'Bogotá' type specimens of the hummingbird genus Adelomyia, with diagnosis of an overlooked subspecies from the East Andes of Colombia

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Received 25 September 2014

Summary.—Molecular work has revealed that Speckled Hummingbirds Adelomyia melanogenys in the East Andes of dpto. Santander, Colombia, represent a distinct lineage not previously recognised taxonomically. Most specimens from this region differ from others taken in the East Andes by their more extensively rufous and speckled posterior underparts. Sound-recordings and biometrics showed broad overlap for all variables in both populations. Statistically significant but non-diagnosable differences exist in the number of notes in trills of songs, speed of calls and bill length. The type of Adelomyia melanogenys (Fraser 1840) is a ‘Bogotá’ specimen similar to birds from dpto. Cundinamarca, Colombia. Trochilus sabinae Bourcier & Mulsant, 1846, is also based on a ‘Colombia’ specimen. A possible type was identified that resembles the Santander population in its underparts. Adelomyia simplex Boucard, 1893, is based on a leucistic ‘Bogotá’ specimen more consistent with the Cundinamarca population than others. If the Santander population is recognised taxonomically, it is suggested to clarify the type locality for sabinae as the west slope of the East Andes in Santander or Boyacá, but molecular work is needed to confirm this. A. m. inornata in the southern Andes has a faster call and distinctive plumage, and perhaps merits species rank.

The genus Adelomyia is monospecific, comprising the polytypic Speckled Hummingbird A. melanogenys, a widespread Andean hummingbird. The following names have been recognised as valid subspecies, with type localities in parentheses: maculata Gould, 1861 (Quito), chlorospila Gould, 1872 (San Antonio, Peru), aeneosticta Simon, 1889 (‘Venezuela’; considered by Cory 1918 to be near Mérida), cervina Gould, 1872 (Medellín, Central Andes, Colombia), inornata Gould, 1846 (Sandillani, Yungas, Bolivia), connectens Meyer de Schauensee, 1945 (head of Magdalena Valley at La Candela, dpto. Huila, Colombia) and debellardiana Aveledo & Perez 1994 (Venezuelan side of Perijá Mountains) (Dickinson & Remsen 2013). The names melanogenys Fraser, 1840, sabinae Bourcier & Mulsant, 1846, and simplex Boucard, 1893, are all based on ‘Bogotá’ or ‘Colombia’ trade specimens, the latter two being generally regarded as synonyms of the first.

Molecular studies have revealed that birds on the west slope of the East Andes in dpto. Boyacá (hereafter ‘Santander–Boyacá population’) differ in mtDNA from all other north Andean populations (Chaves & Smith 2011, Chaves et al. 2011). Differences are substantial: 5.8% versus other populations in the East Andes with which the Santander–Boyacá population has historically been treated as consubspecific (Chaves & Smith 2011: 7, Table 2). These studies were based on sequences of five specimens at Instituto Alexander von Humboldt, Villa de Leyva, Colombia (IAVH). We studied the sequenced specimens and others from the region, analysed vocal and biometric data, and considered the phenotypic differentiation and names for the Santander–Boyacá population.
Figure 1. Post-1997-collected specimens of (above) main East Andes population and (below) Santander–Boyacá population. Top row: (i) ICN 33152 (El Retiro, Ubalá, dpto. Cundinamarca); (ii) ICN 33951 (Toledo, Parque Nacional Natural Tamá, dpto. Norte de Santander); (iii) ICN 34757 (Santa María, dpto. Boyacá); (iv) ICN 22366 (La Aguadita, dpto. Cundinamarca); (v) ICN 33154 (as i); bottom row: (i) ICN 34816; (ii) ICN 34364; (iii) ICN 36458; (iv) ICN 35820; (v) ICN 34987, details of which appear in Appendix 3 (T. M. Donegan)
Figure 2 (left). ICN 33152 (Cundinamarca) and ICN 35828 (Santander) showing differences in underparts coloration; for details of specimens see Fig. 1 (T. M. Donegan)

Figure 3 (below): IAVH series of the Santander–Boyacá population, from left to right: 10293, 13446, 13463, 10562, 8331, 8336; details of specimens in Appendix 3 (T. M. Donegan)
Methods

*Adelomyia* songs typically commence with a very fast rising trill, comprising short notes over a broad frequency, followed by stronger, slower notes with thicker maxima and terminal downstrokes, each of progressively lower max. frequency (Fig. 4, hereafter ‘song’). The species also gives repeated single, high-pitched *chit* notes over a relatively narrow bandwidth (Fig. 5, hereafter ‘call’). Sonograms were produced of songs and calls of the Santander–Boyacá population (*n* = 18 songs from 13 assumed individuals and *n* = 7 calls from seven individuals) and those from elsewhere in the East Andes north of the Andalucía Pass between dptos. Huila and Caquetá near Parque Nacional Natural Serranía de los Picachos (*n* = 21 songs from 11 individuals and *n* = 5 calls from three individuals). Relatively few sound-recordings were available, despite the species’ abundance in appropriate habitats, suggesting that it is not a very active songster or is infrequently recorded. For songs, total length and max. frequency were measured for the entire vocalisation. Number of notes, length and speed were then measured separately for the initial trill and later slower notes (Appendix 2). In some recordings, intermediate notes with both broad bandwidth and a longer terminal element occur, making the distinction between the trill and longer notes less obvious. In such recordings, different parts of songs were separated based on the point before where a note with strong terminus and longer gap preceding it first appears. Some songs included only the trill or the longer notes, but not both; these were excluded from analyses. Calls are typically very long and many recordings are only of fragments. As a result, a 3–16-second sample (depending on the length of the recording) was taken. Number of notes and length were measured to permit speed to be calculated. The max. and min. acoustic frequency of a typical note were then measured for each recording, and used to calculate note bandwidth. Short rattle calls are also given while foraging or in contact, or by birds in the hand in alarm, but these were not studied.

Biometric data were collated from mist-net surveys in Colombia reported in Donegan & Dávalos (1999) (West Andes: *cervina* / *ultracervina*), Salaman et al. (1999) (East Andes: *melanogenys* / *connectens*) and Donegan et al. (2007, 2010) and Villanueva & Huertas (2011) (Santander–Boyacá population). Biometric data for the latter and other East Andes populations (Norte de Santander, Cundinamarca and southern / eastern Boyacá specimens) were compared using specimens at IAvH and were also taken for putative type specimens. The following statistical tests for diagnosability developed by Donegan (2008, 2012) and Donegan & Avendaño (2008) were applied to the vocal and biometric data.

**LEVEL 1**: statistically significant differences at *p*<0.05. A Bonferroni correction was applied (songs: eight variables each, *p*<0.006); calls four variables *p*<0.013; biometrics five variables *p*<0.010). An unequal variance (Welch’s) *t*-test was used; for song speeds, a two-sample Kolmogorov-Smirnov test was applied as an additional test that must be satisfied for Level 1, to account for the possibility of a non-normal distribution. These calculations assess the statistical significance of differences between means of populations, but do not address diagnosability, as they tolerate considerable overlap.

Further calculations were undertaken to measure inter-population differences in the context of various species and subspecies concepts. In the formulae used below, $\bar{\chi}_1$ and $s_1$ are the sample mean and sample standard deviation of Population 1; $\bar{\chi}_2$ and $s_2$ refer to the same parameters in Population 2; and the *t* value uses a one-sided confidence interval at the percentage specified for the relevant population and variable, with *t*$_1$ referring to Population 1 and *t*$_2$ referring to Population 2.

**LEVEL 2**: a ‘50% / 97.5%’ test, following one of Hubbs & Perlmutter’s (1942) subspecies concepts, which is passed if sample means are two mean standard deviations or more apart.

controlling for sample size, i.e. the sample mean of each population falls outside the range of 97.5% of the other population: $|\bar{x}_1 - \bar{x}_2| > (s_1(t_1@97.5\%) + s_2(t_2@97.5\%))/2$.

LEVEL 3: The traditional ‘75% / 99%’ test for subspecies (Amadon 1949, Patten & Unitt 2002), modified to control for sample size, which requires both of the following tests to be passed: $|\bar{x}_1 - \bar{x}_2| > s_1(t_1@99\%) + s_2(t_2@75\%)$ and $|\bar{x}_1 - \bar{x}_2| > s_2(t_2@99\%) + s_1(t_1@75\%)$.

LEVEL 4: diagnosability based on recorded values or, for plumage and subjective vocal characters (note shape and change of note shape), subjective diagnosability; the first part of Isler et al.’s (1998) diagnosability test.

LEVEL 5: ‘Full’ diagnosability (where sample means are four mean standard deviations apart at the 97.5% level, controlling for sample size); the second part of Isler et al.’s (1998) diagnosability test: $|\bar{x}_1 - \bar{x}_2| > s_1(t_1@97.5\%) + s_2(t_2@97.5\%)$.

The Tobias et al. (2010) scoring system was also considered. We do not expressly endorse this system, but use it as a reference point to evaluate taxonomic rank.

We also investigated possible type specimens for three available names in the genus Adelomyia based on ‘Bogotá’ or ‘Colombia’ type specimens: Trochilus melanogenys Fraser, 1840; Trochilus sabinae Bourcier & Mulsant, 1846; and Adelomyia simplex Boucard, 1893. No subsequent publication concerning the genus discusses any of the types of these names in detail, despite several studies (e.g. Cory 1918, Zimmer 1951, Schuchmann 1999, Chaves & Smith 2011, Chaves et al. 2011). Biomap Alliance Participants (2014), who databased all Colombian specimens in public museums worldwide, except IAvH, was used to locate types and other important specimens. We studied all Adelomyia in the American Museum of Natural History, New York (AMNH), Natural History Museum, Tring (NHMUK), IAvH, Instituto de Ciencias Naturales, Universidad Nacional, Bogotá (ICN), Universidad Industrial de Santander, Bucaramanga (MHN-UIS), Muséum National d’Histoire Naturelle, Paris (MNHN) and US National Museum, Smithsonian Institution, Washington DC (USNM). We also obtained photographs from the World Museum, Liverpool (LIVCM). This review included examination of many historic ‘Bogotá’ or ‘Colombia’ specimens of A. melanogenys, at AMNH ($n = 39$), LIVCM ($n = 2$), MNHN ($n = 6$), NHMUK ($n = 21$) and USNM ($n = 8$).

**Results**

Biometric and vocal data are presented in Appendices 1–2. Statistically significant differences were found between the Santander–Boyacá population and the nominate in number of notes (Level 1, $p=0.0003$) and length (Level 1, $p=0.005$) of the trill part of the song. For calls, statistically significant differences in speed were found, which passed the first part of the Level 1 test based on Welch’s $t$ ($p=0.011$) but not when a Bonferroni correction is applied, using Kolmogorov-Smirnov ($p=0.020$). Data are also suggestive of average broader bandwidth for calls in the Santander–Boyacá population, but tests of significance were not met doubtless due to sample size. The difference in call speed is noteworthy given that this varies geographically, with inornata of Bolivia, which is sister to all other Adelomyia in the molecular phylogeny, being fastest (Fig. 5). Differences in bill length ($p=0.05$) also narrowly missed the Level 1 test of statistical significance when applying a Bonferroni correction. Bill measurements were considered to vary substantially between other Adelomyia populations by Chaves & Smith (2011), who did not study biometrics of the Santander–Boyacá population.

Twelve of the 16 Santander–Boyacá specimens with definite locality data (Appendix 1), including all Yariguíes material, are distinguishable from series collected elsewhere in the
East Andes, in having more extensive rufous (marked with glittering green speckles) on the flanks and belly-sides (Figs. 1–3). Their morphology is described in Appendix 4. West and Central Andes specimens (variously attributed to subspecies cervina, ultracervina, connectens or ‘intergrediens’) have a more rufous ground colour to the throat and breast, with less contrasting striations on the throat. Venezuelan specimens (aeneosticta) show a yellower shade of glittering green on the ventral surface and a more contrasting and extensively white breast.

### Taxonomic rank of the Santander–Boyacá population

Based on molecular studies, the Santander–Boyacá population is a phylogenetic species (Cracraft 1983). It would not meet the requirements for species rank under a comparative Biological Species Concept (cf. Helbig et al. 2002), given that Adelomyia is currently treated as monospecific. Ranking this population as a species would also require splitting inornata, aeneosticta and maculata (with chlorospila) to preserve monophyly. Applying Tobias et al. (2010), the Santander–Boyacá population would attain 1–2 points for coloration and speckling of its flanks and belly, one point for the number of notes in the trill part of the song and one point for call speed compared to melanogenys (total 3–4: less than the required seven for species rank). We suspect that one additional point would be awarded for bill length using a larger sample.

No consensus exists as to if or how avian subspecies should be recognised. Patten (2015) proposed that only a failure to achieve both phenotypic and genotypic distinctiveness should deny subspecies status, implying that distinct lineages such as this one should be recognised even in the absence of phenotypic diagnosability. Under their scoring system, Tobias et al. (2010) proposed a benchmark of seven points for species rank, which implies that 3–4 points could be an appropriate score for subspecies rank, especially in a genus where less ancient lineages are recognised taxonomically. In contrast, Remsen’s (2010) proposed subspecies concept requires a single diagnosable character, which is lacking for the Santander–Boyacá population, unless molecular characters are considered.

**Trochilus melanogenys**

In the next three sections, we consider whether any names in Adelomyia based on East Andes specimens might apply to the Santander–Boyacá population. The name melanogenys was described from a ‘Bogotá’ specimen by Fraser (1840). Louis Fraser worked at the Zoological Society’s Museum in Brewer Street, London. Specimens appear to have flowed regularly from him to the British Museum only from 1846 (E. C. Dickinson in litt. 2012). Earlier material—including the melanogenys type—would have been accessioned to the Zoological Society of London collection, which is no longer extant. One ‘Bogota’ specimen we examined (NHMUK 1887.3.22.1561) is annotated: ‘Agrees with the type of A. melanogenys in the Liverpool Museum comp. 19 Mar 1890 O.S.’ [Osbert Salvin]. Of two ‘Bogotá’ specimens at LIVCM (D1098 and D1098b), one D1098 (Fig. 7) bears a red holotype label and a label of the Mus. Derbianum of Liverpool also annotated ‘type’. It was catalogued by Wagstaffe (1978) as the type, but its status has been overlooked in the hummingbird literature. The label is inscribed: ‘Trochilus melanogenys Fraser. Original of W. Fraser’s description in the Proc. Zool. Soc. 1840 p. 18. From Sta. Fé de Bogotá’ and on the reverse: ‘1841. Rec’d from Fraser Mar 31. Length 3¾ In. Extend 4¾ In.’.

The type’s plumage is consistent with Fraser’s (1840) description. In relation to the lower underparts, it reads: ‘corpore subtus ex-ochreo-albo; abdominis lateribus rufo lavatis’ [‘underparts ochre-white; abdominal sides washed reddish’]. That the sides (but
Figure 6. An individual of the Santander-Boyacá population of Speckled Hummingbird *A. melanogenys*. Páramo La Floresta, Serranía de los Yariguíes, Zapatoca, dpto. Santander, January 2011 (B. Huertas / Proyecto YARE II)

Figure 7. Type of *Trochilus melanogenys* (Liverpool museum D1098), showing the pale central vent typical of Cundinamarca birds (Clem Fisher & Tony Parker)
not undertail or belly) are washed rufous is a feature of birds from dptos. Cundinamarca and eastern Boyacá. Fraser (1840) gave both total length and wing length as 3¾ inches. It is implausible that an Adelomyia would have wing and total length equal: the wing length is presumably in error (cf. Appendix 1) and is not stated on the specimen label.

We propose to clarify the type locality of melanogenys as the west slope of the East Andes south of dpto. Boyacá or the east slope of the East Andes south of dpto. Norte de Santander, i.e. that part of the East Andes of Colombia within the range of Clade D of Chaves & Smith (2011: Fig. 1b) and Chaves et al. (2011: Fig. 5).

**Trochilus sabinae**

_Trochilus sabinae_ Bourcier & Mulsant, 1846, is based on a specimen from ‘Bogotá, dans la Nouvelle-Grenade’. The spelling ‘sabinae’ was used in the original description. David & Peterson (2010) endorsed using original spellings for various Bourcier names originally described as unmodified personal names, but _sabinae_ was described in this Latinised form.

In the original description, _sabinae_ is not distinguished from _melanogenys_, suggesting its authors were either unaware of Fraser’s (1840) earlier description or had not made the connection. The description fits a Speckled Hummingbird. Its underparts are described: ‘ Parties plus postérieures du dessous du corps d’un blanc sale sur la région longitudinalement médiaire, d’un blanc fauve ou d’un fauve pâle sur les côtés, et plus densement et plus visiblement marqué sur ceux-ci que sur celle-là de mouchetures d’un vert semi-doré.’ [More posterior parts of the underparts dirty white on the medial line, of a fawn-white or pale fawn on the sides, and more densely and more clearly marked thereon with flecks of semi-golden green.] Measurements (total length 92 mm, bill 16 mm, wings 54 mm, rectrices 38 mm) are given. No illustration accompanies the description and no specimens are cited.

Bourcier & Mulsant’s (1846) name was used by Reichenbach (1855) (who omitted _melanogenys_) as _Metallura sabinae_. Bonaparte (1854) placed _sabina_ (an incorrect subsequent spelling of _sabinae_), _inornata_ and Blossomcrown _Anthocephala floriceps_ in a new genus _Adelomyia_. _Trochilus sabinae_ was later designated from among these names as the type species of _Adelomyia_ by Gray (1855). (Cory 1918 incorrectly stated _melanogenys_ to be the type species of this genus.) Gould (1861), Mulsant et al. (1866), Mulsant & Verreaux (1877), Elliot (1879), Boucard (1893), Hartert (1900), Cory (1918) and Zimmer (1951) all treated _sabinae_ as a junior synonym of _melanogenys_. The genus _Adelisca_ Cabanis & Heine, 1860, has as its type species _melanogenys_ and is generally treated as a junior synonym of _Adelomyia_ Bonaparte, 1854.

Many hummingbird types designated by Bourcier (alone or co-authored with Mulsant, De Lattre or Verreaux) reached Elliot’s collection (e.g. Elliot 1879) and were transferred to AMNH, including the supposed types of _Trochilus antoniae_ Bourcier & Mulsant, 1846 (=Threnetes niger), _Trochilus franciae_ Bourcier & Mulsant, 1846 (=Amazilia franciae), _Trochilus coralliurostris_ Bourcier & Mulsant, 1846 (=Amazilia rutila coralliurostris), _Trochilus viridipallens_ Bourcier & Mulsant, 1846 (=Lampornis viridipallens) and _Trochilus rosae_ Bourcier & Mulsant, 1846 (=Chaetocercus jourdanii rosae). Various Bourcier types were examined at AMNH. Most are mounted and have colourful more or less square labels written in red and blue ink denoting their status.

Greenway (1978: 3) considered that some of Bourcier’s types lack type specimen labels, which may have been removed. Bourcier’s specimens were regularly exchanged with other hummingbird collectors of the time. As an indication of the widespread trade in such specimens at the time, Mulsant _et al._ (1866) includes an advertisement by W. Schlüter for hummingbirds and other specimens, with _A. melanogenys_ among the cheapest at 1.5 marks.
(vs. up to 40 marks for a Red-tailed Comet *Sappho sparganurus* or 160 marks for the most expensive bird-of-paradise). To compound matters, Bourcier sometimes specified ‘type’ on specimens that were representative of the species but not actual types (Greenway 1978: 5).

The current whereabouts of some of Bourcier’s types is a mystery. Deslongchamps (1881) queried whether Elliot (who later deposited specimens at AMNH) certainly obtained the types of *Trochilus grayi*, noting that the Bourcier collection was dispersed at a public sale after his death, and that the Faculty of Sciences of Caen obtained some specimens of this species (along with other Bourcier specimens). It is probable that most of the Caen collection was destroyed during World War II (Greenway 1978: 4). However, Deslongchamps (1881) did not mention any *Adelomyia* in his Caen museum catalogue, so this does not seem a likely repository of the *sabinae* type. Jardine (1852) reported that a collection of Bourcier’s, purchased by Dr Edward Wilson of Philadelphia was lost at sea. It is unknown whether this collection included the *sabinae* type.

Among a large collection of *Adelomyia*, MNHN has five specimens each bearing a more or less square label attached with pink string annotated ‘G. Adelomyia sabina’, with ‘sabina’
then crossed out for melanogenys. None of the other specimens of melanogenys studied by us bear labels with the name sabinae, ‘sabine’ or ‘sabina’. Two of the MNHN specimens (1896-353, 1896-354) were collected near Caracas, Venezuela, and accessioned from Levraud (French consul in Caracas) in the year specified. They are of subspecies aeneosticta, morphologically and by locality. Both specimens post-date the description of sabinae. As Levraud presumably donated locally sourced specimens to MNHN, the pink-stringed label was probably attached at MNHN. Two other ‘sabina’ specimens have similar labels, are unnumbered and lack locality data or additional information.

The final ‘sabina’ specimen, MNHN 347 (Fig. 8), has an additional handwritten label annotated ‘sabine’ and another ‘P. Mr. Lewy 1850’ with ‘No. 347’. The ‘P’ on Lewy specimens has been considered a contraction of ‘presented’ (e.g. Hellmayr & Conover 1942). MNHN 347 was therefore presented to or by Lewy just four years after the description of sabinae.

Unlike the Bourcier types at AMNH, MNHN is unmounted and lacks ornate, colourful labels (cf. Fig. 10). We compared the handwriting in the name ‘sabine’ on the label of MNHN 347 with that on the labels on types of contemporaneously described species, including...
Trochilus rosae Bourcier & Mulsant, 1846 (=Chaetocercus jourdanii rosae) and Trochilus franciae Bourcier & Mulsant, 1846 (=Amazilia franciae). Most are written in a calligraphic style that was relatively widespread in the mid 1800s. The original labels of AMNH types are more ornate and written in three different colours for each of the species name, the word ‘type’
and the authors. However, there are notable similarities. In particular, the ‘s’ is of quite similar shape on the ‘rosa’ and ‘sabine’ labels (although one is upper and the other lower case), both are slanted and in both the final letter is embellished by a line at the end, which in the word ‘rosa’ is upturned (Fig. 10). The name ‘franciae’ on the original label is written with letters less connected than on the ‘sabine’ label (writing more slowly or carefully). The lack of a more ornate Bourcier label on MNHN 347 or such careful handwriting could be explained by the name sabinae being in synonymy with melanogenys and its type specimen then being sold or neglected. Some other supposed AMNH Bourcier types, e.g. Eriocnemis derbyi, lack these sorts of labels. Also notable is that the unmodified names ‘rosa’ and ‘sabine’ are used on the labels in both cases. This reflects Bourcier & Mulsant’s (1846) French vernacular name ‘Le C. de Sabine’, which continued to be used for A. melanogenys, following its synonymy, by Mulsant & Verreaux (1877) as ‘L’Adélomye de Sabine’.

Measurements of MNHN 347 are remarkably similar to those of the type in the original description. Bill to skull is 19 mm, but the bill to feathers length is identical to that in the description (16 mm). Wing is 51.5 mm, 2.5 mm shorter than in the description, but 4% shrinkage in wing length can be expected over c.165 years (Winker 1993) and differing measuring protocols could also be responsible. Tail is almost identical in reported length at 37.5 mm. The bill is longer than that of the small sample of specimens measured from Santander, but within the range of the larger mist-net sample from this region and also within that for East Andes populations.

The sabinae type(s) might be one of the tens of other ‘Bogotá’ or ‘Colombia’ specimens in museums, or it could have been sold to a private collector or lost in the collection sold to Wilson. However, for the reasons above, MNHN 347 may be the type of sabinae.

MNHN 347 lacks some undertail-coverts and lower belly feathering, probably as a result of preparation and subsequent handling as one of the labels is attached very close to the legs. This makes any identification tentative, but MNHN 347 clearly has buffy feathers in the lower chest to undertail region, with rather large green discs on the sides close to the central belly, resembling Santander–Boyacá specimens most closely in this respect (Fig. 8; cf. Figs. 1–3).

The spellings ‘sabina’, ‘sabine’ and ‘rosa’ when used here are solely mentioned to discuss wording on specimen labels and French vernacular names, and are not proposed as emendations or valid subsequent spellings.

**Adelomyia simplex**

A. simplex was based on a ‘Colombia’ specimen. Boucard (1893) wrote: ‘I have also one specimen with the upperside pale slaty-gray. Tail and wing brownish-gray. All the rectrices excepting the median tipped with buffy white. Underside whitish-gray, spotted with small brown spots on throat and flanks. If it should prove a distinct species, I propose the name of **Adelomya simplex** for it.’ (The name Adelomya Mulsant & Verreaux, 1866 is an incorrect subsequent spelling of Adelomyia Bonaparte, 1854, which was relatively widely used in the 1800s.) The name simplex was considered a synonym of A. melanogenys by Hartert (1900). This name should not be confused with Eriopus simplex, Gould, 1849, which is also based on a ‘Colombia’ trade specimen and which Cory (1918) considered to represent an ‘abnormal phase of plumage’ of Coppery-bellied Puffleg Eriocnemis cupreoventris.

The type of A. simplex is at MNHN (CG1989.398: Fig. 9). The specimen bears a ‘Museum Boucard’ label inscribed ‘**Adelomya simplex** type of species Columbia [sic]’. It had not previously been set aside in the type collection at MNHN but is now. The bill is yellowish below (rather than grey as in melanogenys) and more extensively pale, and its legs are also yellow. The bare parts are naturally this colour, not painted. The underside
is pale gray, with brown spots from the throat to breast and flanks. The lower belly and undertail are all white. Leucism is rare in *Adelomyia*, though we found a specimen of the nominate subspecies (NHMUK 2002.3.799, ‘C.B.XXI.169’, ‘Columbia’) with one all-white rectrix. There was a thriving trade in hummingbirds during the mid 1800s for the millinery business and whilst most specimens were used for such purposes, unusual ones were sold to private collectors.

Biometrics (bill to skull 17.2 mm, wing 55.5 mm, tail 38 mm), supercilium, throat and tail plumage and tail shape (only very slight fork) are broadly consistent with nominate *A. melanogenys*, although tail length is rather long for an old specimen of any population studied here (Appendix 1). Tail and throat to breast pattern (if not coloration) are also consistent with *Adelomyia*. Its subspecific identity should be confirmed genetically. It is presently impossible to refute the null hypothesis that this ‘Bogotá’ specimen originated from the environs of Bogotá, but we cannot eliminate the possibility it was collected elsewhere using morphology alone.

**Other available names in Adelomyia, their status and taxonomic rank**

Two other names are based on types in the Bonn museum (Schuchmann 1984, van den Elzen 2010, Dickinson & Remsen 2013): *ultracervinus* Kleinschmidt, 1943 (La Cumbre, Valle del Cauca) and *intergrediens* Kleinschmidt, 1943 (Río Toche, Quindío Pass and Caño del Monte Tolima, 1,700–2,400 m, Colombia: Central Andes). The West Andes population is generally treated as consubspecific with *cervina* of the Central Andes. Specimens are similar in plumage and molecular data show no major distinction between these ranges. We presume that both of Kleinschmidt’s (1943) names are junior synonyms of *cervina*, assuming that they are normal *Adelomyia* from the localities stated, but their type specimens should be verified to confirm this.

The names *cervina* and *chlorospila* were afforded species rank by Gould (1887) and some others. Argentine, Bolivian and Peruvian (Cuzco and Puno) populations referable to *inornata* were ranked as a species by Gould (1846, 1861, 1887), Mulsant & Verreaux (1877), Elliot (1879), Hartert (1900) and Cory (1918). However, the genus has been treated as monospecific essentially universally since Peters (1945), e.g. by Zimmer (1951), Schuchmann (1999), Schulenberg et al. (2007), Dickinson & Remsen (2013), Remsen et al. (2015). The southern populations differ from other *Adelomyia* in having bluish throat feathers, more rufous mantle and rump, and from most populations (but not *chlorospila*) in their buffy tail tip (Fig. 11). They also have a faster paced call than all congeners (Fig. 5). We have not analysed vocal differences statistically, due to the small sample of this type of vocalisation from Peru. Populations referable to *inornata* exceed the Tobias et al. (2010) benchmark for species rank, with at least three points for gorget coloration, two for rump and mantle coloration and three for call speed. Chaves & Smith (2011: Fig. 6) considered *inornata* not to differ significantly in biometrics from other populations, but it occupies different climatic and environmental space, resulting in one additional point. A total score of at least nine exceeds the seven suggested for species rank. Chaves & Smith (2011) and Chaves et al. (2011) found *inornata* to be sister to all other taxa in the genus. The geographically most proximate and closest-related population, *chlorospila* of Peru, differs by 6.2% in mtDNA (Chaves & Smith 2011: 7, Table 2). Further research into the voice of this population and others in the genus is needed and field work in southern Peru should investigate whether *inornata* is parapatric, sympatric or allopatric with respect to *A. m. chlorospila*, as their ranges abut closely. Because *inornata* was apparently lumped without justification by Peters (1945), it could be argued that the molecular study of Chaves & Smith (2011) together with the data presented here are sufficient to restore it to species rank, as has been proposed for some
other hummingbirds (cf. Collar & Salaman 2013, Lozano-Jaramillo et al. 2014). The next oldest lineage, chlorospila of Peru, also differs in morphology from other populations (Fig. 11) but morphological, vocal and molecular data present a complex situation in northern and central Peru, which necessitates further study.

**Discussion**

Six options exist to deal with the taxonomy of the Santander–Boyacá population, for those who wish to recognise it as a subspecies: (i) establish a neotype for sabinae based on the type of melanogenys, placing them in objective synonymy, and describe the Santander–Boyacá population as a subspecies; (ii) establish a neotype for sabinae using a modern Santander–Boyacá specimen; (iii) treat sabinae as a nomen dubium and describe the Santander–Boyacá population as a subspecies; (iv) treat sabinae as a nomen dubium and retain the status quo; (v) ascertain or clarify the type locality of sabinae as the immediate Bogotá region, treat sabinae as a subjective junior synonym of melanogenys and describe the Santander–Boyacá population as a subspecies; or (vi) ascertain or clarify the type locality of sabinae as the range of the Santander–Boyacá population.

In our view, any neotype solution involving sabinae is not feasible. It is a requirement for doing so that ‘no name-bearing type specimen … is believed to be extant’. There are reasons to believe that MNHN 347 may be a type specimen. An application could be made to the Commission that a neotype to be designated, but we do not propose this yet.

Treating sabinae as a nomen dubium potentially avoids controversy, but leaves the Santander–Boyacá population unnamed, which does not facilitate communication, the ultimate purpose of taxonomy and nomenclature. A description could easily be reversed, in the event that a new name was subsequently demonstrated to be a junior synonym of sabinae, but could also be criticised because it can be argued that sabinae is not a nomen dubium if MNHN 347 is the type specimen.

Under Art. 76 of the Code (ICZN 1999), the type locality of a name is the ‘geographical … place of capture, collection or observation of the name-bearing type’. Recommendation 76A refers to ‘ascertaining or clarifying’ a type locality. This should be based on (1) data accompanying the original material, (2) collector’s notes, itineraries or personal communications (3) the original description of the taxon; and (4) ‘as a last resort’, localities within the known range of the taxon or from which specimens referred to the taxon have been taken. Although A. melanogenys is common in forests and mature second growth near Bogotá, it does not occur in Bogotá itself except as a vagrant (ABO 2000). As a result, the locality specified on the label should not be automatically equated with the city; it was more likely taken somewhere else ‘dans la Nouvelle-Grenade’. No collector’s notes, information in the original description or data accompanying the original material provides more detail as to the locality. It is therefore usual to adopt the ‘last resort’ approach under Recommendation 76A with respect to ‘Bogotá’ or ‘Nouvelle-Grenade’ specimens of resident species. ‘Bogotá’ and ‘Nouvelle-Grenade’ (or ‘New Grenada’ or ‘Colombia’) are often used indiscriminately and interchangeably on older specimen labels. Because such specimens are trade specimens, the location is the place of purchase, not necessarily the collection locality. Several such types are now considered to have been collected rather far from Bogotá. For example: (i) that of White-rumped Sirystes Sirystes albocinereus was probably collected in Amazonia or at much lower elevations on the east slope of the Andes below Bogotá (Hellmayr 1927, Donegan 2013); (ii) at least one of the original types and the neotype of Yellow-breasted Brush Finch Atlapetes latinuchus ‘simplex’ were probably taken in Nariño, southernmost Colombia, or northern Ecuador (Donegan & Huertas 2006); and (iii) the type of East Andean Antbird Drymophila caudata was probably collected in Santander.
(Isler et al. 2012) or now-deforested parts of Boyacá (Donegan et al. 2012). Most ‘Bogotá’ specimens of Adelomyia are typical of the nominate. However, some show more extensively rufous underparts than dpto. Cundinamarca birds, so are here considered referable to the Santander–Boyacá population (Appendix 3) and others (e.g. AMNH 483486, ‘Colombie’, formerly of the Boucard collection and others at AMNH) clearly belong to A. m. cervina, so were collected in the West or Central Andes.

In light of the above, we therefore tentatively clarify the type locality of sabinae as dpto. Santander or north dpto. Boyacá on the west slope of the East Andes, i.e. the range of Clade F of Chaves & Smith (2011: Fig. 1b) and Chaves et al. (2011: Fig. 5), and that of subspecies sabinae in McMullan & Donegan (2014: 131). The main advantage of using the type locality to resolve taxonomy provisionally is that this can easily be re-evaluated if and when further information becomes available. A disadvantage is the lack of certainty compared to a successful application to ICZN to establish a neotype. We appreciate that some authorities may prefer to treat the Santander–Boyacá population as part of the nominate subspecies.

The core range of the Santander–Boyacá population today is in Serranía de los Yariguíes, where A. melanogenys was one of the most abundant species mist-netted: 68 different individuals were trapped at nine localities at 1,350–3,000 m elevation during surveys in 2003–11 (Donegan et al. 2010). In the Santurbán massif, west slope of the East Andes in Santander, it was also widespread, being found at 12 localities at 1,250–3,400 m (JEA pers. obs.). The distributional limits of the Santander-Boyacá population to the north and east doubtless coincide with the dry río Suárez / Chicamocha canyon and high elevations of the East Andes. Extensive deforestation has occurred on the west slope of the East Andes in Boyacá, making its southern limit more difficult to define. This population also ranges south at least to Alto de Onzaga, Soatá (Fig. 4C) and Arcabuco, Boyacá (Appendix 3). A. melanogenys has not been reported in Serranía de las Quinchas (Stiles et al. 1999, Stiles & Bohórquez 2002, Laverde et al. 2005, Quevedo et al. 2006), but surveyed localities may have been too low in elevation. The extensive ICN series of East Andes Adelomyia includes the nominate subspecies from east slope localities in dpto. Boyacá (e.g. Garagoa, Pajarito) and west slope specimens from dpto. Cundinamarca (e.g. Fusagasugá) but not further north.

Further molecular studies are required to definitively resolve the taxonomy and nomenclature of Adelomyia in the East Andes of Colombia. Three specimens of the Santander–Boyacá population studied by Chaves & Smith (2011) and Chaves et al. (2011) had identical haplotypes and two reportedly showed minor differences, but a discrepancy is evident in the sequences at GenBank. When phylogenetic analyses are replicated, one of the five specimens falls within the aeneosticta clade (IAVH 8331, tissue JLPV61 accession no. JF89402) (G. Bravo in litt. 2015). This issue perhaps led to $n = 4$ being incorrectly mentioned by Chaves & Smith (2011: Fig. 3). This specimen should be re-sampled. Our Yariguíes series at ICN, MNHN 347 and the types of A. simplex and A. melanogenys should also be sequenced. If molecular work shows that none of the names sabinae, simplex or melanogenys can be related to the Santander–Boyacá population, then description of the Santander–Boyacá population would be warranted.

Acknowledgements

We thank the rest of the EBA Project, YARE Project and YARE II teams, especially Blanca Huertas, Elkin Briceño, John Arias, Martin Donegan, Cristobal Ríos, Laura Rosado, Diana Villanueva, José Aguilar, Viviana Alarcón and Christian Olaciregui, and local guides José Pinto, Alonso Masías and Hernando Figueroa. Hernando Guevara (Corporación Autónoma Regional para la Defensa de la Meseta de Bucaramanga–CDMB), Alvaro Prada, Armando Rodriguez and Héctor Lamo (CAS), and the mayors of San Vicente de Chucuri, Galán, El Carmen and Zapatoca provided the necessary permits for field work (CAS resolutions no. 832 and 305). O. Cortés provided photographs of birds at Soatá. O. Laverde made available his sound-recordings and J. Ruiz digitised YARE II recordings. We acknowledge Juan Luis Parra, M. Álvarez, C. I.
Bohórquez, A. M. Únoma, S. Sierra, C. Roa and F. Forero for their work in collecting and preparing specimens used here. F. Gary Stiles (ICN), Claudia Medina, Socorro Sierra and Fernando Forero (IAvH), Robert Frýs-Jones and Mark Adams (NHMUK), Lydia Garetano and Paul Sweet (AMNH), Patrick Boussès (MNHN) and Brian Schmidt (USNM) provided access to specimens. M. Adams, C. Voisin and A. Previato provided information on specimens. Thanks to C. Fisher (LIVCM) for locating the A. melanogenys type and providing relevant literature and photographs, T. Parker (LIVCM) for photographs of A. melanogenys and A. Previato (MNHN) for help in locating the A. simplex type and photographs. E. Dickinson provided helpful insights into historical collections. Expeditions to Serranía de los Yariguíes were financially supported by the Royal Geographical Society (with Rio Tinto plc). Duke of Edinburgh, Fondo para Acción Ambiental, Fundación Omacha, Conservation International Colombia (Becas Iniciativa de Especies Amenazadas—Jorge Ignacio ‘El Mono’ Hernández-Camacho), Percy Sladen Memorial Fund (Linnean Society) and Fundación ProAves. The YARE Project was supported by the BP Conservation Programme (BirdLife International, Conservation International, Flora & Fauna International, Wildlife Conservation Society), Game Conservancy Trust, Fundación ProAves, World Pheasant Association, Universidad Industrial de Santander, Universidad de Caldas, Universidad de Tolima, and Gobernación de Santander. YARE II was supported by the Conservation Leadership Programme, Fundación ProAves and others referred to in Villanueva & Huertas (2011). Idea Wild and the Explorers Club’s Fund provided equipment and financial support to JEA for his studies in Santander. We thank Gustavo Bravo, Steven Gregory and Guy Kirwan for comments on the manuscript.

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**Appendix 1: biometric data from mist-net captures and specimens of Speckled Hummingbirds**

Data are presented as follows: mean ± standard deviation (lowest recorded value–highest recorded value) (*n* = no. of specimens or individuals).

<table>
<thead>
<tr>
<th>Taxon</th>
<th>Wing-chord (mm)</th>
<th>Tail (mm)</th>
<th>Total culmen from skull (mm)</th>
<th>Body mass (g)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Mist-net captures</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Santander-Boyacá population</td>
<td>55.42 ± 3.19</td>
<td>37.10 ± 3.12</td>
<td>17.92 ± 0.96</td>
<td>4.09 ± 0.48</td>
</tr>
<tr>
<td>Yariguíes</td>
<td>(49.0–62.0)</td>
<td>(31.0–42.5)</td>
<td>(15.9–20.0)</td>
<td>(3.0–5.1)</td>
</tr>
<tr>
<td>All</td>
<td>(n=48)</td>
<td>(n=45)</td>
<td>(n=46)</td>
<td>(n=47)</td>
</tr>
<tr>
<td>melanogenys / connectens:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Churumbelos, East Andes</td>
<td>54.19 ± 3.54</td>
<td>34.06 ± 2.12</td>
<td>15.63 ± 0.86</td>
<td>4.05 ± 0.38</td>
</tr>
<tr>
<td>All</td>
<td>(47.0–67.0)</td>
<td>(30.9–37.2)</td>
<td>(14.2–17.8)</td>
<td>(3.3–4.8)</td>
</tr>
<tr>
<td>All</td>
<td>(n=67)</td>
<td>(n=12)</td>
<td>(n=16)</td>
<td>(n=80)</td>
</tr>
<tr>
<td>cervina: Tambito, West Andes</td>
<td>59.40 ± 2.70</td>
<td>/</td>
<td>16.00 ± 1.73</td>
<td>5.4 ± 0.57</td>
</tr>
<tr>
<td>All</td>
<td>(55.0–62.0)</td>
<td></td>
<td>(15.0–18.0)</td>
<td>(4.7–6.1)</td>
</tr>
<tr>
<td>All</td>
<td>(n=5)</td>
<td></td>
<td>(n=3)</td>
<td>(n=4)</td>
</tr>
<tr>
<td><strong>Specimens</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Santander-Boyacá population</td>
<td>51.71 ± 2.98</td>
<td>33.36 ± 2.39</td>
<td>16.57 ± 1.10</td>
<td>3.87 ± 0.49</td>
</tr>
<tr>
<td>All</td>
<td>(47.0–56.0)</td>
<td>(30.5–37.0)</td>
<td>(15.0–18.0)</td>
<td>(3.0–4.5)</td>
</tr>
<tr>
<td>All</td>
<td>(n=7)</td>
<td>(n=7)</td>
<td>(n=7)</td>
<td>(n=6)</td>
</tr>
<tr>
<td>Santander-Boyacá population</td>
<td>52.25 ± 2.99</td>
<td>32.63 ± 2.98</td>
<td>17.25 ± 0.87</td>
<td>3.85 ± 0.62</td>
</tr>
<tr>
<td>Males</td>
<td>(49.0–56.0)</td>
<td>(30.5–37.0)</td>
<td>(16.0–18.0)</td>
<td>(3.0–4.5)</td>
</tr>
<tr>
<td>All</td>
<td>(n=4)</td>
<td>(n=4)</td>
<td>(n=4)</td>
<td>(n=4)</td>
</tr>
<tr>
<td>melanogenys</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>All</td>
<td>50.08 ± 2.72</td>
<td>33.00 ± 1.53</td>
<td>17.65 ± 1.07</td>
<td>3.68 ± 0.52</td>
</tr>
<tr>
<td>All</td>
<td>(46.0–56.0)</td>
<td>(31.0–36.5)</td>
<td>(15.0–19.0)</td>
<td>(3.0–4.9)</td>
</tr>
<tr>
<td>All</td>
<td>(n=13)</td>
<td>(n=11)</td>
<td>(n=13)</td>
<td>(n=13)</td>
</tr>
<tr>
<td>melanogenys</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Males</td>
<td>51.86 ± 2.12</td>
<td>33.43 ± 1.59</td>
<td>17.57 ± 1.30</td>
<td>3.70 ± 0.34</td>
</tr>
<tr>
<td>Males</td>
<td>(50.0–56.0)</td>
<td>(32.0–36.5)</td>
<td>(15.0–19.0)</td>
<td>(3.0–4.0)</td>
</tr>
<tr>
<td>Males</td>
<td>(n=7)</td>
<td>(n=7)</td>
<td>(n=7)</td>
<td>(n=7)</td>
</tr>
</tbody>
</table>
Appendix 2: vocal data

For each population, data are presented as follows: mean ± standard deviation (lowest recorded value–highest recorded value) (n = no. of vocalisations analysed). n = x in respect of each vocalisation for each population, refers to the assumed no. of individuals sampled.

1. Songs

<table>
<thead>
<tr>
<th>Taxon</th>
<th>Total song length (seconds)</th>
<th>Max. frequency (kHz)</th>
<th>No. of notes in trill</th>
<th>Length of trill section (seconds)</th>
<th>Speed of trill section (notes/second)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Santander–Boyacá</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>population</td>
<td>3.62 ± 2.83</td>
<td>11.39 ± 0.28</td>
<td>12.14 ± 3.57</td>
<td>0.94 ± 0.30</td>
<td>13.89 ± 2.77</td>
</tr>
<tr>
<td>n = 13</td>
<td>(1.49–13.33)</td>
<td>(11.03–11.98)</td>
<td>(7.0–18.0)</td>
<td>(n=16)</td>
<td>(8.71–17.88)</td>
</tr>
<tr>
<td>melanogenys</td>
<td>3.04 ± 0.85</td>
<td>11.20 ± 0.79</td>
<td>7.40 ± 2.74</td>
<td>0.65 ± 0.27</td>
<td>11.90 ± 2.87</td>
</tr>
<tr>
<td>n = 11</td>
<td>(1.38–4.83)</td>
<td>(9.69–12.22)</td>
<td>(2.0–13.0)</td>
<td>(n=20)</td>
<td>(7.08–18.11)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Taxon</th>
<th>No. of longer notes</th>
<th>Length of longer notes section (seconds)</th>
<th>Speed of longer notes section (notes/second)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Santander–Boyacá</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>population</td>
<td>9.28 ± 8.16</td>
<td>2.50 ± 2.69</td>
<td>4.10 ± 0.86</td>
</tr>
<tr>
<td>n = 13</td>
<td>(4.0–4.0)</td>
<td>(0.92–12.50)</td>
<td>(n=18)</td>
</tr>
<tr>
<td>melanogenys</td>
<td>8.43 ± 2.89</td>
<td>2.38 ± 0.81</td>
<td>3.60 ± 0.53</td>
</tr>
<tr>
<td>n = 11</td>
<td>(4.0–16.0)</td>
<td>(0.87–4.05)</td>
<td>(n=21)</td>
</tr>
</tbody>
</table>

2. Calls

<table>
<thead>
<tr>
<th>Taxon</th>
<th>Speed (notes/seconds)</th>
<th>Max. frequency of typical note (kHz)</th>
<th>Min. frequency of typical note (kHz)</th>
<th>Bandwidth of typical note (kHz)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Santander–Boyacá</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>population</td>
<td>1.56 ± 0.18</td>
<td>10.90 ± 0.45</td>
<td>9.08 ± 0.35</td>
<td>1.82 ± 0.57</td>
</tr>
<tr>
<td>n = 7</td>
<td>(1.26–1.71)</td>
<td>(10.33–11.51)</td>
<td>(8.70–9.65)</td>
<td>(n=7)</td>
</tr>
<tr>
<td>melanogenys</td>
<td>1.87 ± 0.16</td>
<td>10.70 ± 0.14</td>
<td>9.33 ± 0.16</td>
<td>1.37 ± 0.25</td>
</tr>
<tr>
<td>n = 3</td>
<td>(1.59–1.98)</td>
<td>(10.56–10.86)</td>
<td>(9.17–9.56)</td>
<td>(n=5)</td>
</tr>
</tbody>
</table>

Sound recordings studied


Appendix 3: specimens attributable to Santander–Boyacá population

ICN, IAvH and MNHN specimens are illustrated in Figs. 1–2, 3 and 8, respectively. Several of the IAvH series are denoted ‘A. melanogenys subsp. AMC’ on the specimen label. Identification of various specimens
as of indeterminate ‘subsp.’ had been added to some Santander specimen labels by JEA during 2011 when he was curating the collection. A. M. Cuervo, who wrote ‘subsp.’ on some other specimen labels together with his initials, has confirmed this denotation was intended to indicate that the specimens are representatives of Chaves & Smith’s (2011) Santander–Boyacá clade and that he is not working on a separate publication or description (A. M. Cuervo pers. comm. to J. E. Avendaño 2013).

Instituto de Ciencias Naturales, Universidad Nacional, Bogotá, Colombia (ICN 35820), adult male, Cerro La Luchata, east slope of Serranía de los Yariguíes, vereda El Alto, Galán, dpto. Santander (06°37’45.1”N, 73°18’53.2”W; 2,100 m), by JEA & A. Masías, on 17 April 2006.

ICN 34816, adult male, vereda Alto Cantagallos, west slope of Serranía de los Yariguíes, San Vicente de Chucurí, dpto. Santander (06°49’N, 73°22’W, 2,400 m), by TMD, E. Briceño (EB) and B. Huertas (BH) and prepared by TMD, on 8 January 2004 (not 2003 as per the label).

ICN 34364, adult male, El Talismán, west slope of Serranía de los Yariguíes, San Vicente de Chucurí, dpto. Santander (06°85’N, 73°22’W, 2,000 m), by TMD, EB & BH and prepared by BH on 6 January 2003.

ICN 36458, male, Finca El Brasil, vereda Retiro Grande, Bucaramanga, dpto. Santander (06°37’34”N, 73°18’53”W, 2,100 m), by JEA on 17 April 2006.


IAvH 8331, male, Reserva Cachalú, Encino, dpto. Santander (06°04’26”N, 73°07’45”W, 2,080 m) by J. L. Parra on 28 August 2006.

IAvH 8335, *idem*, 30 August 2006, 2,100 m, unsexed.

IAvH 8336*, *idem*, 2,080 m, unsexed.

IAvH 10293 male, río Pomeca, Arcabuco, dpto. Boyacá (05°48’80”N, 73°28’97”W), by M. Álvarez & C. I. Bohórquez.

IAvH 10562, male, Costilla de Fara, Cuchilla la Vieja, Inspección de Virolín, Charalá, dpto. Santander (06°06’19”N, 73°13’20”W; 1,750 m), by M. Álvarez, A. M. Umaña, S. Sierra & C. Roa in March 1999.


IAvH 13463*, *idem*, male, 21 September 2004.

MHN–UIS 1196, unsexed, Reserva del Acueducto La Plazuela, km 28 via a Pamplona, Tona, dpto. Santander by JEA on 1 August 2002.

USNM 372893*, female, above Virolín, Santander, 7,000 ft. by M. A. Carriker on 17 September 1943.

USNM 410760, male, Hacienda Las Vegas, dpto. Santander, 6,000 ft. by M. A. Carriker on 23 August 1949.

USNM 410762*, *idem*, 24 August 1949.


MNHN 347, the possible type of *sabinae*, see text.

* = those specimens not distinguishable in lower underparts coloration from other East Andes specimens. Note: given that some specimens are not distinguishable from the nominate population, other ‘Bogotá’ or ‘Colombia’ specimens of more ambiguous underparts coloration doubtless also refer to this population.

**Appendix 4: morphology of the Santander population**

The following is based on ICN 35820. Colours follow Munsell Color (2000), taken by TMD at ICN in June 2012. Crown, dorsal plumage and wing-coverts darkish glittering green (not coded). Flight feathers and alula dusky (10YR 2/1). Uppertail dusky (as above) but tinged greenish. All tail feathers tipped buffy (10YR 7/4), more extensive on outer feathers. Undertail also becomes buffy (10YR 6/4) towards body, appearing more extensively on outer feathers. Undertail-coverts cream (10YR 7/6) broadly spotted with glittering green tear-shaped spots. Ground colour of throat, mid-belly, supercilium and small post-ocular spot dirty cream (5YR 8/2). Dense spotting on throat, with glittering green tear-shaped dots arranged in six distinct lines, with dots smaller towards bill, appearing less intense towards breast. Bill from skull to tip 20 mm, or 14.5 mm (tip to feathers), wing-chord 55 mm, tail 36 mm. Label data: mass: 4.0 g; left testis 2.3 × 2.1 mm; right testis 2.9 × 2.3 mm; iris dark brown; bill black; tarsus dark purple, with white soles to feet; no moult noted. Previously mist-netted, ringed and released on 28 June 2005 (recaptured and released later same day and again on 30 June 2005) by TMD, JEA & BH. (ProAves metal hummingbird ring number N80369 on right tarsus.)

There is some variation in the series. Consistent with female plumage of other subspecies, ICN 34987 is paler glittering green on forecrown but otherwise similar to males. IAvH 13463 has a paler throat than other specimens, with less dense streaking and, unlike other Santander–Boyacá specimens, appears to lack such extensive Rufous markings on flanks, being indistinguishable from southern East Andes specimens.