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Birds of Colombia 2015 and surveys during the filming of '*Colombia Magia Salvaje*'

Aves de Colombia 2015 y estudios durante la filmación de 'Colombia Magia Salvaje'

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Conservación Colombiana *es publicada gracias al apoyo de nuestros donantes:*

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Revision of the status of bird species occurring or reported in Colombia 2015, with discussion of BirdLife International's new taxonomy

Revisión del estatus de las especies de aves que han sido reportadas en Colombia 2015, con una discusión de la nueva taxonomía de BirdLife Internacional

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Abstract

Subtropical Pygmy-Owl *Glaucidium parkeri*, Fiery-tailed Awlbill *Avocettula recurvirostris* and Pale-rumped Swift *Chaetura egregia* are added to Colombia's bird checklist based on photographic records. Band-rumped Storm-Petrel *Oceanodroma castro*, Golden-spangled Piculet *Picumnus exilis*, Yellow-bellied Flycatcher *Empidonax flaviventris* and Yellow-throated Tanager *Iridisornis analis* are all elevated to the status of confirmed species occurring on the mainland, also following photographic records. We considered taxonomic proposals by del Hoyo & Collar (2014) using Tobias *et al*. (2010)'s "species scoring system". We studied possible changes relevant to Colombia in detail, based on new studies of vocalisations, our own fieldwork data and published molecular studies. We conclude that the following proposed Trochilidae (hummingbird) splits are supported by differentiation in voice: White-throated Wedgebill *Schistes albogularis* from Geoffroy's Wedgebill *S. geoffroyi* (Wedge-billed Hummingbird); Longuemare's Sunangel *Heliangelus clarisse* and Merida Sunangel *H. spencei* from Amethystine Sunangel *Heliangelus amethysticollis*; White-tailed Hillstar *Urochroa leucura* from Rufous-gaped Hillstar *U. bougeri*; and Humboldt's Sapphire *Amazilia humboldtii* from Gray's Sapphire *A. grayi*. In light of these positive assessments, we accepted proposed splits of morphologically distinctive hummingbirds in a little-vocalising genus: Perija Starfrontlet *Coeligena consita* and Golden Starfrontlet *C. eos* from Golden-bellied Starfrontlet *C. bonapartei* and Green Inca *C. conradii* from Collared Inca *C. torquata*. We adopt the proposed split of Double-banded Puffbird *Hypnelus bicinctus* from Rufous-throated Puffbird *H. ruficollis*, highlighting vocal differences. We suggest transfer of subspecies *striaticollis* to the *bicinctus* group. We split Splendid Woodpecker *Campephilus splendens* from *C. haematogaster* based on differences in voice, plumage, distribution and drumming behaviour. Carribean Coot *Fulica caribaea* is lumped with American Coot *F. americana* on account of widely reported intergradation. After studying vocal differentiation in three genera, we reject 10 proposed splits in Ramphastidae (toucans) of forms which either intergrade with one another or which are not as vocally distinct as sympatric toucans. Our vocal analyses instead suggest that the Groove-billed Toucanet subspecies *Aulacorhynchus sulcatus erythrognatus* of Venezuela may merit species rank. The widely adopted split of Andean Duck *Oxyura ferruginea* from Ruddy Duck *O. jamaicensis* is again rejected, due to well-documented intergradation in Colombia. We conclude that del Hoyo & Collar (2014)'s taxonomy has been useful and worthwhile in drawing attention to novel taxonomic situations, especially in Trochilidae. However, we suggest using the Tobias *et al*. (2010) system as a point of reference and not a sole criterion to determine taxonomic rank. After analysis of sound recordings of putative related species, we conclude that Providencia Vireo *V. approximans* merits species rank. We split the Blossomcrowns *Anthocephala*. Several amendments to genus and species names, English names and linear order are made, following recent publications. The Colombian checklist increases again to 1,921 species (excluding escapes), of which 1,846 are documented by 'confirmed' records on the mainland.

Keywords: species limits, new records, hummingbird, Trochilidae, toucans, Ramphastidae.

Resumen

Glaucidium parkeri, *Avocettula recurvirostris* y *Chaetura egregia* se agregan al listado de aves de Colombia, todas basadas en registros fotográficos. *Oceanodroma castro*, *Picumnus exilis*, *Empidonax flaviventris* e *Iridisornis analis* son elevadas al estado de 'especies confirmadas', debido también a nuevos registros fotográficos. Se discuten las propuestas taxonómicas de del Hoyo & Collar (2014), las cuales utilizan el "sistema de puntaje de especies" de Tobias *et al*. (2010). Consideramos posibles cambios relevantes para Colombia en detalle, basados en estudios de vocalizaciones, nuestras propias observaciones en el campo y las conclusiones de estudios moleculares realizados por otros autores. Concluimos que las siguientes separaciones de especies de Trochilidae (colibríes) pueden se adoptadas teniendo en cuenta diferencias en vocalizaciones: *Schistes albogularis* de *S. geoffroyi*; *Heliangelus clarisse* y *H. spencei* de *Heliangelus amethysticollis*; *Urochroa leucura* de *U. bougeri*; y *Aamzilia humboldtii* de *A. grayi*. Asi mismo, aceptamos otras dos separaciones propuestas en Trochilidae, de poblaciones que son morfológicamente distintas pero poco vocales, estas son: *Coeligena consita* y *C. eos* de *C. bonpartei*; y *C. conradii* de *C. torquata*. Aceptamos la separación de *Hypnelus bicinctus* y *H. ruficollis*, destacando la existencia de diferencias en sus vocalizaciones. Sugerimos además transferir la subespecie *striaticollis* al grupo *bicinctus*. Separamos *Campephilus splendens* de *C. haematogaster* basado en diferencias en las voces, el plumaje y el comportamiento de 'tamboreo'. *Fulica caribaea* se une con *F. americana*, debido a la existencia de formas intermedias ampliamente reportadas. Posterior a un estudio vocal de tres géneros, rechazamos 10 propuestas separaciones de especies en Ramphastidae (tucanes) para las cuales se conocen formas intermedias, o no existen diferencias vocales tan marcadas como existen en especies simpátricas de la misma familia. Por otro lado, nuestros análisis vocales sugieren que *Aulacorhynchus sulcatus erythrognatus* de Venezuela podría ser elevado taxonomicamente a una especie aparte. La separación de *Oxyura ferruginea* y *O. jamaicensis* se rechaza nuevamente, debido a la existencia de formas intermedias en Colombia. Concluimos que la nueva taxonomía de del Hoyo & Collar (2014) ha sido útil e importante al resaltar varios casos taxonómicos nuevos, especialmente en Trochilidae. No obstante, aunque sugerimos utilizar el sistema de Tobias *et al.* (2010) como un punto de referencia, creemos que no debe ser el único criterio para delimitar especies de aves. Después de analizar grabaciones de especies relacionadas, concluimos que *Vireo approximans* debe ser elevado a una especie separada. También, separamos los colibríes del género *Anthocephala*. Finalmente, se realizaron varias modificaciones a los nombres de géneros y especies, nombres en inglés y el orden del listado. El listado de aves de Colombia aumentó nuevamente a 1,921 especies (excluyendo especies exóticas) de las cuales 1,846 han sido documentadas a través de registros confirmados en el continente.

Palabras clave: limites de especie, nuevo registro, picaflor, Trochilidae, tucán, Ramphastidae

Introduction

This is the 14th year of the national checklist of the Birds of Colombia. The list has grown steadily as a result of the country opening up as a location for birders and ornithologists. Our team has now worked on four editions of Colombia's checklist (Salaman *et al.* 2001, 2008b, 2009, 2010), three field guides (McMullan *et al.* 2010, 2011, McMullan & Donegan 2014) and various annual updates discussing new records, evaluating older ones and incorporating taxonomic changes (Salaman *et al.* 2008a, Donegan *et al.* 2009, 2010a, 2011, 2012, 2013, 2014). We are pleased that the checklist of Colombian birds is now available online at www.proaves.org (Donegan *et al.* 2015), to facilitate usage and updating. This paper sets out details of further changes to the Colombian list since our last update was published in December 2014. In particular, we analyse in detail many of the new taxonomic proposals by del Hoyo & Collar (2014) which are relevant to Colombia.

Species added

Subtropical Pygmy-Owl *Glaucidium parkeri*
This was newly recorded for Colombia on the southern East slope by Acevedo *et al*. (2015). Photographic records are presented, which experts familiar with the species have considered allow identification.

Fiery-tailed Awlbill *Avocettula recurvirostris*
A new species and genus for Colombia, recorded by Diego Calderón, Alison Bentley, Stewart Bentley, Geoffrey Bateman, Aurthur Denholm, Andrew Hawkins and Wendy Hawkins on 18 October 2014 near Mitú, dpto. Vaupés. Gabriel Utría Ortega obtained photographs on 22 November 2014 which have been published by Kirwan *et al.* (2015). The photograph unmistakeably allows identification. This species also occurs in the Amazonian region of both Ecuador and Brazil (del Hoyo & Collar 2014).

Pale-rumped Swift *Chaetura egregia*
Previously known only from tentative records in Colombia (Baruah 2012; discussed in Donegan *et al.* 2012) and mapped to Colombia's eastern border by Van Perlo (2009). Guy Kirwan, Pablo Flórez, Andrew Marshall, Neil Bostock, Mike Coverdale, Peter Shepherd and Filip Belldens obtained a photograph of this species on 28 September 2014, also near Mitú, published in Kirwan *et al.* (2015). A non-natural origin for this or the previous two species is implausible.

Changes of status

Band-rumped Storm-Petrel *Oceanodroma castro*
Elevated from unconfirmed (Obs) status to confirmed, in light of the photographic records of Digby *et al.* (2015) in this issue.

Golden-spangled Piculet *Picumnus exilis*
Elevated from unconfirmed (Obs) status to confirmed, in light of the photographic record of Rueda (2015) in this issue.

Yellow-bellied Flycatcher *Empidonax flaviventris*
A photographic record in Kirwan *et al.* (2015) by Nick Bayly at Sapzurro, Acandí, dpto. Chocó on 18 October 2014 is the first for continental Colombia. The species was known formerly only from records on San Andrés and Providencia. The photograph presented is clear and we agree it gives sufficient basis to treat this as a confirmed record.

Yellow-throated Tanager *Iridisornis analis*.
A photographic record by Delgado-C. *et al.* (2014) on the southern East slope of the Andes means that this species

can finally be added as confirmed for Colombia, following a long succession of sight records since the 1980s (e.g. Hilty & Brown 1986, Salaman *et al.* 1999, 2002).

Notes on other species

Double-crested Cormorant *Phalcrocorax auritus*. A decision is pended on the status of this species, which could change from SA (Obs) to SA based on the photographic record by Donegan & Huertas (2015). The photographs presented are distant and close-ups are grained, but the large bill, long, narrow neck and extensive gular pouch indicate that the bird was not *P. brasilianus*, consistent with observations.

Red-billed Ground-Cuckoo *Neomorphus pucheranii* is now known from a sound recording in Colombia made by Diego Calderón and others (Kirwan *et al.* 2015). We pend changing its category to "confirmed", awaiting proposed publication of sonograms elsewhere (D. Calderón *in litt*. 2015).

Perija Tapaculo *Scytalopus perijanus* has now been described by Avendaño *et al.* (2015). The previously unnamed Perija Tapaculo was widely recognised in other works, based on careful studies of specimens by Donegan & Avendaño (2008) who, *contra* Avendaño *et al.* (2015), treated it as an undescribed taxon of species rank (as did Donegan *et al.* 2009, Salaman *et al.* 2009, 2010, McMullan *et al.* 2010, 2011 and McMullan & Donegan 2014). The new scientific name is now reflected in the checklist.

Blue-and-gold Tanager *Bangsia arcaei* and **Black-and-yellow Tanager *Chrysothlypis chrysomelas*** were previously added as confirmed species for Colombia (Donegan *et al.* 2011) based on a report of specimens by Ruiz-Ovalle & Hurtado (2010) (cf. *Conservación Colombiana* 17: 37). Full details of these records, including photographs of specimens, observations and locality data, have now been published by Ruiz-Ovalle & Hurtado-Guerra (2014).

In addition to their new records of Yellow-throated Tanager, Delgado-C. *et al.* (2014) claimed first national records of **Masked Water-Tyrant *Fluvicola nengeta*** and **Pacific Hornero *Furnarius leucopus cinnamomeus***. They omitted to mention that both species are previously reported for Colombia with published photographic records (Luna 2011). Delgado-C. *et al.* (2014)'s records were made 3-10 months earlier in time than those of Luna (2011).

Moving the checklist to an online excel format from the previous MS Word-based format facilitated a recount of all categories, which is reflected in the first row of numbers in Table 2.

Subspecies

The following two newly described subspecies occur in Colombia:

- *Scytalopus griseicollis morenoi*: described by Avendaño & Donegan (2015), in place of unnamed "subsp.".
- *Basileuterus tristriatus sanlucasensis*: described by Salaman (2015), in place of unnamed "subsp.".

BirdLife Checklist Splits and Lumps

Del Hoyo & Collar (2014) split or lumped a number of non-passerine species based on the 'species scoring system' of Tobias *et al.* (2010). In the following sections, we consider these new taxonomic proposals in detail, for several species occurring in Colombia. The Tobias *et al.* (2010) system has been criticised on technical grounds and in some instances of its application (Remsen 2015, Bakker 2015, Sangster 2015) leading to a call for proposed new taxonomies in the work to be rejected (Remsen 2015). Particular criticisms refer to usage of a single scoring system for all birds, the emphasis on plumage characters over molecular or vocal analyses and treatment of groups which hybridise with one another. In light of these criticisms, rather than adopt all the changes wholesale, we consider proposed splits or lumps for various species which occur in Colombia in detail. In particular, we examine whether the splits have vocal or molecular support.

We have separated this discussion into several sections, first splits we have accepted, then lumps we have accepted. We then go through some proposed taxonomic changes which we do not accept, providing reasons. We mention proposed changes which have been pended for a future checklist update, generally where the situation in Colombia is not key to the outcome or where we have limited or no field experience with the proposed split species. We also pend proposals on parrots for a future update. In the accounts below, various differences between species cited by del Hoyo & Collar (2014) are denoted by referring the scores given for each in their assessment. Further information on the scoring system should be reviewed in Tobias *et al.* (2010) and del Hoyo & Collar (2014).

1. Accepted splits

Western Wedge-billed Hummingbird ('White-throated Wedgebill') *Schistes albogularis*
Eastern Wedge-billed Hummingbird ('Geoffroy's Wedgebill') *S. geoffroyi*
Wedge-billed Hummingbirds *Schistes* are a widely-distributed but poorly-known hummingbird genus, found at low densities in mid-elevation, forested Andean slopes. For example, Hilty & Brown (1986) considered them "local", Ridgely & Greenfield (2001) "uncommon and

local in the undergrowth of montane forest and forest borders" and Hilty (2003) "very uncommon and local". Only two subspecies are widely recognised (Dickinson & Remsen 2013). Nominate *geoffroyi* (Bourcier & Mulsant, 1843) is based on a type specimen with a nonsensical specified collection locality of "La Valée de Cauca près de Cathagene" (Cauca valley near Cartagena) but was probably collected in the East Andes of Colombia (Zimmer 1953). The other taxon, *albogularis* Gould, 1851 has a type specimen thought to have been collected on the west slope of the Andes in Pichincha, Ecuador. Subspecies *chapmani* Berlioz, 1941 has a type locality near Cochabamba in Bolivia. The name *personatus* has been associated with these birds but it is a synonym of *Augastes scutatus* (Zimmer 1953).

Figure 1. Wedge-billed Hummingbirds. Above: White-throated Wedgbill *S. albogularis*. Below: Geoffroy's Wedgebill *S. geoffroyi*. Top left: *S. albogularis* male, Ibagué, Tolima, Colombia (A. Quevedo). Top right: *S. albogularis* female, Mindo, Ecuador (D. Brinkhuisen, November 2009). Lower left: *S. geoffroyi* Primavera, Serranía de los Yariguíes, Santander, Colombia (M. Sharp, 2006). Lower right: *S. geoffroyi* Yanachaga-Chemillen National Park, Peru (L. Gabrielson, 3 October 2006).

Gould (1851, 1861), Boucard (1893-5), Hartert (1900), Cory (1918) and other earlier authors recognised two species in *Schistes*. Peters (1945) lumped them without justification. This was followed by Zimmer (1953), Meyer de Schauensee (1964, 1966, 1970), Hilty & Brown (1986), Dunning (1987), Fjelsdå & Krabbe (1990), Rodner *et al*. (2000), Salaman *et al.* (2001, 2008b, 2009, 2010), Ridgely & Greenfield (2001), Hilty (2003), Erize *et al.* (2006), Restall *et al.* (2006), Schulenberg *et al.* (2007), McMullan *et al.* (2010, 2011), McMullan & Navarrete (2013), McMullan & Donegan (2014), Fogden *et al.* (2014), Gill & Donsker (2015) and Remsen *et al.* (2015).

Ridgely & Greenfield (2001) noted that "Two rather different subspecies" occur on opposite Andean slopes in Ecuador. They drew attention to vocal differences, with East slope birds calling "simple, regularly spaced series of 'tsit' notes" (see also Schulenberg *et al*. 2007). Western slope birds give a "more complex series of 'tsit' notes interspersed with longer and higher-pitched 'tseeet' notes". Highlighting the plumage differences Ridgely & Greenfield (2001) stated that "Separate species are perhaps involved."

A western group ascribed by del Hoyo & Collar (2014) to *albogularis* is found on the western slope of the Andes in Ecuador and Colombia's West and Central Cordilleras. An eastern group (nominate form *geoffroyi*) was mapped on the east slope of Ecuador south to Bolivia, both slopes of the Eastern Cordillera of Colombia and north generally on mountains to the Coastal Cordillera in Venezuela.

Del Hoyo & Collar (2014)'s split is principally based on plumage differences. Western forms differ in their larger, brighter green throat patch and forehead (3), white of lower neck sides joining across breast (ns[2]), breast to vent shiny green versus paler green (ns[2]), short versus long white postocular (ns[2]), green versus bronzy-brown back to uppertail coverts (3), blue green versus yellowy-green uppertail (ns[2]), presence/absence of white tail tips (ns[1-2]), female with all-white throat versus spotted green throat (3) and slightly longer bill (no score). The differences are illustrated in Figure 1. *Schistes* is currently monotypic, so to compare these differences with those between related sympatric species, as proposed by Helbig *et al.* (2002) and Remsen (2005), requires other genera to be considered. Its closest relations are in *Colibri* (McGuire *et al.* 2014), where sympatric species such as Sparkling Violetear *C. coruscans* and Green Violetear *C. thalassinius* also differ in a combination of biometrics, plumage differences and voice.

We studied sonograms of *Schistes* and compared all available sound recordings subjectively. We found Ridgely & Greenfield (2001)'s vocal differences in Ecuador to hold true across the entire ranges of the proposed split taxa. Western populations give a slow, pleasant deliberate series of rather spaced-out, soft, high notes. Individual notes appear as a mixture of upstrokes and downstrokes and are of different maximum and minimum acoustic frequencies from one another. Eastern populations deliver a faster series of notes of equal frequency, bandwidth and note shape (Figure 2).

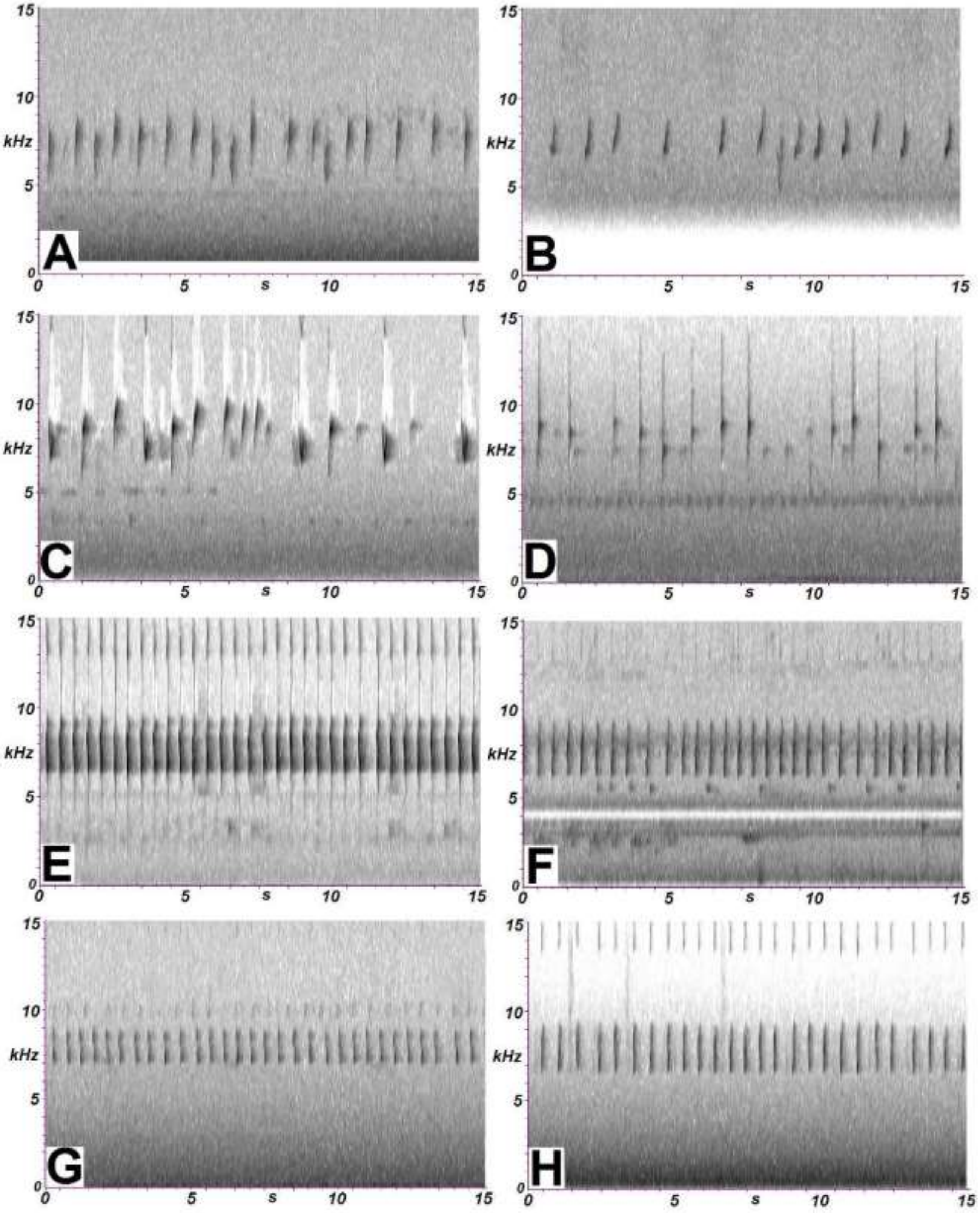

Figure 2. Songs of Wedge-billed Hummingbirds *Schistes* spp. A-D: White-throated Wedgebill *S. albogularis*. E-H: Geoffroy's Wedegbill *S. geoffroyi*. A. Parque Regional Barbas-Bremen, Filandia, Quindío, Colombia (XC131761: O.H. Marín-Gómez). B. *Idem* (XC129965). C. Reserva Los Cedros, Imbabura, Ecuador (XC21109: S. Olmstead). D. Buenaventura reserve, El Oro, Ecuador (XC5466: R. Hoyer). E. Henri Pittier NP, Aragua, Venezuela (XC209993: H. Matheve). F. RNA Reinita Cerulea, Serranía de los Yariguies, Santander, Colombia (XC13952: B. Davis). G. Guacamayos, Napo, Ecuador (XC251485: N. Krabbe). H. San Antonio, Satipo, Junín, Peru (XC152845: H. van Oosten).

We endorse del Hoyo & Collar (2014)'s proposed split on account of it having both morphological and vocal support.

Reversion to Gould (1861)'s more evocative vernacular names "White-throated Wedgebill" and "Geoffroy's Wedgebill" could be considered.

Longuemare's Sunangel *Heliangelus clarisse*
Amethystine Sunangel *H. amethysticollis*
Merida Sunangel *H. spencei.*

The taxonomic status of these three proposed species has been controversial for years. A number of names are available, from north to south: *spencei* Bourcier, 1847 has its type specimen from the Venezuelan Andes; *violiceps* Phelps & Phelps, 1953, has a type from the Perijá mountains; *verdiscutus* Phelps & Phelps, 1955, refers to the population in the northern East Andes near Tamá; *clarisse* Longuemare, 1841 occurs at high elevations in the main Eastern Cordillera of Colombia; *laticlavius* occurs in southern Ecuador and northern Peru; *decolor*, Zimmer, 1951, *apurimacensis* Weller, 2009, and *amethysticollis* d'Orbigny & Lafresnaye, 1838 all occur on the east slope in Peru, with the latter also in Bolivia. Boucard (1893-5) and Cory (1918) both treated *spencei*, '*clarissae*', *laticlavius* (Salvin's Sunangel) and *amethysticollis* specifically. Bourcier (1847) in the original description, Gould (1855), Elliot (1879), Salvin (1892) and Hartert (1900) all recognised both *spencei* and *clarisse* as species. Longuemare (1841) treated *clarisse* as a species prior to the description of *spencei*. *Heliangelus laticlavius* was recognised specifically in the description by Salvin (1892) and also by Hartert (1900).

Peters (1945) adopted a new taxonomy in which only two species were recognised: *clarisse* of the Colombian East Andes (including *spencei* of the Mérida range in Venezuela) and *amethysticollis* of Bolivia to Ecuador. Zimmer (1951) modified this further, describing subspecies *decolor* from northern Peru and lumping all of the others except *spencei* into *amethysticollis*. Zimmer (1951)'s treatment has been followed broadly since, including by Meyer de Schauensee (1964, 1966, 1970), Hilty & Brown (1986), Sibley & Monroe (1990), Ridgely & Greenfield (2001), Dickinson (2003), McMullan *et al.* (2010, 2011), McMullan & Navarrete (2013), McMullan & Donegan (2014), Dickinson & Remsen (2013), Fogden *et al.* (2014), Gill & Donsker (2015) and Remsen *et al.* (2015).

However, various alternative taxonomies have arisen. Schuchmann (1999), Hilty (2003) and Erize *et al.* (2006) all reverted to Peters (1945)'s taxonomy, splitting a broad *clarisse* (including *spencei*, *violiceps* and, when recognised, *verdiscutus*) from the rest of *amethysticollis*. Salaman *et al.* (2001) also split *clarisse* and further treated *violiceps* specifically. Dunning (1987), Fjeldså & Krabbe (1990) and Rodner *et al.* (2000) all adopted a different two-species approach, splitting *spencei* from *amethysticollis*, but including *clarisse*, *violifer* and all the other forms in the latter species. Restall *et al.* (2006) recognised *clarisse* (including *violifer* and *veriscutatus*) and *spencei* as species separate from *amethysticollis*. Schuchmann (1999) considered subspecies *verdiscutus* not to be valid, but Restall *et al.* (2006) considered it "clearly valid" and Hilty (2003) also recognised it.

Del Hoyo & Collar (2014) recognised each of *clarisse*, *spencei* and *amethysticollis* specifically. Focusing on *clarisse* versus *amethysticollis*, they highlighted the blackish versus green head sides of males (3), size of breast band in males (only scored 2, arguably should be higher when live individuals are considered: see Fig. 4), iridescence of green lower breast band (2) and extent of buff mottling on the lower belly (ns2). We would add that females are distinctive, having a black gorget streaked white in *clarisse* and, although sometimes overlooked in the literature, narrow bluish nuchal patch and bluish lower breast band (Fig. 4). Del Hoyo & Collar (2014) also highlighted differences between *spencei* and *clarisse*: in males the silvery-white versus emerald-green frons (3); broader white breast-band (2); less iridescent green lower breast-band; belly with more buff mottling (ns1); and shorter bill (2). They elucidated additional differences between *spencei* and the non-proximate *amethysticollis* group.

We reviewed available homologous vocalisations of all populations in this group and also those of Tourmaline Sunangel *H. exortis*, which is widely treated as a different species but whose range bisects that of the *amethysticollis* group. We found structural vocal differences between: (i) Merida Sunangel *H. spencei*, which gives a multi-note trill of comparatively narrow bandwidth; (ii) Longuemare's Sunangel *H. clarisse*, whose calls are comprised of one or two short notes with broad bandwidth; and (iii) subspecies *laticlavius* of southern Ecuador to northern Peru, the nominate population *amaethysticollis* of Peru and Bolivia (including available recordings attributable to the ranges of subspecies *apurimacensis* or *decolor*) and Tourmaline Sunangel *H. exortis*, whose calls comprise rapid trills of longer duration (which is particularly accentuated in the southernmost of these populations) and generally broad bandwidth (Fig. 3). We do not have examples of this kind of vocalisation for Tamá subspecies *verdiscutatus* or *violiceps* of Perijá, which are placed with *clarisse* by most authors who split *amethysticollis*. Ecuadorian, Peruvian and Bolivian populations showed broadly similar song structure, but some variation in acoustic frequency and call length. This variation should be studied in more detail as more species could potentially be recognised in this southern group. Subspecies *laticlavius* in particular may be another good species and was treated as such by Cory (1918) and earlier authors cited above.

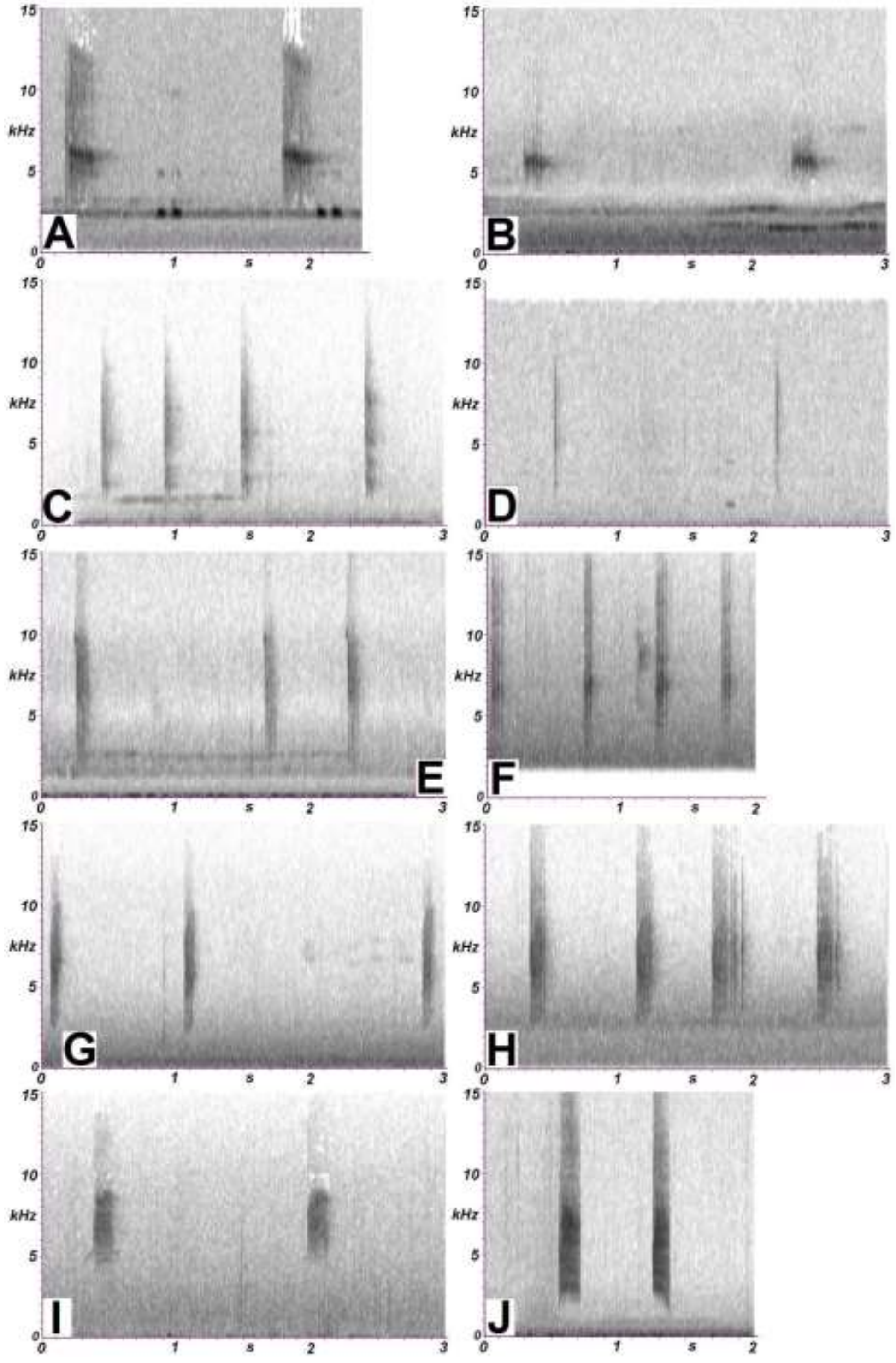

Figure 3. Calls of *Heliangelus* hummingbirds. A-B. Merida Sunangel *H. spencei* (Venezuelan Andes). C-D Longuemare's Sunangel *H. clarisse* (East Andes, Colombia). E-F. Tourmaline Sunangel *H. exortis* (West and Central Andes of Colombia and Andes of N Ecuador on both slopes). G-H. Amethystine Sunangel *H. amethysticollis laticlavius* (S Ecuador to N Peru). I-J. Amethystine Sunangel *H. amethysticollis* (subspp. *amethysticollis/decolor/apurimacensis*) (Bolivia and rest of Peru). A. Pico Humboldt Trail, Parque Nacional Sierra Nevada, Mérida, Venezuela (XC6883: N. Athanas). B. *Idem* (XC223881: P. Boesman). C. Villa de Leyva, Boyacá, Colombia (XC117783: S. Córdoba). D. Alto Cantagallos, San Vicente de Chucurí, Serranía de los Yariguies, Santander, Colombia (XC29397: T. Donegan). E. Entre La Romelia y El Planchon (PNN Munchique), Charguayaco, Vereda La Romelia, Mpio El Tambo, Cauca, Colombia (XC56436: B. López-Lanús). F. Guango Lodge, Napo, Ecuador (XC17324: A. Spencer). G. Reserva Tapichalaca, near Q. Cristopher Parson, Zamora-Chinchipe, Ecuador (XC250925: N. Krabbe). H. mid Gualaceo-Limón road, Morona-Santiago, Ecuador (XC257839: J. V. Moore). I. Carpish Tunnel, Huánuco, Peru (XC223877: P. Boesman). J. Cotapata, La Paz, Bolivia (XC73616: J. Tobias & N. Seddon).

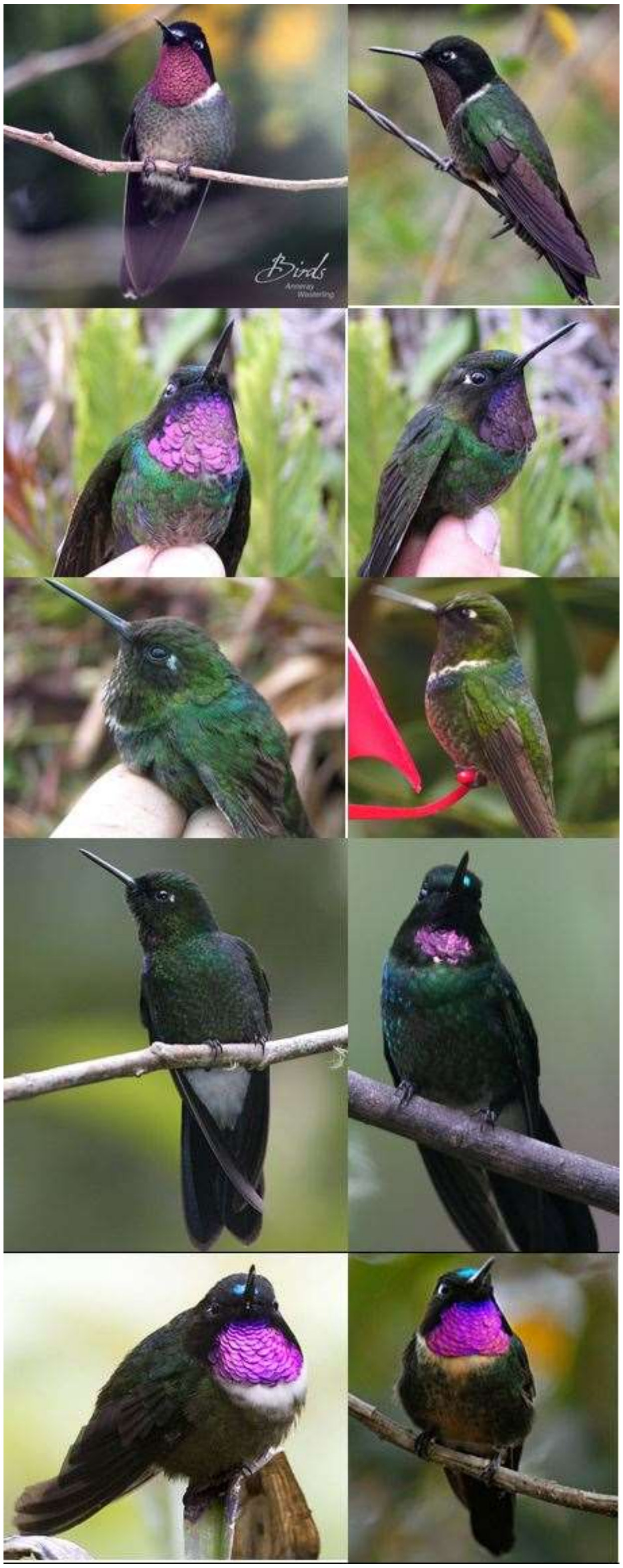

Figure 4. *Heliangelus* Sunangels. Top row: Merida Sunangel *H. spencei* Mérida, Venezuela (A. Westerling / anneray-birdsite.com) (both). Second row: Longuemare's Sunangel *H. clarisse*, males, Filo Pamplona, Serranía de los Yariguies, Santander, Colombia (B. Huertas / T. Donegan / J. Avendaño / Proyecto YARE, July 2006) (both). Third row: Longuemare's Sunangel *H. clarisse* females. Left: Lepipuerto, Serranía de los Yariguíes, Santander, Colombia (B. Huertas / T. Donegan / Colombian EBA Project, January 2005). Right: main East Andes, Colombia (O. Cortés). Fourth row: Tourmaline Sunangel *H. exortis* Guango Lodge, Ecuador (W. Hull, 8 January 2006) (both). Bottom row: Amethystine Sunangel *H. amethystisollis* group. Left: subsp. *laticlavius*, Tapichalaca, Ecuador (L. Hegedus, November 2007). Right: subsp. *apurimacensis*?, ACA's Wayqecha Biological Station, Kosnipata Valley, Cusco, Peru.

A most intriguing finding was the similarity between calls of *H. exortis* and *H. amethysticollis laticlavius*. These two taxa differ markedly in plumage (e.g. extent and coloration of gorget, presence/absence of white below the gorget in males and the presence/absence of a clean white vent). No intergradation or hybridisation has to our knowledge previously been reported.

In conclusion, we would minimally endorse recognising both *clarisse* and *spencei* as species separate from *amethysticollis*, given that they are vocally and morphologically so distinct from all the others. This results in the following new sequence:

- [Merida Sunangel *H. spencei* – extralimital]
- Longuemare's Sunangel *H. clarisse* (provisionally including *violiceps* and *verdiscutus*)
- Tourmaline Sunangel *H. exortis*.
- [Amethystine Sunangel *H. amethysticollis* (provisionally including *laticlavius*, *apurimacensis* and *decolor*) – extralimital]

With these splits and to avoid confusion with the broader group, we further propose reverting to Gould (1855) and Cory (1918)'s vernacular name, "Amethystine Sunanagel", for *H. amethysticollis*.

Rufous-gaped Hillstar *Urochroa bougeri*
White-tailed Hillstar *U. leucura*

Hillstars *Urochroa* occurring on slopes each side of the Andes (*bougeri* on the western slope and *leucura* on the eastern slope) have radically different plumages and so have been considered a possible split in some publications. Hilty & Brown (1986) considered them "very different". Ridgely & Greenfield (2001) noted that "two very different races occur in Ecuador … In view of their plumage and habitat differences, separate species may be involved; west-slope birds could be called the Rufous-gaped Hillstar". In the west, the species was considered "scarcer and more local" and "largely confined to the vicinity of mountain streams". This is consistent with our observations in the West Andes (e.g. Tambito, RNA Las Tangaras) where it is inevitably found over small mountain streams.

Unlike some other birds discussed here, *Urochroa* hillstars have been broadly lumped throughout taxonomic history, including by Boucard (1893-5), Hartert (1900), Cory (1918), Peters (1945) and more recent publications discussed in the above account for *Heliangelus*.

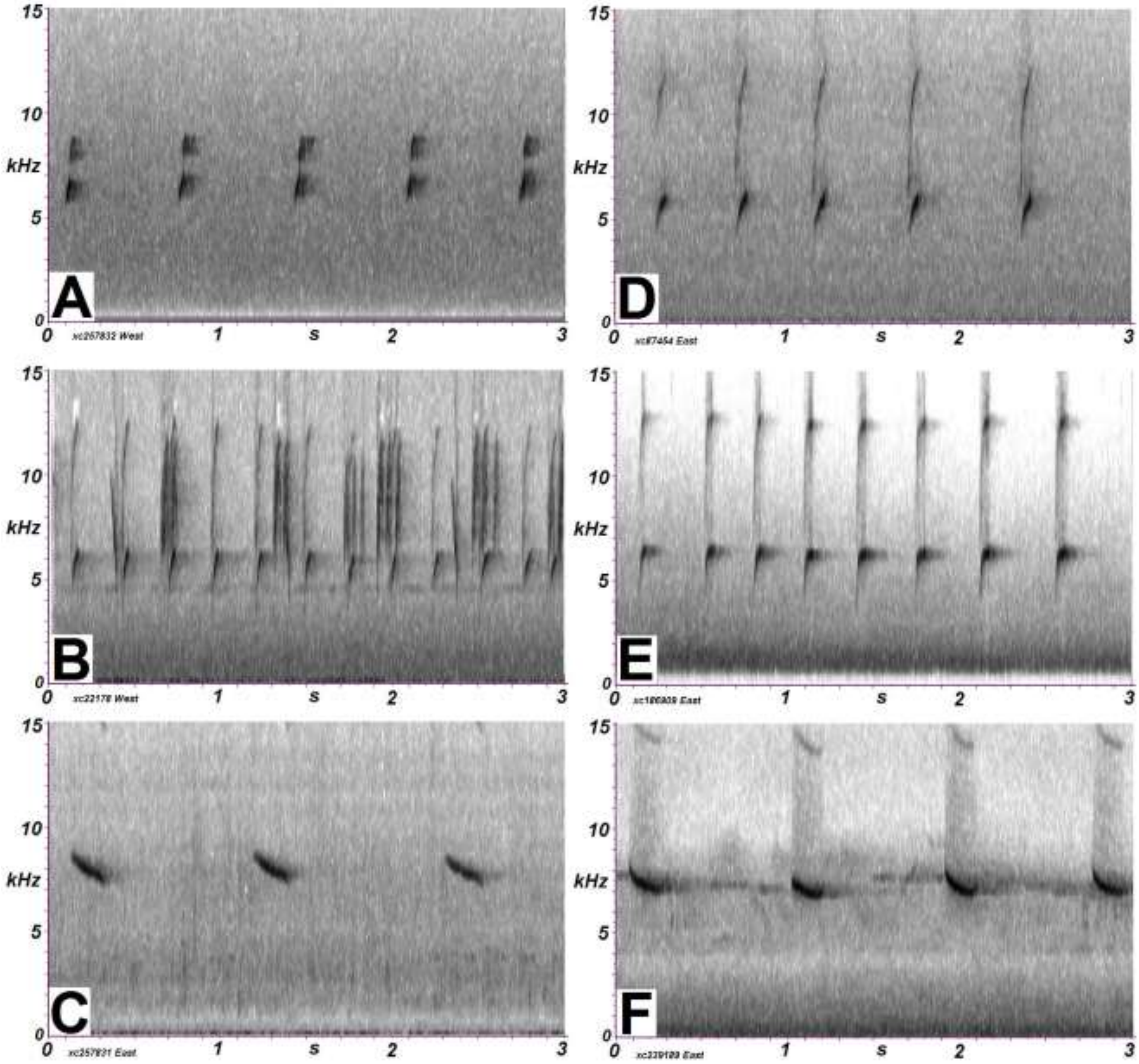

Figure 5B. Calls of the Hillstars. A-C Rufous-gaped Hillstar *Urochroa bougeri*. D-F White-tailed Hillstar *U. leucura* . A. Mindo, Pichincha, Ecuador (XC257832: J. V. Moore). B. road to San José del Palmar, Serranía de las Paraguas, Chocó, Colombia (XC22178: A. Spencer). C. km 11.6, Narupa-Loreto road, Napo, Ecuador (XC257831: J. V. Moore). D. La Guatemala, along the Rio Zuñag, Tungurahua (XC87454: A. Spencer). E. Napo, Ecuador (XC186909: G. Leite). F. km 11.6 Narupa-Loreto road, Napo, Ecuador (XC239189: N. Krabbe).

Del Hoyo & Collar (2014) drew attention to *leucura*'s less extensively rufous gape (3), glittering dark green versus dusky-bronze crown to back (3), bronzy-green versus blue-black central uppertail (2), male breast patch more violet, less deep turquoise blue (ns2) and more extensive white in tail, especially on outermost rectrix (ns2). Studies based on specimens may insufficiently appreciate the differences in tail plumage. The black outer tail feathers in *U. bougeri* make the tail appear dark when perched, compared to a broadly white tail (marked extensively on the four outermost rectrices) in perched *leucura* (Fig. 5).

Figure 5: *Urochroa* Hillstars. Top row: Rufous-gaped Hillstar *Urochroa bougeri*. Bottom row: White-tailed Hillstar *U. leucura*. Top left: RNA Las Tanagaras, Chocó, Colombia (T. Ellery, 30 October 2010). Top right: Montezuma Peak Road, Montezuma Peak, PNN Tatamá, Colombia (C. & M. Perkins / HBW Alive, 11 December 2014). Bottom left: Rio Pucuno, Sumaco, Ecuador (Francis Marion University). Bottom right: WildSumaco, Napo, Ecuador (N. Athanas, 13 June 2012).

The genus *Urochroa* is previously considered monotypic, making comparisons with related sympatric species (as proposed by Helbig *et al.* 2002 and Remsen 2015) tentative. Its closest relations are to *Heliodoxa* (McGuire *et al.* 2014), a genus with various sympatric or allopatric populations ranked as species, which differ principally in gorget coloration and tail shapes and lengths. The morphological differences between *Urochroa* compare favorably to those between recognised species in *Heliodoxa*, as illustrated by del Hoyo & Collar (2014, p. 285).

We reviewed vocalisations of both *Urochroa* populations based on materials in the Macaulay Library and xeno-canto. Sonograms were produced of all recordings and these were compared subjectively. Both western and eastern populations give at least one similar call, consisting of repeated upstrokes (Fig. 5B). Variation within populations exceeds that between populations in both acoustic frequency and speed for this kind of vocalisation. However, there are some small differences in note shape evident from the small sample (n=3 for each population). In western populations, notes appear more as straight lines on sonograms, while in eastern populations birds show a blob at the end of the note, where the call is loudest, reflecting accentuation of the end of the call. Eastern populations also give slower downstrokes as calls. There were no representatives of this kind of call in our vocal sample for western populations. In light of the combination of plumage, habitat and tentative vocal differences, we support splitting these two hummingbirds.

Humboldt's Sapphire *Amazilia humboldtii*
Gray's Sapphire *A. grayi*

Ridgely & Greenfield (2001) reverted to the taxonomy of earlier authors (e.g. Bourcier & Mulsant 1852, Gould 1861, Boucard 1893-5, Hartert 1900, Cory 1918) in treating *A. humboldtii* as "a monotypic species distinct from *H grayi* based on a number of striking plumage differences in both sexes, and on their entirely disjunct distributions and different habitats". *A. humboldtii* occurs near the Pacific coast of Colombia and Ecuador in humid habitats and low elevations, whilst *A. grayi* is present at higher elevations in the arid upper Cauca valley. Peters (1945) had lumped these "seemingly for no reason … influenced by … range confusion that resulted from native-collected skins with unreliable locality data" (Ridgely & Greenfield 2001). (Experts on the spellings of scientific names should consider further whether "*humboldti*" or "*humboldtii*" is the correct spelling for these birds, given that both forms appear in the literature cited above.)

There are significant differences in habitat use between these populations. Hilty & Brown (1986) first noted that *humboldtii* occurs "mainly near coast in humid forest borders, tall second growth and mangroves" with (presumably) *grayi* "in drier interior val. in scrubby or cultivated areas and lighter woodland borders". They cited "fewer" records from wet foothills and mountains in between. Ridgely & Greenfield (2001) later asserted that: "There is no evidence that the two come into contact." Stiles (2003) considered them to be separated vertically by 600 m of habitat that is unsuitable for either taxon. In Ecuador, *A. grayi* is found in "arid scrub and gardens", *humboldtii* in "mangroves along the coast" (Ridgely & Greenfield 2001) and may only wander into

Figure 6. Sapphires. Left: Gray's Sapphire *Amazilia grayi* male, km 18, Valle del Cauca, Colombia (D. Calderón-F. www.colombiabirding.com). Middle and right: Humboldt's Sapphire *Amazilia humboldtii* near-adult male (middle) and female (right) Chocó, Colombia (T. Ellery, September 2014).

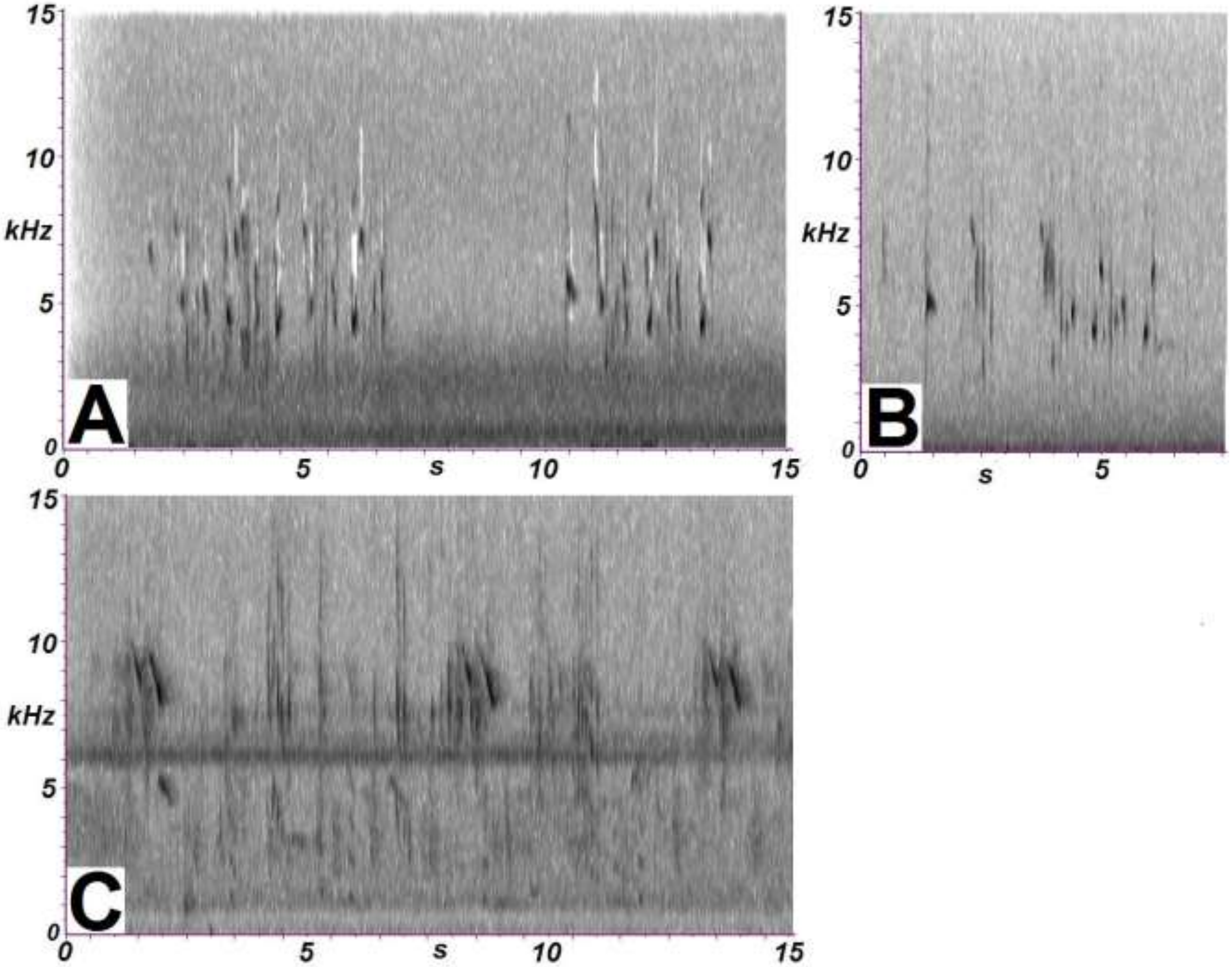

Figure 7. Songs of Sapphires. A-B: Gray's Sapphire *Amazilia grayi*. C: Humboldt's Sapphire *A. humboldtii*. A. Salinas, Imbabura, Ecuador (XC262877: J. Nilsson). B. 13 km N of Salinas, Imbabura, Ecuador (XC250992: N. Krabbe). C. La Pampa, near Cayapas-Mataje Ecological Reserve, Esmeraldas, Ecuador (XC261731: O. Jahn).

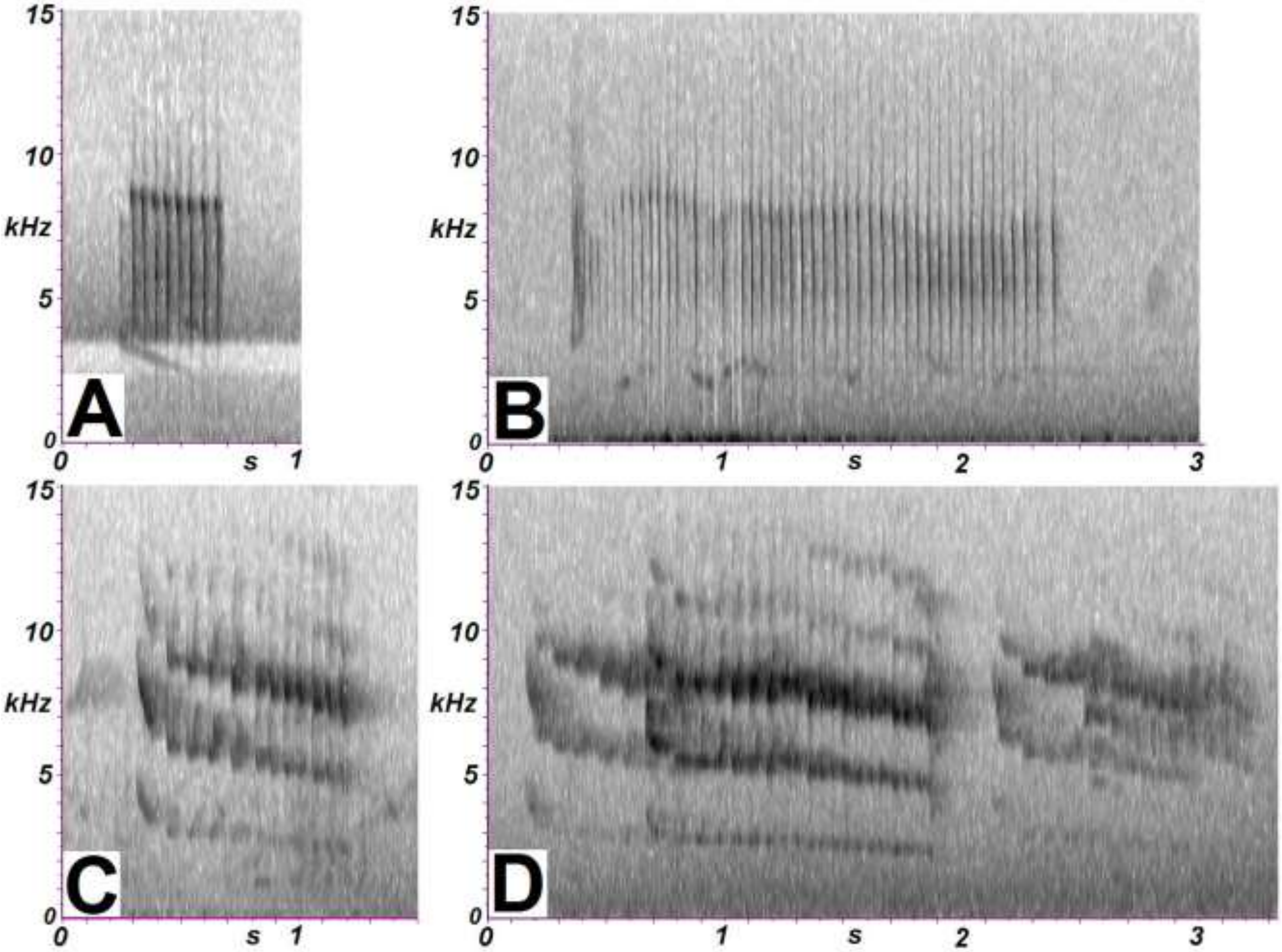

Figure 8. Calls of Sapphires. A-B: Gray's Sapphire *Amazilia grayi*. C-D: Humboldt's Sapphire *A. humboldtii*. A. 2.5 km NE of Tumbabiro, Imbabura, Ecuador (XC24465: P. Coopmans). B. 13 km N of Salinas, Imbabura, Ecuador (XC250991: N. Krabbe). C. Changuaral, Esmeraldas, Ecuador (XC165644: J. Nilsson). D. Idem (XC165642).

other habitats seasonally. Stiles (2003) studied plumage, morphometrics and habitats, concluding that the two forms should be split.

These taxa are already widely split, for example by: Rodner *et al.* (2000), Ridgely & Greenfield (2001), Salaman *et al.* (2001), Stiles (2003), Restall *et al.* (2006), McMullan *et al.* (2010, 2011), McMullan & Navarrete (2013), McMullan & Donegan (2014), Dickinson & Remsen (2013), Fogden *et al.* (2014), Gill & Donsker (2015), Remsen *et al*. (2015) and now del Hoyo & Collar (2014). They were lumped by Dunning (1987), Fjeldsa & Krabbe (1990), Schuchmann (1999), Dickinson (2003) and Erize *et al.* (2006), among others.

Del Hoyo & Collar (2014) focus again on plumage differences in revising Schuchmann (1999)'s lumped taxonomy. *A. grayi* differs from *A. humboldtii* in its green versus blue tail (3), near-diagnosably shorter bill (2), average longer wings and tail (1), extent of blue on head and throat (3) and whiter, less spotted underparts of the female (2). Differences in tail coloration are noteworthy because other *Amazilia* species, such as Copper-rumped Hummingbird *A. tobaci* and Copper-tailed Hummingbird *A. cupreicauda* differ principally in this feature and are arguably less distinct from one another. The scores greatly exceed the benchmark of 7 for species rank. Plumage differences are illustrated in Figure 6.

To our knowledge, no-one has examined voice in this group, probably because few sound recordings existed until recently. Comparisons of most-homologous-looking vocalisations reveal considerable vocal differentation. Songs of both species consist of a jumbled series of notes, which in *humboldtii* are longer and slower-delivered (Fig. 7). The trilling calls of *humboldtii* (n=2) are slower than those of *grayi* (n=2), with several undertones visible on sonograms and a different note shape (Fig. 8).

This combination of vocal, habitat and plumages differences in our view provides a strong rationale for continued recognition of two separate species, consistent with Ridgely & Greenfield (2001), Stiles (2003), del Hoyo & Collar (2014) and our current treatment.

Golden-bellied Starfrontlet *Coeligena bonapartei*
Perija Starfrontlet *Coeligena consita*
Golden Starfrontlet *Coeligena eos*

Subspecies *eos* of the Mérida range in Venezuela was split by Schuchmann (1999). Del Hoyo & Collar (2014) followed and also split *consita* of the Perijá mountains.

Figure 9. Starfrontlets. Top left: male Merida Starfrontlet *C. eos* Mérida, Venezuela (T. Ellery, Feb/March 2014). Top right: male Merida Starfrontlet *C. eos* Finca la Huérfana, El Cobre, Táchira, Venezuela (T. Noernberg / Internet Bird Collection). Middle left and right: male Perija Starfrontlet *C. consita* RNA Chamicero de Perija, Cesar, Colombia (J. Beck & K. Borgmann / birdsofpassage.wordpress.com, 27 April 2015). Bottom left and middle: male Golden-bellied Starfrontlet *C. bonapartei* Filo Pamplona, Serranía de los Yariguíes, Santander, Colombia (B. Huertas / T. Donegan / J. Avendaño / Proyecto YARE, July 2005). Bottom right: male Blue-throated Starfrontlet *C. helianthea* East Andes, Colombia (T. Ellery, July 2014).

C. bonapartei and *C. eos* were previously treated as separate species by Cory (1918) and Peters (1945), prior to *consita* being described. However, Wetmore & Phelps (1952), when describing *eos*, lumped all three forms. They highlighted the intermediate nature of *consita* in some aspects of its plumage as regards the other two. This was followed by Meyer de Schauensee (1964, 1966, 1970), Meyer de Schauensee & Phelps (1978), Hilty & Brown (1986), Dunning (1987), Fjelsdå & Krabbe (1990), Rodner *et al*. (2000), Salaman *et al.* (2001, 2008b, 2009, 2010), Krabbe *et al.* (2005), Restall *et al.* (2006), Erize *et al.* (2006), McMullan *et al.* (2010, 2011), McMullan & Donegan (2014), Fogden *et al.* (2014), Gill & Donsker (2015), Remsen *et al.* (2015) and Lopez *et al*. (2015), among others. Hilty (2003) accepted Schuchmann (1999)'s split of *eos* but placed *consita* in the same species with *bonapartei*.

Del Hoyo & Collar (2014) cite the following differences of *consita* from *bonapartei*: strong rufous band on wing [=proximate flight feathers: see Fig. 9] versus all-dusky wing (3), smaller and deeper blue central throat patch (2), brighter, more golden tail and underparts with rufescent discs on lower breast (ns2), pale leaf-green not full metallic green cap in male (ns2), bright orange versus white spot behind eye in female (2). And from *eos*: slightly longer bill (1), golden-green versus bronze-green-tipped pale rufous tail (3), smaller, bluer, less violet central throat patch in male (2), bright orange versus white spot behind eye in female (2), rufous-orange chin and throat versus cinnamon chin and throat with green discs in female (ns2), underparts more golden, less rufous so that eos looks darker on body but paler on tail than consita (ns1).

Remsen *et al.* (2015) rejected Schuchmann (1999)'s proposed split of *eos*, on the basis of Wetmore & Phelps (1952) because "intraspecific variation in several other undoubted species of *Coeligena* (*iris, torquata, violifer*) equals or exceeds that within a broad *bonapartei*". They also cited a lack of available specimens or collecting effort between the ranges of *consita* and *bonapartei*. However, it could instead be argued that *Coeligena* has historically been over-lumped. These particular *Coeligena* are high elevation species found only in elfin forest and paramo/forest ecotones. In studies of Serrania de los Yariguíes, mist-netting at multiple high elevation sites in primary habitats produced records of *bonapartei* only above 3,100 m elevation (Donegan *et al.* 2010b). In the Bogotá region, where elfin forests are found at lower elevations on slopes with regrowth scrub habitat, all modern sound recordings of this species in xeno-canto are above 2,500 m. Hilty & Brown (1986) specified a minimum elevation of 2,150 m. The separate ranges of *consita* and *bonapartei* in northern Colombia are bisected by the Ocaña depression (minimum elevation, *c*.1,200 m) which results in at least 150 km distance between land of suitable elevations. This barrier divides the range of several high elevation taxa which are recognised as species and co-occur with *Coeligena* in the same paramo ecotone, elfin forest and human-modified montane scrub habitats, such as Perija Tapaculo *Scytalopus perijanus* versus Pale-bellied Tapaculo *S. griseicollis* and Perija Thistletail *Asthenes perijana* versus White-chinned Thistletail *A. fuliginosa*. The comparators of Violet-fronted Starfrontlet *C. violifer* and Collared Inca *C. torquata* are less strongly-argued because these are allopatric populations which del Hoyo & Collar (2014) also split. An unfavorable comparison with the morphologically diverse Rainbow Starfrontlet *C. iris* is noteworthy, but del Hoyo & Collar (2014) considered that group potentially to be in need of revision. A favorable comparison with differences between the nominate form of *bonapartei* and sympatric Blue-throated Sunangel *C. helianthea* (Fig. 9) can be made in support of this proposed split.

Vocal data are not available for several populations discussed here and *Coeligena* are not renowned songsters, as noted below for *C. torquata*. A molecular study is apparently in preparation, which should shed further light on this group. It promises to show "a complex evolutionary history of rapid divergence" (López *et al*. 2015). In the meantime, on account of plumage (Fig. 9) and distributions and taking into account our generally favorable assessments of other Trochilidae splits proposed by del Hoyo & Collar (2014), we provisionally accept this split. This could of course be reconsidered if necessary following the forthcoming molecular study.

Green Inca *Coeligena conradii*
Collared Inca *C. torquata*

Collared Inca is widespread in the Andes, with Green Inca restricted to the Venezuelan Andes and Tamá of Colombia. They are universally lumped in the literature cited for *C. bonapartei*, representing a novel modern split by del Hoyo & Collar (2014). They were however split from the time of *conradi*'s description by Bourcier (1847), Elliot (1879), Salvin (1892) and Cory (1918), among others. Peters (1945) lumped them and has been widely followed since. Cory (1918) placed Tamá specimens in *torquata*, but brilliant green birds referable to the Green Inca occur there, including in Colombia (Hilty & Brown 1986, Sanchez-Montaño *et al*. 2004). Green Inca males look superficially similar to female Collared Incas, having green not black overall plumage (4), lacking a bluish crown spot (2) and outer primaries edged rufous (1). Female Green Incas have a rufous throat (2). Del Hoyo & Collar (2014) also recognised Gould's Inca *C. inca* of Peru to Bolivia (previously recognised by Schuchmann 1999) and Vilcabamba Inca *C. eisenmanni* of Peru specifically. The split of Gould's Inca has some molecular support (McGuire *et al*. 2014).

Despite being a widespread and familiar hummingbirds of montane Andean forest, there are few sound recordings of these Incas available. They do not appear to vocalise frequently. In light of this, the strong morphological differentiation and positive assessments of other hummingbird taxonomic proposals in del Hoyo & Collar (2014), we adopt their new taxonomy here too. The males of the two proposed species are quite different (Fig. 10).

Figure 10. Incas of the East and Venezuelan Andes. Left: male Collared Inca *Coeligena torquata* Lepipuerto, Serranía de los Yariguíes, Santander, Colombia (B. Huertas / T. Donegan / Colombian EBA Project, January 2005). Right: male Green Inca *C. conradii* Estancia La Bravera, El Jají, Mérida, Venezuela (M. Wieser / Internet Bird Collection, 6 May 2013).

Russet-throated Puffbird *Hypnelus ruficollis*
Double-banded Puffbird *Hypnelus bicinctus*

Historically, these taxa were split, including by Sclater (1882), von Berlepsch & Hartert (1902), Cory (1919), Ridgway (1914), Wetmore (1939) and Peters (1948). Since Phelps & Phelps (1958) recommended an end to that, lumped treatments have prevailed: see Meyer de Schauensee (1964, 1966, 1970), Hilty & Brown (1986), Sibley & Monroe (1990), Rodner *et al.* (2000), Salaman *et al.* (2001, 2008b, 2009, 2010), Dickinson (2003), Hilty (2003), Erize *et al.* (2006), McMullan *et al.* (2010, 2011), Dickinson & Remsen (2013) and Remsen *et al.* (2015). McMullan & Donegan (2014) considered that "more than one species likely involved but they are universally lumped". Hilty & Brown (1986) and Hilty (2003) asserted that the two forms "hybridize" in the Maracaibo basin and Catatumbo lowlands of Colombia, presumably based on Phelps & Phelps (1958). The latter authors described a new subspecies *striaticollis* from the coast to the East of Maracaibo (Quisiro, Zulia to Debajuro, Falcón). A modern example from this population is shown in Figure 13. They considered that "This local race, with the incipient black band across the lower throat, is intermediate between the one-banded form *H. ruficollis* and the Double-banded form *H. bicinctus*. The only difference between the two is the lack of the second band in *ruficollis*. Their ranges do not overlap. We have in our collection a male specimen of *bicinctus* from Ciudad Bolivar, very far removed from the range of *ruficollis*, which is similar to the type of the new *striaticollis*, with the same incipient throat band, lined instead of solid black. These specimens indicate that the hitherto so-called species are conspecific, *bicinctus* being a subspecies of *ruficollis*."

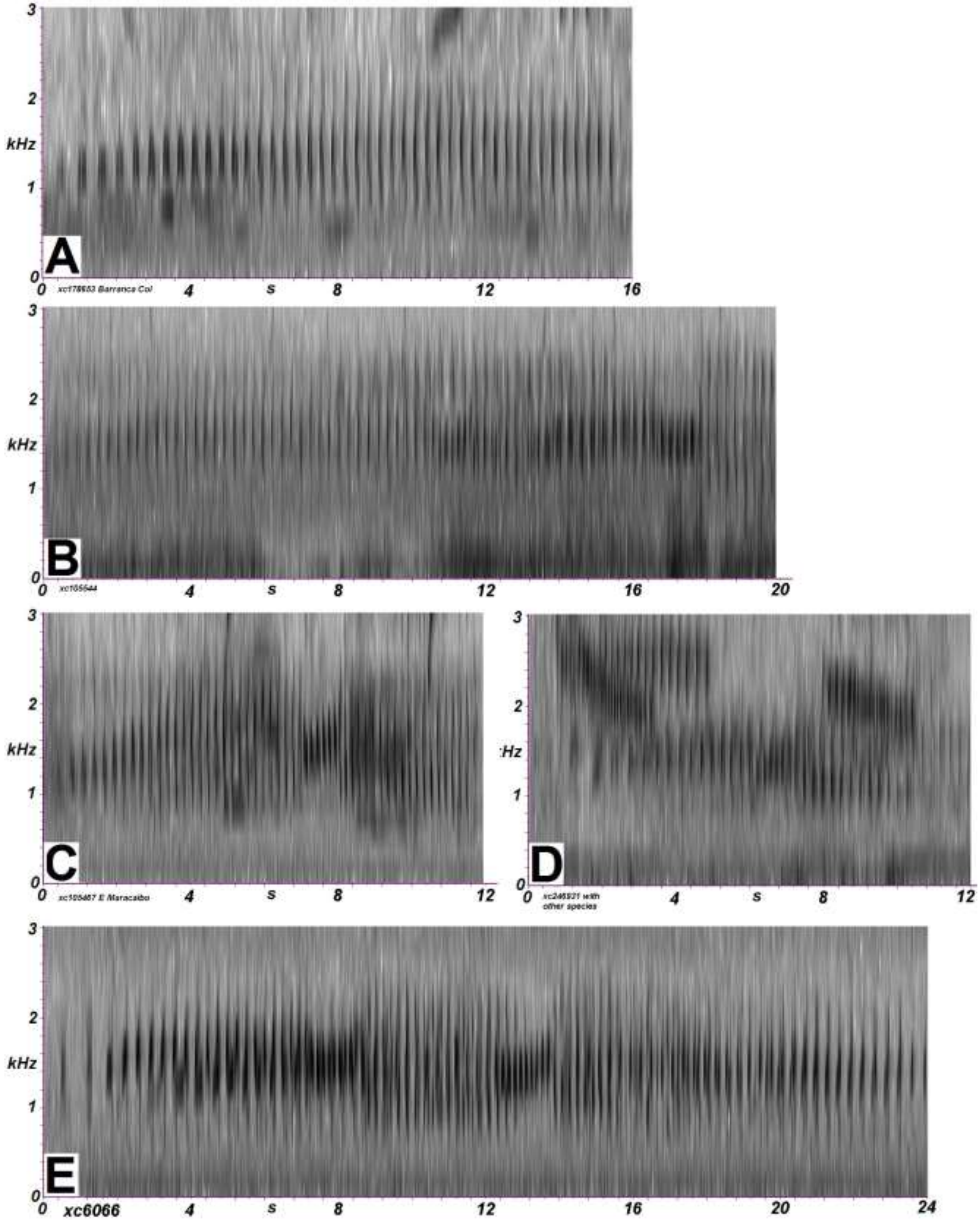

Figure 11. Puffbird songs and duets. A-C: Rufous-throated Puffbird *H. ruficollis*. D-E: Double-banded Puffbird *H. bicinctus*. A. Betulia, Santander, Colombia (XC178653: O. Cortés). B. Bachaquero, Venezuela (XC105544: A. Lastukhin, starting as a single note repeated call, illustrated as a close-up in Figure 12). C. *Idem* (XC105467). D. Los Llanos, Apure, Venezuela (XC246931: J. Klaiber). E. Hato Masaguaral, 54 km S of Calabozo, Aragua (XC6066: C. Parrish).

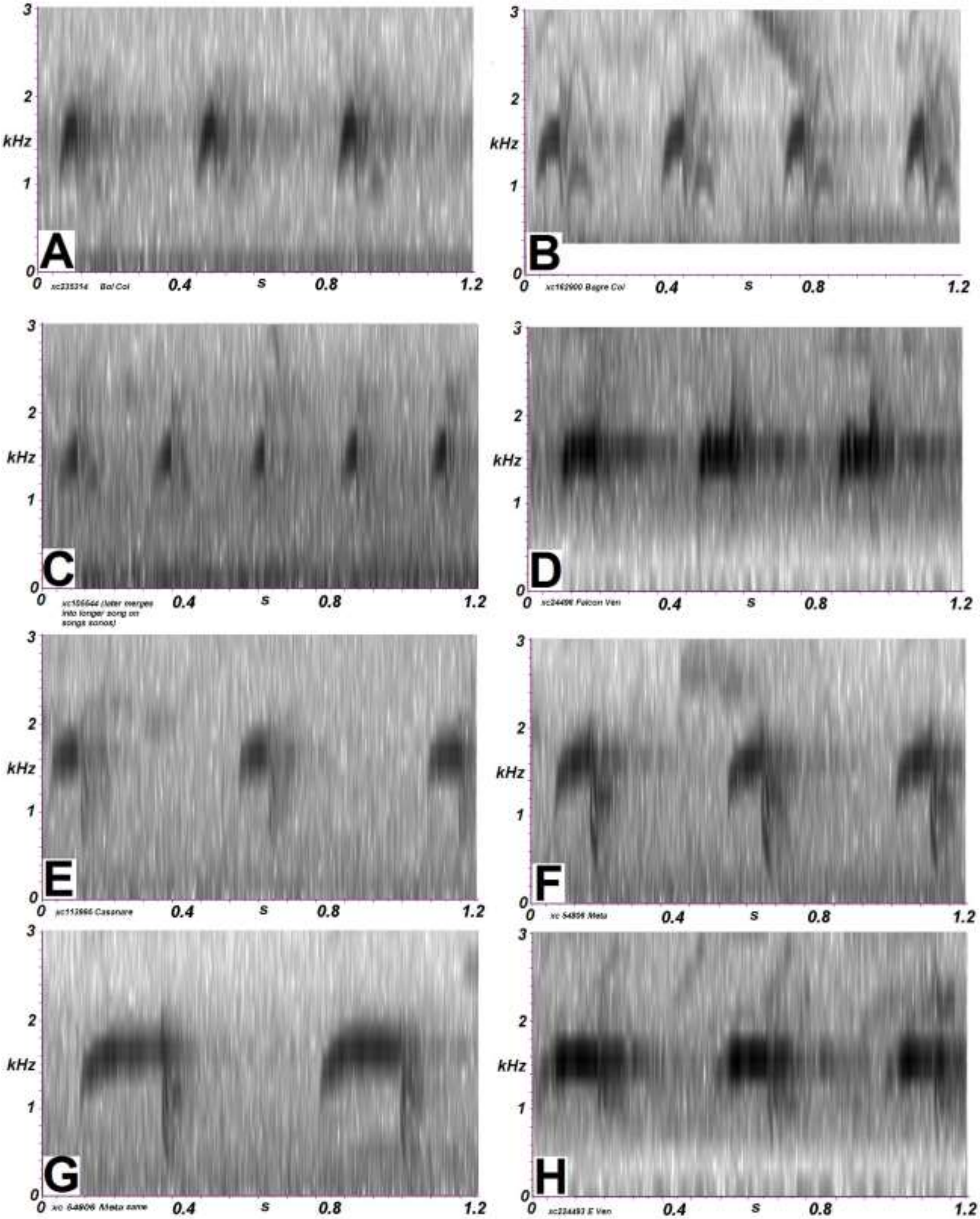

Figure 12. Puffbird repeated single note call extracts. A-C: Rufous-throated Puffbird *H. ruficollis*. D-H: Double-banded Puffbird *H. bicinctus*. A. San Juan Nepomuceno, Bolívar (XC234314: J.S. León-Lleras). B. El Bagre, Antioquia, Colombia (XC162900: J. A. Arango-Bermúdez). C. Bachaquero, Venezuela (XC105544: A. Lastukhin, extract of start of Figure 11B, before the call is followed by a song). D. La Misión Limestone hills, Falcón, Venezuela (XC224496: P. Boesman). E. vereda El Delirio, Orocue, Casanare, Colombia (XC113995: S. Chaparro Herrera). F. Finca La Pradera, Parroquia Remolinos, Municipio Puerto López, Meta (XC54806: B. López-Lanús). G. *Idem*, extract of longer notes in same recording. H. Villa Lola area, Bolivar, Venezuela (XC224493: P. Boesman).

Figure 13. Puffbirds *Hypnelus*. Top row: Russet-throated Puffbird *H. ruficollis*. Bottom row: Double-banded Puffbird *H. bicinctus*. Above left: Armero, Tolima, Colombia (A. Quevedo, 14 November 2008). Above middle: Bahia Concha, Santa Marta, Colombia (A. Quevedo, 12 September 2007). Above right: near Santa Marta, Colombia (A. Quevedo, 8 January 2009). Below left: Puerto Gaitan, Meta (O. Cortés 31 September 2013). Below middle: Russet-throated Puffbird *Hypnelus "ruficollis" (=bicinctus) striaticollis* 20km south of Coro, Falcón state (N. Athanas, 7 August 2006). Below right: Cotumbo north of Maracay, Venezuela (N. Athanas).

Table 1: vocal data for *Hypnelus* calls

Taxon / Variable	**Call length (s)**	**Number of notes -1**	**Speed (notes/s)**	**Length of fourth note (s)**	**Max. acoustic frequency of fourth note (kHz)**
ruficollis group	11.19 ± 3.25 (6.56-16.34) (*n*=6)	36.67 ± 11.71 (20 - 53) (*n*=6)	3.27 ± 0.41 (2.97 – 4.07) (*n*=6)	0.07 ± 0.02 (0.05 – 0.09) (*n*=6)	1.81 ± 0.17 (1.49 – 1.97) (*n*=6)
bicinctus group	18.40 ± 14.62 (2.44-63.48) (*n*=15)	42.07 ± 28.34 (6 - 125) (*n*=15)	2.40 ± 0.38 (1.77 – 3.01) (*n*=15)	0.23 ± 0.06 (0.13 – 0.33) (*n*=14)	1.84 ± 0.12 (1.63 – 2.00) (*n*=14)
Diagnosability	N/A	N/A	Level 1 (p<0.009).	Levels 1 (p<1x10^{-7}), 2, 4. See note.	N/A

Note: [Levels 3 and 5 each narrowly missed by a difference between means of c.0.02kHz.]

Rasmussen & Collar (2002) doubted this interpretation, considering *bicinctus* a separate species from *H. ruficollis*. They reported any hybridisation to be unusual and not indicative of free interbreeding. Restall *et al.* (2006) treated *ruficollis* as: "Separated from Two-banded Puffbird in R&C on basis of morphological, plumage and vocal differences, with which we completely agree. Supposed intermediates between them were found to be juvenile and immatures of Two-banded Puffbird (Restall & Lentino in prep.)." Gill & Donsker (2015) and del Hoyo & Collar (2014) also now split these. (Restall *et al.* (2006) further drew attention to a "Rufous-throated group" comprising subspp. *coloratus* and *ruficollis* (smaller with proportionately heavier bill) and a "Paler group" of *decolor* and *striaticollis*. However, the ranges of some of these groups overlap, suggesting that variation may be individual or involve a "Gloger's Rule" pattern of paler birds in dryer habitats.)

We analysed sound recordings of the *ruficollis* and *bicinctus* groups (subject to a range adjustment discussed below) to consider possible vocal support for the proposed split. We found two main kinds of vocalisations for both populations, one in which repeated notes varied a little in volume, frequency and length over time, but which were relatively constant in note shape ("repeated notes": Fig. 12). This is often given in duet, particularly in western populations, with a second individual (female?) vocalising at lower frequencies immediately after the first individual (male?). Other vocalisations are more complex, also often given as a duet, but with notes of several different shapes given in sequences (Fig. 11).

We analysed calls statistically after measuring various vocal variables. The vocal sample included individuals from across the range of the two groups, including in northern Venezuela fairly close to the area east of Maracaibo where they separate. Only one vocalisation was analysed per recording. For calls, we measured number of notes (minus 1), call length (from the start of the call to the start of the last note) and speed (number of notes divided by length). The fourth note of the call was then measured for length and maximum acoustic frequency. Any "tails" of noise at the start or end of the fourth note were excluded for purposes of measuring frequency. When two birds vocalised in closely-coordinated duets, only the first vocalising individual's note was measured. The fourth note was chosen because some earlier notes can have unusual shapes or be of low volume and a note relatively close to the start of the call, which *bicinctus* delivers more slowly, seemed likely to elucidate differentiation. These data were subjected to statistical tests of diagnosability discussed in Donegan (2013).

Songs were not measured because a more complicated scheme for analysing these would need to be devised and the sample size for western populations was lower (*n*=4). This kind of vocalisation seemed to vary considerably within populations and included faster elements in both populations.

Vocal data is presented in Table 1. For calls, the fourth note of the Russet-throated group (<0.09s) was consistently shorter than in the Double-banded group (>0.13s). Statistically significant differences were found in this variable and there was no overlap in measurements. Despite the small sample size and resultant high student-*t* values, the "gold" standard (Level 5) test of diagnosability was missed only narrowly (0.02s of difference between means). Further studies might ascertain diagnosability by this standard with a greater sample or by considering measurements of different notes' lengths (e.g. 2nd, 3rd, 5th or 6th notes). Separately, song speed showed statistically significant differentiation with only a tiny overlap. We found calls of Russet-throated to have a different, more chevronned note shape, particularly comparing notes at the start of vocalisations. This results in calls being sharper-sounding, more like an *Aulacorhynhus* Toucanet than the Sandpiper-like calls of Eastern populations. The speed and note length data together show Double-banded recordings to have longer and slower-delivered notes in their calls, a difference which is particularly notable at the start.

Differences in calls are consistent east to the easternmost part of the range of Russet-throated group (east bank of the Maracaibo basin) and the westernmost part of the range of Double-banded group (in Falcón, Venezuela). Vocal differences are also consistent either side of the East Andes in Colombia, where *Hypnelus* are low elevation, dry habitat specialists that do not occur in the cooler and more humid Andes. There is no evidence of hybridisation in photographs on HBW Alive, including from relatively nearby locations in north-western Venezuela (in stark contrast with the situation involving many Ramphastidae, as discussed below). If there is a hybrid zone, we concur that it must be narrow and does not seem to prevent these two well-defined groups from persisting or vocalising differently (Rasmussen & Collar 2002).

A recent photograph of a live individual showing all features of subspecies *striaticollis* from close to the type locality shows the double banded pattern (which may not be so evident in specimens) and dark face side (Fig. 13) characteristic of the *bicinctus* group. Moreover, per Phelps & Phelps (1958), this supposed subspecies is very similar to some specimens collected further East, which are clearly of the *bicinctus* group. Del Hoyo & Collar (2014) did not recognise supposed intermediate subspecies *striaticollis* as a valid subspecies but (like all other authors) placed it in synonymy with other subspecies in the *ruficollis* group. Subspecies *striaticollis* (if it is valid) would in our view be better placed in the *bicinctus* group (*stat. nov.*). The reported distributions of the two split species should be reset accordingly.

The plumage differences between the two proposed split populations are quite striking, as has so often been remarked upon in the literature cited above. *Hypnelus* is previously regarded as monotypic, so no examples of similar congeners can be compared. The plumage differences here do, however, compare favorably to those between demonstrably good puffbird species, such as White-whiskered Puffbird *Malacoptila panamensis* and Moustached Puffbird *M. mystacalis*, which replace one another by elevation in the Colombian Andes (Hilty & Brown 1986). In light of all the above, we now align ourselves with those who adopt this proposed split.

Sound recordings analysed in vocal study. Russet-throated XC234134, XC162900, XC105544, XC178652, ML69332, ML69333. Double-banded: XC113995, XC54806, XC244890, XC224496, XC204479, XC224493, ML172537, ML6707, ML69324, ML69325, ML69326, ML69327, ML69328, ML69329, ML69330. Other recordings in ML or XC contain only songs or other kinds of vocalisations. ML = Macaulay Library. XC = xeno-canto.org.

Splendid Woodpecker *Campephilus splendens*
Crimon-bellied Woodpecker *C. haematogaster*

These lowland to foothill woodpeckers have their ranges bisected by the high Andes. Rodner *et al.* (2000) noted that they may be separate species, citing "P. Salaman pers. comm.". Ridgely & Greenfield (2001) flagged that: "Two distinctly different races are found in Ecuador … have been considered separate monotypic species … and as they also appear to differ vocally, this treatment may well be correct." Restall *et al.* (2006) thought *splendens* "sometimes" to be considered a separate species. We could find no publication affording it species rank since the 19th century (e.g. Hartert 1898). The two forms seem to have been universally lumped since Ridgway (1914).

Del Hoyo & Collar (2014) drew attention to several novel morphological differences. In the western group, *C. splendens*, the cream moustachial extends down the neck, while in males of *C. haematogaster* it ends at the back of the head (2). The upper breast of *C. haematogaster* is more extensively black (3). *Campephilus splendens* has prominent buffy marks on the flight feathers (3), which are visible in the folded wing. Such markings are much reduced in *C. haematogaster*. *C. splendens* also has a different shade of scarlet on the crown (ns1) and more strongly barred underparts. These differences are illustrated in Figs. 18-19.

Both groups give various vocalisations, namely (i) repeated, high-pitched sharp notes with large gaps between them ("calls": Fig. 14); (ii) slow trills, given when more than one individual is present ("interaction calls": Fig. 15); and (iii) fast, unmusical and harsh rattles ("rattle calls": Fig. 16). Males also engage in drumming by repeatedly striking their bill against tree trunks (Fig. 17). We analysed each of these sounds, finding notable differences between the two proposed species. In our view, when these are considered alongside the morphological differences highlighted by del Hoyo & Collar (2014), the split is well-supported.

Calls (Fig. 14) differ, with *S. splendens* attaining higher maximum acoustic frequencies. In note shape, *C. splendens* calls are invariably comprised of symmetrical up-down strokes, whereas in *C. haematogaster*, note shapes are typically downstroke-shaped and of broader bandwidth. Some Eastern recordings (e.g. Fig. 14E) rarely show up-downstroke note shapes. The two populations at least differ in the frequency with which such shaped notes are used in calls.

Interaction calls have many undertones and overtones in both populations. In available recordings of *C. splendens* (Fig. 15), higher frequency tones (*c*.5-8kHz) are accentuated whilst in *C. haematogaster*, the lower tones at *c*.1-3kHz are strongest. Eastern populations seem to be able to accentuate different overtones in their rattle calls (Fig. 16) so it would be preferable to have a larger sample (currently *n*=3 each) to confirm if this is a real difference for interaction calls.

The most noteworthy differences were in drumming (Fig. 17). Drumming varies between different woodpecker species (e.g. Stark *et al*. 2008) but is little studied in the Neotropics for *Campephilus* (though see Swiston & Mennill 2009). Ridgely & Greenfield (2001) had previously highlighted differences: in the northwest (*splendens*), it "gives a strong double-rap" but, in the east, "drum a fast series of 2-3 loud raps sounding like a machine gun burst". McMullan & Donegan (2014) also elucidated differences in drumming: "6-tap" drum in *haematogaster* versus "2-tap" in *splendens*. Ridgely & Gwynne (1989) referred to a double-drum for western populations. In the west, all drums in our sample were of 2 notes and at faster drum speeds. In the East, drums consisted of more notes (typically 5-6, 3 in one recording) and were slower. Because these noises are produced through mechanical action, note shapes and tone are probably an effect of substrate composition (i.e. size, hardness and hollowness of wooden trunk). However, the number of 'knocks' in a drumming and their speed are more likely to be based on innate characters of the woodpecker population (e.g. neck muscle strength or nature and skull density), which affect their ability rapidly to move the head backwards and forwards for a period of time. In *splendens*, drumming is a sprint but *haematogaster* is more of a long-distance runner.

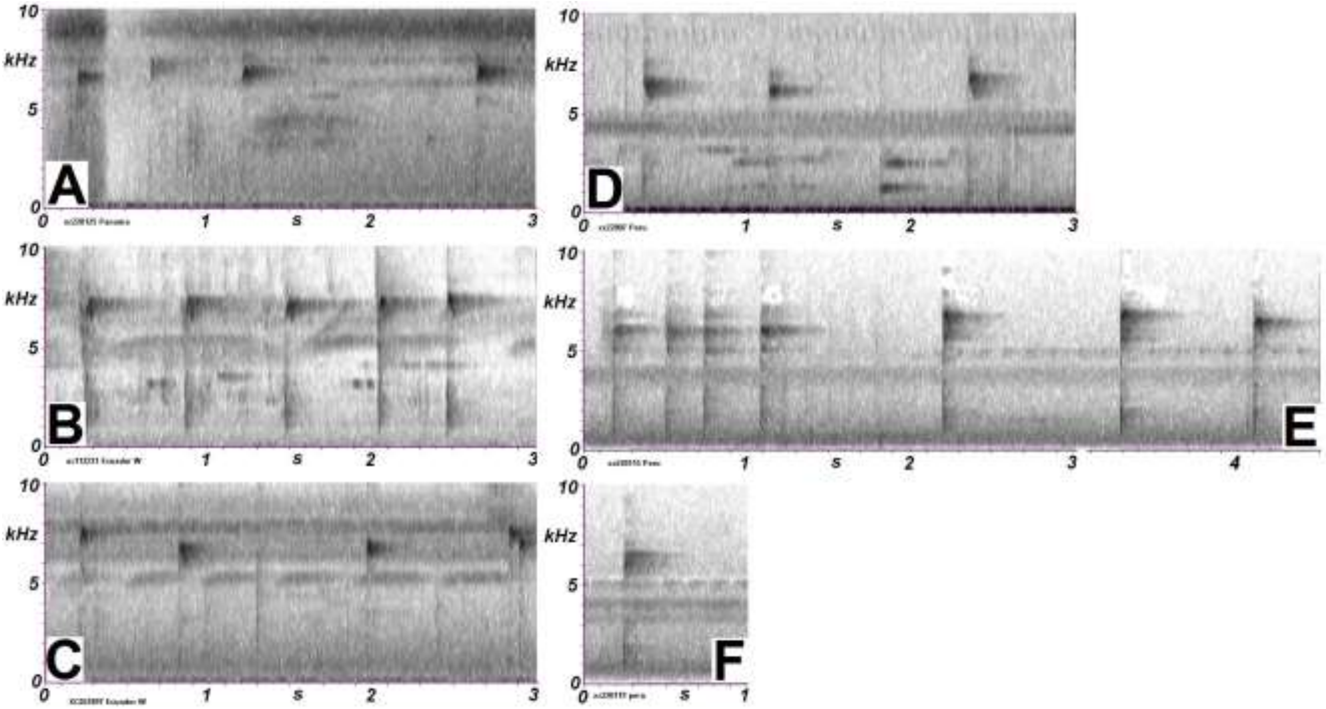

Figure 14. Calls of Crimson-bellied Woodpeckers. A-C: Splendid Woodpecker *C. splendens*. D-F: Crimson-bellied Woodpecker *C. haematogaster*. A. Nusagandi NP, Panama (XC220125: P. Boesman). B. La Union Road, 6.5 km NW of Alto Tambo, Esmeraldas, Ecuador (XC112231: T. Brooks). C. Esmeraldas: Corriente Grande, Río Guaduero, Ecuador (XC261897: O. Jahn). D. Capiri, Marcapata, Cusco, Peru (XC22807: D. Geale). E. Abra Patricia road, San Martín, Peru (XC220115: P. Boesman). F. *Idem* (XC220119).

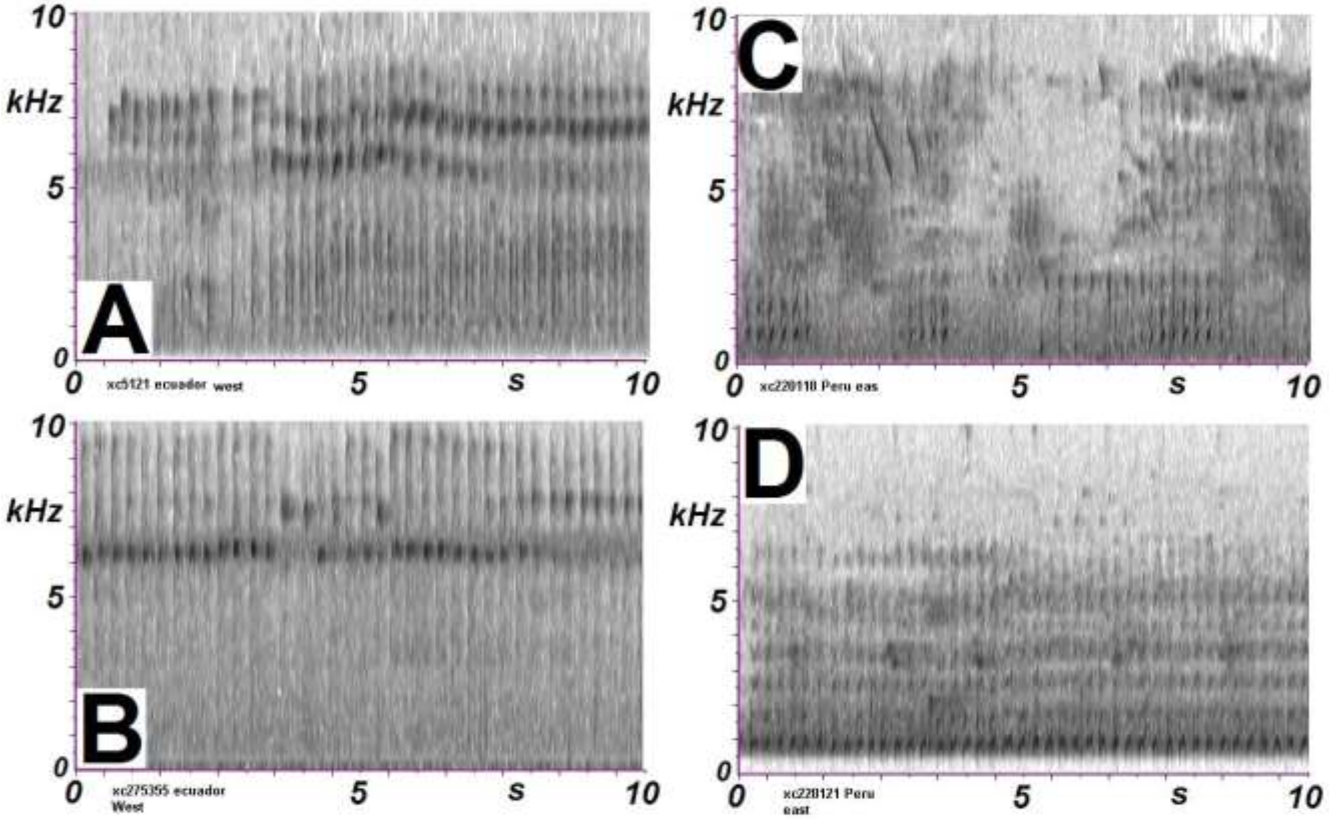

Figure 15. Interaction calls of Crimson-bellied Woodpeckers. A-B: Splendid Woodpecker *C. splendens*. C-D: Crimson-bellied Woodpecker *C. haematogaster*. A. Milpe, Pichincha, Ecuador (XC5121: N. Athanas). B. Esmeraldas: Palma Real, Río Santiago, Ecuador (XC275355: P. M. Valenzuela). C. Villa Rica-Oxapampa road, Pasco, Peru (XC220118: P. Boesman). D. *Idem* (XC220121).

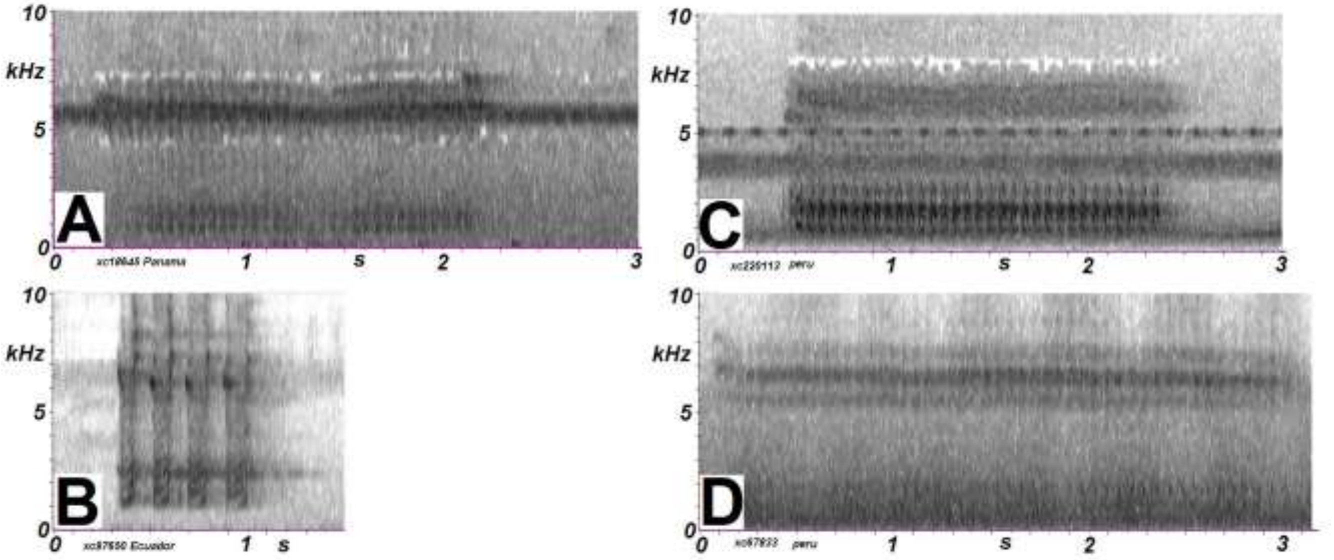

Figure 16. Crimson-bellied Woodpeckers rattle calls: A-B: Splendid Woodpecker *C. splendens*; C-D: Crimson-bellied Woodpecker *C. haematogaster*. A. Burbayar Lodge, Nusagandi, Panama (XC18645: K. Allaire). B. La Union Road, 6.5 km NW of Alto Tambo, Esmeraldas, Ecuador (XC97650: A. Spencer). C. Abra Patricia road, San Martín, Peru (XC220113: P. Boesman). D. Manu Road above San Pedro, Cusco, Peru (XC67833: F. Lambert).

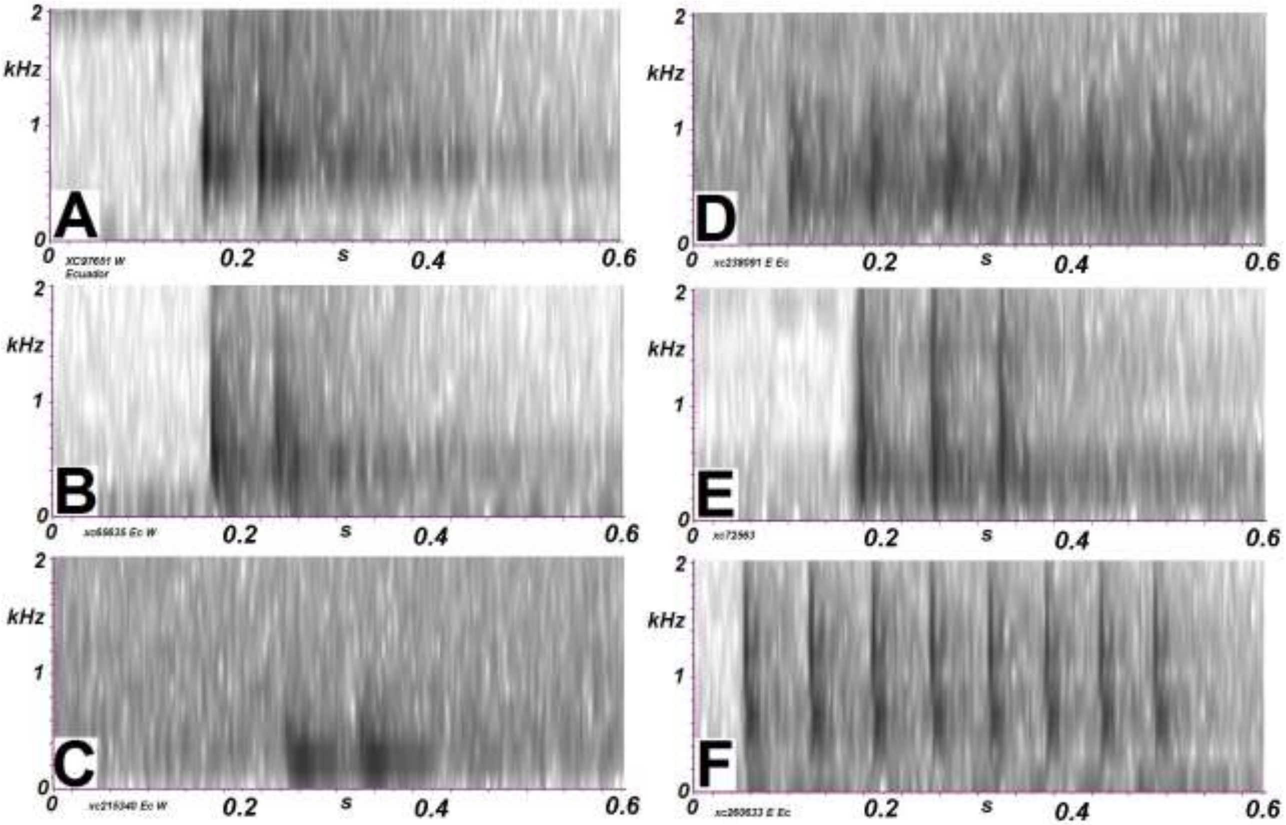

Figure 17. Drumming of Crimson-bellied Woodpeckers: A-C: Splendid Woodpecker *C. splendens*; D-F: Crimson-bellied Woodpecker *C. haematogaster*. A. La Union Road, 6.5 km NW of Alto Tambo, Esmeraldas, Ecuador (XC97651: A. Spencer). B. Rio Silanche, Pedro Vicente Maldonado, Pichincha, Ecuador (XC65635: A. Spencer). C. Un Poco del Chocó, Pichincha, Ecuador (XC215340: J. Fischer). D. West slope of Cordillera de Cutucú, Morona-Santiago, Ecuador (XC238091: N. Krabbe). E. Wildsumaco, 5km NW of Guagua Sumaco, Napo, Ecuador (XC72563: A. Spencer). F. km 35, Narupa-Loreto road, Napo, Ecuador (XC260633: M. Lysinger).

Figure 18. Crimson-bellied Woodpeckers. Left: all of Crimson-bellied Woodpecker *C. haematogaster* Mocoa-Pasto road, Putumayo, Colombia (01°4'44.08"N 76°43'54.73"W) (P. Salaman). Right: all of Splendid Woodpecker *C. splendens* El Bagre, Antioquia, below Serranía de San Lucas (P. Salaman / A. Cuervo / J. M. Ochoa / T. Donegan / Proyecto EBA Colombia, August 1999). Note the more raised crest, reduced eye stripe and marked primaries of *C. splendens*.

Figure 19. Crimson-bellied Woodpeckers. Upper Left and middle left: Crimson-bellied Woodpecker *C. haematogaster*. Right and bottom: Splendid Woodpecker *C. splendens*. Same individuals as in Figure 18.

Rattle calls were variable in the few recordings available, such that it is difficult to draw conclusions as to the existence or nature of any differences (Fig. 16). McMullan & Donegan (2014) referred to a “shorter more relaxed” laughter call of *splendens*, based on the vocalisation in Figure 16B. However, a greater sample is needed to evaluate whether this kind of call is absent in *haematogaster*. Ridgely & Greenfield (2001) considered that, in the east, these birds call "stk! St-kr-r-r-r-r-r-r!" but in the west; "stk!". Del Hoyo & Collar (2014) cited these same vocal differences. This may be a result of comparing non-homologous vocalisations.

Others of del Hoyo & Collar (2014)'s proposed splits in Picidae have been criticised (Remsen 2015). This is a difficult family in which to propose changes to taxonomies solely on the basis of plumage for allopatric populations. Nonetheless, we consider that differentiation in voice, drumming behaviour and morphology discussed here would be unusual for conspecifics in this family and, on balance, much prefer this new arrangement.

We also note that many textbooks, including del Hoyo & Collar (2014), map *splendens* (or western *haematogaster*) as occurring only west to the San Lucas range in northern Colombia. However, it also occurs on the west slope of Serranía de los Yariguíes in Santander (J. Avendaño records in Donegan *et al*. 2010b) and in RNA Pauxi pauxi (Cerro de la Paz, Santander) (T. Ellery, obs.), near the western base of the East Andes.

Common Snipe *Gallinago gallinago*
Wilson's Snipe *Gallinago delicata*
This is a split which we have previously adopted. It was accepted as a taxonomic change, since the relevant account in *Handbook of the Birds of the World* was published, by del Hoyo & Collar (2014).

Vermiculated Screech-Owl *Megascops vermiculatus*
Guatemalan Screech-Owl *M. guatemalae*
This split follows the conclusions of König & Weick (2008) that these two taxa (and other forms such as *napensis* of Eastern Colombia) should be treated as separate species on morphological and vocal grounds. Dantas *et al.* (2015) subsequently published a detailed study of *Megascops*, in which these two taxa were afforded species rank, taking into account their substantial genetic differences and results of previous studies. We follow del Hoyo & Collar (2014) and Dantas *et al*. (2015)'s proposals to split these two taxa as a first step to resolving taxonomy of the group. Colombian populations should all be referred to as Vermiculated Screech-Owl *M. vermiculatus* under this arrangement.

2. Accepted lumps

Carribean Coot *Fulica caribaea*
American Coot *F. americana*
Del Hoyo & Collar (2014) lumped these, considering *caribaea* a morph and not recognising it even as a subspecies. These two widely-recognised species differ from one another principally in coloration of the knob at the top of the frontal shield (Fig. 20), which in *caribaea* is yellow and in *americana* is red. Both morphs are found in the northern Caribbean to Florida, with mixed pairs reported on Cuba, Hispaniola and the Virgin Islands among others (Bond 1961, Roberson & Baptista 1988, Raffaele *et al.* 1998, McNair & Cramer-Burke 2006). Wanderers or examples of *caribaea* morphs can be found in Florida also. Vocalisations are considered identical (Bond 1961).


Figure 20. Colombian Coots *Fulica*. Above: Caribbean Coot *F. americana caribaea* La Guajira, Colombia (P. Salaman / T. Ellery). Below: American Coot *F. a. columbiana* Bogotá, Colombia (O. Cortés, 21 October 2014).

Colombia is unique in supporting populations of all three recognised subspecies. *F. a. americana* is a vagrant to San Andrés island (Donegan & Huertas 2015), *F. a. caribaea* is recently recorded in open marshlands of north Colombia (Ellery 2013) where it is probably a rare resident and *F. a. columbiana* is a localised population of high elevation wetlands in the East Andes and Cauca valley (Hilty & Brown 1986). A recent second national mainland record of Caribbean Coot is shown in Figure 20. High elevation *columbiana* and low elevation *caribaea* occupy different habitats in Colombia. Subspecies *columbiana* is morphologically more similar to 'true' *americana* than *caribaea*, despite the range disjunctions, perhaps suggesting a vagrant origin. Taxonomic studies have focused to date on the Caribbean populations, but should also consider those in the Andes.

We accept this proposed lump. In addition to reported intergrades, other coots such as Andean Coot *F. ardesiaca* show polymorphism in frontal shield coloration. However, we would propose to retain *caribaea* as a subspecies, reflecting the diagnosability of most individuals. At least in Colombia, the three subspecies names refer to identifiable populations with different distributions.

3. BirdLife Checklist splits not adopted

Ruddy Duck *Oxyura jamaicensis*
Andean Duck *O. ferruginea*

Andean resident proposed species *ferruginea* is represented by subspecies *andina* in Colombia (Hilty & Brown 1986). North American *O. jamaicensis* has been recorded on San Andrés island as a vagrant (Salaman *et al.* 2008). *O. ferruginea* was afforded species rank by Livezey (1995) who considered it more closely related to Lake Duck *O. vittata* of southern South America. Hellmayr & Conover (1948), Siegfried (1976), Ridgely & Greenfield (2001), Salaman *et al.* (2001), Jaramillo (2003), Erize *et al.* (2006), Carbonell *et al.* (2007), McMullan & Navarrete (2013) and del Hoyo & Collar (2014) split these birds on this basis. Other authors have lumped them, such as Blake (1977), Johnsgard (1979), Adams & Slavid (1984), Fjeldså (1986), Hilty & Brown (1986), Fjeldså & Krabbe (1990), Carboneras (1992), Asociación Bogotana de Ornitología (2000), Dickinson (2003), Salaman *et al.* (2008b, 2009, 2010), McMullan *et al.* (2010, 2011), Dickinson & Remsen (2013), McMullan & Donegan (2014) and Remsen *et al*. (2015). Several authors, including Todd (1979), Adams & Slavid (1984), Hilty & Brown (1986), Fjeldså (1986), Fjeldså & Krabbe (1990), ABO (2000) and McMullan & Donegan (2014) drew attention to subspecies *andina* of Colombia being intermediate in its plumage features between *jamaicensis* and *ferruginea*. Birds with white cheeks similar to *jamaicensis*, entirely black cheeks similar to *ferruginea* and mixed black/white cheeks are all found in the Bogotá region (e.g. Fig. 21).

McCracken & Sorenson (2005)'s molecular study of the group concluded that "the lack of shared haplotypes between *O. j. jamaicensis* and *O. j. ferruginea* suggests long-standing historical isolation. In contrast, *O. j. andina* shares haplotypes with *O. j. jamaicensis* and *O. j. ferruginea*, which supports Todd’s (1979) and Fjeldså’s (1986) hypothesis that *O. j. andina* is an intergrade or hybrid subspecies of *O. j. jamaicensis* and *O. j. ferruginea*." Consistent with this, Muñoz-Fuentes *et al.* (2013) sampled five *andina* and found "out of the five individuals studied, four had mtDNA haplotypes that were identical to haplotypes from North America, whereas the other haplotype was identical to those of other tropical Andean individuals." It is unclear where *andina* would be placed under any split. Given the existence of an intermediate population, we prefer to maintain these as a single species.

Figure 21. Ruddy Ducks *O. jamaicensis andina*. Top left: more '*jamaicensis*'-like; bottom right more *'ferruginea*'-like, others between. All taken on same body of water and date at Parque La Florida, Bogotá (T. Ellery, 1 October 2015).

Lesser Pied Puffbird *Notharcus subtectus*
Greater Pied Puffbird *N. tectus*

These populations, separated by the Andes, differ in the size of the breast band, presence/absence of white spots on the crown, extent of white wing patch and bill and tail lengths (del Hoyo & Collar 2014). Ridgely & Greenfield (2001) commented that these are "Two rather different races" and McMullan & Donegan (2014) flagged that "more than one species may be involved". However, they were univerally lumped in modern literature prior to del Hoyo & Collar (2014). A "higher pitched and possibly more piping, less modulated" song was noted by the latter authors. Variation in voice seems highly complex, based on available recordings, with several different kinds of call given by different populations (e.g. Schulenberg *et al.* 2007) and broad overlap in the note shapes and frequencies across vocalisations as a whole. A detailed study into the functions of different kinds of song and their comparability between populations would shed further light on the status of these populations. This split is pended rather than rejected.

Toucan (Ramphastidae) splits

A number of toucans proposed for species rank by del Hoyo & Collar (2014) are discussed in the following sub-sections. Several of them hybridise rampantly with one another in broad zones of contact or form intermediate populations, such as *Ramphastos cuvieri* & *R. tucanus, R. culminatus* & *R. vitellinus* and *R. culminatus & R. ariel*. Reported hybridisation does not necessarily mean that conspecific treatment is obligatory, because many demonstrably good biological species hybridise infrequently with one another (especially in groups such as Anatidae and Trochilidae) either at very low frequencies, in situations involving hybrid sterility or otherwise not resulting in significant gene flow between populations. However, the extent of collections in South America, particularly remote parts of NW Colombia and N and NE Brazil where toucan hybridisiation and intermediates are reported has been relatively sparse. As a result, any instances of hybridisation need careful study before concluding that conspecificity is inappropriate (cf. Parkin *et al*. 2003). In the case of toucans, studies exist confirming substantial gene flow between populations which have been considered separate species (Haffer 1967, 1974, Weckstein 2005, Patané *et al.* 2009). In several cases, hybridisation among toucans occurs across broad regions (Haffer 1974, Patané *et al.* 2009).

In Colombia, there are several morphologically similar toucan species which co-occur in sympatry which are demonstrably good species. These provide a useful comparator for assessing species limits between allopatric toucans under the comparative approach advocated by Helbig *et al*. (2002) and Remsen (2005).

- In the *Ramphastos* group, Chocó Toucan *R. brevis* and Yellow-throated Toucan *R. ambiguus swainsonii* are sympatric in the Chocó. They show virtually no morphological differences, except for *R. brevis*' smaller overall size, but differ unmistakeably in voice. *R. brevis* calls involve repeated, single notes with broad bandwidth and of an insect-like quality, *c*.0.3 s long. This is one of Haffer (1974)'s "croakers". In contrast, *R. ambiguus* songs involve three notes, c.0.5 s long "dios-te-de" with a "yelping" quality.
- Cuvier's Toucan *R. (tucanus) cuvieri* and Channel-billed Toucan *R. (vitellinus) culminatus* are sympatric in Colombian Amazonia. In morphology, the two differ principally in the breast coloration (yellow/white). Morphological distinctions within each of these broader species (*sensu* Haffer 1974) are more substantial than those between sympatrics, as is discussed below. The two again differ vocally. *R. (v.) culminatus* gives single insect-like notes (rather like *R. brevis*) and *R. (t.) cuvieri* gives more complex "dios-te-de" calls (rather like *R. ambiguus*). The differences between and ranges of sympatric "yelper" and "croaker" groups have been well-documented throughout Amazonia (Haffer 1974) and they have been recovered as reciprocally monophyletic in molecular studies (Weckstein 2005, Patané *et al.* 2009).
- The Emerald Toucanet *A. prasinus* (subspecies *albivitta* or *griseigularis*) and Crimson-rumped Toucanet *A. haematopygus* are broadly sympatric in premontane to lower montane cloud forests and borders at *c*.1,400-2,500 m throughout the Colombian Andes. Their voices are similarly structured, consisting of incessantly repeated hoarse barks. With experience, however, the calls can be told apart. *A. haematopygus* has lower-pitched calls (*c*.<2kHz vs. >2 kHz) which are comprised of longer notes (*c*.0.2 vs 0.1 s) delivered more slowly (*c*.2 vs. 2.5+ notes/s). See Figure 24. They differ in morphology (e.g. presence/absence of a red rump) and bill coloration (red versus black-and-yellow) also.
- Groove-billed Toucanet *A. (sulcatus) calorhynchus* and *A. prasinus lautus* replace one another by elevation in the Santa Marta mountains, the former at lower and dryer elevations. *A. sulcatus* is greyer green overall in its plumage and has more extensive yellow markings on the proximal lower mandible. Both give incessant, hoarse barks as calls. However, the songs of *calorhynchus* are faster (c. 3 notes/s versus c. 2 notes/s) and marginally longer in duration. It could be said that the song of *calorhynchus* consists of mostly call notes with short gaps between notes, while that of *lautus* consists of mostly silence with short notes interspersed.

In Colombia, these four "good" sympatric congeneric Ramphastidae species are all vocally distinct from one another by several vocal variables. All of them also show at least some morphological differentiation.

Cuvier's Toucan *Ramphastos cuvieri*
Red-billed Toucan *R. tucanus*

Western Amazonian *R. cuvieri* differs from *R. tucanus* of north-eastern Amazonia principally in the latter's more extensively red mandibles. It also has a yellow (not orange or red) rump and yellowish lower breast. Subspecies *inca* of species group *cuvieri* has some red on the bill. Nominate *cuvieri* has an orange rump, between red and yellow edgings. Haffer (1974) reported *tucanus* and *cuvieri* to hybridise in northern and eastern Amazonia. Hilty (2003) more recently highlighted the presence of intermediates in Amazonas state of Venezuela. Various authors (Cory 1919, Peters 1948, Meyer de Schauensee 1964, 1966, 1970, Sibley & Monroe 1990, Rodner *et al.* 2000, Salaman *et al.* 2001, Restall *et al.* 2006, Erize *et al.* 2006) have split these two populations. However, since Haffer (1974) many persons to have considered the species have lumped them (e.g. Hilty & Brown 1986, Dunning 1987, Sick 1993, Ridgely & Greenfield 2001, Short & Horne 2001, Dickinson 2003, Hilty 2003, Souza 2004, Schulenberg *et al.* 2007, Salaman *et al.* 2008b, 2009, 2010, Van Perlo 2009, McMullan *et al.* 2010, 2011, Dickinson & Remsen 2013, McMullan & Navarrete 2013, McMullan & Donegan 2014, Remsen *et al.* 2015). Weckstein (2005) found *cuvieri* and *tucanus* together to form a monophyletic group. Subsequently, Patané *et al.* (2009), with broader sampling of individuals, found neither *cuvieri* nor *tucanus* to be monophyletic, consistent with Haffer (1974)'s observations that they intergrade with one another. However, the two taxa when combined were found to be monophyletic. We found no diagnostic vocal differences between these taxa based on a review of recordings in the xeno-canto collection. We continue to treat these named populations as part of the same species.

Figure 22. Channel-billed Toucans *Ramphastos vitellinus* in Colombia. Left: "Citron-throated" Toucan *R. v. citreolaemus* Serranía de las Quinchas, Boyacá (A. Quevedo, 17 May 2006). Right: "Yellow-ridged" Toucan *R. v. culminatus* Reserva Halcón Colorado, Villavicencio, Meta (A. Quevedo, 30 July 2005). We have prepared a collage including WA photographs showing plumage variation elsewhere in this group, which is available from the authors privately due to copyright restrictions.

Citron-throated Toucan *R. citreolaemus*
Channel-billed Toucan *R. vitellinus*
Yellow-ridged Toucan *R. culminatus*
Ariel Toucan *R. ariel*

Two supposed species in this group occur in Colombia, with *citreolaemus* west of the Andes and *vitellinus* in Amazonia. The other forms occur principally in Brazil and neighbouring countries, with *ariel* in the Atlantic region and East Amazonia, *vitellinus* also in North Amazonia and *culminatus* in western and southern Amazonia (including subspecies *pintoi*) under del Hoyo & Collar (2014)'s new taxonomic arrangement. Colombian populations differ strikingly from one another in bill coloration (blue versus yellow bill ridge; presence/absence of orange at proximal base to both mandibles; yellow versus blue proximal upper mandible; extensive versus narrow mark on upper mandible) and some aspects of plumage (yellowish versus entirely white breast) (Fig. 22).

Haffer (1974) found members of this group occurring East of the Andes, namely 'subspecies' *vitellinus*, *culminatus* and *ariel*, to intergrade with one another in broad hybrid zones, illustrated therein and mapped more recently by Patané *et al.* (2009). Examples of intermediates are common in specimen collections and modern photographic databases such as WikiAves Brazil (WA). We found several examples of "*pintoi*" (e.g. WA685598: D.W. Santos), *pintoi / vitellinus* intermediates (e.g. WA1638463: R.N. Cipriani), *vitellinus / culminatus* intermediates (e.g. WA1237040: J.A. Daffonseca), *ariel / vitellinus* intermediates (e.g. WA1082657: C. A. Borges) in this online photographic collection.

Since Haffer (1974), many authorities have lumped these populations, including Sick (1993), Ridgely & Greenfield (2001), Short & Horne (2001), Weckstein (2005), Schulenberg *et al.* (2007), Salaman *et al.* (2008b, 2009, 2010), Van Perlo (2009), Patané *et al.* (2009), McMullan *et al.* (2010, 2011), Honkala & Niiranen (2010), Souza (2004), McMullan & Navarrete (2013), McMullan & Donegan (2014) and Remsen *et al.* (2015). However, Cory (1919), Meyer de Schauensee (1964, 1966, 1970), Hilty & Brown (1986), Dunning (1987), Sibley & Monroe (1990), Rodner *et al.* (2000), Salaman *et al.* (2001), Erize *et al.* (2006) and Restall *et al*. (2006) all split *citreolaemus*, *vitellinus* and *culminatus*. Historically, *ariel* has been treated as a species (e.g. Cory 1919).

Molecular studies (Weckstein 2005, Patané *et al.* 2009) paint an interesting picture consistent with Haffer (1974)'s conclusions. The South-east Atlantic population of *ariel* includes individuals that are sister to all other toucans in this group in phylogenies, with *citreolaemus* samples being the next most basal, this being the sister group to a clade including "all the others" in Amazonia, including Amazonian *ariel*. Patané *et al*. (2009) considered the only isolating mechanism in the Amazonian region to be in the lower part, where the wide river separates subspecies "*pintoi*" and *ariel* morphotypes to the South (usually included within the *culminatus* group) from northern *vitellinus* populations. There is then a broken anti-clockwise ring of hybridisation across the rest of Amazonia, which Hilty (2003) considers to be more intense towards the headwaters of major rivers. Monophyly was not supported for any of del Hoyo & Collar (2014)'s proposed species in these studies. This is because subspecies *ariel* includes individuals which are sister to all others (from the Atlantic region) while northern *ariel* populations have molecular biology similar to other Amazonian birds.

The position of *citreolaemus* with respect to the other taxa is arguably different as it occurs west of the Andes and so it is allopatric with respect to all the other taxa, except perhaps in north-western Venezuela. Hilty (2003) split *citreolaemus* only from *vitellinus* (which was retained as a group including all the other taxa), on the basis that these low-elevation populations were separated by the Andes and there is no evidence that they hybridise or possibility of this occurring. Despite this approach, he mapped one *vitellinus* record from north of the Mérida Andes. Such a sequence is undesirable as it creates a polyphyletic *R. vitellinus* (Patané *et al*. 2009) and the plumage differences between *citreolaemus* and others are less than those between populations which freely intergrade in Amazonia.

We inspected sound recordings on xeno-canto and noted some previously unrecognised vocal variation. Birds west of the Andes (*citreolaemus*) differ somewhat in voice from Amazonian birds, with calls consisting of shorter duration notes which are delivered faster (*c*.1 note/s versus >*c*.1 note/s in *vitellinus*). Atlantic *ariel* have calls with longer note duration. Haffer (1974), who last considered vocal differentiation, lacked recordings from west of the Andes referable to *citreolaemus*. Patané *et al.* (2009) discussed whether *ariel* could be split into two subspecies: Atlantic and Amazonian, citing morphometric differences and mtDNA differentation. This proposition should be investigated further. In particular, apparent small vocal differences between Atlantic and Amazonian and trans-Andean populations should be investigated statistically. Because *ariel*'s type was collected in Rio de Janeiro, the name is referable to the Atlantic population. Publishing a description of Amazonian populations of *ariel*, even as a subspecies, would be difficult in light of reported intergradation.

A three-species approach recognising (i) Atlantic *ariel*, (ii) an Amazonian *vitellinus/culminatus/pintoi/'ariel'* swarm and (iii) *citreolaemus*, may ultimately be an alternative feasible taxonomic treatment and is one that has limited molecular and vocal support. However, mtDNA variation within the group as a whole (1.31%) is low to moderate and sampling of Atlantic *ariel* to date is restricted to the far south of its range (Patané *et al.* 2009). Given that Haffer (1974)'s detailed study, the results of recent molecular studies and our studies of morphological variation based on modern photography are all consistent with a broader lump, we would not advocate such a treatment at this stage. In conclusion, we feel unable to support del Hoyo & Collar (2014)'s new taxonomy, or any of the other alternate split taxonomies that have been adopted in the past. We prefer instead to apply Haffer (1974)'s sequence for now.

Emerald Toucanet *Aulacorhynchus prasinus* splits

This toucan has for decades been treated as a widely distributed species of mountains from Central America to the Andes. Navarro *et al*. (2001) studied morphological variation focusing on Central American forms but also noting some differentiation among South American subspecies. They proposed numerous splits. Puebla-Olivares *et al.* (2008) and Bonnacorso *et al.* (2011) found *prasinus* to be monophyletic, but split it into eight phylogenetic species based on plumage and molecular differences. Several of the proposed split taxa occur in Colombia: *lautus* of Santa Marta, *albivitta* of the East Andes and *griseigularis* of the Central and West Andes. Puebla-Olivares *et al.* (2008) considered that relevant characters differentiating their eight clades "are important in social and reproductive behavior in the Ramphastidae … therefore, they could facilitate reproductive isolation in cases where populations came into contact" and that "the clades that we have identified likely represent species entities recognizable under the biological, evolutionary, and phylogenetic concepts". Some other authorities have followed such an approach, notably Gill & Donsker (2015). However, these proposals have not been widely accepted in the subsequent fieldguide or checklist literature (Schulenberg *et al*. 2007, Salaman *et al.* 2010, McMullan *et al.* 2010, 2011, Dickinson & Remsen 2013, McMullan & Navarrete 2013, McMullan & Donegan 2014, Remsen *et al.* 2015). Del Hoyo & Collar (2014) recognised six of Puebla-Olivares *et al*. (2008) and Bonnacorso *et al.* (2009)'s eight species, placing Colombian populations in a single species group, *albivitta*. Haffer (1974) and Short & Horne (2001, 2002) in contrast considered the various allopatric taxa that make up this group to be no more distinctive than those in the genus that are known to intergrade.

We examined sonograms of all claimed split species from throughout the range of *A. prasinus*. Spectograms of each taxon proposed for species rank by Puebla-Olivares *et al.* (2008) and Bonnacorso *et al.* (2011) are set out in Figure 24. All species give repeated croak noises comprising up-down-strokes, peaking typically at just below 2kHz at a rate of 2-3 notes/s. There appear to be some minor geographical or individual variations in acoustic frequency, speed and perhaps note shape. We have not studied vocalisations statistically, but the differences are unimpressive when compared to those between sympatric *Aulacorhynchus* species in Colombia. We therefore reject all of the splits proposed for Colombia and retain a broad *A. prasinus*, comprised of multiple morphologically distinctive subspecies. Conservation issues raised by the new taxonomy discussed by Bonnacorso *et al.* (2011) seem less pressing than for some other taxa studied here, given that these birds are often common in secondary habitats and forest borders.

Figure 23. *Aulacorhynchus* Toucanets of Colombia. Top left: Emerald Toucanet *A. prasinus albivitta* El Talisman, Serranía de los Yariguies, Santander (B. Huertas / T. Donegan / E. Briceño / Proyecto EBA Colombia, January 2003). Top right: *A. p. griseigularis* near Medellín, C. Andes (T. Ellery, December 2014). Lower left: *A. p. lautus* El Dorado, Santa Marta (T. Ellery, January 2015). Lower right: Yellow-billed Toucanet *A. sulcatus calorhycnhus* Santa Marta, below RNA El Dorado (T. Ellery, January 2015).

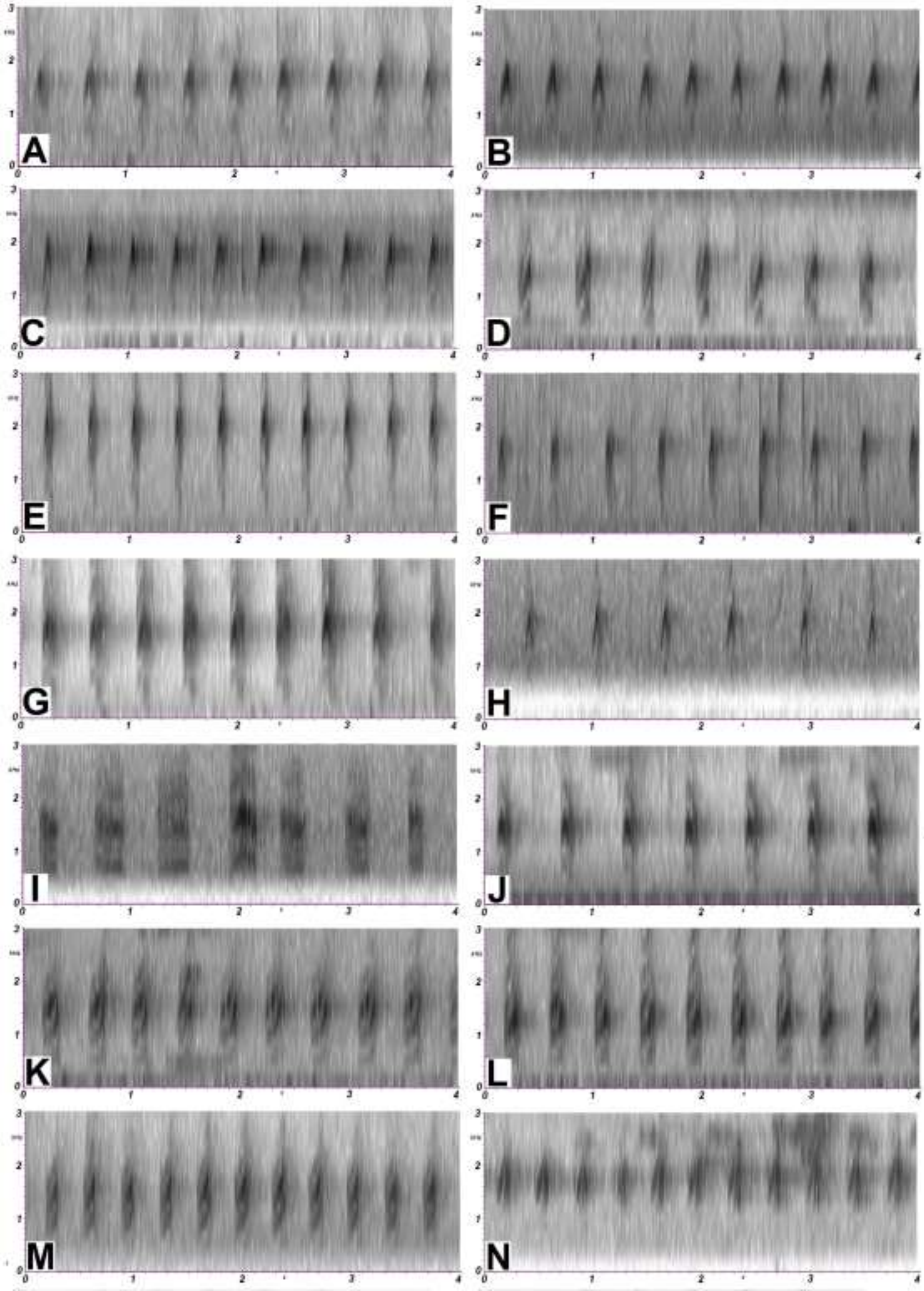

Figure 24. Songs of *Aulacorhynchus* toucanets. A. Emerald Toucanet *Aulacorhynchus prasinus cognatus* Darién, Panama (XC60792: K. Allaire). B. *A. p. caeruleogularis* Chiriquí, Panama (XC31808: A. Spencer). C. *A. p. prasinus* Morazan, El Salvador (XC198333: G. Funes). D. *A. p. wagleri* Oaxaca, Mexico (XC219401: P. Boesman). E. *A. p. albivitta* Tolima, Central Andes, Colombia (XC52684: B. López-Lanús). F. *A. p. griseigularis* Risaralda, West Andes, Colombia (XC117909: S. Córdoba). G. *A. p. lautus* Santa Marta, Colombia (XC235595: N. Krabbe). H. *A. p. atrogularis* San Martín, Peru (XC219372: P. Boesman). I. Blue-throated Toucanet *A. coeruleicinctus* Pasco, Peru (XC219373: P. Boesman). J. Red-rumped Toucanet *A. haematopygus* Valle, West Andes, Colombia (XC117679: J. López). K. Groove-billed Toucanet *A. sulcatus calorhynchus* Santa Marta, Colombia (XC235596: N. Krabbe). L. *A. s. calorhynchus* Mérida, Venezuela (XC219396: P. Boesman). M. *A. s. sulcatus* Aragua, Coastal Cordillera, Venezuela (XC219397: P. Boesman). N. *A. s. erythrognatus* Paria peninsula, Sucre, Venezuela (XC219400: P. Boesman).

Groove-billed Toucanet *Aulacorhynchus sulcatus*
Yellow-billed Toucanet *A. s. calorhynchus*
These toucans were widely split in the 1800s-1900s, with yellow-billed *A. calorhynchus* restricted to the Santa Marta, Perija and Mérida mountains; and red-billed *A. sulcatus* considered to occur in the coastal cordillera and Sucre mountains of Venezuela. Schwarz (1972) noted that the two forms have a hybrid zone in western Venezuela (Cerro Platillón and mountains of north-west Lara state). Intermediates between the traditional *sulcatus* and *calorhynchus* groups have been studied in their molecular biology and are highlighted in published phylogenies (Bonaccorso *et al.* 2011). Despite this, various modern authors continue to split them, notably Rodner *et al.* (2000), Hilty (2003), Erize *et al.* (2006), Restall *et al*. (2006) and now del Hoyo & Collar (2014). Bonaccorso *et al.* (2011) found these two northern groups to be monophyletic when taken together but also mutually monophyletic (if hybrids or intermediates are placed with the *calorhynchus* group), in a 50% Bayesian majority rule consensus tree, although with low (<1% mtDNA) differentiation.

We found these two proposed split groups to include populations that are vocally very similar (Figure 24K-M). Both proposed species have populations that give upturned notes of similar length, shape, duration and speed and with a clear undertone. On account of the differences in bill colour found between hybridising *Ramphastos*, the molecular data and more striking vocal differences that exist between sympatric *Aulacorhynchus*, we do not accept this split.

Surprisingly, we found subspecies *erythrognathus* of the Paria peninsula and Sucre mountains, which has never previously been recognised specifically, to be vocally distinct from other *sulcatus/calorhynchus* populations. Assuming the identification of recordings to be correct, it has a different note shape to its calls, with no undertone visible on sonograms (Fig. 24N). This population has an orange bill base on both mandibles, which is more extensive than the yellow lower mandible base in other *A. sulcatus*. A split *A. s. erythrognathus* would not be monophyletic with respect to other *A. sulcatus* (Bonaccorso *et al.* 2011). Its status should be investigated further and has no bearing on the Colombian checklist.

4. Extralimital splits with no impact on the scientific names of Colombian species

The following splits by del Hoyo & Collar (2014) were not considered in detail here, owing to a lack of personal experience of the authors with all treated forms. The position of populations in Colombia is not central to the taxonomic treatment of these proposals. No changes to scientific names or numbers of species occurring in Colombia would result from any of these splits.

Black-capped Petrel *Pteerodroma hasitata*
Jamaican Petrel *P. caribbaea*
Jamaican Petrel is considered sufficiently distinct by del Hoyo & Collar (2014) to merit species rank, on account of plumage and biometric differences. It is considered probably extinct and has not been recorded in Colombia.

(Greater) Band-winged Nightjar *Caprimulgus longirostris*
Certain isolated and vocally distinct taxa occurring outside Colombia were split from *C. longirostris* (see further Spencer 2010 and Sigurdsson & Cracraft 2014).

Black-throated Brilliant *Heliodoxa schreibersii*
Black-breasted Brilliant *H. whitelyana*
The montane, southern Peruvian form *whitelyana* has been proposed as a split from a widespread Amazonian species.

Fiery Topaz *Topaza pyra*
Crimon Topaz *T. pella*
This split involves separation of a north-east Amazonian species from *T. pyra,* which would still be the named form which occurs in Colombia.

Long-billed Hermit *Phaethornis longirostris*
Ecuadorian Hermit *P. baroni*
Mexican Hermit *P. mexicanus*.
The newly split *baroni* may occur in south-west Nariño but there are no confirmed records to date of which we are aware (Biomap Alliance Participants 2015). There are only a few sound recordings available of *baroni*, which makes any assessment of rank difficult. This is a quite vocal hummingbird genus. Studies of lekking calls are probably critical to unravelling the group's taxonomy.

Gull-billed Tern *Gelochelidon nilotica*
Australian Gull-billed Tern *G. macrotarsa*
These forms would split out in Asia and we therefore express no comment on the proposal.

Common Squirrel-Cuckoo *Piaya cayana*
Mexican Squirrel-Cuckoo *Piaya mexicana*
This widespread species would be split in northern Central America.

Crimson-mantled Woodpecker *Colaptes rivolii*
Black-crowned Woodpecker *C. atriceps*
The latter refers to populations occurring in southern Peru and Bolivia.

Lineated Woodpecker *Dryocopus (Hylatomus) lineatus*
Dusky-winged Woodpecker *D. fuscipennis*
Newly split *fuscipennis* may range into southern Nariño, but is presently treated as extralimital.

5. Other pended splits

We do not consider the following splits by del Hoyo & Collar (2014) in detail, due to a lack of personal experience of the authors with all treated forms or due to question marks over the proposed treatment, which may merit further investigation. In most cases, the position of populations in Colombia is not central to taxonomic treatments. Several of these changes would result in a different scientific name for a species occurring in Colombia as a result of an extralimital split, because the nominate form would cease to be present in the country.

Northern Band-tailed Pigeon *Patagioenas fasciata*
Southern Band-tailed Pigeon *P. albilinea*
These proposed split species separate out in Costa Rica. A detailed vocal study would be welcomed, given the importance of voice in distinguishing pigeon species and the innate nature of some kinds of vocalisations in this family (cf. Donegan & Salaman 2012).

European Herring Gull *Larus argentatus*
American Herring Gull *L. smithosonianus*
Del Hoyo & Collar (2014) split Herring Gulls on a trans-Atlantic basis, citing the "current trend to accept this arrangement" but without applying species scoring tests. This split treatment was criticised by Remsen (2015), but it is widely adopted (e.g. Sangster *et al*. 2007, Dickinson & Remsen 2013).

Approximately 40% of adult birds can supposedly be identified by experienced observers on the basis of mantle pigmentation, minor aspects of wing patterning or bill morphology. This percentage increases with younger birds, with first winters claimed to be 90% diagnosable and second winters 70% diagnosable (Lonergan & Mullarney 2004).

Molecular (mtDNA) differentiation paints a different picture, with *smithsonianus* sister to, or in a group sister to, several European taxa including *argentatus* (e.g. Crochet *et al.* 2002, Liebers-Helbig *et al.* 2010). Actual mtDNA distance is relatively low. These results might be explained by occasional hybridisation between sympatric *Larus* species, which is well documented, leading to molecular distance being greater between species whose breeding territories are more distant from one another.

We doubt that these two proposed species would meet the requirements of species scoring tests or biological species concepts because adults are non-diagnosable vocally or morphologically.

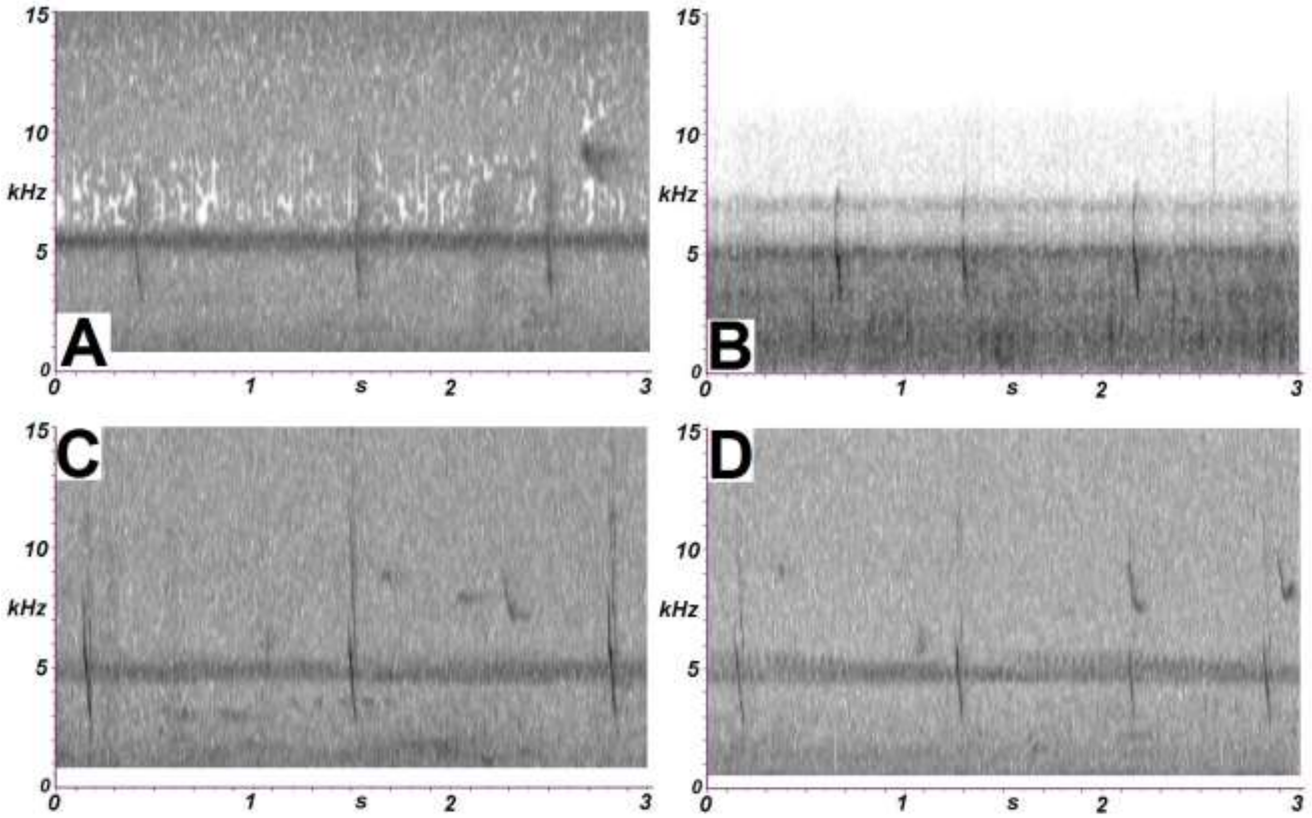

Figure 26. Calls of some *Lophornis* Coquettes. A-B: Festive Coquette *L. chalybeus*. C-D: "Butterfly Coquette" *L. verreauxii*. A. APA Capivari Monos, São Paulo, Brazil (XC187479: M. A. Melo). B. Fazenda Castanheiras (APA -Bororé - Colonia), São Paulo, Brazil (XC34807: M. A. Melo). C. Estancia Caparu-Lagunitas, Santa Cruz, Bolivia (XC53237: J. Quillen Vidoz). D. *Idem* (XC53238).

Butterfly Coquette *Lophornis verreauxii*
Festive Coquette *L. chalybeus*

Del Hoyo & Collar (2014) proposed restricting *L. chalybeus* to the Atlantic forest of Brazil, which would make *L. verreauxii* the new name for more widespread western Amazonian populations of Colombia, Ecuador, Venezuela, Brazil and Guyanan countries. Males of *L. verreauxii* have an elongated crest (3, most conservatively), which is absent in *L. chalybeus*. The two have different tail coloration in both sexes (2) and underparts coloration (2), which is most prominent in females. None of Meyer de Schauensee (1964, 1966, 1970), Hilty & Brown (1986), Dunning (1987), Sick, (1993), Fjelsdå & Krabbe (1990), Rodner *et al.* (2000), Souza (2004), Salaman *et al.* (2001, 2008b, 2009, 2010), Ridgely & Greenfield (2001), Dickinson (2003), Hilty (2003), Erize *et al.* (2006), Restall *et al.* (2006), Schulenberg *et al.* (2007), Honkala & Niiranen (2010), Van Perlo (2009), McMullan *et al.* (2010, 2011), Dickinson & Remsen (2013), McMullan & Navarrete (2013), McMullan & Donegan (2014) or Fogden *et al.* (2014) commented on these as a possible split, although Restall *et al*. (2006) highlighted morphological differences between the two subspecies occurring in Venezuela.

We pend a decision on this split for various reasons. First, although the name for Colombian populations would change, the key region for understanding the taxonomy of this group falls outside Colombia. Secondly, the reported score of 7 is borderline. Thirdly, Restall *et al.* (2006) illustrate *klagesi* of eastern Venezuela as having a different crest length from *verreauxii*. Del Hoyo & Collar (2014) placed this subspecies with *verreauxii* but did not comment on the differentiation of *klagesi*.

An inspection of sonograms suggests that *L. chalybeus* call notes may attain lower minimum frequencies (Fig. 26) and have a different pattern of overtones. However, the available sample is small (n=2 for *chalybeus* and n=3 for *verreauxii*) and these differences need confirming with a greater vocal sample. Subspecies *klagesi* is not represented in our vocal sample. Sound recordings and further morphological comparisons involving *klagesi* should be considered prior to making taxonomic changes in this group. The morphological differences between some populations are quite striking and del Hoyo & Collar (2014)'s taxonomies seem generally robust for hummingbirds. As a result, we suspect strongly that one or more splits may be warranted.

Collared Araçari *Pteroglossus torquatus*
Stripe-billed Araçari *P. sanguineus*

Haffer (1967, 1974) and Short & Horne (2001, 2002) considered these two groups to interbreed in north-western Colombia and so treated them as conspecific. In split taxonomic arrangements, *torquatus* has a bifurcated range in both the Magdalena valley and Central America, with *sanguineus* in the Colombian and Ecuadorian Chocó (Del Hoyo & Collar 2014). No hybridisation is recorded and populations separate on either slope of footbills below the west slope of the West Andes. However, in the Darién, a narrow hybrid zone exists in Colombia (Haffer 1974). Ridgely & Gwynne (1989) noted that a *torquatus* x *sanguineus* AMNH specimen taken in the Darién of Panama showed hybridisation also to be taking place on the other side of the border. Some Remsen *et al*. (2015) participants commented on the very narrow nature of this hybrid zone, which is probably only 20 km wide (from N to S), straddling the Atlantic to the Pacific coast. Most birds in Colombia appear "pure" in their plumage (e.g. Fig. 25). Haffer (1974) considered the two to show "uninhibited hybridisation" in the Darién region, which indicates that "color differences between these forms do not assure reproductive isolation".

Figure 25. Locally captured Collared Araçari *Pteroglossus torquatus* in captivity. Honduras, El Carmen, Serannía de los Yariguies, Santander, Colombia (T. Donegan / Proyecto YARE, January 2006).

Many authors such as Dunning (1987), Short & Horne (2001, 2002), McMullan *et al.* (2010, 2011), Salaman *et al.* (2008b, 2009, 2010), McMullan & Donegan (2014), Remsen *et al.* (2015) lump these as a result. In contrast, Hilty & Brown (1986), Sibley & Monroe (1990), Dickinson (2003), Rodner *et al.* (2000), Salaman *et al.* (2001), Erize *et al.* (2006), Restall *et al*. (2006), Pereira & Wajntal (2008), Patel *et al.* (2011) and Gill & Donsker (2015) ranked *sanguineus* as a species. Lumped treatments are more controversial today after Pereira & Wajntal (2008) and Patel *et al.* (2011) found sampled individuals of nominate *torquatus* to be sister to a group including Fiery-billed Araçari *P. frantzii* and other populations in the *torquatus* group. Splitting of *torquatus* would be necessary to maintain the monophyly of currently recognised species. However, this study was based only on samples of *sanguineus* from Ecuador and of *torquatus* from central Panama so is not informative of the situation either in the Magdalena valley or the Darién hybrid zone.

Our inspection of sound recordings elucidated no obvious differences between *sanguineus* and *torquatus*. Therefore, on the basis of the approach to species limits in toucans discussed above, and on account of intergradation in north-west Colombia and southern Panama, we provisionally retain these two taxa as conspecific for now. We could accept this split despite the hybrid zone (which is very narrow) and lack of vocal differences if molecular data were more convincing, but the sampling for this group to date is insufficient. Molecular studies based on samples from the hybrid zone and Magdalena valley should be prioritised.

Black-spotted Barbet *Capito niger*
Gilded Barbet *C. auratus*
This split would result in a name change for eastern Colombian populations, with *niger* becoming restricted to the Guyanan shield. A number of other distinctive subspecies occur in this complex, which were not proposed for species rank.

White-necked Puffbird *N. hyperrhynchus*
Guianan Puffbird *N. macrorhynchus*
These two morphologically distinctive puffbirds have been widely either split or lumped by different authors. A split would result in a name change for Colombian populations. The key study area for these birds is in northern Brazil and the Guyanan shield. We would be broadly in favour of re-splitting these based on the strong morphological differences involved, but those working in northern Amazonia would be better qualified to comment.

Ringed Woodpecker *Celeus torquatus*
Amazonian Black-breasted Woodpecker *C. occidentalis*
Atlantic Black-breasted Woodpecker *C. tinnunculus*
Only one of these three proposed species occurs in Colombia, namely *C. occidentalis* in Amazonia. The form *torquatus* of north-east South America is very different from the other two morphologically. Picidae is a group which, like Ramphastidae, may not be well-suited to the species scoring system in some cases (Remsen 2015; although see above discussion of *Campephilus* for a new proposal in this family with vocal and other support). We pend a decision on this split, in the hope that insights from those who know these populations better in Brazil and Venezuela may come to light.

6. Parrot splits

Del Hoyo & Collar (2014) split the following Psittaciformes which occur in Colombia:

- Black-legged Parrot *Pionus xanthomerius* (which occurs in Leticia, Amazonas) from Yellow-tailed Parrot *P. xanthurus* and Green-thighed Parrot *P. leucogaster*.
- Northern Festive Amazon *A. bodini* (of the Orinoco drainage, including in eastern Colombia) from Southern Festive Amazon *A. festiva* (of the Amazonian drainage, including in eastern Colombia).
- Red-lored Amazon *A. autumnalis* (of Central America and northern and western Colombia) from Lilacine Amazon *A. lilacina* (of the Ecuadorian Chocó) and Diademed Amazon *A. diadema* (of Amazonian Brazil).
- Southern Mealy Amazon *A. guatemalae* (of South America) from Northern Mealy Amazon *A. farinosa* (of Central America), as also suggested by Wenner *et al*. (2012).
- Painted Parakeet *Pyrrhura picta* (of the Guyanan shield and eastern Venezuela*)* from Sinu Parakeet *P. subandina* (presumed extinct, of Sinú drainage below PNN Paramillo, Colombia), Perija Parakeet *P. caeruleiceps*, and other extralimital forms.
- Scarlet-fronted Parakeet *Psittacara wagleri* (of the Colombian Andes) from Cordillera Parakeet *P. frontatu* (of the Ecuadorian and Peruvian Andes).
- Choco Parakeet *P. pacifica* (of the Colombian and Ecuadorian Chocó) from Maroon-tailed Parakeet *P. melanura* (of Amazonia and the upper Magdalena valley).
- Turquoise-winged Parrotlet *Forpus spengeli* (of northern Colombia) from Blue-winged Parrotlet *Forpus xanthopterygius* (of Amazonia and eastern South America), as subsequently suggested by Bocalini & Silveira (2015).

Parrots can be a difficult group taxonomically, due to voice being learned. Some of the populations listed above are almost unknown in life. In light of the number of other situations examined this year, it has not been possible to carry out a detailed review of the taxonomy of all these birds also. These proposals will therefore be pended whilst we study specimens in detail and collate further fieldwork data.

Conclusions and observations on del Hoyo & Collar (2014), committee-based taxonomies and the Tobias *et al*. (2010) scoring system

In the texts above, we conclude that del Hoyo & Collar (2014)'s splits for Trochilidae (hummingbirds) occurring in Colombia are generally solid (6 splits are accepted and 5 largely extralimital situations pended). For other small families, we accepted splits or lumps in Bucconidae (puffbirds) (1, with 2 pended), Picidae (woodpeckers) (1 with 2 pended), Rallidae (rails and other gallinaceous waterbirds) (1), Scolopacidae (snipes) (1) and Strigidae (owls) (1). We rejected new taxonomic proposals in Anatidae (ducks, 1) and Ramphastidae (toucans, 12, of which 3 could potentially be recut following further studies, and 1 pended). Various other situations, largely involving extralimital forms, were also pended.

Del Hoyo & Collar (2014) have drawn attention to several strong candidates for species rank, various of which lacked recent attention. The attempted expediency and internal consistency of their approach are noteworthy. There is also a conservation imperative. As an example, the now critically-endangered Blue-bearded Helmetcrest *Oxypogon cyanolaemus* was first recognised as a result of work connected with this initiative (Collar & Salaman 2013) and rediscovered soon after attention had been drawn to its taxonomic status and plight (Rojas & Vasquez 2015). Other threatened, formerly non-recognised species, such as *Coeligena consita*, were doubtless sleep-walking towards extinction owing to a lack of attention. Taxonomy is critical for conservation, because unless species limits are accurate, resources will be diverted towards the wrong priorities. This initiative reflects a concern of many conservationists that the taxonomic tools with which we work are blunt, inconsistent and inaccurate.

We would contrast the expediency of del Hoyo & Collar (2014) with the frustrating inaction of current processes for taxonomic change in the ornithological community. From making a taxonomic finding in the field, lab or museum to preparing a manuscript of sufficient quality for some journals or committees might take 3-5 years, with a good wind. It then might take a year or more for peer review, another six months to see a paper published, a year or more before a proposal is put to a committee and 1-3 years for the committee to pontificate upon it. In the event of a positive outcome, BirdLife International would then consider its own taxonomic approach. If it agreed, then, the next year, it would assess threats. IUCN would finally reflect BirdLife treatments in its threatened species designations some time after that. Situations such as *Oxypogon* have been addressed more quickly, due to rapid publication in this journal, rapid submission of proposals to ornithological committees and NGO attention, but this is more the exception than the norm. The entire process from discovery to recognition of an engangered bird species can more typically take 10 years, which is hardly appropriate given the current rate of habitat loss in many parts of the tropics.

The expediency, rationality and consistency issues facing taxonomy and conservation in general, which del Hoyo & Collar (2014) rightly seek to address, are well-illustrated by several cases relevant to Colombia:

- 'Paltry' Tyrannulets in the *Zimmerius improbus / vilissimus* group were split by Ridgely & Tudor (1994). This was endorsed in a short note within a paper in this journal, which included sonograms and a photograph of specimens of proximate forms (Donegan *et al.* 2009). A further re-arrangement was supported by Rheindt *et al.* (2013)'s molecular study. They proposed splitting populations in the two original sub-groups into more species. Newly recognised or proposed forms occurring in Colombia are illustrated in Donegan *et al.* (2012) and McMullan & Donegan (2014). All relevant splits are accepted by Gill & Donsker (2015) but not by the American Ornithologists' Union's South American committee (AOU-SACC) or North American committee (AOU-NACC). Remsen *et al*. (2015) (AOU-SACC) rejected Ridgely & Tudor (1994) proposals and Donegan *et al.* (2009)'s supporting materials, largely on grounds of subjective quality of the publications and the promise of a forthcoming study which appeared four years later. Now some six years since the proposal was made and 21 years since Ridgely & Tudor (1994)'s split was first proposed, these authorities have not reconsidered yet. The vocal, morphological and molecular differentiation between some of these tyrannulets is such that they might better be placed in different genera than as conspecifics. Some populations have small distributions and narrow elevational ranges, meaning that they may be endangered.

- The Santa Marta subspecies *lehmanni* of Black-throated Tody-Tyrant *Hemitriccus granadensis* is vocally quite distinct from Colombian Andean races (T. Ellery data), but there seems little point publishing on this topic when ornithological authorities would probably wish to see a study also involving Peruvian populations before revising the taxonomy of this group. Requirements of some committees for a broad geographical study of entire groups are a barrier to recognising endangered local populations worthy of species rank. Similar situations exist with Grey-breasted Wood-Wren *Henicorhina leucophrys* and Rufous Antpitta *Grallaria rufula*, both of which in Colombia comprise multiple good species that are well-known to observers. Both have been subjects of "very soon to be published" studies for a decade or more. Again considering the Perijá mountains, probably Phelps' Brush-Finch *Arremon perijanus* and Perija Antpitta *Grallaria (rufula) saltuensis* should both be categorised as endangered or critically endangered species. The *Arremon* split was subject to a published molecular and vocal study in a major ornithological journal that has been widely accepted by all relevant committees, whilst the *Grallaria* remains in a state of perpetual review resulting in *saltuensis* attracting less attention from conservationists and governmental policy-setters.

- Observers visiting ProAves' new reserve in Perija are often baffled as to why some of its most distinctive residents are split whilst others are not. Another example from this region is the Perija Brush-Finch *Atlapetes nigrifrons*. This was proposed for species rank almost a decade ago in a peer-reviewed publication in a reputable ornithological journal (Donegan & Huertas 2006). The split is also supported by published a vocal study in this journal (Donegan *et al*. 2014). Unpublished molecular data is inconsistent with any close relation to Yellow-breasted Brush-Finch *A. latinuchus* (C.D. Cadena in Remsen *et al*. 2015). Several members of Remsen *et al*. (2015) doubted Donegan & Huertas (2006)'s results or interpretations and rejected this split, preferring to wait for a molecular study (involving one of their members) to be published before making taxonomic changes. The promised molecular study has not been published 9 years on. During that time, deforestation of lower elevations of the Perija mountains, which supposedly harbour no endemic bird species worthy of protection, has been catastrophic. (Political instability has principally complicated conservation action in this region until very recently, but the situation has not been prioritised.) There were suggestions that this taxonomic change should not take place without a broader taxonomic review, although that seems misplaced given that Donegan & Huertas (2006) and Donegan *et al*. (2014) studied morphology and voice respectively of the entire *latinuchus* group, concluding in each case that *nigrifrons* was exceptionally different. Gill & Donsker (2015) accepted this split in 2014, but Remsen *et al*. (2015) have not reconsidered it yet.

- Sapphire-bellied Hummingbird *Lepidopyga lilliae* is widely thought to be a colour morph and not a valid species. It was recognised as a species by del Hoyo & Collar (2014) and even Donegan & McMullan (2014, reluctantly, with a note that it is probably invalid). This 'species' is treated as critically-endangered by BirdLife International, so continues to distract observers' and conservationists' attention. Studies that might be acceptable to committees as a basis for taxonomic change remain unpublished.

This situation of delay is compounded because AOU-SACC, the main taxonomic committee for South America, presided over a broad rejection of many sensible taxonomic changes proposed in field guides by Ridgely & Tudor (1989, 1994) and Ridgely & Greenfield (2001) based on research in Ecuador and elsewhere in South America. After moving to AOU-SACC treatments for the Colombian bird checklist (Salaman *et al.* 2008b), we have spent much time and effort re-studying some of these situations and re-adopting previously accepted splits, for example in *Geotrygon* (Donegan & Salaman 2012) and *Sirystes* (Donegan 2013). In contrast to the treatment of Colombia's endemic *Zimmerius* and *Atlapetes* species, these taxonomic proposals were accepted promptly by both Remsen *et al*. (2015) and Gill & Donsker (2015). Work on such situations distracts researchers' attentions from publishing more original taxonomic pieces.

Members of some committees often will cite a lack of sufficient data or detailed study, in respect of proposals in the field guide or some periodical literature, to reject proposed taxonomic changes, meaning that the taxonomy of the Bible of the museum community (the *Peters Checklist*: e.g. Peters 1945, 1948) can be retained. Taxonomic arrangements based on decades-old, brief and unsubstantiated viewpoints and a fraction of the specimen or vocal data that exists today are thus preferred over the conclusions of more detailed studies, including those published in reputable journals. In particular, modern reinterpretations of morphological and distribution data, even if based on large new datasets, are regarded by some persons as an unacceptable method for revisiting *Peters Checklist* taxonomies: vocal support is near-obligatory and molecular data is preferred. Proposals for *Atlapetes* (discussed above) and Slate-crowned (Guianan) Antpitta *Grallaricula nana kukenamensis* are examples of this. Such approaches fail to take into account an unfortunate reality that many 'species' occurring in South America have broad distributions and occur across large, topographically difficult areas (some of which are remote, inaccessible or politically unstable) or are rare, meaning that we may not reasonably demand gap-free datasets. Where gaps do exist, it should be acceptable to use comparative approaches to determine a provisional status by considering those characters which can be analysed and available data.

Another barrier to a more rational avian taxonomy emerging is a preoccupation among the community with relative trivia: English name hyphenation, linear orders of lists, competing vernacular names and the spellings of scientific names. In our recent field guides for Colombia (McMullan *et al*. 2010, 2011, McMullan & Donegan 2014), we adopted a straightforward approach to such trivia that others would be encouraged to consider:

- The International Code for Zoological Nomenclature should be followed without modification or deviation (cf. Nemésio *et al*. 2013).

- Where more than one competing vernacular name in widespread usage exists (regionally or more generally), they can both be denoted.

- Parkes (1978) made sensible proposals for the formation and hyphenation of English names which should best be followed. These were widely used for decades until Gill & Donsker (2015) and Remsen *et al*. (2015)'s hyphen wars.

We also, sometimes reluctantly, deal with these more trivial issues in this annual series of papers and other publications. In an ideal world, committees who have unresolved species rank issues to address should prioritise consideration of those instead.

A final confounding issue is that many birds have a distribution within the region of competence of multiple committees, who sometimes take different approaches. Different committees are staffed by different persons who may have different perspectives about avian taxonomy, particular situations or particular publications. European committees often split populations which U.S. committees lump, resulting in widespread confusion among users of bird names and inconsistent treatments towards inter-continental vagrants and pan-global species, such as the Herring Gull *Larus argentatus* (where we would side with the AOU's approach for now, as discussed above). Our work with the Colombian checklist and field guides may be considered a further source of confusion, although it predates (by many years) attempts by other ornithologists to publish a rival Colombian checklist ("El Listero Clandestino" in Remsen *et al*. 2015). Del Hoyo & Collar (2014)'s work might be cited in such terms also, given its overlap of scope with other world lists (e.g. Dickinson & Remsen 2013, Gill & Donsker 2015). Separate developments in contemporaneous taxonomic initiatives ultimately tend to get ironed out over (many) years, through follow-up studies, although this is not always satisfactory as discussed above.

We are unable to be optimistic that the heliocentric taxonomic changes discussed in this paper will be reflected in some international or regional committee checklists for many years. Some will doubtless cite the somewhat superficial nature of the discussions above and the absence of a sufficiently good study to change treatments. More detailed treatises by authors with better credentials including more detailed statistical analyses based on perfect data sets in more important journals may be published one day and lead others to accept some of del Hoyo & Collar (2014)'s proposals. Additional research into the molecular biology of some of these forms might also give more confidence. However, that should not in our view prevent taxonomists taking views based on existing data, nor changing such views later should it become necessary to do so. We are all collectively "fiddling while Rome burns", if being closed-minded to new findings that may challenge preconceptions or requiring perfect data sets for change. We agree with the principle that those working on taxonomic questions should consider only taxonomic issues, because that is what we do. However. this principle does not preclude the possibility of decision-making based on existing data sets, nor changing taxonomies back to how they were, if a further publication refutes findings of a previous one.

The above criticisms of the current *modus operandi* of ornithological taxonomy are set out partially as a result of the visceral reaction to del Hoyo & Collar (2014)'s work on the part of some members of the ornithological establishment (Remsen 2015, Sangster 2015). Clearly, we do not agree with all of del Hoyo & Collar (2014) taxonomic changes either. By conservatively pending many of them, criticisms of inaction and unreasonable demand for more data may apply to us too, but this was done principally for situations not involving Colombia. We are a small group working with the world's largest national fauna, so must prioritise. We hope that experts in other regional or national faunas can consider others of these new taxonomic proposals in more detail, and soon.

Rather than abandonment or restriction of the Tobias *et al*. (2010) system (Remsen 2015), we would instead draw the following conclusions:

1. *The species scoring system should not be used in isolation. Appropriate benchmarks for different families under the scoring system should be considered*. The non-passerines comprise a diverse group of bird families. Intra-specific plumage differentiation in toucans (as measured by the scoring system) exceeds that found in hummingbirds, based on this study. We would restrict any abandonment of proposed new 'scoring system'-based taxonomies (Remsen 2015) to Ramphastidae and *Oxyura jamaicensis*, for now. In contrast, we agreed with at least some taxonomic changes proposed to six diverse non-passerine families. A "one size fits all" score of 7 as a benchmark for species rank was supported by other data in our study for several ecologically diverse families, but it does not seem appropriate for all birds. The scoring system should be used as a guide and point of reference, like other statistical frameworks for assessing species rank (cf. Isler *et al*. 1998).

2. *The species scoring system can be used to identify novel situations in need of revision*. Some of the splits covered here are ones which we originally proposed or have previously adopted (e.g. *Campephilus splendens*, *Amazilia humboldtii*). Other proposals were novel to us. We were surprised and intrigued to find out how solid some of the proposals were. National, regional and international committees' lists can be enhanced by considering del Hoyo & Collar (2014)'s taxonomic proposals.

3. *The species scoring system is a useful and helpful benchmark*. The concept and analyses behind it are, generally speaking, solid. The outputs of the system

can give greater confidence to new taxonomic proposals.

4. *Consistency and fair consideration of new methods*. It is easier to criticise a new idea than to come up with one, but that does not necessarily mean that the innovation was wrong or cannot be improved upon or worked with.

Other splits

Santa Marta Blossomcrown *Anthocephala floriceps*
Tolima Blossomcrown *A. berlepschi*

We follow Lozano-Jaramillo *et al.* (2014) in splitting these two Colombian endemic hummingbirds, principally based on the data and photographs presented by F. G. Stiles in Remsen *et al.* (2015).

Figure 27. Tolima Blossomcrown *A. berlepschi* Vereda Cai, Ibagué (A. Quevedo, 22 April 2015).

Providencia Vireo *Vireo approximans*
Thick-billed Vireo *V. crassirostris*

Bond (1961) noted that Thick-billed Vireo gives a song "with many variations", "but on Old Providence it utters a simple chatter like that of a Mangrove Vireo". Thick-billed Vireo is not otherwise distributed close to Providencia: it breeds in the Bahamas, Turks & Caicos Islands, Cayman Islands, Haiti (Tortuga) and northern Cuba, with vagrants in Florida, USA (Raffaele *et al*. 1998). Presumably due to distributions and voice, Raffaele *et al.* (1998) considered that the records of Thick-billed Vireo on Providencia were misidentified and relate instead to Mangrove Vireo *V. pallens*. Brewer (2010) therefore placed *approximans* in *pallens*. Raffaele *et al*. (1998)'s reference to "records" led McMullan *et al.* (2010, 2011) and McMullan & Donegan (2014) erroneously to consider *crassirostris* a "rare boreal migrant" when it is a resident species. Hilty & Brown (1986), McNish (2003) and Salaman *et al.* (2001, 2008b, 2009, 2010) also each continued to treat *crassirostris* as the species occurring on Providencia. A further possible taxonomy emerged more recently when *approximans* was split by Gill & Donsker (2015). Recent molecular studies of the family do not include samples of *V. caribaeus* or *V. (?.) approximans* (Slager *et al*. 2014). In the absence of other data, we reviewed vocalisations of Providencia Vireo and possible related species (San Andrés Vireo *V. caribaeus*, Thick-billed Vireo *V. crassirostris* and Mangrove Vireo *V. pallens*). We compared vocalisation structures subjectively, in order to assess relations.

Figure 28. Colombia's endemic insular vireos. Above: San Andrés Vireo *V. caribaeus* (A. Quevedo, 24 October 2005). Below: Providencia Vireo *V. approximans* (P. Salaman, 27 October 2001 at 13°20'36.86"N, 81°23'17.18"W). Note the differences in tertial markings and crown/mantle coloration.

In Figure 29, sonograms of some of the recordings inspected are shown, demonstrating vocal variability in each of the species studied. Mangrove Vireo has a highly variable vocal repertoire. Its vocalisations all consist of a note of a particular shape which is repeated again and

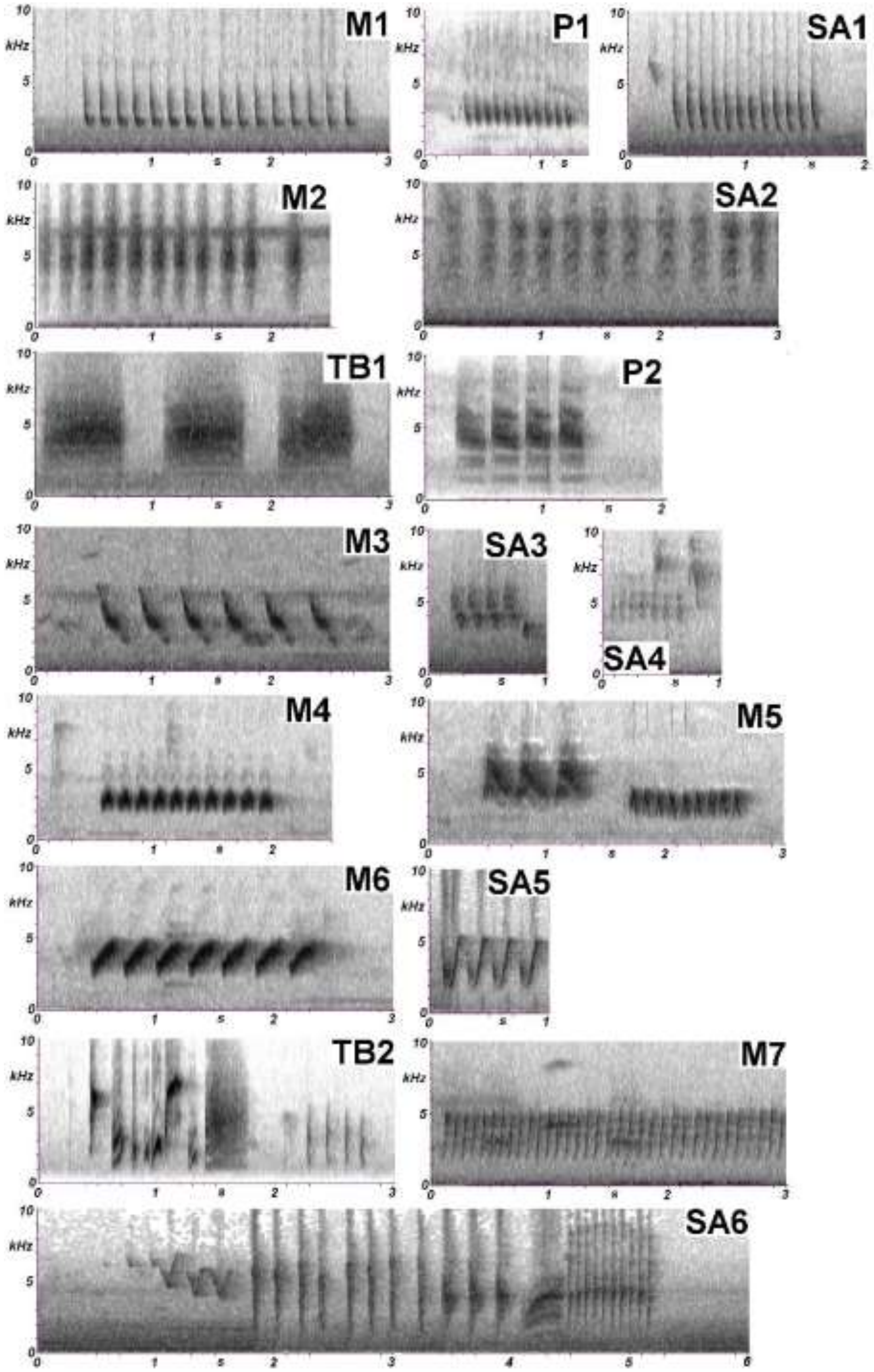

Figure 29. Vocalisations of Mangrove Vireo *V. pallens* (M), Providencia Vireo *V. approximans* (P), San Andrés Vireo *V. caribaeus* (SA) and Thick-billed Vireo *V. crassirostris* (TB). First row, repeated downstroke calls. M1 Las Coloradas Rd, Yucatán, Mexico (XC103432: N. Larsen). P1 Providencia, Colombia (XC185550: J.A. Alonso de Juan). SA1 El Radar road, San Andrés, Colombia (XC7768: T. Mark). Rows 2-3 Grating or contact calls. M2 Bahía de San Lorenzo, Honduras (XC143350: J. van Dort). SA2 Scrub west of San Luis, San Andrés, Colombia (XC86773: T. Donegan). TB1 Cayo Peradon Grande, Cuba (XC256884: H. Matheve). P2 Providencia, Colombia (XC185547: J.A. Alonso de Juan). Rows 4-5, Slower downstroke calls and up-downstroke calls. M3 XC103420 (as XC103432). SA3 El Radar road, San Andrés, Colombia (XC7770: T. Mark). SA4 Big Pond, San Andrés, Colombia (XC86783:T. Donegan). M4 Tikal National Park, old airstrip, Peten, Guatemala (XC125977: M. Nelson). M5 Carambola Gardens, Sandy Bay, Roatán, Bay Islands (XC264269: M. McKewy Mejía). Row 6, Upstroke calls. M6 Tikal National Park, Petén, Guatemala (XC125976: M. Nelson). SA5 San Andrés island, Colombia (XC82864: C. Gómez). Rows 7-8, More complex or longer calls. TB2 Cayo Peradon Grande, Cuba (XC256885: H. Matheve). M7 Marble Hill Farms, José Santos Guardiola, Bay Islands, Honduras (XC185199: O. Komar). SA6 San Andrés island, Colombia (XC82872: C. Gómez).

Table 2. Summary of changes resulting in changes of numbers of species in particular categories and new species total. For key to codes used in header, see Donegan *et al*. (2015).

Change	**Species**	**Conf.**	**Obs.**	**Obs Bog**	**SA.**	**SA Obs**	**Obs+**	**Bog**	**Ext**	**Int**	**Int Obs**	**Esc**	**Esc Obs**	**Total**
2014 Checklist totals		**1,833**	**46**	**1**	**13**	**7**	**3**	**4**	**1**	**3**	**1**	**[9]**	**[7]**	**1912 [1,928]**
Species added	Subtropical Pygmy-Owl *Glaucidium parkeri*	+1												
	Fiery-tailed Awlbill *Avocettula recurvirostris*	+1												
	Pale-rumped Swift *Chaetura egregia*	+1												
Splits	Western Wedge-tailed Hummingbird *Schistes albogularis*	+1												
	White-tailed Hillstar *Urochroa leucura*	+1												
	Perija Starfrontlet *Coeligena consita*	+1												
	Green Inca *Coeligena conradii*	+1												
	Double-banded Puffbird *Hypnelus bicinctus*	+1												
	Splendid Woodpecker *Campephilus splendens*	+1												
	Santa Marta Blossomcrown *Anthocephala floriceps*	+1												
Lump	Carribean Coot *Fulica caribaea*	-1												
Changes of status	Band-rumped Storm-Petrel *Oceanodroma castro*	+1	-1											
	Golden-spangled Piculet *Picumnus exilis*	+1	-1											
	Yellow-bellied Flycatcher *Empidonax flaviventris*	+1			-1									
	Yellow-throated Tanager *Iridisornis analis*	+1	-1											
Overall Change since 2014 Checklist		**+13**	**-3**		**-1**									
New totals per category 2015		**1,846**	**43**	**1**	**12**	**7**	**3**	**4**	**1**	**3**	**1**	**[9]**	**[7]**	**[1,937]**
Less escaped species														**[-16]**
TOTAL BIRD SPECIES FOR COLOMBIA														**1,921**

again. Different particular vocalisations often have very different note shapes, but variation in note shapes within each call is minimal. Our sample includes calls consisting of repeated: downstrokes (Fig. 29, M1, M3), upstrokes (Fig. 29, M6, M7), harsh notes appearing as a wall of noise on sonograms (Fig. 29, M2) and symmetrically shaped up-down notes (Fig. 29, M4, M5). In contrast, Thick-billed Vireo vocalisations are more complex, with multiple differently shaped notes typically occurring in particular vocalisations (Fig. 29, TB2) other than alarm calls (Fig. 29, TB1).

All four species give harsh alarm calls. In Thick-billed Vireo (Fig. 29, TB1), the individual notes are longer than in any other species studied here. In Mangrove Vireo (Fig. 29, M2) and San Andrés Vireo (Fig. 29, SA2), individual notes are of similar length, but in San Andrés Vireo higher tones are accentuated and up or up-down shaped note shapes are visible on sonograms. In Providencia Vireo, gaps between notes are shorter than in other species and notes are longer than both Mangrove and San Andrés Vireos.

Three of the populations also give songs comprising fast downstrokes (Fig. 29, M1, SA1, P1), which in Mangrove Vireo are slowest and in Providencia Vireo are of narrowest bandwidth.

San Andrés Vireo and Thick-billed Vireo both give highly complex songs comprising a variety of different note types (Fig. 29, SA6); examples of these were not found in other populations.

Neither San Andrés Vireo nor Providencia Vireo is an obligate mangrove species. Both are found on dry scrub, typically at slightly higher elevations, being rare or absent in mangroves. Mangrove Vireo is common in the mangroves of the Yucatán, although it does occur in some inland habitats.

Overall, we would concur with Brewer (2010)'s transfer of *V. approximans* to *V. pallens* as a more accurate reflection of relations than retaining it with *V. crassirostris*. However, we prefer treating Providencia Vireo as a separate species in light of its vocal and plumage differences from other congeners.

This split results in no change in numbers on the Colombian checklist, only a change in the name for the vireo occurring on Providencia.

Tricolored Brush-Finch *Atlapetes tricolor*
Choco Brush-Finch *A. crassus*
This split is accepted on the basis of vocal and molecular analyses by Sánchez-González *et al.* (2014). Only the latter occurs in Colombia.

Genus names, linear order, spellings, English names and pended proposals

The following changes to names and orders, which are either under consideration or have been accepted by Remsen *et al.* (2015), are relevant to Colombia and adopted here. Proposal numbers and, where appropriate, key references supporting these changes are cited below:

569. Revise the generic classification of the Mountain-Tanagers (Sedano & Burns 2010) (T. Donegan).
607. Recognize a new species-level taxonomy of trumpeters (Psophiidae) (Ribas *et al.* 2012) (T. Pegan & J. Hruska); option 1, which results in no change to species or subspecies in the Colombian checklist).
641. Change English names of: (A) Bay-winged Cowbird, (b) Red-breasted Blackbird and White-browed Blackbird, and (C) Band-tailed Oropendola and Casqued Oropendola (J.V. Remsen).

644B. Modify linear sequence of species in Phoenicopteridae (Torres *et al.* 2014) (A. Jaramillo).

649. Revise linear sequence of species in Fregatidae (Kennedy & Spencer 2004) (J.V. Remsen).
650. (A) Resurrect *Mustelirallus* for *Porzana albicollis* and (B) transfer *Neocrex* to *Mustelirallus* (García *et al.* 2014) (J.V. Remsen).
651. Resurrect *Porphyriops* for *Gallinula melanops* (García *et al.* 2014) (J.V. Remsen).
653. Change English name Brush-Finch to Brushfinch (J.V. Remsen & T. Schulenberg).
654. Elevate *A. f. berlepschi* to species rank (Lozano *et al.* 2014) (see above).
656. Revise generic classification of 6 species of *Hylophilus*: (A) resurrect *Pachysylvia* and (B) recognize *Tunchiornis* (Slager *et al.* 2014, Slager & Klicka 2014).
660. English names for Lineated Woodcreeper group (only part B relevant for Colombia) (J. V. Remsen).
661. Revise linear sequence of Vireonidae (Slager *et al.* 2014) (D. Slager).
663. Change English name of *Ramphastos ambiguus* (J.V. Remsen).
665. Revise the classification of sandpipers and turnstones (Arenariinae) (Gibson & Baker 2012) (R. C. Banks)
669. English names of the Blossomcrowns (F.G. Stiles).
670. Recognize *Scytalopus perijanus* as a valid species (Avendaño *et al.* 2015) (see above).
678. Spelling of the name for *Dives warszewiczi* is *Dives warczewiczi* (Manuel A. Plenge).
680. Revise linear sequence of cuckoos (Cuculidae) (Sorenson & Payne 2015) (T. Schulenberg).

The following are pended:

628. Reassign species currently placed in *Myrmeciza* into 12 genera (Isler *et al.* 2013) (part G only).
648. Revise classification of the Phalacrocoracidae (Kennedy & Spencer 2014) (J. V. Remsen).
675. Change South American siskins from the genus *Sporagra* to the genus *Spinus* (E. J. Beckman and C. C. Witt) (Beckman & Witt 2015). New generic arrangements for these birds (*Spinus*, *Sporagra* or *Carduelis*) are proposed with each molecular paper that is published, making fools of us all.

Threat Categories

Updates to the threat status of species occuring in Colombia were made following a further review by BirdLife International that concluded during autumn 2015:

Red Knot *Calidris canutus* LC to NT
Yellow-headed Manakin *Xenopipo flavicapilla* NT to VU
Chestnut-capped Piha *Lipaugus weberi* EN to CR

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