The birds of the Serranía de Perijá: The northernmost avifauna of the Andes

Las aves de la Serranía de Perijá: la avifauna más septentrional de los Andes

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Abstract

Serranía de Perijá is the northernmost projection of the Andes. Although it has a distinct orogenic history from the adjacent ranges of northern South America, Perijá has received little biological research and conservation attention, particularly on the Colombian side. The avifauna of Serranía de Perijá remains understudied and its populations are often not included in biogeographic studies or taxonomic revisions. Here we present the results of two ornithological expeditions carried out in 2008 and 2009 along the western (Colombian) slope of this range, from between 1500 to 3100 m. We recorded 182 bird species in montane forests and paramo habitats. Combining historical records from museum collections and the literature with our findings resulted in at least 425 species recorded to date in this range above 800 m. We discuss novel information on distribution and natural history and underscore intriguing patterns of geographic variation and endemism of selected Perijá taxa. Our study has implications for understanding the diversity of birds of the Northern Andes and urges for research and conservation actions of the remaining montane forests and paramo of Serranía de Perijá.

Key words: biogeography, Colombia, conservation, paramo, range extension, tropical montane forest, Venezuela

Resumen

La Serranía de Perijá es la proyección más septentrional de los Andes. Aunque posee una historia orogénica distinta a la de las montañas adyacentes del norte de Suramérica, pocas veces ha sido objeto de investigaciones biológicas o recibido suficiente atención en conservación, particularmente en Colombia. La avifauna de la Serranía de Perijá aún es poco conocida y sus poblaciones no suelen ser parte de estudios biogeográficos o revisiones taxonómicas. Aquí presentamos los resultados de dos expediciones ornitológicas realizadas en 2008 y 2009 en la vertiente occidental (colombiana) de esta formación entre 1500 y 3100 m. Encontramos 182 especies en bosques montanos y páramo. La combinación de los registros históricos a partir de colecciones biológicas y la literatura con nuestros datos resulta en al menos 425 especies registradas hasta ahora en la región por encima de 800 m. Discutimos información novedosa de distribución geográfica e historia natural y resaltamos patrones interesantes de variación geográfica y endemismo de algunos taxones de Perijá. Nuestro estudio tiene implicaciones para entender la diversidad de aves de los Andes del Norte y muestra la urgencia en investigar y conservar los remanentes de bosque montano y páramo de la Serranía de Perijá.

Palabras clave: biogeografía, Colombia, bosque montano, conservación, ampliación de distribución, páramo, Venezuela

Introduction

Northern South America is characterized by a complex array of isolated mountain massifs and Andean cordilleras with a diverse geological history, and a rich ecological diversity that have fascinated biogeographers and ornithologists (Chapman 1917, Vuilleumier 1970). The Eastern

Andes (Cordillera Oriental) is narrow in the south and broadens in its central part as the widest cordillera of the region. With *ca.* 1275 km of extension, it is one of the most topographically and ecologically complex range of the Andes and one with a heterogeneous orogenic history (Parsons 1982, Gregory-Wodzicki 2000, Cediel *et al.* 2003, Graham 2009). In their northern portion, the Eastern Andes attain their highest topographical complexity, reaching their highest elevation in the Sierra Nevada del Cocuy and tapering into the northernmost spur of the Andes: the Serranía de Perijá of Colombia and Venezuela (de Booy 1918, Phelps 1943, Hitchcock 1954, Rangel-Ch. 2007). Serranía de Perijá had a relatively independent orogeny from that of the adjacent mountain ranges, and although it suffered a major uplift since the late Miocene along with the Eastern Andes, its formation predates that of other ranges of the Northern Andes (Kellogg 1984, Hernández-Camacho *et al.* 1992, Clapperton 1993, Montes *et al.* 2010). This range has received much less research attention than the adjacent major massifs such as the Sierra Nevada de Santa Marta (SNSM), the Mérida cordillera, the Coastal cordillera or even the Pantepui region (Hernández-Camacho *et al.* 1992, Viloria & Calchi La C. 1993).

Current knowledge of the avian diversity and composition of Perijá is derived from the sparse and incomplete collections of the late nineteenth and early twentieth centuries. The more accessible lower foothills and adjacent lowlands (<800 m) were studied first. A very small series of specimens was collected on the western (Colombian) side of the range by F. A. A. Simons between 1878 and 1879, perhaps the first explorer of the region (Salvin & Godman 1879, Simons 1881, de Booy 1918), whereas the eastern side on the Maracaibo versant (Venezuela) was first visited in 1920 by W. H. Osgood and B. Conover (Osgood & Conover 1922, Phelps 1943). Only until 1940 the first collections of montane birds were made on the eastern slope of the Serranía de Perijá at La Sabana (=Ayapa, 1200-1800 m; Phelps & Gilliard 1940, Phelps 1943), which marked the beginning of an active period of ornithological exploration in this range. The highlands of the Serranía de Perijá were more accessible from the Colombian side, which allowed M. A. Carriker, Jr. to complete three expeditions between 1941 and 1952 (Carriker 1954). However, ornithological work in the Serranía de Perijá mostly concentrated on the eastern versant between 1940 and 1977 (Aveledo Hostos & Pérez Chinchilla 1989), notably by personnel of the Phelps, La Salle and Adolfo Pons collections in Venezuela (Phelps & Gilliard 1940, Aveledo Hostos & Pons 1952, Ginés *et al.* 1953, Phelps & Phelps 1953, Viloria & Calchi La C. 1993). Despite the fact that most of Carriker's work on the Colombian side of the range preceded or was contemporary with that made on the Venezuelan side, his specimens were seldom examined in the numerous descriptions that followed, which were mainly based on Venezuelan specimens. Nevertheless, Perijá birds from both sides of the border have not been subject of detailed studies, especially in recent times (but see Cuervo *et al.* 2014, Avendaño *et al.* in press).

During the last three decades, very little ornithological work has been done in Serranía de Perijá (see Viloria & Calchi La C. 1993, Ardila-Reyes *et al.* 2007), consisting of sporadic collections and anecdotal observations. Most of that work remains unpublished. On the Venezuelan side, the region has been visited by C. Sharpe, J. G. León and D. Ascanio (Ascanio & León 2004), but a two-day rapid inventory in April 2004 by Lentino *et al.* (2004) was probably the first systematic ornithological work there in decades, resulting in 17 birds not previously recorded in the region. On the Colombian slope, personnel of the Instituto de Ciencias Naturales of the Universidad Nacional collected an important series at La Jagua

de Ibirico in 1996, while between 2005-2007 a rapid biodiversity assessment of the highlands of the range (2800-3400 m) did not consider systematic collection of specimens (Ardila-Reyes *et al.* 2007). The paucity of ornithological research in the Serranía de Perijá, especially on the Colombian side and the security risks posed by the area (see Malakoff 2004), makes this important biogeographic range one of the most unexplored areas of the Northern Andes (van Velzen 1992).

Here, we present the results of recent ornithological expeditions to the humid montane forests and the paramo of the western slope of Serranía de Perijá. We reviewed all known bird records in the region to present an updated list of the montane birds of this range (above 800 m). We underscore the occurrence of birds on each side of the international border and discuss the implications of this information for the distribution patterns and taxonomy of the avifauna of Serranía de Perijá and its endemic taxa. Finally, we discuss the importance of conserving the northernmost range of the tropical Andes and its avifauna.

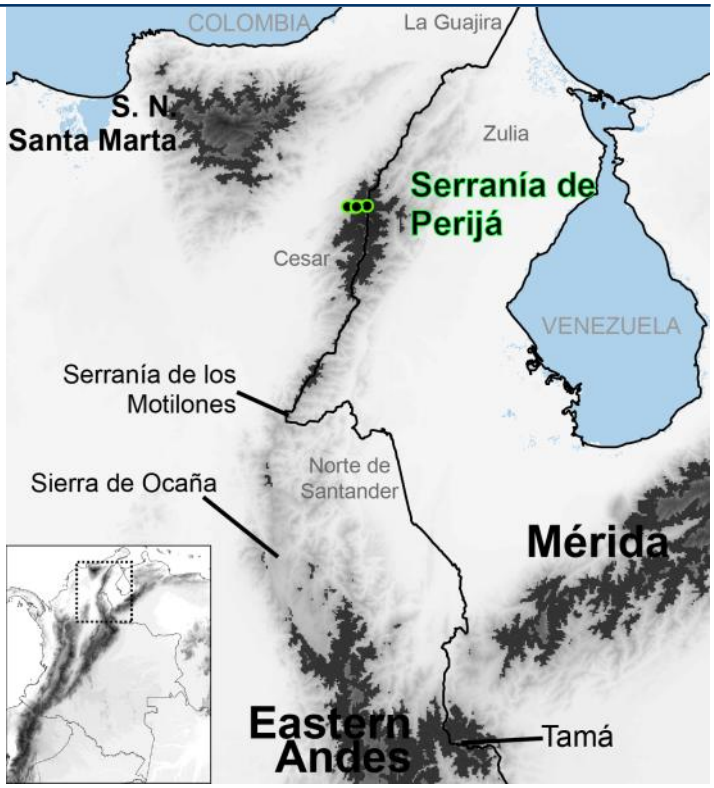

Figure 1. Map of northern South America depicting the location of Serranía de Perijá and adjacent mountain ranges such as the Mérida cordillera, the Eastern Andes including the Tamá massif, Sierra de Ocaña and Serranía de los Motilones, and the Sierra Nevada de Santa Marta. Symbols on Perijá indicate the geographic location of our study sites above the town of Manaure, Cesar, on the Colombian slope; from west to east: San Antonio, El Cinco, and Sabana Rubía (see text for details).

Study area & methods

The Serranía de Perijá (hereafter simply "Perijá") consists of a series of successive ranges or "serranías" that have received different names on both sides of the border (*i.e.* Lamas, Valledupar, Mene, Montes de Oca, Sierra Negra, Sierra Colorada) (Ginés & Jam L. 1953). We visited the western slope and the ridgetop of the northern sector of Perijá between 1500-3100 m, above the town of Manaure, Department of Cesar, Colombia (Fig. 1). We carried out two ornithological expeditions, the first between 4 and 15 July 2008, the second between 7 and 21 February 2009. The authors conducted fieldwork with the assistance of J. Botero and O. H. Marín in the 2009 trip. We tallied all birds observed or heard, obtained sound recording and photographs of birds, and collected specimens trying to cover several microhabitats along the elevational transect. We followed trails into the interior of montane humid forest and along the border of stunted second growth with ferns and *Chusquea* bamboo, and paramo. We prepared specimens as conventional round skins, now housed in the ornithological collection of the Instituto de Ciencias Naturales at the Universidad Nacional de Colombia, Bogotá. Tissue samples of each specimen were collected and deposited at the Colección de Tejidos of Instituto Alexander von Humboldt and Banco de Tejidos of Universidad de los Andes. Taxonomic nomenclature follows the South American Checklist Committee of the American Ornithologists' Union (Remsen *et al.* 2014), except when noted. The three localities surveyed are detailed in Figure 2, and included:

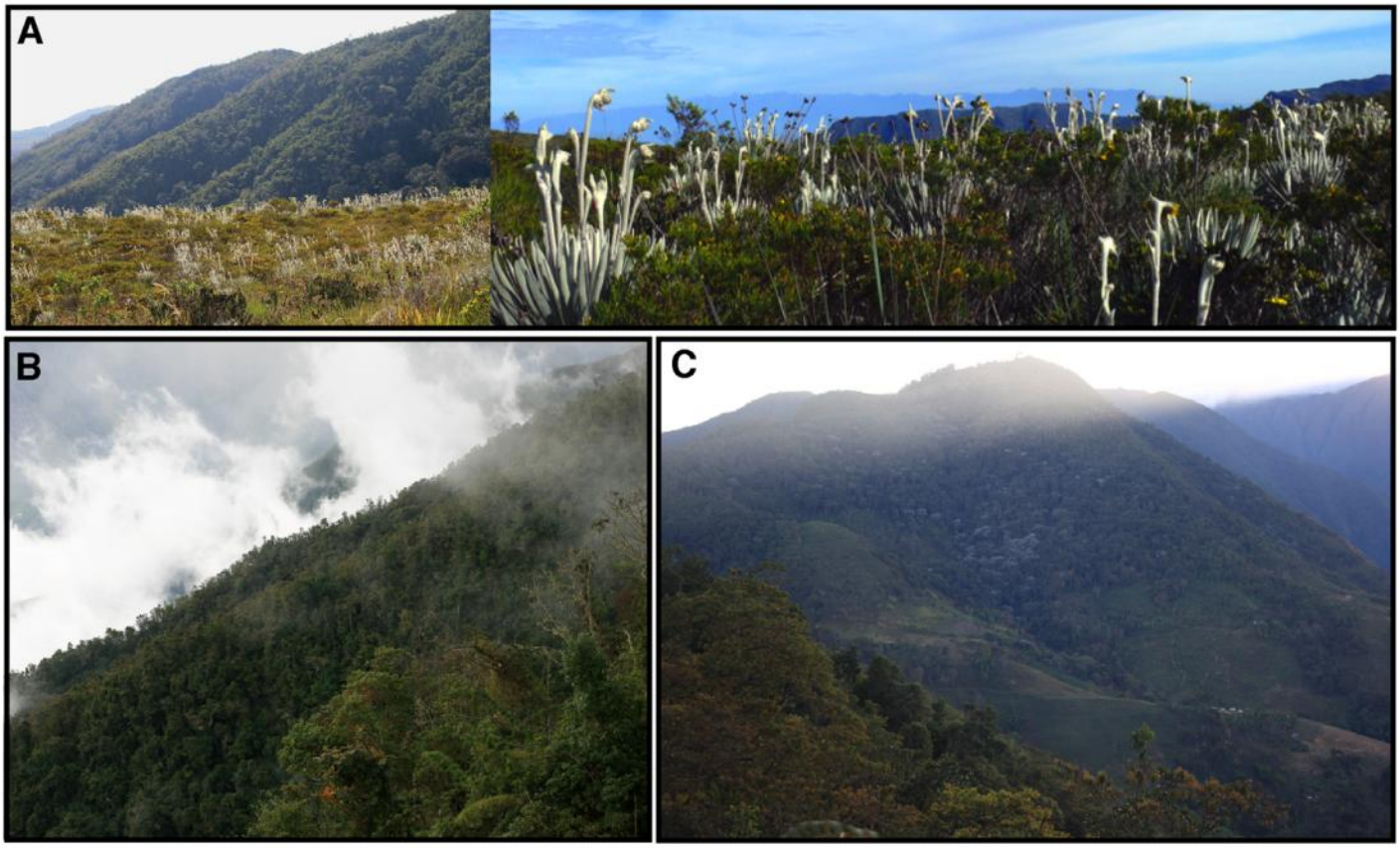

Figure 2. Landscape and habitat photos at our study sites in Serranía de Perijá. **(A)**: top two from Sabana Rubia (paramo and treeline with stunted forest); **(B)**: El Cinco (upper montane secondary forest in steep terrain); **(C)**: San Antonio (disturbed lower montane secondary forest fragments in a matrix of pastures and agricultural fields).

1. PÁRAMO DE SABANA RUBIA, CASA E' VIDRIO.- (10° 22'N, 72°53'W; 2900-3100 m). Field work was concentrated on the treeline zone, at elfin forest patches and open grassy areas of successional subparamo and disturbed paramo vegetation dominated by *Calamagrostis effusa* and *Chusquea spathacea* grasses, *Cortaderia colombiana, Espeletia perijaensis* and *Libanothamnus occultus* with some isolated *Eucalyptus* sp. trees and some shrubby areas (Rivera-Díaz & Fernández-Alonso 2003). Intensive cattle ranching, opium crops and agriculture previously disturbed this area, with the paramo area periodically burned (Fig. 2a). Sabana Rubia is within walking distance of the Venezuelan border and just 9 km south of Cerro Pintado (Department of La Guajira), the northernmost paramo habitat of the Andes and a historic ornithological locality visited by M. A. Carriker, Jr. in 1942. Fieldwork was carried out between 5 and 10 July 2008.

2. EL CINCO. - (10°21'N, 72°56'W; 2200-2740 m). Humid montane forest site characterized by fragments of primary and secondary forest with trees including *Styloceras laurifolium, Billia rosea, Guarea kunthiana, Ruagea sp., Prumnopitys montana, Clusia multiflora, Ternstroemia meridionalis, Podocarpus oleifolius, Weinmannia pinnata, Spinacia sessiliflora* and *Hesperomeles ferruginea*. Shorter trees that reached up to the subcanopy included *Hesperomeles ferruginea, Paragynoxys martingrantii* and *Oreopanax triphyllum*. In addition to the species listed, *Miconia limitaris, Cybianthus iteoides* and *C. tamanus* were common in the shrub layer. In some places of the understory and forest borders, *Chusquea tessellata* bamboo stands were the dominant species (Fig. 2b) (Rangel-Ch. & Arellano-P. 2007). In El Cinco, forest cover is reduced to small patches and clearing and burning is expanding for agricultural fields. Fieldwork was

conducted 11-15 July 2008 and 7-12 February 2009.

3. SAN ANTONIO. - (10°21'N, 72°59'W; 1500-1900 m). Humid premontane forest patches with relatively tall trees (c. 25-30 m) including *Prunus integrifolia, Guarea kunthiana, Vochysia gigantea, Beilschmiedia sulcata* and *Alchornea glandulosa*, second growth and shrubby areas with presence of *Cecropia sp., Cestrum racemosum, Oreopanax parviflorum, Guatteria* sp. and *Huertea granulosa*. The landscape mostly consists of non-native grasslands used for livestock grazing, coffee and plantain plantations and young second growth with isolated and ornamental trees. Remnant forests are heavily logged and highly fragmented, surrounded by pastures and agricultural fields. Fieldwork concentrated on these forest patches and forest borders (Fig. 2c) and was carried out between 13 and 18 February 2009.

We present a combined list of the known occurrence records of birds from the Perijá based on our fieldwork data, museum records and historical information. Our focus is on the montane habitats above 800 m, thus we did not discuss bird records from the surrounding lowlands of western Zulia, the Catatumbo basin, the Cesar Depression or La Guajira peninsula. We consulted major museum collections with specimens collected in the range: the American Museum of Natural History (AMNH), the Academy of Natural Science of Philadelphia (ANSP), the Colección Ornitológica Phelps (COP), the Instituto de Ciencias Naturales at the Universidad Nacional de Colombia (ICN), Colección Adolfo Pons, Caracas (PONS) and the National Museum of Natural History, Smithsonian Institution (USNM). Second, we compared this information with data gathered from the literature, including previous ornithological surveys and descriptions of taxa using Perijá specimens (Phelps 1943, Ginés *et al.* 1953, Ginés & Yépez 1953, Carriker 1954, Phelps & Phelps 1958, 1963, Aveledo Hostos & Pérez Chinchilla 1989, Viloria & Calchi La C. 1993, Hilty 2003, Ascanio & León 2004, Lentino *et al.* 2004, Ardila-Reyes *et al.* 2007, Restall *et al.* 2007, Cuervo *et al.* 2014).

Results

We recorded 182 bird species during the two expeditions to Perijá, 43 in Páramo de Sabana Rubia, 83 in El Cinco and 116 in San Antonio. We collected 287 specimens representing 103 species (three skins per species, on average), 37 of which were not previously represented at the ICN or in any other ornithological collection. We recorded two species new to Perijá and at least six not previously recorded on the Colombian side of the range (see below).

Our data, in conjunction with historical and specimen records, resulted in a total of 425 bird species so far known to occur in Perijá above 800 m. Only 274 species have been recorded in the Colombian slopes whereas 409 have been recorded in Venezuela, approximately (Appendix). Over 150 Perijá birds have not been recorded on the Colombian side of Perijá, which contrasts with the only 16 species that have not been confirmed in Venezuela. Forty-five avian taxa are endemic to the Perijá mountains, including four species (*i.e., Metallura iracunda, Scytalopus* sp nov., *Asthenes perijana*, and *Arremon perijanus)* as per current taxonomic authorities (Remsen *et al.* 2014).

Several records in the literature may be rendered as incorrect or treated provisionally as hypothetical until proper documentation is acquired, thus we did not include them in the compiled list. Excluded records are largely derived from undocumented observations (*e.g.,* Ardila *et al.* 2007) or faulty taxonomy. These involved species that would represent extraordinary range disjunctions or geographic replacements from adjacent ranges of

conspecific Perijá birds (*e.g.,* reports of *Asthenes fuliginosa* in addition to *Asthenes perijana)*. The list of taxa treated as hypothetical or incorrect until specimens are collected includes: *Buteo ventralis, Gallinago paraguaiae, G. stricklandii, Aglaeactis cupripennis, Coeligena torquata, Eriocnemis vestita, Oxypogon guerinii, Cinclodes fuscus, Asthenes fuliginosa, Ochthoeca frontalis, O. fumicolor, Anisognathus igniventris, Cnemoscopus rubrirostris, Iridosornis rufivertex, Conirostrum rufum, Cnemarchus erythropygius, Atlapetes albofrenatus, Catamenia analis* and *Phrygilus unicolor*. Additional collecting would be necessary to confirm these species in Perijá.

The following accounts present novel information on the distribution, natural history or geographic variation and taxonomy of selected Perijá birds, highlighting endemic taxa or birds little known in this region. The compiled list of birds reported in the Perijá mountains (above 800 m) is given in Appendix. An album with photos is available at: https://www.flickr.com/photos/amcuervo/sets/72157648905991251/

Vultur gryphus (Andean Condor): In July 2008 and February 2009 we observed solitary males soaring along with *Geranoaetus melanoleucus* (Black-chested Buzzard-Eagle) above Sabana Rubia (3050 m) and two other males soaring above El Cinco and San Antonio (2500 and 1900 m, respectively), together with *Coragyps atratus* (Black Vulture) and *Cathartes aura* (Turkey Vultures). In Perijá, it was previously recorded at Cerro Tetarí in Venezuela, near the Colombian border (Calchi & Viloria 1991). *Vultur gryphus* is regularly observed in the eastern sector of SNSM, whereas in the Eastern Andes it has been photographed as far north as the Tamá massif, south of the town of Toledo, (C. A. Leal, pers. comm.) and Cáchira, Norte de Santander (Rodríguez-Mahecha & Orozco 2002, Mejía Tobón *et al.* 2008). Further studies are necessary to confirm whether Perijá offers suitable habitat for a population of condors and whether they breed in the region. It is possible that the observed individuals are part of a metapopulation connecting SNSM, Paramo de Santurbán, Tamá, and the Sierra Nevada del Cocuy. Although historically known from the three ranges of the Colombian Andes, SNSM, and Mérida cordillera, most northern Andean populations have been declining. Captive-breeding conservation programs have taken place in Puracé, Los Nevados, Sumapaz, Chingaza and El Cocuy. The only confirmed natural populations in northern Colombia appear to be ones in SNSM and Perijá.

Geranoaetus melanoleucus (Black-Chested Buzzard-Eagle): We made two separate observations of soaring individuals of this montane raptor. The first was flying over the paramo at Sabana Rubia along with Andean Condor *(Vultur gryphus)* in July 2008 and the other was above El Cinco in February 2009. The distribution of *G. melanoleucus* in Colombia is patchy along the three Andean ranges and not well known (Hilty & Brown 1986, Cuervo & Delgado-V. 2001, Krabbe *et al.* 2006). In the Eastern Andes, it is known from Boyacá (Iguaque at 3200 m, F. G. Stiles, pers. com.), Cundinamarca, mostly above 2500 m (Hilty & Brown 1986) and the Paramo de Santurbán in Santander, above 3400 m (JEA pers. obs.). Our sightings were not confirmed with specimens or by indirect evidence but they would extend the known distribution towards the northernmost portion of the Eastern Andes in Colombia. Documentation with specimens and further research on the movements and population size of this large raptor are needed.

Dromococcyx pavoninus (Pavonine Cuckoo): We heard the species' distinctive song in small second growth patches below San Antonio at 1600 m in February 2009. The natural history and distribution of this cuckoo in its disjunct range in northwestern

South America is not well understood. Aveledo Hostos & Ginés (1950) described the subspecies *perijanus* based on Venezuelan specimens, but it is unclear in their description what makes *perijanus* different from better known populations. For decades, one Carriker specimen collected at Fonseca at 1225 m on the north face of Perijá (Montes de Oca) was the only record for Colombia, but it has been found in different locations of the northern Central Andes since 2000 (Cuervo *et al.* 2008a) and the Magdalena valley foothills (Freeman *et al.* 2012). For example, one specimen was collected in 2011 by F. G. Stiles in Yariguíes N. P., Santander (ICN 38062). Ours is the first record of *D. pavoninus* for the western slope of Perijá, although there are more from the Venezuelan side (Aveledo Hostos & Ginés 1950, Hilty 2003). Further fieldwork and collections would be critical to determine the distribution and geographic variation of this species in northern Venezuela and central Colombia, and to test the distinctiveness and range limits of the subspecies *perijanus* (Aveledo Hostos & Ginés 1950, Payne 2005).

Aeronautes montivagus (White-tipped Swift): Flocks of approximately 40 individuals were observed daily at close range flying over San Antonio (1800 m) and El Cinco (2500 m) in the mornings, while emitting their distinctive vocalization. A nesting colony was recently discovered near Cerro Pintado in La Guajira (Strewe 2004). Our observations constitute the second record of this species for Perijá, although it might be widespread in this range.

Metallura tyrianthina ssp. (Tyrian Metaltail): This hummingbird was common in Perijá between 2000 and 2800 m. The Perijá population of *M. tyrianthina* closely resembles the subspecies *districta* of SNSM and it has been assigned historically to that subspecies. Comparisons of our recently collected specimens from Perijá and those from topotypical *districta* reveal that they are slightly distinct phenotypically (F. G. Stiles and AMC, unpubl. data). The distinctiveness of this *M. tyrianthina* population is corroborated by phylogeographic patterns in *M. tyrianthina*, which showed that the Perijá and SNSM populations are genetically divergent and not sister to each other (Benham *et al.* in press).

Metallura iracunda (Perijá Metaltail): This endemic hummingbird was uncommon to fairly common between 2500 and 3050 m at our study sites in July 2008, but no records were obtained in 2009 when we concentrated our efforts at lower elevations (Fig 3a). We captured 15 individuals, of which three males and two females were collected at Sabana Rubia (3025 m) and one male at El Cinco (2500 m). We generally found this species foraging at medium and low levels at the edge of mature forests, tall second growth, stunted elfin forests and often near ground level in paramo with grassland vegetation and shrubbery patches (Wetmore 1946). It also used bamboo-dominated thickets *(Chusquea spathacea)* and frailejon *(Espeletia perijaensis* and *Libanothamnus ocultus)* (Rivera-Díaz & Fernández-Alonso 2003). We did not find it below 2500 m. In Venezuela, it is reported from 1800 to 3400 m, but most commonly above 2400 m (Meyer de Schauensee & Phelps 1978, Hilty 2003). We made the first sound recordings available that document its distinctive vocalizations (XC22195). The local population of *M. tyrianthina* is also fairly common in Perijá and we found it broadly sympatric with *M. iracunda* at all localities in montane forest and paramo (see also Wetmore 1946). Both *Metallura* lineages endemic to Perijá are non-sister close relatives, and members of a clade of northern species characterized by deep geographic structure (Benham *et al.* in press) and strong sexual dimorphism (García-Moreno *et al.* 1999).

Coeligena bonapartei consita (Golden-bellied Starfrontlet): This polytypic hummingbird consists of three allopatric, differentiated populations: *C. b.*

Figure 3. Photographs of selected birds from Serranía de Perijá. **(A)**: *Metallura iracunda*, the photo on the right is comparison with the local subspecies of *M. tyrianthina* with which it is sympatric; **(B)**: *Coeligena bonapartei consita;* **(C)**: *Drymophila klagesi;* **(D)**: *Grallaria rufula saltuensis;* **(E)**: *Grallaria ruficapilla perijana*.

bonapartei of the western slopes of the Eastern Andes, *C. b. eos* of the Mérida cordillera and *C. b. consita* of Perijá (Wetmore & Phelps 1952, Howard & Dickinson 2003). We obtained a series of four males and five females of *consita*, all adults in fresh plumage, which clearly exhibit the diagnostic traits of this taxon (Fig. 3b). These were captured in stunted forest and paramo at Sabana Rubia at 3025 m in July 2008 and in upper montane forests at El Cinco forest at 2550 m in February 2009, where it was fairly common in the edge and forest interior. The taxon *consita* was previously known on the Colombian side of Perijá from a single female collected above Hiroca, about 40 km south of our localities (Carriker 1954). Compared to the other two subspecies of *C. bonapartei*, this Perijá endemic is more similar in plumage to *C. b. eos* of the Mérida cordillera, but the buffy spot on the secondaries of *consita* males is less conspicuous and the tail is green throughout instead of partly hazel; in females, the throat is much less spotted, and the abdomen is more extensively green, and the undertail coverts are spotted with iridescent green (Wetmore & Phelps 1952). Phylogeographic analyses in *Coeligena* hummingbirds with emphasis on *bonapartei* subspecies and *helianthea* (Blue-throated Starfrontlet) show a complex evolutionary history of rapid divergence in this group (J. L. Parra *et al.* unpubl. data).

Ara militaris (Military Macaw): In February 2009, we observed a pair flying above El Cinco from the eastern side of Perijá in Venezuela to the northwest in the direction to Cerro Pintado, just north of our camping site. This species has a discontinuous distribution locally up to 2000 m or more (Hilty & Brown 1986) in foothills and mountain areas with cliffs and rough terrain. Although this species is known from SNSM and Perijá (Rodríguez-Mahecha 2002), our observation suggest that this threatened macaw ranges further north in the range to Cerro Pintado and on both slopes.

Drymophila klagesi (Klages's Antbird): This antbird of the mountains of northern South America in Venezuela and Colombia was traditionally treated as conspecific with the *D. caudata* (Long-tailed Antbird). However, a recent study demonstrated that the latter consists of at least four species-level taxa, one of which is *D. klagesi*, based on vocal, genetic, and ecological data (Isler *et al.* 2012). We found *D. klagesi* in San Antonio at 1825 m in February 2009, obtaining audio recordings and two specimens along the border of a dense secondary forest fragment with Chusquea bamboo thickets (Fig. 3c). These data and specimens were included in the study by Isler *et al.* (2012). Perijá specimens from Venezuela were used to describe the subspecies *aristeguietana* on the basis of a stronger streaking of the breast and by lighter rufous flanks and rump (Aveledo Hostos & Pérez Chinchilla 1994). However, these characters are not consistently different, thus it has been suggested that *aristeguietana* is not be a valid subspecies (Isler *et al.* 2012). On the western slope of Perijá, *D. klagesi* was known from only three specimens taken by Carriker at Sierra de Eroca, La Guajira. Other records of this species in Colombia are from the northern Eastern Andes in Sierra de Ocaña, Norte de Santander. We did not find it at our trails or high elevation camps above 1900 m, which together with historical specimen records, indicate that *D. klagesi* does not occur above 1900 m in Perijá, unlike the two Andean *Drymophila* species (i.e., *D. striaticeps, D. caudata*), which may be locally found up to 3150 m (Krabbe *et al.* 2006, Isler *et al.* 2012).

Grallaria rufula saltuensis (Rufous Antpitta): An unrecognized, loud and distinctive vocalization was recorded at El Cinco at 2400 m, which was then used to lure the bird to a spot for visual confirmation. The antpitta was singing from the short bushes (1.5 m) of a hedgerow between a dirty road and an open agricultural field. This specimen, an adult male, was collected allowing us

to confirm that the distinctive song was of *G. rufula saltuensis*. A female was also collected nearby our camp at 2500 m in July 2008 (Fig. 3d). We also heard and recorded this species at San Antonio at 1800 m in February 2009. In general, this species was uncommon to rare between 1800 and 2500 m. The Perijá subspecies *saltuensis* was described based on Carriker's specimens from the Colombian slope (Wetmore 1946), but it was subsequently found at various locations in the Venezuelan slopes (Phelps & Phelps 1952). Species limits in the highly variable *G. rufula-carrikeri* complex, including this Perijá lineage, are being analyzed using a dense phylogeographic and vocal sampling, which will advance our understanding of speciation in the Andes and species diversity in Grallaria (Chesser *et al.* unpubl. data.).

Scytalopus sp.: Two tapaculos have been recorded thus far in Perijá. One is a species of second growth and ravines in lower montane forests and foothills, *Scytalopus atratus nigricans* (White-crowned Tapaculo), which is only known in Perijá from the eastern flank at its type locality in Zulia, Venezuela (Phelps & Phelps 1953). We did not find *S. atratus nigricans* across our study sites. The second is a *Scytalopus* species of the humid montane and elfin forests at the treeline (between 1600 and 3100 m), which we found to be fairly common at all our study sites. M. A. Carriker, Jr. collected the first specimens of this montane population in 1941, but they were reported erroneously as *S. atratus nigricans* (Carriker 1954, Meyer de Schauensee 1959) and identified in the museum as *S. latebricola meridanus* (specimens at USNM, Avendaño *et al.* in press). Specimens of this same population have been taken in the Venezuelan part of the range from 1952 to 1978, which in addition to more recent records (Lentino *et al.* 2004), confirm its occurrence on both sides of the border (Avendaño *et al.* in press). Despite the existence of these Colombian and Venezuelan series for over half a century, they were not subject of comparative taxonomic studies. This lack of study likely resulted in much instability in its identity. For instance, this Perijá *Scytalopus* has been assigned to a variety of taxa, including *caracae, meridanus* and *griseicollis* by different authors and it has been overlooked in the literature (*i.e.,* Fjeldså & Krabbe 1990, Krabbe & Schulenberg 2003). During our expeditions, we collected data on vocalizations, habitat, distribution and breeding ecology of this enigmatic population, that in combination with museum comparisons and a suite of analysis, allowed Avendaño *et al.* (in press) to demonstrate that it is a divergent, unnamed species endemic to Perijá. The southern distributional limit of this new species is not well established; it could potentially overlap with the northernmost population of *S. griseicollis* around Serranía de los Motilones.

Sittasomus griseicapillus (Olivaceous Woodcreeper): This woodcreeper is widespread throughout the Neotropics, occurring mostly in lowland humid forests up to 1000 m from northern Mexico to southeastern South America (Marantz *et al.* 2003, Patten 2011). In Colombia, this species is locally found in mid-elevation cloud forests of the Andes up to 1915 m (Cuervo *et al.* 2008b). We collected an adult male (ICN 37193) in San Antonio at 1900 m that was foraging in the midstory of a disturbed tall secondary forest patch (Fig 4a). Phelps & Gilliard (1940) described the subspecies *perijanus* on the basis of five specimens collected at La Sabana (=Ayapa), on the eastern slope of Perijá at 1200 m, distinguishing it from the subspecies *griseus* from northern Venezuela and Tobago. Both *S. g. perijanus* and *S. g. griseus* are considered part of the same vocal and plumage group (Marantz *et al.* 2003, Patten 2011). Although no specimens of *S. g. levis* were originally used in the description of *S.*

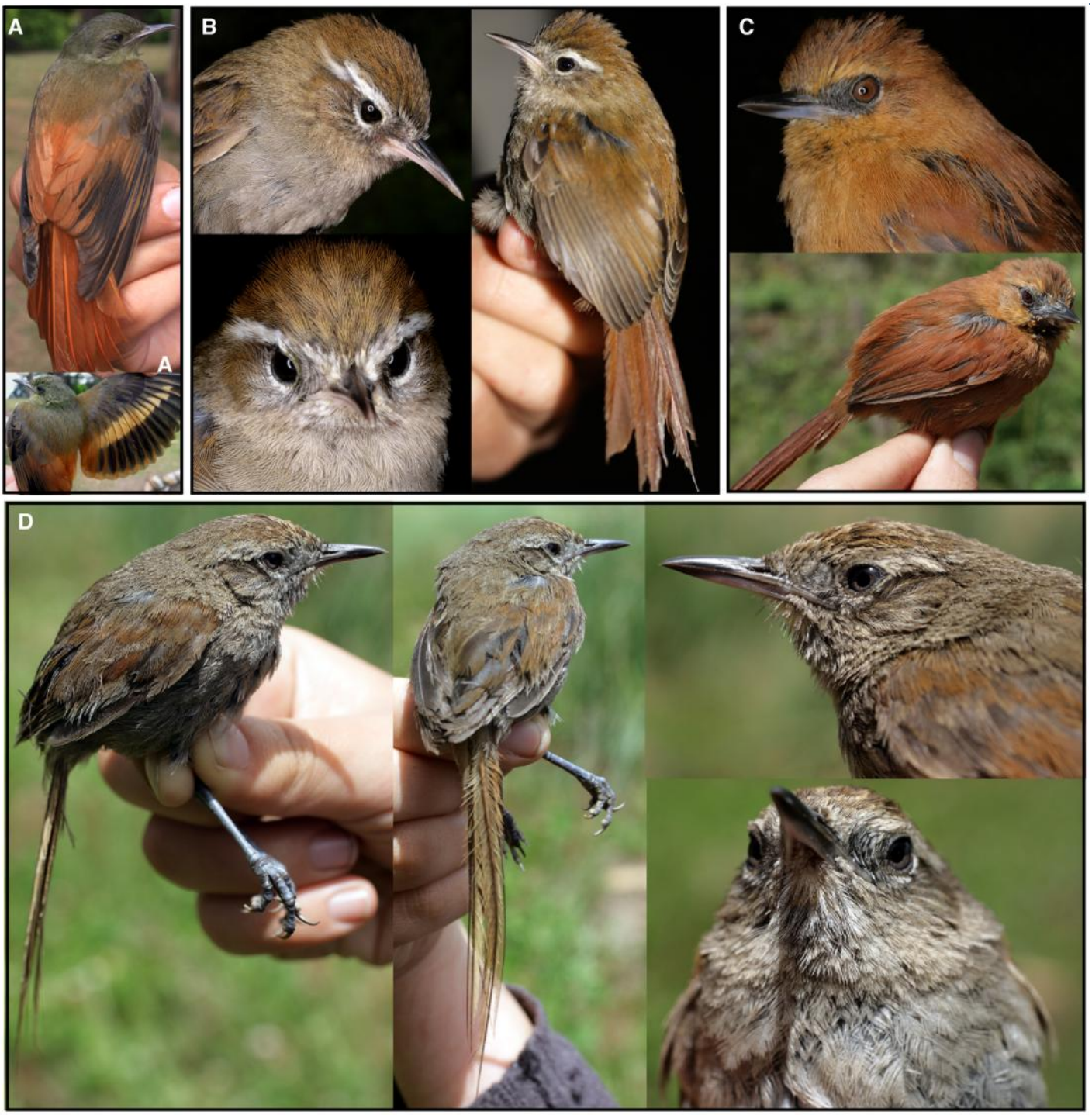

Figure 4. Photographs of selected birds from Serranía de Perijá. **(A)**: *Sittasomus griseicapillus;* **(B)**: *Hellmayrea gularis brunneidorsalis;* **(C)**: *Synallaxis unirufa munoztebari;* **(D)**: *Asthenes perijana.*

g. perijanus (Phelps & Gilliard 1940), an unpublished note from 1953 indicated that direct comparisons of *perijanus* and *levis* specimens from Panama at AMNH confirmed that *S. g. perijanus* was also distinguishable from that race. However, we did not find phenotypic differences between our Perijá specimen and those assigned to *levis* from northern Colombia at ICN. A number of hypotheses need further investigation with the analyses of an expanded series of specimens from both slopes of Perijá, Panama, northern Colombia and Venezuela, including the types of named forms. First, that *S. g. perijanus* is a valid taxon but restricted to the eastern slope of Perijá, in which

case *S. g. levis* is assumed to occur throughout northern Colombia. Second, that *S. g. perijanus* is a valid taxon, distinct from *S. g. levis* of western Panama, but more widespread in northern Colombia. Third, that *S. g. perijanus* is not distinguishable from *S. g. levis*. If the subspecies *perijanus* is valid, it is not clear where it would replace *levis* and *tachirensis*. A revision of the taxonomy, distributional and elevational range of the lineages involved in this polytypic species is needed with complementary datasets, including vocalizations and a greater series of recent specimens.

Anabacerthia striaticollis (Montane Foliage-gleaner): We observed solitary individuals foraging in the midstory of tall secondary forest in San Antonio between 1800 and 1900 m in February 2009 and collected an adult at 1900 m (ICN 37124). M. A. Carriker, Jr. collected five specimens further north in Laguna de Junco, Cerro Pintado (Colombia) in June 1942; however, Carriker's series was not examined in the description of the taxon *perijana* (Phelps & Phelps 1952), which was based on specimens collected in Venezuela. We compared specimens of nominate race *striaticollis* (Eastern Andes) and *anxia* (SNSM) with our specimen from Perijá. Whereas our specimen is definitively distinct from *anxia*, it cannot be distinguished from the series of *striaticollis* in coloration or morphometrics. Phelps & Phelps (1952) mentioned that the wing in *perijana* is shorter than *striaticollis;* however, we found that our Perijá specimen has a longer wing than the nominal *striaticollis* (93 *vs*. 90 mm, n=5). Moreover, throat coloration, dorsal and ventral plumage are identical to *striaticollis*. Two hypotheses should be evaluated with an expanded series of specimens to clarify the taxonomic status of the Perijá population of this furnariid. One the one hand, it is possible that *perijana* is a valid taxon but restricted to the eastern slope of Perijá whereas *striaticollis* extends its distribution from the Eastern Andes to the western slope of the range. Alternatively, *perijana* may not a valid taxon by being undistinguishable from topotypical *striaticollis*. To assess the latter hypothesis, it is necessary to re-examine the series of specimens included in the description of *perijana*, which came from the Mérida cordillera of Venezuela and from different ranges of the Colombian Andes (Phelps & Phelps 1952), which in turn could be distinct from topotypical *striaticollis* from the Eastern Andes.

Hellmayrea gularis brunneidorsalis (White-browed Spinetail): This species was uncommon and mostly detected by voice between 2500 and 3050 m at El Cinco and Sabana Rubia in 2008 and 2009. Individuals were found foraging near the ground in the interior of mature montane forest and stunted elfin forest. We collected five specimens of the distinct subspecies *brunneidorsalis* (Fig 4b), a taxon endemic to Perijá that is characterized by drab grayish brown underparts (Phelps & Phelps 1953, Remsen 2003). This taxon was known in Colombia from only three specimens collected in 1942 (Carriker 1954). *Hellmayrea* is absent from the SNSM whereas in the northern Eastern Andes, *brunneidorsalis* is replaced by another population that is slightly distinct from *cinereiventris*, the subspecies endemic to the Mérida cordillera. Preliminary comparative analyses and levels of population divergence indicate that in addition to *brunneidorsalis* two other genetic and phenotypically divergent lineages of *Hellmayrea* occur in the Eastern Andes, and that this genus may consist of various species (AMC, unpubl. data).

Asthenes perijana (Perijá Thistletail): We only encountered this poorly known furnariid at our highest elevation site between 2950 and 3050 m in July 2008, where it was uncommon and mostly detected by voice. We observed one pair near the ground moving across the dense short shrubs and ravines of the paramo and recorded its song, which is distinct from that of other members of the

Asthenes fuliginosa complex of the northern Andean paramos (XC22194). A solitary individual female was collected (ICN 36847) on highly disturbed paramo in early succession with scattered *Eucalyptus* trees, an area heavily used in the past for livestock. This specimen exhibits the described morphological patterns of *A. perijana* (Phelps 1977), but its plumage was in worn condition (Fig. 4c). Its habitat includes high Andean scrub and grassland with *Cortaderia colombiana, Calamagrostis effusa* and *Calamagrostis* sp., paramo with humid natural grasslands with frailejones *(Espeletia perijaensis and Libanothamnus occultus),* and woody vegetation along ravines that often have bamboo thickets *(Chusquea spathacea)* (Rivera-Díaz & Fernández-Alonso 2003). There are no confirmed records below 2900-3000 m. We reidentified as *Synallaxis unirufa munoztebari* a specimen in poor condition (ICN 36047) that was collected in September 2006 above Manaure at 2600 m and identified originally as *A. perijana*. Data on the reproductive biology of *A. perijana* is anecdotic (Phelps 1977, Meyer de Schauensee & Phelps 1978), both immature and adults in breeding condition have been found by the middle of the year. From the information gathered by earlier collectors and our recent visits to Perijá, we conclude that this endemic species is uncommon and restricted to the mountaintops of the central and northern sector of Perijá on both sides of the border. To the south, it is replaced across the low pass at Serranía de los Motilones by the Eastern Andes form of *A. fuliginosa* (specimen from San Alberto, Cesar), and on the Mérida cordillera by *A. coryi*. These three populations form a clade with other Andean lineages of the *A. fuliginosa-griseomurina* group (Derryberry *et al.* 2011, AMC, unpubl. data).

Synallaxis unirufa munoztebari (Rufous Spinetail): This species was common to fairly common between 1800 and 3050 m, agreeing with an earlier assertion that this is the most common furnariid of the cloud forests of Perijá, at least on the western slope (Carriker 1954). The birds were generally found in pairs along the edges of mature forests, tall secondary forest and elfin forest. We obtained audio recordings and seven specimens (three males and four females) of the distinctive subspecies *munoztebari*, which is endemic to the Serranía de Perijá (Phelps & Phelps 1953, Remsen 2003). It was described on the basis of 10 specimens collected on the upper Río Negro, on the Venezuelan side (Phelps & Phelps 1953). M. A. Carriker, Jr. had collected a series of 11 specimens of this taxon by 1942 (Carriker 1954). We found an additional specimen collected at El Cinco (ICN 36047) that was misidentified as *Asthenes perijana*. The song and calls of *munoztebari* are distinct from those of all other subspecies of *S. unirufa* and related species (B. O'Shea, pers. comm.). A phylogeographic study in a complex of northern *Synallaxis* species that includes *munoztebari* will shed light on the evolution and species limits of spinetails from northern South America (AMC & S. Claramunt, unpubl. data).

Myiopagis olallai incognita (Foothill Elaenia): Three specimens of this recently described *Myiopagis* were collected from cloud forests on the Venezuelan slope of Perijá (1100-1200 m) *between* 1940 and 1951 (PONS 3860, 3861, COP 6733). These specimens were referenced in the literature as vagrant records of the lowland *M. caniceps* (Phelps 1943, Restall *et al.* 2007), but Cuervo *et al.* (2014) demonstrated that these specimens represented an undescribed taxon that differs consistently from all subspecies of *M. caniceps* (also see Ginés *et al.* 1953) as well as from *M. olallai.* This subspecies resembles *M. o. coopmansi* from the Central Andes in Antioquia (Cuervo *et al.* 2014), but differs from it in a number of traits. This subspecies is endemic to Perijá, but it has not been recorded to date in Colombia, and remains unknown in life.

Zimmerius improbus ssp. (Venezuelan Tyrannulet): The taxon *improbus* has been mostly treated as a subspecies of *Z. vilissimus* along with *parvus* and *petersi* (Traylor 1979, Hilty & Brown 1986), or more recently elevated to species rank with *petersi* (Ridgely & Tudor 1994). A recent molecular phylogenetic study (Rheindt *et al.* 2013) demonstrated that *Z. improbus* is distantly related to both, *Z. petersi* and the clade including Z. *vilissimus*. We collected three specimens of *Z. improbus* in Perijá at San Antonio and El Cinco (ICN 36783, 37134, 37143) between 1800 and 2500 m. Three genetic clusters in *Z. improbus* (Rheindt *et al.* 2013) parallels phenotypic variation observed in specimens further indicating that the Perijá and SNSM populations are each distinct unnamed taxa, and that populations assigned to the subspecies *tamae* (*e.g.,* northeastern Colombia except Perijá and Táchira in western Venezuela) are indistinguishable from nominate *improbus* of the Mérida cordillera (AMC and M. Lentino, unpubl. data).

Poecilotriccus ruficeps (Rufous-crowned Tody-Flycatcher): Two males were collected in February 2009 in San Antonio at 1825 m (ICN 37127, 37194) at the dense edge of a tall secondary forest fragment (Fig. 4d). Another individual was observed nesting in a different forest patch at the same locality. These reports are the northernmost records for this species and the first for Perijá (Johnson 2002, Hilty 2003). Our specimens are close to the subspecies *ruficeps* by having the gray hind neck delimited by a narrow black line, and mostly cinnamon-rufous head and face (Johnson 2002). The distribution of the different forms of *P. ruficeps* is complicated, showing individual variation and a leapfrog pattern of geographic structure (Johnson 2002), but the large geographic gaps that define this patchy distribution pose further challenges to understand this variation. Preliminary analysis suggests no genetic divergence among subspecies groups (AMC unpubl. data).

Henicorhina leucophrys manastarae (Gray-breasted Wood-Wren): Several named taxa of this polytypic complex occur in the mountain ranges of the Northern Andes and may prove to represent distinct species, while other cryptic lineages remain to be described (Kroodsma & Brewer 2005, J. Pérez-Emán *et al.* unpubl. data). We found specimens assignable to the subspecies *manastarae*, which are distinct in plumage pattern and coloration from a series at ICN from the SNSM and all over the Colombian Andes. We obtained sound recordings as well as seven males and four females between 1800 and 2550 m in San Antonio and El Cinco. In addition, three adult males (ICN 38241, 38246, 38247) were taken by JEA on June 2011 between 1350 and 1450 m at the Casacará river, above Agustín Codazzi ($09^{0}59'$N $73^{0}03'$W), representing the lowest elevational record of this wren in Perijá. This population is more closely related to *H. l. bangsi* (Caro *et al.* 2013), the population endemic to the foothills and lower montane forests of the SNSM (Bangs 1899, Todd & Carriker 1922).

Buthraupis montana venezuelana (Hooded Mountain-Tanager): This species was fairly common at Sabana Rubia (2900-3050 m) and El Cinco (2400-2500 m) in July 2008 and February 2009. We obtained audio recordings and four specimens (ICN 36812, 36856, 37088 and 37094) of the subspecies *venezuelana* (Aveledo Hostos & Pérez Chinchilla 1989). This Perijá endemic is characterized by the coloration of its upperparts, which are duller, and greenish blue tinged with olivaceus tones instead of the shiny deep blue upperparts of *gigas* of the Tamá massif and the rest of the Eastern Andes. In addition, the outer webs of secondaries and tertials are olive green in *venezuelana* (*cf.* Aveledo Hostos & Pérez Chinchilla 1989). This mountain tanager was found in small groups and sometimes in mixed-species

flocks in the canopy and emergent trees of secondary forests, stunted elfin forests and the wooded ravines in the paramo. Begging juveniles were observed and recorded at Sabana Rubia in July 2008 at 3100 m. This distinctive Perijá population is the northernmost of this widespread Andean species, which does not occur in the SNSM or the Mérida cordillera.

Anisognathus lacrymosus pallididorsalis (Lacrimose Mountain-Tanager): Four subspecies occur in close proximity in the northern part of the species range: *melanops* of the Mérida cordillera, *yariguierum* of the western slope of the Eastern Andes, *tamae* of Santander (except in the west) and the Tamá massif in Norte de Santander and Táchira, Venezuela, and *pallididorsalis* of Perijá (Aveledo Hostos & Pérez Chinchilla 1989, Isler & Isler 1999, Donegan & Avendaño 2010). We obtained audio recordings, photographs and nine specimens of *pallididorsalis* (Fig. 5a). We found this distinct endemic subspecies to be fairly common between 2400 and 3100 m at El Cinco and Sabana Rubia, foraging in small groups and often joining mixed flocks with *Mecocerculus leucophrys* (White -throated Tyrannulet), *Myiothlypis nigrocristata* (Black-crested Warblers), *Buthraupis montana* (Hooded Mountain-Tanager) and *Atlapetes schistaceus* (Slaty Brush-Finches) from understory to midstory, forest edges, paramo scrubland and isolated *Eucalyptus* trees in the disturbed paramo, hedgerows and young second growth.

Arremon perijanus (Perijá Brush-Finch): We found *A. perijanus* daily in San Antonio at 1900 m and downslope to about 1300 m. Solitary individuals or pairs were mostly foraging in the low understory of secondary forest patches and forest edges (Fig. 5b). Audio recordings and two male specimens were obtained at San Antonio in February 2009, and JEA collected a pair on the Casacará River (09^{0}59'N 73^{0}03'W), above Agustín Codazzi, Cesar, on June 2011 at 1400 m, which represents the southernmost confirmed record of this species (Phelps & Phelps 1952, Cadena & Cuervo 2010). Further field and museum-based research is needed to understand phenotypic differentiation and the distributional limits between *A. perijanus* and *A. assimilis larensis* (Gray-browed Brush-Finch), which could potentially occur in Serranía de los Motilones. The taxon *larensis* is known as far north as Sierra de Ocaña and the Tamá massif in Norte de Santander and southern Táchira state, Venezuela (Cadena & Cuervo 2010), and it may prove to represent another species-level lineage in the *A. torquatus* complex (Cadena & Cuervo 2010).

Atlapetes latinuchus nigrifrons (Yellow-breasted Brush-Finch): This distinct taxon is restricted to Perijá and is found on both slopes (Phelps & Gilliard 1940, Hilty 2003, Donegan & Huertas 2006). We collected five specimens in July 2008 and February 2009 between 1800 and 2500 m at San Antonio and El Cinco (ICN 36728, 36741, 36796, 37118, 37065); an additional specimen was collected at the Casacará River, above Agustín Codazzi in 2011 (ICN 38239). This subspecies has a white-edged wrist and outer web margins in primaries 9 and 10, giving the appearance of a white leading edge that contrasts with the gray wings. All our observations and specimens were of birds with gray upperparts. An adult female (ICN 32646) is the only specimen from the Perijá series with a remarkably different coloration of upperparts; it was collected on 17 March 1996 (at Cesar, La Jagua de Ibirico, La Victoria, 1700 m) in the same habitat and elevation where *A. l. nigrifrons* is found. Although it exhibits similar features to *A. l. nigrifrons* in morphology and plumage pattern, its rump, back, mantle, outer webs of secondary and tertiary feathers and wing coverts are olive green (not gray). This individual could be a rare variant of an otherwise gray-backed population (also see Donegan & Huertas 2006). However, the green upperparts of this

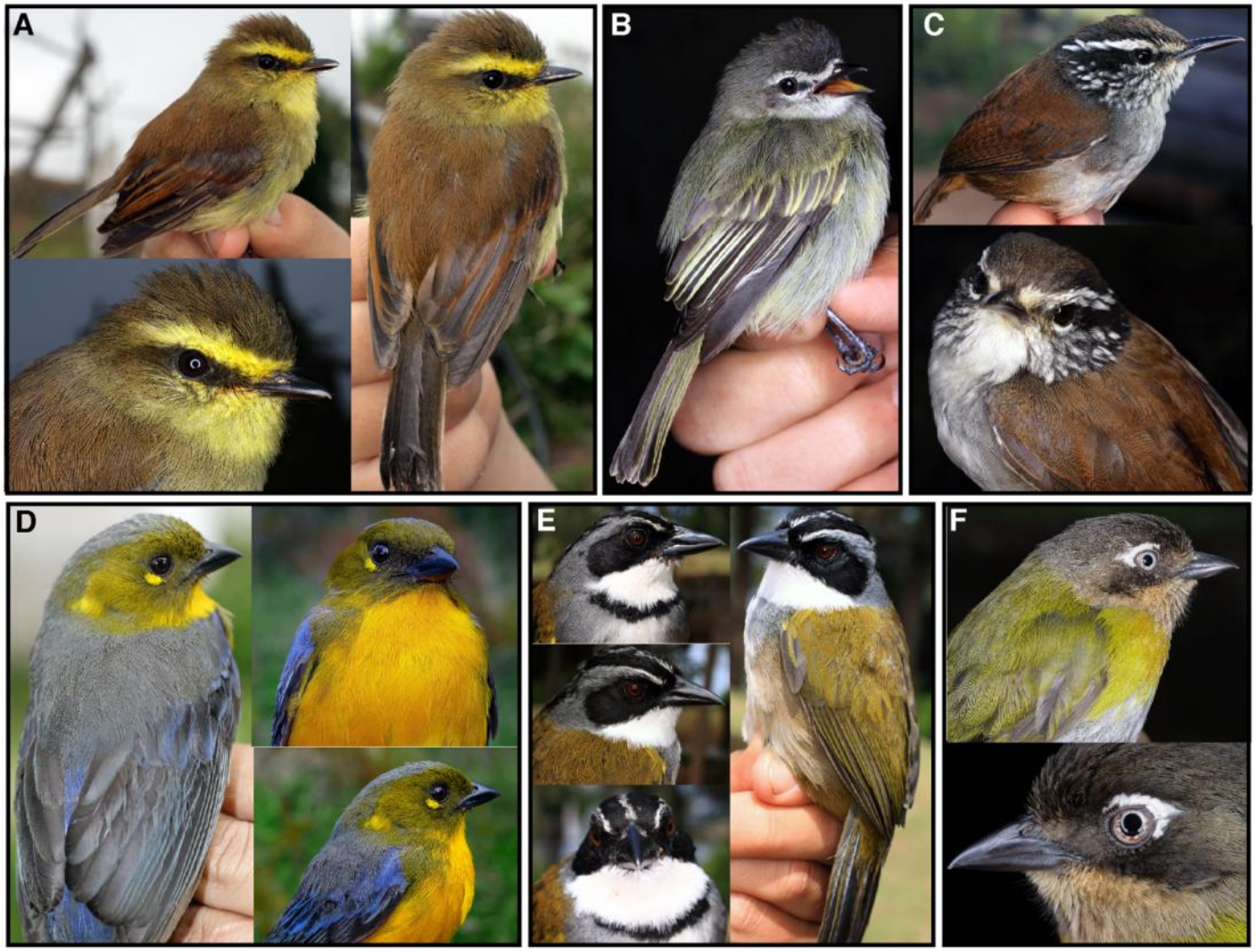

Figure 5. Selected endemic bird taxa to the Serranía de Perijá. (A): *Ochthoeca (Silvicultrix) diadema rubellula*; (B): *Zimmerius improbus* ssp.; (C): *Henicorhina leucophrys manastarae*; (D): *Anisognathus lacrymosus pallididorsalis*; (E): *Arremon perijanus;* (F): *Chlorospingus flavopectus ponsi.*

specimen are closer to those of *A. albofrenatus* but are darker, and it is possible that it might be a hybrid between *A. l. nigrifrons* and *A. albofrenatus*. Nonetheless, *A. albofrenatus* is known only as far north as Sierra de Ocaña.

Chlorospingus flavopectus ponsi (Common Chlorospingus): We collected a series of six males and two females in July 2008 and February 2009 above El Cinco between 2500 and 3000 m, where it was quite common (Fig. 5c). These specimens correspond to the distinct subspecies *ponsi* (Phelps & Phelps 1952), which was described from skins collected on the eastern slope of Perijá between 1900-2900 m. The subspecies *ponsi* is endemic to Perijá and represents the northernmost lineage of this widespread complex in the Andes (Phelps & Phelps 1952). On the Colombian slope of Perijá, *ponsi* is known as far south as La Jagua de Ibirico, Cesar. However, recent data (Avendaño *et al.* 2013) suggest the existence of a contact zone, with presumed intermediate specimens between *ponsi* and subspecies *jacqueti* and *eminens;* the latter two meet their ranges at the northern sector of the Eastern Andes at Serranía de los Motilones.

Setophaga virens (Black-throated Green Warbler): On 17 February 2009 we found a male in nonbreeding plumage (ICN 37178) near San

Antonio at 1825 m foraging on the top and outer branches of a pine tree *(Pinus patula)* in an open area. This boreal migrant is rare in Colombia, where it has only been recorded in the Sierra Nevada de Santa Marta (ICN 21684) and from a few sight records from the Central and Eastern Andes (Hilty 2003). In Venezuela, it is an uncommon migrant in the coastal range (Hilty & Brown 1986). Our specimen represents the first record of this species for the western slope of Perijá; it was observed in the eastern slope in Venezuela in April 2004 (Hilty 2003). Perijá might prove to be an important wintering area for this species.

Discussion

We conducted the first collecting ornithological expeditions in decades to the Serranía de Perijá on the Colombian slope as a step forward to continue characterizing the diversity, biogeography, and natural history of the northernmost Andean avifauna. In conjunction with previously known bird records on both sides of the border, our data bring the regional montane avifauna to 425 bird species. Estimates of species richness and composition that are based on overlapping expert range maps (Kattan *et al.* 2004) or reported in previous bird lists from the region are similar to the one reported herein, but they are often inflated by species of the dry and humid forests of the surrounding lowlands (*e.g.,* in western Zulia, the Catatumbo and the Cesar Depression, Viloria & Calchi La C. 1993) or by dubious records (*e.g., Cnemarchus erythropygius,* Ardila-Reyes *et al.* 2007). Although comparisons of species richness among montane regions in the Northern Andes may not be feasible due to sampling and taxonomic biases and differences in area, habitats and orogenic history, avian species richness in Perijá seems to be lower than those of the SNSM and the Eastern Andes (see Kattan *et al.* 2004). Likewise, the number of Perijá endemic species is lower than adjacent mountain ranges, but this difference might decrease with the analysis of modern specimens in a range-wide phylogenetic analyses (*e.g.,* Cadena & Cuervo 2010, Derryberry *et al.* 2011, Rheindt *et al.* 2013, Caro *et al.* 2013, Benham *et al.* in press).

The bird inventory of Perijá should not be considered comprehensive but preliminary given that several areas (*e.g.,* Sierra Negra, the southern limits with Serranía de los Motilones) and elevations (*i.e.* foothills, premontane forests) remain to be surveyed thoroughly on both sides of the border. The recent discovery of distinct populations in Perijá demonstrates that the paucity of museum and phylogeographic analysis of local populations have confounded endemic taxa with widespread birds or have overlooked them entirely (see Rheindt *et al.* 2013, Cuervo *et al.* 2014, Avendaño *et al.* in press, Benham *et al.* in press). The higher number of records on the Venezuelan side reflects the asymmetry of ornithological research efforts and higher diversity on the eastern slope which harbors larger areas of continuous habitats over the elevational gradient and higher average precipitation levels.

We gathered novel biological information on poorly known endemic species *(Metallura iracunda, Scytalopus* sp. nov., *Asthenes perijana* and *Arremon perijanus)* and other populations restricted to this range (*e.g., Metallura tyrianthina* ssp., *Zimmerius improbus* ssp). Our specimens and data have been instrumental to improving our understanding of geographic variation and biogeographic patterns of the tropical montane avifauna (i.e., Cadena & Cuervo 2010, Derryberry *et al.* 2011, Gutiérrez-Pinto *et al.* 2012, Isler *et al.* 2012, Rheindt *et al.* 2013, Caro *et al.* 2013, Valderrama *et al.* 2014, Benham *et al.* in press). In addition to the above examples, ongoing taxonomic and comparative phylogeographic studies is being used to characterize the

evolutionary distinctiveness of the Perijá avifauna (A. M. Cuervo *et al.* unpublished data), and is focused on endemic taxa including *Coeligena bonapartei consita, Hellmayrea gularis brunneidorsalis, Synallaxis unirufa munoztebari, Grallaria rufula saltuensis, Ochthoeca diadema rubellula*. Taken together, these data on local bird populations indicate that the current Perijá avifauna evolved from a dynamic history of divergence in isolation and multiple colonization waves from surrounding mountain regions, a mechanism that seems to have been pervasive in shaping the Neotropical avifauna (see Smith *et al.* 2014). Perijá populations tend to exhibit strong biogeographic affinities with variety of regions, predominantly the mountains of Venezuela and the northern Eastern Andes *(i.e., Aglaiocercus kingii, Zimmerius improbus, Drymophila klagesi),* the main Andean chain including the Eastern cordillera *(i.e., Asthenes* spp., *Hellmayrea gularis, Poecilotriccus ruficeps, Hemitriccus granadensis, Dubusia taeniata, Buthraupis montana)* and the SNSM *(i.e., Grallaria rufula spatiator*, *Henicorhina leucophrys bangsi, Diglossa humeralis nocticolor).*

Pervasive anthropogenic disturbance over most of the Colombian side of Perijá has a long history and continues to exert conversion of remnants of natural habitat into pastures and agricultural fields. The landscape was mostly covered by forest until the late nineteenth century (Simons 1881); since then, deforestation surged as a result of expanding plantations, particularly coffee and pastures. During most of the late twentieth century mining, pastures for cattle ranching, and illicit crops promoted vast landscape changes in the forest and paramo areas on the Colombian side of Perijá (Fjeldså *et al.* 2005). Upper montane and elfin forests are now replaced with savannah-like vegetation growing on compact soils.

Several other studies have contributed to the characterization of the biodiversity the region and have also highlighted the need for urgent conservation actions (Lynch 2003, Rangel *et al.* 2007, Pulido & Andrade 2008, Rojas *et al.* 2010, 2011, Passos *et al.* 2009, Anganoy-Criollo 2012).

No data on demographic trends are available to evaluate the status of bird populations after the harsh change in the natural landscape cover in Perijá, but local extirpations could have been commonplace. In contrast, the Venezuelan slope is protected by the Parque Nacional Serranía de Perijá (c. 300,000 ha). A binational park system such as the one in place in the Tamá massif would be a decisive step forward in the long-term conservation of the biodiversity of Perijá.

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Appendix 1. List of birds from the Serranía de Perijá mountain range (above c. 800 m), indicating records on each slope (country). Taxonomy mostly follows the A.O.U. South American Checklist Committee (Remsen *et al.* 2014).

English name	*Scientific name*	Distribution [1]		Additional information [2]		
		Eastern slope (Venezuela)	Western slope (Colombia)	Specimen	Vocal record	Photo
Tinamidae						
Highland Tinamou	*Nothocercus bonapartei*	A, C	x	4		
Gray Tinamou	*Tinamus tao*	A, B, C	E			
Great Tinamou	*Tinamus major*	C				
Little Tinamou	*Crypturellus soui*	A, B, D	x	4		
Cracidae						
Band-tailed Guan	*Penelope argyrotis albicauda**	A, B, C	x	2,4		
Andean Guan	*Penelope montagnii*	B	x, E	1,4	x	
Crested Guan	*Penelope purpurascens*	C				
Wattled Guan	*Aburria aburri*	A, B, C	x, E	4		
Yellow-knobbed Curassow	*Crax daubentoni*	C	x	4		
Helmeted Curassow	*Pauxi pauxi gilliardi**	A, B, C	x	2,4	x	
Odontophoridae						
Crested Bobwhite	*Colinus cristatus*	B				
Marbled Wood-Quail	*Odontophorus gujanensis*	C				
Black-fronted Wood-Quail	*Odontophorus atrifrons navai**	A, B	x, E	4	x	
Ardeidae						
Striated Heron	*Butorides striata*	B				
Cattle Egret	*Bubulcus ibis*	B				
Threskiornithidae						
Bare-faced Ibis	*Phimosus infuscatus*	B				
Cathartidae						
Turkey Vulture	*Cathartes aura ruficollis*	A, B	E			
Black Vulture	*Coragyps atratus*	B	E			
King Vulture	*Sarcoramphus papa*	A				
Andean Condor	*Vultur gryphus*	G	E		x	
Accipitridae						
White-tailed Kite	*Elanus leucurus*		E			
Swallow-tailed Kite	*Elanoides forficatus*	A, B				
Crested Eagle	*Morphnus gujanensis*	H				
Harpy Eagle	*Harpia harpyja*	B				
Black-and-white Hawk-Eagle	*Spizaetus melanoleucus*	A, B	x			
Black-and-chestnut Eagle	*Spizaetus isidori*	A				
Plumbeous Kite	*Ictinia plumbea*	D	x	4		
Semicollared Hawk	*Accipiter collaris*	A				
Sharp-shinned Hawk	*Accipiter striatus*	H	E	1	x	x
Savanna Hawk	*Buteogallus meridionalis*	B				
Solitary Eagle	*Buteogallus solitarius*	A, B	x	4		
Roadside Hawk	*Rupornis magnirostris*	H	x			
White-rumped Hawk	*Parabuteo leucorhous*	H	E	5		
Black-chested Buzzard-Eagle	*Geranoaetus melanoleucus*	B	E		x	
White Hawk	*Pseudastur albicollis*	D	x	4		
Gray-lined Hawk	*Buteo nitidus*	A, B	E			
Broad-winged Hawk	*Buteo platypterus*		E			
Short-tailed Hawk	*Buteo brachyurus*	H	E	5		
Zone-tailed Hawk	*Buteo albonotatus*	A				

English name	*Scientific name*	Distribution [1]		Additional information [2]		
		Eastern slope (Venezuela)	Western slope (Colombia)	Specimen	Vocal record	Photo
Rallidae						
Sora	*Porzana carolina*	A				
Purple Gallinule	*Porphyrio martinicus*		x	4		
Eurypygidae						
Sunbittern	*Eurypyga helias*	H		5		
Jacanidae						
Wattled Jacana	*Jacana jacana*	B				
Columbidae						
Scaled Pigeon	*Patagioenas speciosa*	A, C				
Band-tailed Pigeon	*Patagioenas fasciata*	A, C	x, E	1,4	x	
Plumbeous Pigeon	*Patagioenas plumbea*	A, B, C				
Ruddy Pigeon	*Patagioenas subvinacea*	A, B, C	x	2,4		
Eared Dove	*Zenaida auriculata*	B				
White-tipped Dove	*Leptotila verreauxi*	A, B, C	E			
Gray-fronted Dove	*Leptotila rufaxilla*	A, C				
Lined Quail-Dove	*Geotrygon linearis*	A, C	x, E	4		
Violaceous Quail-Dove	*Geotrygon violacea*	C	x	4		
Ruddy Quail-Dove	*Geotrygon montana*	C	x	4		
Ruddy Ground Dove	*Columbina talpacoti*	B				
Scaled Dove	*Columbina squammata*	B				
Blue Ground Dove	*Claravis pretiosa*	A, C				
Maroon-chested Ground Dove	*Claravis mondetoura*	H		5		
Cuculidae						
Squirrel Cuckoo	*Piaya cayana*	A, B, C	E		x	
Yellow-billed Cuckoo	*Coccyzus americanus*	A				
Smooth-billed Ani	*Crotophaga ani*	A, B	E			
Striped Cuckoo	*Tapera naevia*	A, C				
Pavonine Cuckoo	*Dromococcyx pavoninus perijanus**	A, B, C	E	2		
Strigidae						
Tropical Screech-Owl	*Megascops choliba*	D	E			
Rufescent Screech-Owl	*Megascops ingens*	D	x	4		
Cinnamon Screech-Owl	*Megascops petersoni*	C		5		
Vermiculated Screech-Owl	*Megascops guatemalae*	C				
White-throated Screech-Owl	*Megascops albogularis obscurus**	D	x			
Spectacled Owl	*Pulsatrix perspicillata*	B	x	4		
Great Horned Owl	*Bubo virginianus*	D				
Mottled Owl	*Ciccaba virgata*	B, C	x, E	4		
Black-and-white Owl	*Ciccaba nigrolineata*	C	x	4		
Rufous-banded Owl	*Ciccaba albitarsis*	H		5		
Andean Pygmy-Owl	*Glaucidium jardinii*	C	E	1	x	
Striped Owl	*Pseudoscops clamator*	C				
Stygian Owl	*Asio stygius*	D				
Steatornithidae						
Oilbird	*Steatornis caripensis*	B, C				
Nyctibiidae						
Great Potoo	*Nyctibius grandis*	C				
Common Potoo	*Nyctibius griseus*	D				
Caprimulgidae						
Common Nighthawk	*Chordeiles minor*	A				
Rufous-bellied Nighthawk	*Lurocalis rufiventris*	D		4		
Band-winged Nightjar	*Systellura longirostris*	H	E	1,4,5	x	

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Chestnut-collared Swift	*Streptoprocne rutila*	A	E, x	4		
White-collared Swift	*Streptoprocne zonaris*	A, B	E, x	4		
Gray-rumped Swift	*Chaetura cinereiventris*	A				
Vaux's Swift	*Chaetura vauxi*	A, B				
White-tipped Swift	*Aeronautes montivagus*	C	E		x	
Pygmy Swift	*Tachornis furcata*	C		2		
Lesser Swallow-tailed Swift	*Panyptila cayennensis*	B				
Trochilidae						
White-tipped Sicklebill	*Eutoxeres aquila*		x	1		
Rufous-breasted Hermit	*Glaucis hirsutus*	H	E	1		
Band-tailed Barbthroat	*Threnetes ruckeri*	A, B				
Gray-chinned Hermit	*Phaethornis griseogularis*	B				
Sooty-capped Hermit	*Phaethornis augusti*	H	x	1,5		
Pale-bellied Hermit	*Phaethornis anthophilus*	H	x	1,5		
Green Hermit	*Phaethornis guy*	C				
Long-billed Hermit	*Phaethornis longirostris*	A, B	x, E	1,4		
Green-fronted Lancebill	*Doryfera ludovicae*		x	1		
Brown Violetear	*Colibri delphinae*	A				
Green Violetear	*Colibri thalassinus*	A	x, E	1,4	x	
Sparkling Violetear	*Colibri coruscans*	H	E	1,5	x	x
Amethyst-throated Sunangel	*Heliangelus amethysticollis violiceps**	C	x, E	1,2,4	x	x
Spangled Coquette	*Lophornis stictolophus*	B				
Speckled Hummingbird	*Adelomyia melanogenys*	A	x, E	1,4	x	x
Long-tailed Sylph	*Aglaiocercus kingii*	A	E	1		x
Tyrian Metaltail	*Metallura tyrianthina* ssp*	C	x, E	1,4,5	x	x
Perija Metaltail	*Metallura iracunda**	G,H	x, E	1,4,5	x	x
Bronzy Inca	*Coeligena coeligena zuliana**	A	x, E	1,4	x	x
Golden-bellied Starfrontlet	*Coeligena bonapartei consita**	G,H	x, E	1,4,5	x	x
Mountain Velvetbreast	*Lafresnaya lafresnayi*	G,H	x, E	1,4,5	x	x
Booted Racket-tail	*Ocreatus underwoodii dicifer**	A	x, E	1,4		
Violet-fronted Brilliant	*Heliodoxa leadbeateri parvula*	A	x, E	1	x	x
Gorgeted Woodstar	*Chaetocercus heliodor*		x	1		
Rufous-shafted Woodstar	*Chaetocercus jourdanii rosae**	C	E	5		
Red-billed Emerald	*Chlorostilbon gibsoni*	H	E	1,5		
Blue-tailed Emerald	*Chlorostilbon mellisugus*	A	E		x	
Coppery Emerald	*Chlorostilbon russatus*	G,H	x, E	1,4,5		
Lazuline Sabrewing	*Campylopterus falcatus*	C	x, E	1,4	x	x
White-vented Plumeleteer	*Chalybura buffonii*	B	x, E	1,4		
Crowned Woodnymph	*Thalurania colombica*	A, B	x	4		
Steely-vented Hummingbird	*Amazilia saucerrottei*	A	x, E	1		
Green-bellied Hummingbird	*Amazilia viridigaster*	B				
Golden-tailed Sapphire	*Chrysuronia oenone*	B, D				
Shining-green Hummingbird	*Lepidopyga goudoti*	D		2		
Trogonidae						
Golden-headed Quetzal	*Pharomachrus auriceps*	A	x, E	4	x	
Crested Quetzal	*Pharomachrus antisianus*	A, C	x	4		
Gartered Trogon	*Trogon caligatus*	B, C				
Collared Trogon	*Trogon collaris*	A, C	x	4		
Masked Trogon	*Trogon personatus*	A, C	x, E	1,4	x	x

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Momotidae						
Whooping Motmot	*Momotus subrufescens*	C				
Bucconidae						
Moustached Puffbird	*Malacoptila mystacalis*	H	x, E	4,5		
Ramphastidae						
Black-mandibled Toucan	*Ramphastus ambiguus*	A, B, C	x, E	4	x	
Keel-billed Toucan	*Ramphastos sulfuratus*	A				
Emerald Toucanet	*Aulacorhynchus prasinus*	A, C	x, E	1,4	x	
Groove-billed Toucanet	*Aulacorhynchus sulcatus*	A	x	4		
Crimson-rumped Toucanet	*Aulacorhynchus haematopygus*	A, B	x	4		
Picidae						
Scaled Piculet	*Picumnus squamulatus rohli / lovejoyi*	A, C	x	1,5		
Olivaceous Piculet	*Picumnus olivaceus tachirensis*	B, C				
Chestnut Piculet	*Picumnus cinnamomeus*	D		2		
Red-crowned Woodpecker	*Melanerpes rubricapillus*	C	E			
Smoky-brown Woodpecker	*Picoides fumigatus*	A	x, E	1,4		x
Red-rumped Woodpecker	*Veniliornis kirkii*	C				
Golden-green Woodpecker	*Piculus chrysochloros*	C		2		
Golden-olive Woodpecker	*Colaptes rubiginosus*	A, B	x, E	4		
Crimson-mantled Woodpecker	*Colaptes rivolii*	H	x, E	1,4,5	x	x
Lineated Woodpecker	*Dryocopus lineatus*	A, B, C				
Crimson-crested Woodpecker	*Campephilus melanoleucos*	A, B, C	x	4		
Falconidae						
Barred Forest-Falcon	*Micrastur ruficollis*	A, B	x, E	4		
American Kestrel	*Falco sparverius*	B	x, E	4		
Bat Falcon	*Falco rufigularis*	A, B				
Aplomado Falcon	*Falco femoralis*	C	E	5		
Psittacidae						
Lilac-tailed Parrotlet	*Touit batavicus*	A, B				
Blue-fronted Parrotlet	*Touit dilectissimus*	C				
Orange-chinned Parakeet	*Brotogeris jugularis*	A, B				
Saffron-headed Parrot	*Pyrilia pyrilia*	A, B, C	E			
Red-billed Parrot	*Pionus sordidus*	A	x, E	4		
Bronze-winged Parrot	*Pionus chalcopterus*	A, B	x, E	4		
Mealy Parrot	*Amazona farinosa*	A				
Scaly-naped Parrot	*Amazona mercenarius*	B	x, E	4		
Green-rumped Parrotlet	*Forpus passerinus*	B				
Painted Parakeet	*Pyrrhura picta caeruleiceps**	A, B, F, D	x, E	4,5		
Brown-throated Parakeet	*Eupsittula pertinax*	A				
Military Macaw	*Ara militaris*	B, C	E		x	
Scarlet-fronted Parakeet	*Psittacara wagleri*	C	x, E	4		
Thamnophilidae						
Fasciated Antshrike	*Cymbilaimus lineatus*	A, B, C				
Great Antshrike	*Taraba major*	A, B, C				
Black-crowned Antshrike	*Thamnophilus atrinucha*		x	1		
Recurve-billed Bushbird	*Clytoctantes alixii*	A, B, C				
Plain Antvireo	*Dysithamnus mentalis*	A, B	x	2,3,4		
Slaty Antwren	*Myrmotherula schisticolor*	B	x	2,4		
Rufous-winged Antwren	*Herpsilochmus rufimarginatus*	B, C				
Klages's Antbird	*Drymophila klagesi*	A, B, C	x, E	1,4	x	x
White-bellied Antbird	*Myrmeciza longipes*	A				
Blue-lored Antbird	*Myrmeciza immaculata*	B, C				
Magdalena Antbird	*Sipia palliata*	C				
Grallariidae						
Great Antpitta	*Grallaria excelsa*	C				
Scaled Antpitta	*Grallaria guatimalensis*	A, C	x	4		
Chestnut-crowned Antpitta	*Grallaria ruficapilla perijana**	C	x, E	1,2,4	x	x
Rufous Antpitta	*Grallaria rufula saltuensis**	H	x, E	1,2,4,5	x	x
Rusty-breasted Antpitta	*Grallaricula ferrugineipectus*	C				

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Rhinocryptidae						
White-crowned Tapaculo	*Scytalopus atratus*	F		2,5		
Tapaculo	*Scytalopus* sp.*	A, C	x, E	1,4,5	x	x
Formicaridae						
Black-faced Antthrush	*Formicarius analis*	A, B, C		3		
Rufous-breasted Antthrush	*Formicarius rufipectus*	C				
Furnariidae						
Gray-throated Leaftosser	*Sclerurus albigularis*	C	x	4		
Chapman's Leaftosser	*Sclerurus andinus*	H	x	4,5		
Olivaceous Woodcreeper	*Sittasomus griseicapillus*	C	x, E	1,2,4		x
Ruddy Woodcreeper	*Dendrocincla homochroa*	B, C				
Plain-brown Woodcreeper	*Dendrocincla fuliginosa*	C	x	4		
Wedge-billed Woodcreeper	*Glyphorhynchus spirurus*	C				
Northern Barred-Woodcreeper	*Dendrocolaptes sanctithomae*	B C				
Black-banded Woodcreeper	*Dendrocolaptes picumnus*	C	x	4		
Strong-billed Woodcreeper	*Xiphocolaptes promeropirhynchus*	A, C	E	1,4	x	
Cocoa Woodcreeper	*Xiphorhynchus susurrans*	A, B	x	4		
Olive-backed Woodcreeper	*Xiphorhynchus triangularis*	A, C	x			
Brown-billed Scythebill	*Campylorhamphus pusillus*		x, E	4	x	
Streak-headed Woodcreeper	*Lepidocolaptes souleyetii*	A, B, C				
Montane Woodcreeper	*Lepidocolaptes lacrymiger*	A, C	x, E	1,4		
Plain Xenops	*Xenops minutus*	B, C		2,3		
Streaked Xenops	*Xenops rutilans perijanus*	A, C	E	3,4	x	
Streaked Tuftedcheek	*Pseudocolaptes boissonneautii*	A	x, E	1		x
Rusty-winged Barbtail	*Premnornis guttuliger*	H	x	4,5		
Montane Foliage-gleaner	*Anabacerthia striaticollis perijana**	A, C	x, E	1,2		x
Streak-capped Treehunter	*Thripadectes virgaticeps klagesi*	A, C				
Spotted Barbtail	*Premnoplex brunnescens*	A, C	x			
Pearled Treerunner	*Margarornis squamiger*	G,H	x, E	1,5		x
White-browed Spinetail	*Hellmayrea gularis brunneidorsalis**	C	x, E	1,5		x
Streak-backed Canastero	*Asthenes wyatti perijanus**	H	E	5		
Perija Thistletail	*Asthenes perijana**	H	E	1,5	x	x
Crested Spinetail	*Cranioleuca subcristata*	C				
Streak-capped Spinetail	*Cranioleuca hellmayri*	D,H				
Yellow-chinned Spinetail	*Certhiaxis cinnamomeus*	D		2		
Pale-breasted Spinetail	*Synallaxis albescens*	C	x, E	1,4		
Rufous Spinetail	*Synallaxis unirufa munoztebari**	C	x, E	1,2	x	x
Stripe-breasted Spinetail	*Synallaxis cinnamomea*	A, B, C	E			
Tyrannidae						
Sooty-headed Tyrannulet	*Phyllomyias griseiceps*	A, B				
Black-capped Tyrannulet	*Phyllomyias nigrocapillus*	C				
Forest Elaenia	*Myiopagis gaimardii*	C				
Foothill Elaenia	*Myiopagis olallai incognita**	C				
Greenish Elaenia	*Myiopagis viridicata zuliae**	A, B	x	2,4		
Yellow-bellied Elaenia	*Elaenia flavogaster*	A, B, C	E			x
Lesser Elaenia	*Elaenia chiriquensis*	C	x, E	4		
Mountain Elaenia	*Elaenia frantzii*	H	x, E	1,4,5	x	
Brown-capped Tyrannulet	*Ornithion brunneicapillus*	B				
White-throated Tyrannulet	*Mecocerculus leucophrys*	H	x, E	1,4,5	x	x

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Venezuelan Tyrannulet	*Zimmerius improbus* ssp.*	A, C	x, E	1,4,5	x	x
Golden-faced Tyrannulet	*Zimmerius chrysops*	A, B, C	x	4		
Variegated Bristle-Tyrant	*Phylloscartes poecilotis*	A, C		2		
Rufous-browed Tyrannulet	*Phylloscartes superciliaris*	A, C		2		
Olive-striped Flycatcher	*Mionectes olivaceus*	A, B, C	x, E	1,4		x
Ochre-bellied Flycatcher	*Mionectes oleagineus*	A, B, C	E	1		
Slaty-capped Flycatcher	*Leptopogon superciliaris*	A, B, C	x, E	1,4	x	x
Scale-crested Pygmy-Tyrant	*Lophotriccus pileatus*	A, B	x	2,3,4		
Pale-eyed Pygmy-Tyrant	*Atalotriccus pilaris*	C	x	4		
Pearly-vented Tody-Tyrant	*Hemitriccus margaritaceiventer*	B				
Black-throated Tody-Tyrant	*Hemitriccus granadensis*	H	x, E	1,2,4,5	x	x
Rufous-crowned Tody-Flycatche	*Poecilotriccus ruficeps*		E	1		x
Yellow-olive Flycatcher	*Tolmomyias sulphurescens*	C	x	4		
White-throated Spadebill	*Platyrinchus mystaceus perijanus**	B	x	2,4		
Yellow-throated Spadebill	*Platyrinchus flavigularis vividus**	C	x	4		
Royal Flycatcher	*Onychorhynchus coronatus*	D	x	4		
Flavescent Flycatcher	*Myiophobus flavicans*	A, C	x	2,4		
Tawny-breasted Flycatcher	*Myiobius villosus*	C				
Ruddy-tailed Flycatcher	*Terenotriccus erythrurus*	B				
Cinnamon Flycatcher	*Pyrrhomyias cinnamomeus*	A, C	x, E	1,4		x
Cliff Flycatcher	*Hirundinea ferruginea*	A, B, C				
Euler's Flycatcher	*Lathrotriccus euleri*	B				
Acadian Flycatcher	*Empidonax virescens*	C				
Olive-sided Flycatcher	*Contopus cooperi*	A				
Smoke-colored Pewee	*Contopus fumigatus*	A, B, C	x, E	1	x	
Eastern Wood-Pewee	*Contopus virens*	C	x	4		
Tropical Pewee	*Contopus cinereus*	A, C				
Black Phoebe	*Sayornis nigricans*	C				
Vermilion Flycatcher	*Pyrocephalus rubinus*	B, C				
Rufous-tailed Tyrant	*Knipolegus poecilurus*	D	x	4		
Streak-throated Bush-Tyrant	*Myiotheretes striaticollis*	H	x, E	4,5		
Smoky Bush-Tyrant	*Myiotheretes fumigatus olivaceus**	H	x, E	1,4,5		x
Yellow-bellied Chat-Tyrant	*Ochthoeca diadema rubellula**	H	x, E	1,2,4,5		x
Rufous-breasted Chat-Tyrant	*Ochthoeca rufipectoralis rubicundulus**	H	x, E	1,2,4,5		x
Cattle Tyrant	*Machetornis rixosa*	B, C				
Piratic Flycatcher	*Legatus leucophaius*	B, C	E			
Rusty-margined Flycatcher	*Myiozetetes cayanensis*	C				
Social Flycatcher	*Myiozetetes similis*	C	E	1,5		
Great Kiskadee	*Pitangus sulphuratus*	C	E			
Lesser Kiskadee	*Pitangus lictor*	C	E			
Lemon-browed Flycatcher	*Conopias cinchoneti*	C				
Golden-crowned Flycatcher	*Myiodynastes chrysocephalus*	A, B, C	x, E	4	x	
Streaked Flycatcher	*Myiodynastes maculatus*	A, B, C	x	4		
Boat-billed Flycatcher	*Megarynchus pitangua*	A, B, C	x, E	4		
Tropical Kingbird	*Tyrannus melancholicus*	A, B, C	x, E	4		
Fork-tailed Flycatcher	*Tyrannus savana*	C	E	5		
Grayish Mourner	*Rhytipterna simplex*	B				
Dusky-capped Flycatcher	*Myiarchus tuberculifer*	A, B, C	x	4		
Venezuelan Flycatcher	*Myiarchus venezuelensis*	D	x	1,2		
Bright-rumped Attila	*Attila spadiceus*	C				

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Cotingidae						
Green-and-black Fruiteater	*Pipreola riefferii*	C	x	4		
Barred Fruiteater	*Pipreola arcuata*	D	x	4		
Golden-breasted Fruiteater	*Pipreola aureopectus*	A, C	x, E	4	x	
Scaled Fruiteater	*Ampelioides tschudii*	A, B, C	x	4		
Red-crested Cotinga	*Ampelion rubrocristatus*	G,H	x, E			
Red-ruffed Fruitcrow	*Pyroderus scutatus*	A, C	x	4		
Bearded Bellbird	*Procnias averano*	B				
Pipridae						
White-bibbed Manakin	*Corapipo leucorrhoa*	C, H	x	1,5		
Striped Manakin	*Machaeropterus regulus*	D		2		
Golden-headed Manakin	*Ceratopipra erythrocephala*	A, C	x	4		
Tityridae						
Masked Tityra	*Tityra semifasciata*	A, B, C	x, E	1,4		
Russet-winged Schiffornis	*Schiffornis stenorhyncha*	A, C				
Barred Becard	*Pachyramphus versicolor*	A	E	1		
Cinnamon Becard	*Pachyramphus cinnamomeus*	B, C				
White-winged Becard	*Pachyramphus polychopterus*	A, C				
Black-and-white Becard	*Pachyramphus albogriseus*	A, C				
Pipritidae						
Wing-barred Piprites	*Piprites chloris perijanus**	A, B, C	x	3,4		
Vireonidae						
Yellow-browed Shrike-Vireo	*Vireolanius eximius*	A, B, C	x	4		
Brown-capped Vireo	*Vireo leucophrys*	A, B	x, E	1,4	x	
Red-eyed Vireo	*Vireo olivaceus*	C	E			
Rufous-naped Greenlet	*Hylophilus semibrunneus*	B, C	x	4		
Golden-fronted Greenlet	*Hylophilus aurantiifrons*	B				
Scrub Greenlet	*Hylophilus flavipes*	A		2		
Corvidae						
Black-chested Jay	*Cyanocorax affinis*	A, B, C	x, E	4		
Green Jay	*Cyanocorax yncas*	A, C	x, E	1,4		
Hirundinidae						
Blue-and-white Swallow	*Pygochelydon cyanoleuca*	C				
Brown-bellied Swallow	*Orochelidon murina*	H	x, E	4,5		
Southern Rough-winged Swallow	*Stelgidopteryx ruficollis*	A, C				
Troglodytidae						
Scaly-breasted Wren	*Microcerculus marginatus*	A, B, C	x	4		
House Wren	*Troglodytes aedon*	A, B				
Mountain Wren	*Troglodytes solstitialis*	A	x	4		
Bicolored Wren	*Campylorhynchus griseus*	B	x	1		
Whiskered Wren	*Pheugopedius mystacalis*	A, B	x, E	4	x	
Rufous-breasted Wren	*Pheugopedius rutilus*	A, B, C	E	1		
Rufous-and-white Wren	*Thryophilus rufalbus*	A, B, C				
Buff-breasted Wren	*Cantorchilus leucotis*	B, C		2		
Rufous Wren	*Cinnycerthia unirufa chakei**	C	x, E	2,4	x	
Gray-breasted Wood-Wren	*Henicorhina leucophrys manastarae**	A, C	x, E	1,2,4	x	x
Cinclidae						
White-capped Dipper	*Cinclus leucocephalus*	C				
Bombycillidae						
Cedar Waxwing	*Bombycilla cedrorum*	C				

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Turdidae						
Andean Solitaire	*Myadestes ralloides*	A, C	x, E	1,4	x	x
Orange-billed Nightingale-Thrus	*Catharus aurantiirostris*	A, C	x, E	1,2		
Slaty-backed Nightingale-Thrush	*Catharus fuscater*	C	x, E	1,4	x	x
Gray-cheeked Thrush	*Catharus minimus*	A, C				
Swainson's Thrush	*Catharus ustulatus*	H	x, E	1,4,5		
Pale-eyed Thrush	*Turdus leucops*	A	x	1		
Pale-breasted Thrush	*Turdus leucomelas*	H	x, E	1		
Chestnut-bellied Thrush	*Turdus fulviventris*	H	x, E	1,4,5		
Black-hooded Thrush	*Turdus olivater*	A, B, C	x, E	1,4	x	x
Great Thrush	*Turdus fuscater*	H	x, E	1,4,5	x	
Glossy-black Thrush	*Turdus serranus*	C	x, E	1,4		
White-necked Thrush	*Turdus albicollis*	A, B, C				
Mimidae						
Tropical Mockingbird	*Mimus gilvus*	A, B, C	E		x	
Motacillidae						
Paramo Pipit	*Anthus bogotensis*		x	6		
Thraupidae						
Black-faced Tanager	*Schistochlamys melanopis*	C	x	4		
Magpie Tanager	*Cissopis leverianus*	A, B				
Oleaginous Hemispingus	*Hemispingus frontalis flavidorsalis**	C	x, E	1,2,4,5	x	x
Fulvous-headed Tanager	*Thlypopsis fulviceps obscuriceps**	C	x, E	1,2,4		
White-lined Tanager	*Tachyphonus rufus*	A, B	E			
Crimson-backed Tanager	*Ramphocelus dimidiatus*	A, B, C				
Hooded Mountain-Tanager	*Buthraupis montana venezuelanus**	H	x, E	1,4,5	x	x
Lacrimose Mountain-Tanager	*Anisognathus lacrymosus pallididorsalis*	A, C	x, E	1,2,3,4	x	x
Buff-breasted Mountain-Tanage	*Dubusia taeniata*	H	E	1,5		x
Blue-gray Tanager	*Thraupis episcopus*	A	x, E	4		
Palm Tanager	*Thraupis palmarum*	A, B				
Blue-capped Tanager	*Thraupis cyanocephala*	A, C	x, E	1,4	x	x
Black-headed Tanager	*Tangara cyanoptera*	A, B, C	x, E	1,2		
Black-capped Tanager	*Tangara heinei*	A	x, E	1,4	x	
Blue-necked Tanager	*Tangara cyanicollis*	B, C		4		
Speckled Tanager	*Tangara guttata*	B, D				
Beryl-spangled Tanager	*Tangara nigroviridis*	A, C	x	4		
Bay-headed Tanager	*Tangara gyrola toddi*	A, B, C	x, E	1,4		
Saffron-crowned Tanager	*Tangara xanthocephala*	A, C	x	4		
Golden Tanager	*Tangara arthus*	A, C	x	4		
Swallow Tanager	*Tersina viridis*	A, B, C	x	4		
Green Honeycreeper	*Chlorophanes spiza*	A, B, C	E			
Blue-backed Conebill	*Conirostrum sitticolor pallidus**	H	E	1,5		
Black Flowerpiercer	*Diglossa humeralis*	C	x, E	1,4	x	x
White-sided Flowerpiercer	*Diglossa albilatera*	A, C	x, E	1,4	x	x
Rusty Flowerpiercer	*Diglossa sittoides coelestis**	C	x, E	4,5		
Bluish Flowerpiercer	*Diglossa caerulescens ginesi**	C	x, E	1,2,4		
Masked Flowerpiercer	*Diglossa cyanea obscura**	C, D				
Plushcap	*Catamblyrhynchus diadema*	C	E	1		x
Slaty Finch	*Haplospiza rustica*	H	E	1,5		
Wedge-tailed Grass-Finch	*Emberizoides herbicola*	C	x	4		
Blue-black Grassquit	*Volatinia jacarina*	C	x, E	4		
Lesson's Seedeater	*Sporophila bouvronides*	B				
Ruddy-breasted Seedeater	*Sporophila minuta*	B, C				
Chestnut-bellied Seed-Finch	*Sporophila angolensis*	C				
Black-and-white Seedeater	*Sporophila luctuosa*		E			
Yellow-bellied Seedeater	*Sporophila nigricollis*	A, B, C				
Paramo Seedeater	*Catamenia homochroa*	H	E	1,5	x	x
Bananaquit	*Coereba flaveola*	A, B, C				
Dull-colored Grassquit	*Tiaris obscurus*	D	x	1,4	x	
Sooty Grassquit	*Tiaris fuliginosus*	C	E			

English name	*Scientific name*	Distribution [1]		Additional information [2]		
		Eastern slope (Venezuela)	Western slope (Colombia)	Specimen	Vocal record	Photo
Incertae Sedis						
Rosy Thrush-Tanager	*Rhodinocichla rosea*	C	x	3,4		
Buff-throated Saltator	*Saltator maximus*	A, B, C	x, E	4		
Streaked Saltator	*Saltator striatipectus*		E	1		
Emberizidae						
Rufous-collared Sparrow	*Zonotrichia capensis*	C	x, E	1,4	x	
Grassland Sparrow	*Ammodramus humeralis*		x	4		
Black-striped Sparrow	*Arremonops conirostris*	C		2		
Golden-winged Sparrow	*Arremon schlegeli*	C	x	4		
Chestnut-capped Brush-Finch	*Arremon brunneinucha*	B, C	x, E	1,4	x	x
Perija Brush-Finch	*Arremon perijanus**	B, C	x, E	1,2,4	x	x
Yellow-breasted Brush-Finch	*Atlapetes latinuchus nigrifrons**	A, C	x, E	1,2,4	x	x
Slaty Brush-Finch	*Atlapetes schistaceus fumidus**	C	x, E	1,4	x	x
Common Chlorospingus	*Chlorospingus flavopectus ponsi**	A, B, C	x, E	1,2,4	x	x
Cardinalidae						
Summer Tanager	*Piranga rubra*	C	x, E	4		
Scarlet Tanager	*Piranga olivacea*	A				
White-winged Tanager	*Piranga leucoptera*	A, C	x	4		
Red-crowned Ant-Tanager	*Habia rubica*	A, B, C				
Golden Grosbeak	*Pheucticus chrysogaster*	C	x	4		
Rose-breasted Grosbeak	*Pheucticus ludovicianus*	C	x, E	4		x
Blue-black Grosbeak	*Cyanocompsa cyanoides*	A, B, C			x	
Blue Grosbeak	*Passerina caerulea*	D	x	4		
Dickcissel	*Spiza americana*	D	x	4		
Parulidae						
Golden-winged Warbler	*Vermivora chrysoptera*	C, D	x	4		
Black-and-white Warbler	*Mniotilta varia*	C	E			
Tennessee Warbler	*Leiothlypis peregrina*	C	x, E	1	x	
Mourning Warbler	*Geothlypis philadelphia*	C	E			
Kentucky Warbler	*Geothlypis formosa*		x	1		
American Redstart	*Setophaga ruticilla*	C	x, E	4,5		
Tropical Parula	*Setophaga pitiayumi*	A, B, C	x	4		
Blackburnian Warbler	*Setophaga fusca*	A, C	x, E	4		
Black-throated Green Warbler	*Setophaga virens*	A	E	1		
Black-crested Warbler	*Myiothlypis nigrocristata*	C	x, E	1,4	x	x
Gray-throated Warbler	*Myiothlypis cinereicollis pallidulus**	A, B, C	x, E	1,2,4		x
Rufous-capped Warbler	*Basileuterus rufifrons*	H	x	1,5		
Golden-crowned Warbler	*Basileuterus culicivorus*	A, B, C	x, E	1	x	
Three-striped Warbler	*Basileuterus tristriatus*	C	x, E	1,2	x	x
Canada Warbler	*Cardellina canadensis*	C				
Slate-throated Redstart	*Myioborus miniatus*	A	x, E	1,4	x	x
Icteridae						
Russet-backed Oropendola	*Psarocolius angustifrons*	A, B, C	x, E	1,4	x	
Crested Oropendola	*Psarocolius decumanus*	C	x	4		
Scarlet-rumped Cacique	*Cacicus uropygialis*	A				
Yellow-billed Cacique	*Amblycercus holosericeus*		x, E	1,4	x	x
Orchard Oriole	*Icterus spurius*	A				
Orange-crowned Oriole	*Icterus auricapillus*	A, B, C				
Yellow-backed Oriole	*Icterus chrysater*	B	x, E	4		
Yellow Oriole	*Icterus nigrogularis*	A				
Yellow-hooded Blackbird	*Chrysomus icterocephalus*	B				
Giant Cowbird	*Molothrus oryzivorus*	C	E			
Carib Grackle	*Quiscalus lugubris*	A				

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Fringillidae						
Andean Siskin	*Sporagra spinescens*		x, E	4	x	
Yellow-bellied Siskin	*Sporagra xanthogastra*	A				
Lesser Goldfinch	*Astragalinus psaltria*	B, C	x	4		
Golden-rumped Euphonia	*Euphonia cyanocephala*	A, C				
Orange-bellied Euphonia	*Euphonia xanthogaster*	A, C	x	4		
Blue-naped Chlorophonia	*Chlorophonia cyanea*	A, B, C	x	4		
Chestnut-breasted Chlorophonia	*Chlorophonia pyrrhophrys*	H	x, E	1,4,5	x	

[1]Source: A: Lentino *et al.* (2004); B: Ascanio & Leon (2004); C: Ginés *et al.* (1953); D: Viloria & Calchi La C (1993); E: this study; F: Botero & Paez (2011); G: Calchi La C & Viloria (1991)

[2]Additional data: *Restricted taxa to Perijá Mountains; 1: Colección de Ornitología Instituto de Ciencias Naturales, Universidad Nacional de Colombia (ICN); 2: American Museum of Natural History (AMNH); Academy of Natural Sciences of Philadelphia (ANSP); National Museum of Natural History, Smithsonian Institution (USNM); 5: Colección Ornitológica Phelps (COP); 6: Senckenberg Museum Frankfurt