in Ecuador in September, November, January, May, and June (Haase, 2011; eBird, 2020). The number of records has increased in recent years (Haase, 2019), but the Puerto López individual is the first reported in breeding/alternate plumage. The species has not been found breeding in Ecuador to date.

Brown Noddy *Anous stolidus*
Esmeraldas Province, off Punta Galera, 24 February 2016, R. Ahlman, D. Jumbo (photo).

Three adults were observed and one of them photographed (Fig. 4f) on a pelagic day trip off Punta Galera. Another individual was observed from shore on 23 February 2016 at Same, Esmeraldas by the same observers, who also report a sight record from December 2015 at Punta Galera. Previously recorded from Santa Elena peninsula only (Camacho & Torres, 2011; Haase, 2019) in February (contra Freile & Restall, 2018), with 17 individuals reportedly observed in 2010–2019 from La Chocolatera by Haase (2019).

Camacho & Torres (2011) identified the bird they observed as probable *A. s. galapagensis*, due to its dark brown plumage with a paler, but not well-defined forecrown and grayish-brown rearcrown. However, the noddies observed at Punta Galera might correspond to *A. s. ridgwayi*, which is warmer brown, with a more contrasting whitish crown and paler forecrown (Howell & Zufelt, 2019). This record would represent the first record of *A. s. ridgwayi* in Ecuadorian waters, but further documentation is needed to confirm it. This subspecies likely breeds on the Malpelo Islands, Colombia (López-Victoria & Estela, 2007), *c.* 380 km north-northwest of Punta Galera.

Black Noddy *Anous minutus*
Santa Elena Province, La Chocolatera, 7 July 2015, R. Ahlman (photo).

One individual was observed between 6h45–8h35 near the rocky coast, momentarily joining a large feeding aggregation of seabirds (Fig. 2b). There is one previous record of a dark noddy from the Santa Elena peninsula area, first published with unconfirmed identification (Haase, 2011), but later identified as *Anous minutus* (Haase, 2019). The July 2015 record becomes the second record of the species and first documented evidence for Ecuador (*cf.* Ahlman, 2015b).

Common Tern *Sterna hirundo*
Imbabura Province, Laguna Yaguarcocha, 24 November 2018, E. Obando, J. Meneses, M. Aragón (photo).

One bird in non-breeding plumage was observed distantly in the early morning and was later relocated and photographed after a considerable closer approach (Fig. 4g). It was resting on a buoy only 20 m from an Elegant Tern *Thalasseus elegans* (see below). There are few inland records of *Sterna hirundo* in Ecuador, this one being the first in the Ecuadorian Andes and the highest in elevation (Freile & Restall, 2018) at 2200 m a.s.l. It is also the only record in the entire Andean cordillera known to us (eBird, 2020).

Elegant Tern *Thalasseus elegans*
Imbabura Province, Laguna Yaguarcocha, 24 November 2018, E. Obando, J. Meneses, M. Aragón (photo).

One individual in non-breeding plumage was observed near the *S. hirundo* reported above (Fig. 4h). It was first observed flying over a Cattle Egret *Bubulcus ibis* breeding colony and later perched on a buoy, where it was photographed. This is the first documented record of *Thalasseus elegans* in the Andes of Ecuador (Freile & Restall, 2018), but there is one additional record with no date or locality details (Ridgely & Greenfield, 2020). As far as we are aware, this is the first documented record from the entire Andes.

Sandwich Tern *Thalasseus sandvicensis*
Orellana Province, *c*. 10–15 km downriver from Coca on the Río Napo, 8 January 2018, B. Nooner (photo).

One adult in non-breeding plumage was observed and photographed flying close to sand bars in the middle of the river at 14h30 (Fig. 4i; Nooner, 2018). This is the first record from Amazonian Ecuador (Freile & Restall, 2018) and, as far as we know, from the entire inner Amazon basin (eBird, 2020).

Sunbittern *Eurypyga helias*
Napo Province, Río Quijos Ecolodge, 21 October 2018, C. A. Vásquez (photo).

One bird was photographed walking over boulders on the Río Quijos (Fig. 4j). This record, at *c*. 1500 m a.s.l., is one of the highest in elevation from eastern Ecuador (Freile & Restall, 2018; Cadena-Ortiz *et al*., 2018). The photographed bird belongs to the subspecies *Eurypyga helias meridionalis* (grayish back and upperwing coverts), a foothill subspecies only recently observed for the first time in Ecuador in 2008 (Freile *et al*., 2013) and known from just two additional localities (Freile & Restall, 2018; Cadena-Ortiz *et al*., 2018). The fact that this form maintains its integrity despite being possibly in contact with the nominate form of the Amazonian lowlands suggests that it might deserve species status, but more information is needed to determine whether these two subspecies actually overlap.

White-faced Storm-Petrel *Pelagodroma marina*
Galápagos Province, near Española Island coast to the north, 15 June 2018, A. Jaramillo (photo).

Galápagos Province, pelagic between San Cristóbal and Española, 12 July 2014, A. Bruun Kristensen (photo).

Two separate individuals were seen in pelagic waters between San Cristóbal and Española (Figs. 5g, 5h). There are few Galápagos records, where the species is considered as vagrant (Wiedenfeld, 2006; McMullan & Navarrete, 2017). The paucity of records might be explained partially by poor knowledge of oceanic birds and limited pelagic observation activity (Wiedenfeld, 2006). Dates suggest non-breeding austral visitors (Howell & Zufelt, 2019).

Markham's Storm-Petrel *Oceanodroma markhami*
Galápagos Province, between San Cristóbal Island and Española Island, 28 July 2017, A. Jaramillo (photo).

Galápagos Province, near San Cristóbal Island coast to the south, 16 August 2008, J. Gilliam (photo).

Two birds were seen in pelagic waters between San Cristóbal and Española on separate dates (Figs. 5i, 5j). There are few Galápagos records of this non-breeding austral vagrant (Wiedenfeld, 2006; McMullan & Navarrete, 2017). However, as with previous species, the scarcity of records might partially be explained by limited pelagic work.

Ringed Storm-Petrel *Oceanodroma hornbyi*
Galápagos Province, off south Floreana Island, 8 November 2017, R. Tizard (photo).

A single bird was observed and photographed in pelagic waters off Floreana (Fig. 3a). This represents the first documented record from the Galápagos (Freile *et al*., 2020), where the species is known from two published sight records (Wiedenfeld, 2006) on an unexpected date for an austral breeder (April 1967). Records in waters off mainland Ecuador also include unexpected dates (July 2007, February 2008; see Freile *et al*., 2013; Nilsson *et al*., 2014), suggesting that the temporal distribution patterns of this species, which is confined to the Humboldt Current, are more complex than previously acknowledged (Howell & Zufelt, 2019).

Figure 2: First documented records of species previously considered hypothetical/undocumented in mainland Ecuador. a) *Thaumastura cora*, Jimbura, Loja province (R. Ahlman; ML 104924311); b) *Anous minutus*, La Chocolatera, Santa Elena province (R. Ahlman; ML 20122651); c) *Setophaga pensylvanica*, Jardín Botánico de Quito, Pichincha province (E. Ocaña); d) *Setophaga virens*, Mindo, Pichincha province (M. Bonet; ML 146581841); e) *Icterus galbula*, Buenaventura Reserve, El Oro province (L. Seitz; ML 135003401); f) *Spiza americana*, Las Peñas, Esmeraldas province (R. Ahlman; ML 20370601).

Peruvian Diving-Petrel *Pelecanoides garnotii
Guayas Province, Puerto Engabao, 14 January 2017, F. Pásara Hurtado (photo).

A single exhausted individual of this globally endangered species (BirdLife International, 2020) was rescued while swimming close to shore (Fig. 1a). It died afterwards, but the specimen was not secured and no necropsy analysis was done. This constitutes the first record for Ecuador and the northernmost record for the genus and species, *c*. 440 km north of Lobos de Tierra, the nearest coastal area where recorded in Peru, even though it has not bred there for several decades (Figueroa, 2013). The closest breeding colony lies 370 km further southeast of Lobos de Tierra, at Isla Corcovado (Valverde-Romero, 2006).

This Humboldt Current species likely breeds year-round in coastal areas and islands of Peru and Chile (Howell & Zufelt, 2019; BirdLife International, 2020) and is considered to be sedentary (Onley & Scofield, 2007). The species is not known to wander or disperse over long distances under normal climatic conditions (Carboneras *et al*., 2020), but it is affected by abnormal climatic situations, because it feeds mostly on small pelagic fish that are more susceptible to changes in sea surface temperature (Brooke, 2004; García-Godos & Goya, 2006). Therefore, its dispersion northwards to the southern coast of Ecuador might have been caused by the weak cold-water event La Niña, as part of the El Niño Southern Oscillation (ENSO), that produced nutrient-rich and cooler water conditions in the eastern tropical Pacific from late 2016 to early 2017 (L'Heureux *et al*., 2017). With cold ocean waters being more productive, this *P. garnotii* might have travelled north in search for prey, as has been hypothesized for other marine organisms (Álava & Carvajal, 2005; Páez-Rosas *et al*., 2018). Nonetheless, we cannot fully rule out the possibility of a boat-assisted arrival to the Ecuadorian coast because diving-petrels often land on ships when attracted by lights (Howell & Zufelt, 2019).

Wood Stork *Mycteria americana*
Pichincha Province, Reserva Mashpi Shungo, 9 November 2015, A. Solano-Ugalde.

Napo Province, Borja bypass, secondary road, 28 March 2019, M. Sánchez-Nivicela, M. and L. Ramsey, L. Pérez (photo).

One individual was seen flying over a river edge near Mashpi Shungo, and another pair was photographed at the Borja bypass (Fig. 4k). Both records are outside this species' regular distribution range (Freile & Restall, 2018), but the species tends to wander widely, including trans-Andean passage (Ridgely & Greenfield, 2020).

Tricolored Heron *Egretta tricolor*
Galápagos Province, Punta Cormorán, Floreana, May 2018, J. and E. Morton (photo).

One individual of undetermined age and sex was observed and photographed (Fig. 3b) at Flamingo Lagoon, Punta Cormorán, as it flew and landed along the shoreline. This is the first documented record for Galápagos. Only one previous sighting was reported by Swash & Still (2000) without supporting evidence or further data (Wiedenfeld, 2006).

Reddish Egret *Egretta rufescens*
Santa Elena Province, Ecuasal Pacoa, 10 June 2019, B. Haase (photo).

One adult of undetermined sex was observed in artificial salt-evaporating ponds (Fig. 5k). Presumably, the same individual remained in the area for 8 months, with the most recent report coming from February 2020 (eBird, 2020). Two previous records exist in Ecuador, one individual seen in Río Napo in July 2009 and one observed at Pacoa from November 2013 through September 2014 (Freile *et al*., 2013; Nilsson *et al*., 2014), with the latter apparently remaining at Pacoa until October 2015 (Haase, 2019). Dates of the three records, and this individual's extended residence at Pacoa, suggest a tendency of this species to establish itself temporarily at new localities after post-breeding dispersal, and to complete pre-basic molt before migrating back to its breeding grounds. It breeds in southern North America, the Caribbean, and the northern coast of South America (Koczur *et al*., 2020).

A

B

Figure 3: First documented records of species previously considered as hypothetical/undocumented in Galápagos, Ecuador. a) *Oceanodroma hornbyi*, off southern Isla Floreana, Galápagos province (R. Tizard; ML 86890521); b) *Egretta tricolor*, Punta Cormorant, Isla Floreana, Galápagos province (J. Morton).

Glossy Ibis *Plegadis falcinellus*

Imbabura Province, Laguna Yaguarcocha, 11 February 2015, D. Arias, L. Calapi (photo).

Sucumbíos Province, Puerto El Carmen de Putumayo, 17 January 2017, R. Ahlman, D. Jumbo (photo).

One individual was observed near a communal roost of Cattle Egrets *Bubulcus ibis* at Laguna Yaguarcocha (Arias-Cruzatty, 2015; Fig. 4l). Another individual was observed along the banks of a pond in degraded habitat near Puerto El Carmen de Putumayo (Fig. 4m). The Yaguarcocha record is the first in the Andes of Ecuador, while the Puerto El Carmen record is only the second known to us from the Amazonian lowlands of Ecuador (Freile & Restall, 2018). Number of records and abundance of this species in Ecuador have increased notably in recent years, from few localities and low numbers in the late 1990s and early 2000s (López-Lanús & Gastezzi, 2000; Ridgely & Greenfield, 2001) to several localities and increasing counts in the 2010s (Santander *et al*., 2013; Nilsson *et al*., 2014; Freile & Restall, 2018).

Puna Ibis *Plegadis ridgwayi*
Pichincha Province, Laguna de Limpiopungo, 21 August 2018, N. G. Monteros (photo).

Pichincha Province, Laguna de Limpiopungo, 22 August 2018, F. Melo (photo).

Both records refer to the same individual (Fig. 5l), observed at Limpiopungo from 21 August until at least 21 September 2018 (Salazar, 2018). There is one previous record at the same locality of a single individual observed on 3–15 January 2015 (Freile *et al*., 2019).

Pearl Kite *Gampsonyx swainsonii*
Zamora Chinchipe Province, Paquisha, 18 May 2018, F. Castillo (photo).

One adult was first observed at Paquisha on 18–29 May 2018 (Fig. 4n) and the species continued to be observed regularly in and around the town through at least January 2020 (eBird, 2020). This is one of the southernmost records in Amazonian Ecuador, where the species is primarily confined to the northern lowlands (Freile & Restall, 2018). However, it is likely colonizing new areas towards the Andean foothills and southern Amazonian Ecuador following deforestation (Ridgely & Greenfield, 2020).

Snail Kite *Rostrhamus sociabilis*
Pichincha Province, Reserva Mashpi Shungo, 8 January 2018, D. Chalá, A. Solano-Ugalde (photo).

Pichincha Province, Laguna de Limpiopungo, 15 February 2018, Z. Armas (photo).

The Mashpi record involves a juvenile found in weakened condition, which later died (Fig. 4o), whereas the Limpiopungo record also involves a juvenile, but in good condition (Fig. 4p). The Limpiopungo bird was persistently being mobbed by a resident Andean Lapwing *Vanellus resplendens* and an Andean Gull *Chroicocephalus serranus*. This species was considered Vulnerable in Ecuador by Granizo *et al*. (2002), but is likely increasing in numbers at present, especially in western Ecuador, and spreading northwards and into the Andean foothills; as a result, it has been removed from the country's red list (Freile *et al*., 2019b). There is a single previous highland record of an adult found dead, curiously also at Limpiopungo (de Vries, 1980).

Gray-bellied Hawk *Accipiter poliogaster*
Orellana Province, Shiripuno, 20 May 2012, R. Gelis (photo).

One adult was encountered inside primary forest, where it was depredating an unknown bird (Gelis, 2012). Apparently, this rare hawk has a wide distribution across the entire Amazon Basin, but it is poorly known and seldom recorded in Ecuador (Freile & Restall, 2018). There are a few additional records available in eBird, including one juvenile at Sumaco at a higher elevation than expected (Espinosa, 2015), an adult near Paquisha (Castillo, 2020), and another juvenile at Nuevo Paraíso Road, Zamora Chinchipe province, which is the southernmost record (Tizard, 2017).

Swainson's Hawk *Buteo swainsonii*
Manabí Province, Manantiales, 29 May 2018, G. Donoso (photo).

One subadult of undetermined sex was found in weakened condition at a farm (Fig. 5m), but apparently escaped after being photographed (G. Donoso, *in litt*., May 2018). There are few records of this boreal transient hawk in western Ecuador (Freile & Restall, 2018). The May date indicates a delayed migrant.

Koepcke's Screech-Owl *Megascops koepckeae*
Loja Province, campus of Universidad Técnica Particular de Loja (UTPL), urban Loja, February–May 2018, L. Ordóñez, A. Orihuela, A. Armijos, J. Freile (photos, audio-recordings).

A small population was unexpectedly discovered on the UTPL campus, within the city of Loja (Fig. 5n), and a few additional territories have subsequently been located in the Loja valley since then (Ordóñez-Delgado & Freile, 2019). This former Peruvian endemic owl has been recorded from Ayabaca province, *c*. 90 km south of Loja, so it might occur in other dry Andean valleys in the intervening area (Ordóñez-Delgado & Freile, 2019).

Figure 4: Major range extensions and extralimital records of birds in Ecuador. a) *Amazilia amazilia*, Copalinga Lodge, Zamora-Chinchipe province (R. Goodell); b) *Aramus guarauna*, Mashpi, Pichincha province (A. Solano-Ugalde); c) *Aramus guarauna*, Paquisha, Zamora-Chinchipe province (F. Castillo); d) *Vanellus chilensis*, Paquisha, Zamora-Chinchipe province (F. Castillo); e) *Attagis gayi*, south side Volcán Chiles, Carchi province (E. Taimal); f) *Anous stolidus*, off Punta Galera, Esmeraldas province (R. Ahlman; ML 204999951); g) *Sterna hirundo*, Yaguarcocha, Imbabura province (E. Obando); h) *Thalasseus elegans*, Yaguarcocha, Imbabura province (E. Obando)…

Figure 4: Major range extensions and extralimital records of birds in Ecuador. …i) *Thalasseus sandvicensis*, 10–15 km down river from Coca, Orellana province (B. Nooner); j) Sunbittern *Eurypyga helias meridionalis* (C. A. Vásquez); k) *Mycteria americana*, Borja bypass, Napo province (L. Ramsey); l) *Plegadis falcinellus*, Yaguarcocha, Imbabura province (D. Arias-Cruzatty); m) *Plegadis falcinellus*, Puerto El Carmen de Putumayo, Sucumbíos province (R. Ahlman; ML 205005521); n) *Gampsonyx swainsonii*, Paquisha, Zamora-Chinchipe province (F. Castillo); o) *Rostrhamus sociabilis*, Mashpi, Pichincha province (A. Solano-Ugalde); p) *Rostrhamus sociabilis*, Limpiopungo, Pichincha province (Z. Armas); q) *Glaucidium peruanum*, Mashpi, Pichincha province (A. Solano-Ugalde); r) *Thlypopsis sordida*, Paquisha, Zamora-Chinchipe province (F. Castillo).

Pacific Pygmy-Owl *Glaucidium peruanum*
Pichincha Province, Pachijal, 11 January 2018, F. Bolaños, A. Solano-Ugalde (photo).

One individual was rescued after crashing against a window; it recovered and was released the following day at Mashpi Shungo (Fig. 4q). Pachijal and Mashpi are outside the species' regular distributional range, but there are records from nearby areas in Pichincha province (Río Silanche, Puerto Quito), and further north in Cristóbal Colón, Esmeraldas province (eBird, 2020). Increasing deforestation, expansion of the agricultural frontier, and local climate changes (*i.e.*, decreasing humidity) might be the drivers of its range expansion.

White-throated Kingbird *Tyrannus albogularis*
Orellana Province, Nuevo Rocafuerte, 7 May 2018, R. Ahlman (photo).

Two separate individuals were seen nearby Nuevo Rocafuerte and readily identified as different from Tropical Kingbird *Tyrannus melancholicus* by the clear-cut white throat, clean yellow below, lack of olive wash on the breast, pale gray head, pronounced dark mask, and clear-cut green back (Fig. 5o). A short trill call of this individual was recorded (Ahlman, 2018c). There are a few additional sightings in the same general area and further west along the Río Napo (eBird, 2020). This record along with associated published evidence (Ahlman, 2018b), represent the first documentation for the species in Ecuador (Freile *et al.*, 2020).

Bobolink *Dolichonyx oryzivorus*
Esmeraldas Province, Punta Galera, 11 October 2015, R. Ahlman (photo).

A flock of four individuals was encountered in dry scrub near the coast (Fig. 5q). There are few records of vagrants in Ecuador, including records from the Galápagos Islands (Wiedenfeld, 2006; Freile & Restall, 2018; eBird, 2020). The species occurs as transient in Ecuador, with records limited to October–November and April–May (Freile & Restall, 2018). Paucity of records might be explained by short transit visits that make it pass overlooked (Ridgely & Greenfield, 2001).

Yellow-backed Oriole *Icterus chrysater*
Carchi Province, El Carrizal, near Tulcán, 30 March 2019, G. Lucero (photos).

One pair was found near Tulcán in a rural area characterized by cultivated land and remnant *Eucalyptus globulus* woodland patches (Fig. 5r). They were subsequently seen for two consecutive weeks. The pair often remained high in the *Eucalyptus* trees, but sometimes descended to nearby shrubs. They were found again in June 2019 (eBird, 2020). This is only the second Ecuadorian record of this species, which actually ranges to extreme southern Colombia (Ayerbe-Quiñones, 2018).

Baltimore Oriole *Icterus galbula*
El Oro Province, Buenaventura Reserve, 29 December 2018, L. Seitz (photo).

A single individual, presumably an immature male, was briefly observed and photographed (Fig. 2e). As admitted by the observer, it is not easy to separate a pure *Icterus galbula* from a hybrid *I. galbula* x Bullock's Oriole *I. bullockii* (Seitz, 2018). Some details that could differentiate these two species and a range of hybrid plumages are not appreciable in the photograph (belly color and pattern, molt wear in wing feathers). Thus, it is not possible to segregate with 100% certainty between *I. galbula* and *I. bullockii* (A. Jaramillo, *in litt.*, March 2020; see Jaramillo & Burke, 1999). Yet, CERO accepts the record as pertaining to *I. galbula* based on known wintering ranges of the two species. This is the fifth record of *I. galbula* in Ecuador (Freile & Restall, 2018). There is a recent photographic record of a non-breeding male in Puembo Birding Garden, Pichincha province (Mac, 2020).

Bay-breasted Warbler *Setophaga castanea*
Pichincha Province, Mindo, road to Mariposario, 13 March 2019, D. Jumbo (photo).

A male molting into breeding plumage was observed in a second-growth patch near Mindo, foraging in *Inga* and *Alnus* trees (Fig. 5p). It moved in the same flock as a Black-throated Green Warbler *S. virens* (see below).

There are few previous records for northern Ecuador (Freile & Restall, 2018; eBird, 2020). There is a report from the same location in February 2020 (Jumbo, 2020).

Chestnut-sided Warbler *Setophaga pensylvanica*
Pichincha Province, Jardín Botánico de Quito, 18 February 2019, J. Freile.

A single female was first recorded on 18 December 2018 by A. Morales & G. Nazati. The first photos taken of this individual show a full non-breeding plumage (see eBird, 2020). It remained in the same area until at least 16 May 2019, allowing for photographic documentation of its molt progression into breeding plumage. By 9 February it had begun its molt and by 14 March it was already in full breeding plumage (Fig. 2c). There are few, scattered records in northern Ecuador (Freile & Restall, 2018; eBird, 2020), mostly on April–May, and this is the first documented evidence to be formally published. There is an earlier photographic record by D. M. Brinkhuizen of a first-year male from Mindo (Brinkhuizen, 2014).

Black-throated Green Warbler *Setophaga virens*
Pichincha Province, Mindo, road to Mariposario, 10 March 2019, E. Capella, M. Bonet (photo).

One male molting into breeding plumage was first found on 10 March 2019 in the canopy of second growth, mostly accompanying mixed-species flocks (Bonet, 2019; Fig. 2d). It was last found on 3 April 2019 (eBird, 2020). There are very few and scattered records in Ecuador, this one being the first documented (Freile & Restall, 2018).

Western Tanager *Piranga ludoviciana
Pichincha Province, Reserva Otongachi, 2 May 2019, A. G. Simbaña Jaramillo (photo).

One second-year male molting into breeding plumage was photographed while visiting a fruit feeder (Fig. 1b). It is not known if this individual remained in the area because observations were limited to a single day. This is the first record for Ecuador and South America (Remsen *et al*., 2020) and comes on an unexpected date. The species winters in Central America, south to westernmost Panamá and adjacent Costa Rica, from where it departs by late March through April (Hudon, 2020). Previous records outside its typical wintering range or breeding grounds during the boreal spring are confined to northern United States and central-east Canada (Hudon, 2020). The southernmost record comes from Finca Velásquez, Veraguas, Panamá (Groenendijk, 2018), 850 km north-northwest of Reserva Otongachi, whereas the closest record to South America comes from the island of Bonaire (Wells & Childs-Wells, 2002).

The mechanism by which this individual arrived to northwest Ecuador cannot be determined with certainty, but two possibilities stand out. First, it could represent an overshooting migrant, which might have passed its normal winter grounds during fall migration and overwintered in Ecuador while remaining undetected. However, considering the late date and the tendency of the species to vacate southern wintering areas in March and April (Hudon, 2020), it seems more plausible that this individual engaged in reverse migration as a result of misorientation. It has been proposed that a small number of individuals in migratory species depart their wintering grounds in a 180° reverse direction, just as some individuals seem to do when departing their breeding grounds (Howell *et al*., 2014). From many points in the core wintering range of *P. ludoviciana* along the Pacific slope of Central America, the area in northwest Ecuador where this individual was found lies on a straight 180° directly opposite the species' breeding areas in North America.

Dickcissel *Spiza americana*
Esmeraldas Province, Las Peñas, 12 October 2015, R. Ahlman (photo).

A single adult was located in an open field with shrubby vegetation (Fig. 2f). There is only one previous record for Ecuador, an undocumented observation from Jatun Sacha, Napo province (Clay, 1999). The Las Peñas record provides the first documentation of the species for Ecuador (see eBird, 2020). There is one additional, recent record from the same area (Rowlett, 2019).

Figure 5: Rare birds recorded in Ecuador. a) *Oressochen jubatus*, clay licks in south bank of Napo River near Yasuni National Park control, Orellana province (P. Petrus; ML 65893401); b) *Spatula cyanoptera*, Lago San Pablo, Imbabura province (C. Vogt; ML 44409931); c) *Anas acuta*, Las Peñas, Esmeraldas province (R. Ahlman; ML 41959991); d) *Podiceps major*, Isla de la Plata, Manabí province (B. Wilcox; ML 78530561); e) *Larus belcheri*, Puerto López, Manabí province (S. M. Plúa); f) *Larus belcheri*, Mar Bravo, Santa Elena province (P. Bourdin; ML 105439221); g) *Pelagodroma marina*, near Isla Española, Galápagos province (A. Jaramillo; ML 105290011); h) *Pelagodroma marina*, near Isla San Cristóbal, Galápagos province (A. Bruun Kristensen); i) *Oceanodroma markhami*, near Isla San Cristóbal, Galápagos province (A. Jaramillo; ML 65144431); j) *Oceanodroma markhami*, near Isla San Cristóbal, Galápagos province (J. Gilliam; ML 92349131)…

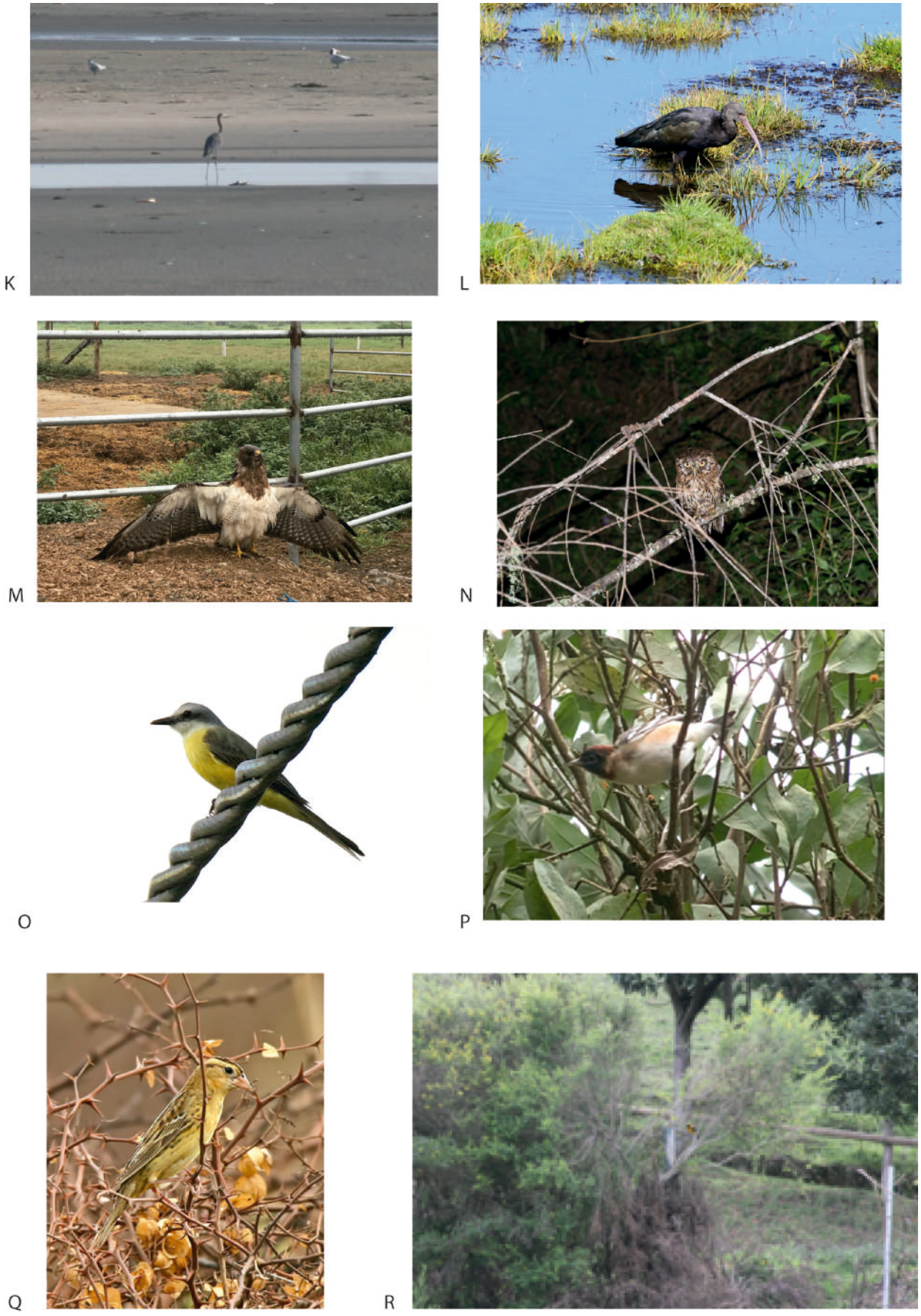

Figure 5: Rare birds recorded in Ecuador …k) *Egretta rufescens*, Pacoa, Santa Elena province (B. Haase); l) *Plegadis ridgwayi*, Limpiopungo, Pichincha province (N. G. Morelos); m) *Buteo swainsonii*, Manantiales, Manabí province (G. Donoso); n) *Megascops koepckeae*, Loja city, Loja province (P. Székely); o) *Tyrannus albogularis*, Nuevo Rocafuerte,

Orellana province (R. Ahlman; ML 99462291); p) *Setophaga castanea*, Mindo, Pichincha province (D. Jumbo; ML 145236871); q) *Dolichonyx oryzivorus*, Punta Galera, Esmeraldas province (R. Ahlman; ML 20370761); r) *Icterus chrysater*, El Carrizal, Carchi province (G. Lucero).

Pearly-breasted Conebill *Conirostrum margaritae
Orellana Province, river island close to Nuevo Rocafuerte, 6 May 2018, R. Ahlman (photo).

One pair was first found in a small patch of medium-aged *Cecropia* on a small river island dominated by grassy vegetation (Fig. 1c; Ahlman, 2018a), where it responded strongly to playback by approaching and singing. It was observed again on 4 May 2019 by the same observer, together with J. Illanes and X. Chv (eBird, 2020). This is the first record of the species for Ecuador and one of the few records along the Río Napo—and the westernmost in the Amazon basin (Schulenberg *et al*., 2006).

Orange-headed Tanager *Thlypopsis sordida*
Zamora Chinchipe Province, Paquisha, 22 July 2017, F. Castillo (photo).

Three birds were first seen in July 2017 and remained in the area until at least the end of that year, including repeated observations at the same fruit feeder (Fig. 4r). This species is mostly confined to riparian secondary vegetation and was, until recently, mainly confined to river islands and the riparian vegetation along the shorelines of major rivers (Ridgely & Greenfield, 2001; McMullan & Navarrete, 2017). However, it appears to be spreading into second-growth areas away from rivers and into the Andean foothills (Krabbe, 2018; eBird, 2020), likely in response to deforestation.

Other records received
The following records, received by CERO, do not represent significant range extensions but add to our knowledge of bird distributions in Ecuador.

Gould's Jewelfront *Heliodoxa aurescens*. Two adults (male and female) at 24 de Mayo, Pastaza province (16–18 November 2017; W. Arteaga-Chávez), mist-netted and observed in primary forest and edge at 1280 m a.s.l. [Mostly recorded below 1250 m, locally higher; Freile & Restall, 2018].

Gray-capped Cuckoo *Coccyzus lansbergi*. One individual was observed and photographed in December 2017–January 2018 at Mashpi Shungo Reserve (H. and N. Jacob, A. Solano-Ugalde). [Few records in humid lowlands of Pichincha province and neighboring areas; Freile & Restall, 2018].

Comb Duck *Sarkidiornis sylvicola*. One pair was observed in June 2015 at La Tembladera (A. Solano-Ugalde, M. Sánchez-Nivicela, R. Ahlman and J. Freile) swimming in open water near floating vegetation. After first appearing in 2015, the species was again observed several times at La Tembladera in the second half of 2018, with the highest reported count being an astonishing 300 individuals in early August (eBird, 2020). Sporadic records have continued into early 2020 (eBird, 2020). [Few localities known in Ecuador to date; trend in population numbers is not well understood, but population considered small and declining; Freile *et al*., 2019b].

Horned Screamer *Anhima cornuta*. Up to four individuals were seen at La Tambladera in June 2015 (A. Solano-Ugalde, M. Sánchez-Nivicela, R. Ahlman and J. Freile), where the species is regularly seen in low numbers. [Localities for this species in western Ecuador and number of individuals has increased notably in recent years (Martínez & Gastezzi, 2014; Freile *et al*., 2019a)].

Gray-breasted Flycatcher *Lathrotriccus griseipectus*. One individual was seen, heard, and audio-recorded at Mashpi Shungo Reserve for about one month in December 2017–January 2018 in second-growth woodland and a bamboo groove. [Few records from the humid lowlands, where apparently seasonal].

Golden Grosbeak *Pheucticus chrysogaster*. One female was observed and photographed in a bird hide feeding with other frugivores at Reserva Los Laureles de Guasaganda, La Maná, Cotopaxi province (C. Pellet, November 2017). [Rare in subtropics and foothills of western Ecuador, where possibly expanding following deforestation].

Rose-breasted Grosbeak *Pheucticus ludovicianus*. One adult male was observed at an open area in Reserva Los Laureles de Guasaganda, La Maná, Cotopaxi province (C. Pellet, April 2018). [Considered to be a rare boreal winter resident, mostly recorded in October–March; Freile & Restall, 2018].

White-lined Tanager *Tachyphonus rufus*. One individual was observed visiting a plantain feeder at Yanacocha Reserve (P. Greenfield and others, November 2018); it was mostly female-plumaged but showed some smudges of black feathers that suggested it was a young male. [Highest known record, *c*. 1500 m above its regular altitudinal range; Freile & Restall (2018), but likely spreading due to deforestation; one pair has become regular at Yanacocha recently; first records from this locality date back to January 2018 (eBird, 2020). There are additional records from the Quito area dating back to 2015 (Ahlman, 2015a) and from the Perucho valley (Loaiza, 2020) that support the range expansion hypothesis].

Rejected records

Table 2 presents six records rejected due to insufficient information and/or erroneous identifications. CERO postponed decisions on seven additional reports because submitted information was unsatisfactory to reach a definitive conclusion. Postponed records include one species reported for the first time in Ecuador (Bronzy Jacamar *Galbula leucogastra*; see Carrasco, 2016), for which CERO believes further field observations are needed.

Table 2: Summary of rejected records submitted to the Committee for Ecuadorian Records in Ornithology (CERO) between November 2017–June 2019.

Record number	Species	Locality, province	Date	Notes
2018-004	American Avocet *Recurvirostra americana*	Manta-Montecristi area, Manabí	15 December 2017	Probably mis-identified; insufficient description.
2018-030	Pavonine Quetzal *Pharomachrus pavoninus*	La Josefina, Pichincha	20 August 2018	Mis-identified Crested Quetzal *P. antisianus*.
2019-006	Golden-headed Quetzal *Pharomachrus auriceps*	Parque Guápulo, Pichincha	April 2019	Mis-identified Crested Quetzal *P. antisianus*.
2019-021	Purple Martin *Progne subis*	La Lobería, San Cristóbal, Galápagos	12 January 2019	Mis-identified young Barn Swallow *Hirundo rustica*.
2018-008	Chestnut-collared Swallow *Petrochelidon rufocollaris*	Meseta de Gualpi, vía Chical, Carchi	24 February 2018	Mis-identified young Blue-and-white Swallow *Pygochelidon cyanoleuca*.
2018-032	Darwin-Finch *Geospiza* sp.	Milagro, Guayas	October 2018	Mis-identified young Shiny Cowbird *Molothrus bonariensis*

Invalidated record

Saffron-headed Parrot *Pyrilia pyrilia*. There are five undocumented sightings in Ecuador. Ridgely & Greenfield (2001) discuss two of them: a pair observed by J. C. Matheus at Salto del Bravo in 1992 and 20 individuals observed by F. Sornoza near Pedro Vicente Maldonado in 1998. Later records include one individual believed seen at Estero Capulí, in Chachi indigenous territory, Esmeraldas province, by the Santiago-Ónzole rivers, by A. Solano-Ugalde. Additional observations, with little further details, were reported by Benítez & Matheus (1997) and Benítez *et al*. (1997).

After observing *Pyrilia pyrilia* in Colombia and juvenile Rose-faced Parrot *P. pulchra* in Colombia and Ecuador, A. Solano-Ugalde retracted his original identification. Juvenile *P. pulchra* has yellowish brown head,

not the intense rich yellow of *P. pyrilia*, but light conditions can mislead identification. Likewise, P. Greenfield discussed the first record of this species in Ecuador with the late J. C. Matheus, who admitted a potential confusion with juvenile *P. pulchra*, whereas F. Sornoza also conceded that misidentified juveniles could have been involved in his record.

None of the observers involved mentioned important field marks to separate these two species: red underwing coverts and yellow 'shoulder' patches (Hilty & Brown, 1986), and likely used the color of the head as the single identification character. As further discussed by Jahn (2011), "freshly fledged juveniles of *P. pulchra* have basically yellowish-brown heads… much like adults of *P. pyrilia*". He further argues that "under certain light conditions, *e.g.*, when the sunlight reflects on the crown and hind neck, distant or fast-flying adults of *P. pulchra* may look almost golden-headed and can be easily confused with *P. pyrilia*".

Since there are no definite records of *P. pyrilia* in a well-surveyed area like Playa de Oro, Esmeraldas province (Jahn, 2011), as well as anywhere else in the lowlands of western Pichincha, where bird observation is a regular activity by residents and visitors alike, we regard all records as unproven. Juan C. Matheus obtained observations reported by Benítez & Matheus (1997) and Benítez *et al*. (1997) in short visits to Charco Vicente and Estero Pote, two localities well studied by O. Jahn and P. Mena-Valenzuela (see Jahn, 2011). Since J. C. Matheus dismissed his other record at Salto del Bravo, it is plausible that these records at Charco Vicente and Estero Pote also involved misidentified *P. pulchra*.

There are no records south of the Río San Juan in Cauca Department, western Colombia (Ayerbe-Quiñones, 2018), *c*. 360 km north-northwest of the Ecuadorian border. The species is not known to engage in seasonal migrations and, therefore, should not be expected to occur in Ecuador as a vagrant. In light of the distance from known populations and the fact that the Ecuadorian sightings most likely involved misidentified individuals, CERO removes *P. pyrilia* from the Ecuador bird list.

Undocumented, published records

A few undocumented Ecuador records have been considered valid in previous publications (Ridgely & Greenfield, 2001; McMullan & Navarrete, 2017; Freile & Restall, 2018). Some records, albeit undocumented, have been accepted as valid without hesitation (*e.g.*, Pale-billed Hornero *Furnarius torridus*; Ridgely & Greenfield, 2001), while others have been maintained on the country checklist due to lack of evidence to prove them erroneous, as has been the practice of CERO in previous reports (Nilsson *et al*., 2014; Freile *et al*., 2017, 2019a). In the following accounts, we review some controversial published records, all of which lack documentation and may well turn out to be invalid due to misidentifications or imprecise locations. Decisions upon records of the following species are pending until receiving a formal proposal to remove them from the Ecuador's list or to revise their status in the country.

Green-tailed Goldenthroat *Polytmus theresiae*. There are two specimens (male and female) collected at Laguna de Siguin, Pastaza province (Berlioz, 1937), a locality long considered imprecise (Ridgely & Greenfield, 2001) and even asserted to be in Peru (Ridgely & Cooper, 2011). There is a site named Siguin north of Río Pastaza, *c*. 25 km southeast of Puyo, but elevation and habitat there seem inappropriate for the species (Table 1). However, there are records in northern Peru along the lower Pastaza drainage (Schulenberg *et al*., 2007) that might suggest its presence on the Ecuadorian side of the Pastaza. *Fide* P. J. Greenfield, some observers argued that it might be present in the Kapawi area, Pastaza. Until presence/absence in this area is proven, the species remains as hypothetical/undocumented.

Rufous-crested Coquette *Lophornis delattrei*. There is a single sight record of a pair seen at Jatun Sacha, Napo province, by B. Bochan on 19–25 April 1992 (Ridgely & Greenfield, 2001). Identification criteria to distinguish this species from Spangled Coquette *L. stictolophus* are still evolving (Ridgely & Cooper, 2011). Thus, the fact that few field guides were available by 1992 (Hilty & Brown, 1986), coupled with a deficient knowledge of these species' distributions, suggests a possible misidentification. Given that the observer did not provide field notes and descriptions of her sightings, it remains impossible to determine the validity of this record. There are no further reports of *L. delattrei* from Jatun Sacha and other areas at similar elevations, and with similar habitats, whereas *L. stictolophus* is regularly recorded in Reserva Ecológica Tamandua and Aguayacu, only 47 km southwest and 26 km northwest of Jatun Sacha, respectively, albeit at higher elevations (eBird, 2020). It should be noted that seasonal altitudinal movements have been reported for *L. delattrei* (McMullan, 2016).

Blue-tufted Starthroat *Heliomaster furcifer*. There is a single sight record of an apparent immature male by R. S. R. Williams at La Selva, Sucumbíos province, in December 1994 (Ridgely & Greenfield, 2001; or December 1996 *fide* R. S. R. Williams, *in litt*., June 2020). The apparent lack of supporting evidence, field notes, or descriptions has made some experts (N. Krabbe, R. S. Ridgely, N. Athanas) suggest that the record is not valid (see also Ridgely & Cooper, 2011). However, according to the observer, this record was supported by field notes and a field sketch sent to R. S. Ridgely a few days after fieldwork.

It has been suggested that the species, which ranges from southern Brazil south through northern Argentina (McMullan, 2016), performs some sort of post-breeding migration (Mazzoni & Perillo, 2014). Nonetheless, the date of the purported observation at La Selva does not fit into an austral migration pattern since the species is reported to breed from November to March (Schuchman *et al*., 2020). There is one additional unproven sighting by X. Amigo nearby Río Bigal Reserve, Orellana province (see Freile & Restall, 2018), but the description is insufficient to validate identification. Robert S. R. Williams (*in litt*., June 2020) felt confident at the time about his identification in the field, but now believes he cannot be 100% certain that he did not make a mistake. A study of the purported notes and sketch done in the field is pending. However, we believe this species should be removed from the country list since there are no definitive records.

Sapphire-spangled Emerald *Amazilia lactea*. A single sight record involves a presumed male seen by R. S. Ridgely and F. Sornoza in a swampy area along the Maxus road, Orellana province (Ridgely & Greenfield, 2001). According to N. Krabbe (*in litt*., January 2008), R. S. Ridgely later admitted his doubt about this sighting since he has subsequently observed Glittering-throated Emerald *Amazilia fimbriata* showing bluish-tinged underparts. Although the species is known to engage in local seasonal movements (McMullan, 2016), it is not known from nearby areas in Loreto department, Peru (Schulenberg *et al*., 2007). The species is transferred to the genus *Chionomesa* by Remsen *et al*. (2020).

Rusty-faced Parrot *Hapalopsittaca amazonina*. The only existing record involves one pair observed by G. H. Rosenberg at Cerro Mongus, Carchi province in March 1992—and identified by distribution (Ridgely & Greenfield, 2001). Intensive fieldwork at nearby Guandera Reserve (*i.e*., 10–12 simultaneous field observers during three consecutive sampling months; Cresswell *et al*., 1999) failed to detect this species, as well as many repeated visits to Cerro Mongus by several observers (eBird, 2020). The nearest locality for the species is Laguna La Cocha, Nariño department, Colombia, *c*. 110 km northeast of Cerro Mongus (Harding, 2016). Even though G. H. Rosenberg's record could have involved a wandering pair, no movements are reported for the species (Collar & Boesma, 2020) and its close relative, the Red-faced Parrot *H. pyrrhops*, is known to be mostly sedentary (Toyne & Flanagan, 1997).

Gary H. Rosenberg (*in litt*., June 2020) considers it appropriate to retract his original identification, although the original description in his field notes fits an *Hapalopsittaca*. Either further discussion on this species' status or a formal proposal to remove it from the country's list is needed.

Cinereous Finch *Piezorina cinerea*. A single sight record exists, near El Empalme, Loja province, by B. Whitney on 15 March 1990, with no further observations despite numerous visits to adequate habitat reported by Ridgely & Greenfield (2001) and carried on subsequently by several observers. Niels Krabbe (*in litt*., January, 2008) suggested that this record might correspond to an escaped bird, since it is a common cage-bird in Tumbes, Peru. However, vagrancy could have also been involved (Ridgely & Greenfield, 2001). Field notes taken by B. M. Whitney suggests a protracted observation that theoretically should have permitted a correct identification (Fig. 6).

While the nearest localities for the species to El Empalme lie *c*. 80 km west and south, respectively, and 15 km west and 50 km south of the nearest Ecuadorian border (eBird, 2020), there are also records further west, near the coast, only 2–3 km south of the Ecuadorian border, implying that the species might eventually be recorded again in Ecuador. Degradation of habitat structure driven primarily by historical and recent land use changes are reported as drivers of variation in the distribution and abundance of Tumbesian species (Devenish *et al*., 2017). These changes can allow species that are tolerant of degraded habitats, such as *Piezorina cinerea*, to colonize new areas as their local abundances increase and their ranges expand.

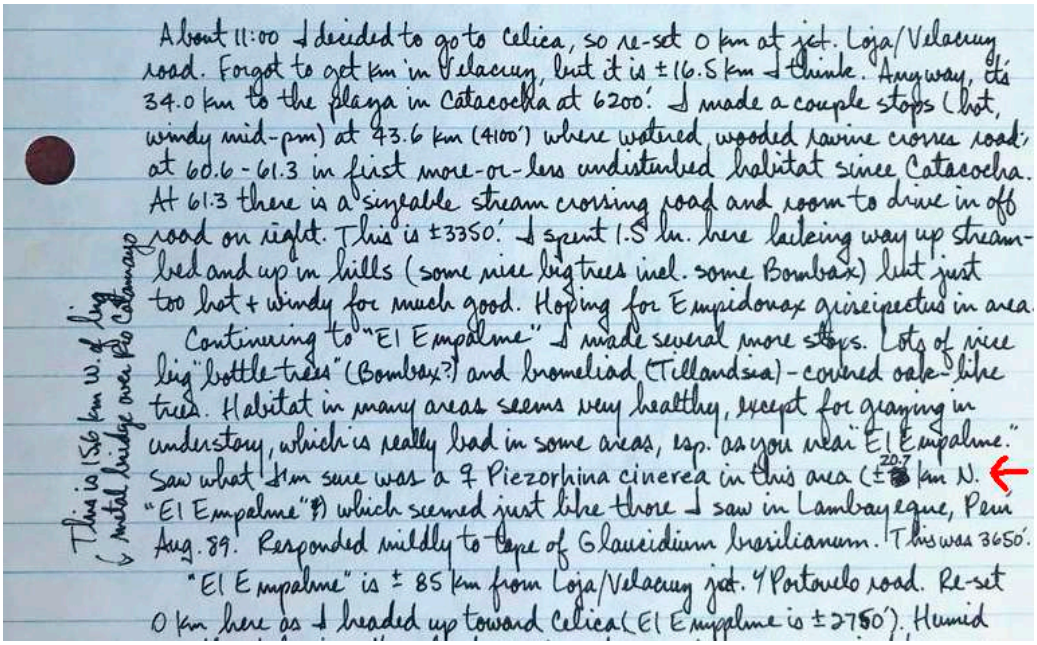

Figure 6: Fragment of field notebook by B. M. Whitney of the single sight record of Cinereous Finch *Piezorina cinerea* in Ecuador.

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