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***Fotografía portada* / Cover photograph**
The first ever published photograph in life of Santa Marta Wren *Troglodytes monticola*, an Endangered and Colombian endemic species restricted to a highly degraded timberline ecotone in the Sierra Nevada de Santa Marta. By Juan Carlos Luna.

Editor General: *Alexander Monsalve Aponte.*

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

Contenidos — Contents

An apparent hybrid *Heliodoxa* hummingbird from the West Andes of Colombia

Un aparente híbrido del género Heliodoxa en la Cordillera Occidental de Colombia

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Abstract

Details and photographs are presented of an individual mist-netted in the West Andes of Colombia in 1997, which seems possibly to represent a combination between Fawn-breasted Brilliant *Heliodoxa rubinoides* and Empress Brilliant *H. imperatrix*.

Resumen

Presentamos medidas y fotografías de un aparente híbrido capturado en la Cordillera Occidental de Colombia en 1997. Este individuo parece posiblemente representar una combinación entre Heliodoxa rubinoides y H. imperatrix.

Introduction

During August to September 1997, the authors studied birds in Tambito Nature Reserve, El Tambo municipality, dpto. Cauca in the Western Cordillera of Colombia (*c*. 02°30'N, 77°00'W), using mist-nets and observations (see Donegan & Davalos 1999 for details). In a study site located in mature, emergent secondary growth with abundant palms at 1,600 m (Site 2 in Donegan & Dávalos 1999), the most abundant genus during netting was *Heliodoxa*, with 30 Empress Brilliant *H. imperatrix* and 9 Fawn-breasted Brilliant *H. rubinoides* captured in four days. In addition, a further hummingbird was captured which could not be identified. A discussion of this individual was included in an unpublished expedition report provided to donors and presence of a hybrid *Heliodoxa* was briefly mentioned in Donegan & Dávalos (1999), but no details have been published to date.

Hybrids are more frequent among the hummingbirds than many other bird families. Many dubious taxa have been described based on apparent hybrid types for both Colombia (Hilty & Brown 1986) and South America (Remsen *et al*. 2012). The study and diagnosis of novel hummingbird hybrids continues today (e.g. Banks & Johnson 1961, Graves & Zusi 1990, Graves & Newfield 1996, Graves 1990, 1996, 1997a,b, 1998a,b, 1999a,b, 2001, 2003a,b,c, 2004, 2006, 2007a,b). Among reported study cases are both intergeneric (Graves & Zusi 1990) and intrageneric (Graves 2003b) hybrids considered to involve members of the genus *Heliodoxa*. This paper discusses a previously undescribed morphotype that apparently results from a novel intrageneric combination in this genus.

Description of individual

The bird is illustrated in Figs. 1 to 5, with a morphological description appearing in Table 2 and biometric data in the Appendix. The photographs are of low quality, taken on a late 1980s model SLR camera without flash and with print film. As a result, they are not comparable to those taken by ornithologists today, although the key features of the bird are clearly visible. The individual is identified to the genus *Heliodoxa* on account of its straight and black bill being tapered to the skull, with feathers extending forwards on the bill, unmodified remiges, unspotted rectrices, general size (see Appendix), presence of a gorget, forked tail and glittering crown. No morphological features of other hummingbird genera were noted, so species of other genera were not considered in detail here. Biometric measurements are set out in the Appendix. The bird was in primary, tail and body moult.

Discussion

The most striking morphological feature of this individual was its glittering silvery blue gorget (Fig. 1). This, combined with the absence of any rufous on the malar (Fig. 5), make it a presumed adult male and preclude the two *Heliodoxa* species confirmed at the locality. Green-crowned Brilliant *H. jacula* also occurs in the region, but at lower elevations, and has a blue gorget. However, various features are inconsistent for *H. jacula*, particularly the tail coloration (which is dusky, not navy blue), light brown tail shafts (not concolor with the tail), the shade of blue on the gorget and large gorget size (cf. Figs. 9-10), some of which are more reminiscent of *H. rubinoides* (cf. Fig. 8).

Differences from *Heliodoxa* species occurring on the Pacific slope of Colombia are detailed further in Table 1.

New hummingbird species continue to be discovered (e.g. Cortés-Diago *et al* 2007) and reported (Valdes-Velásquez & Schuchmann 2009) from the West Andes. The presence of a fourth sympatric *Heliodoxa* species at the same locality would be unprecedented for the genus and seems improbable. This individual is more likely to have had a hybrid origin based on these considerations alone, and shows various intermediate features between species present at the study locality (Table 2).

Table 1. Differences between presumed hybrid *Heliodoxa* and species occurring in the region.

Species	Differences
Empress Brilliant *Heliodoxa imperatrix*	Male Empress has a pink (not blue) gorget, a longer and green tail, no brown in the wing or tail, no white on the undertail coverts, no speckling on the breast and a more tapered head with more extensive bill feathering. The BMNH collection includes two specimens of *imperatrix* with a silver gorget, showing bluish or pinkish sheens but these do not fully match that of the presumed hybrid either.
Fawn-breasted Brilliant *H. rubinoides*	Fawn-breasted has a pink (not blue) gorget, a more extensively brown (less extensively green) breast, a light brown tail which is much shorter and lacks white undertail coverts. Its bill is more tapered, downcurved and thicker. Tail, bill and body lengths and mass of Fawn-breasted fall out of range (the latter being too short or low).
Green-crowned Brilliant *H. jacula*	Green-crowned's blue gorget is smaller and shaped as a crescent moon, rather than a larger rotated D and is of a different shade of blue. It has no brown in the wing. Mass of Green-crowned is too low and other measurements are at the extreme of variation in this species.

Other Colombian *Heliodoxa* (*aurescens*, *leadbetteri*, *schreibersi*, *gularis*) are not in range and most show distinctive marks not found on this individual, so are not considered plausible parental species.

Key features for purposes of hybrid diagnosis are those potentially referable only to a single species. The brownish wing covert edgings, brownish leading primary (Fig. 1), dusky tail (Fig. 4) and brown ventral tail shaft coloration (Fig. 3) are exclusively *H. rubinoides* features among the three possible parental species considered here. Brown and reddish pigments are often expressed in hybrid hummingbirds where they are available as a parental character (Banks & Johnson 1961, Graves & Newfield 1996, Graves 2004). The blue gorget is a feature solely of *jacula*. However, the shade is lighter and more silvery. Some *imperatrix* specimens at BMNH and photographs available online show silver gorgets suggesting that silver coloration may be a rare variation or polymorphy within the species. The novel "bluing" of feathers is a particular feature of hummingbird hybridisation (Graves 1998a, 1999b) and so *jacula* cannot be considered as necessarily a parent.
Most biometrics fall within the range of all species, although they are more typical of *imperatrix*, with various measures at the extreme for both *rubinoides* and *jacula* (see Appendix). No feather-by-feather measures of rectrices of the nature undertaken by Graves (op. cit.) were undertaken due to a lack of familiarity of the authors with this method for assessing hybrid hummingbirds at the time of the study. Although the central feathers were missing due to moult, the two outer tail feathers on each side demonstrate a deeply forked shape (Figs. 4-5), more like *imperatrix* (Fig. 7; males have longer tails) or *jacula* (Fig. 9) and does not at all resemble that of *rubinoides* (Fig. 6). The biometrics and particularly long body and large mass fall only within the range of *imperatrix* (Appendix).

Table 2. Morphological description of putative hybrid, with an indication of possible parental species for each character.

Feature	Possible species
Bill black and straight. Head tapered into the bill.	All.
Glittering green on upperparts	All.
White postocular	All.
Blue gorget on throat	Closest to *jacula*'s blue but lighter / more silver. Close to *imperatrix*'s silver morph gorget, but bluer.
Size of gorget on throat	*rubinoides* or *imperatrix* (cf. Figs. 9-10).
Fawn spotted breast coloration	Most like *rubinoides* but more extensively green. Male *jacula* have a fawn base to glittering green breast feathers, but fawn is almost imperceptible unless a bird is stretched or moulting.
White upper undertail coverts	Unusual in both *jacula* (e.g. Fig. 10) and *imperatrix*.
Dull shade of glittering green on lower underparts	*jacula*.
Lower undertail coverts glistening green	*jacula* or *imperatrix*.
Thin white feathering on black legs	All.
Primaries, secondaries and tertials "dusky"	*imperatrix* or *jacula*.
Brownish / dusky tinge to some wing coverts	*rubinoides*.
Brown tinge on leading primary	*rubinoides*.
Tail length	*jacula* or between *imperatrix* and *rubinoides*.
Deeply forked tail	*jacula* or *imperatrix*.
Coloration of tail feathers: dusky with brownish tinge	None; *rubinoides* has a brownish tail, others have glittering green/blue tails.
Central two tail feathers copper brown	*rubinoides*.
Copper rump	*jacula* or *rubinoides*.
Tail feather shafts on underside are brown	*rubinoides*.
Body length	*imperatrix*.
Wing length	All.
Tail length	*imperatrix* or *jacula*.
Bill length	All.
Mass	*imperatrix*.

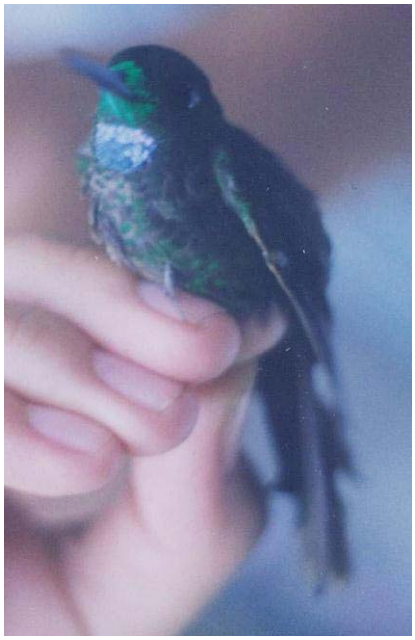

Figure 1. Putative hybrid *Heliodoxa*: frontal view. Photo: T. Donegan

Figure 2. Putative hybrid *Heliodoxa*: dorsal view. Photo: T. Donegan

Figure 3. Putative hybrid *Heliodoxa*: ventral view. Note white undertail and brown tail shafts. Photo: T. Donegan

A male *H. jacula* x *H. imperatrix* specimen is to be found at the British Natural History Museum (no. 1902.13.2211) and was inspected by TMD in September 1997. The same specimen was discussed in detail recently by Graves (2004), whose diagnosis we agree with. Graves (2004) considered the BMNH skin to represent "*the only known instance of intrageneric hybridisation in Heliodoxa*". It differs from the Tambito individual in having a green and relatively longer tail and total body length, no brown in the wing coverts and no noticeably paler base coloration or spotting of the underparts (our measures: Tail 64 mm, Wing 77; Body 154 mm, broadly close to Graves (2004)'s measures in each instance). Its blue violet gorget is noteworthy (given that *imperatrix* has a pink gorget) and an instance of predominating of blue coloration in a hybrid. Although not all hybrid combinations would necessarily look similar (as a result of meiosis in each parental species and sex-related differences) both this and the Tambito bird are putative males and specimen 1902.13.2211 is a rather different bird from that captured at Tambito.

Figure 4. Putative hybrid *Heliodoxa*: dorsal view showing tail shape. Photo: T. Donegan

Figure 5. Putative hybrid *Heliodoxa*: side view showing head shape (out of focus). Photo: T. Donegan

We have no specimens or molecular data that could provide definitive conclusions as to the hybrid or other origin of this organism. The possibility of it representing a bizarre aberration or even a new species cannot therefore be

excluded. A cross between *H. jacula* and *H. rubinoides* would produce all observed characters except the large body size and mass: a hypothesis for this combination would be supported by the blue gorget and lack of brighter glittering green plumage on the lower underparts. Given that *H. rubinoides* and *H. imperatrix* were both common at this locality and together can produce all observed features except the blue gorget, the latter feature could represent an example of 'bluing' of the silvery throat morphotype of *imperatrix* in a hybrid combination between these two species. We hope that with details included in this publication, ornithologists and birders who visit the West Andes can look out for other individuals demonstrating this plumage.

Figure 6. Tail view of male Fawn-breasted Brilliant *H. rubinoides* from same expedition. Photo: T. Donegan

Figure 7. Tail view of female Empress Brilliant *H. imperatrix* from same expedition. Photo: T. Donegan

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Figure 8. Frontal view of male Fawn-breasted Brilliant *H. rubinoides* from same expedition. Photo: T. Donegan

Figures 9 a-b. Left: Moulting adult male nominate *H. jacula* from Alto Honduras, Serranía de los Yariguíes (not using flash). Note less extensive and dark blue gorget. Photo: B. Huertas / Proyecto YARE, January 2006. Right: Adult male nominate *H. jacula* from Cerro de la Paz, Santander (using flash). Note less extensive and dark blue gorget. Subspecies *jamiesoni* of the West Andes can have a larger gorget but it does not approach that of the individual illustrated in Figs. 1-6 in size. Photo: T. Donegan / Proyecto EBA, January 2003.

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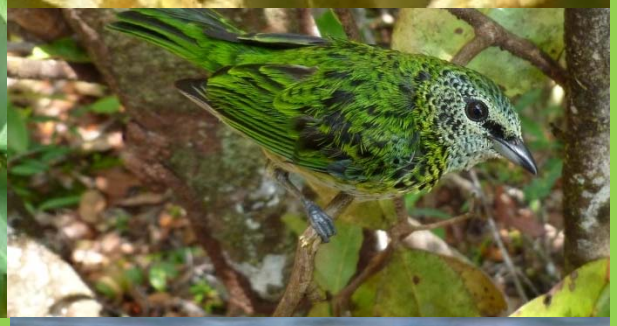
Appendix: biometric data

For each taxon, data are as follows: mean ± standard deviation (lowest recorded value–highest recorded value) (*n* = sample size). Data are based entirely on live mist-net capture data. *H. rubinoides and H. imperatrix* data all originates from the same study at Tambito by the authors. *H. jacula* data comes from studies by TMD and others in Serranía de San Lucas (see details in Salaman *et al*. 2002, Donegan 2012) and Serranía de los Yariguíes, Colombia (see details in Donegan *et al*. 2010). Live data and photographs in this paper of *H. jacula* involve the nominate subspecies rather than *H. j. jamiesoni* of the West Andes, but inspection of specimens shows them to be only mildly differentiated in biometrics.

Species / Individual	**Body (mm)**	**Wing (mm)**	**Tail (mm)**	**Bill to cranium (mm)**	**Mass (g)**
Presumed hybrid	138	78	55	26	9.2
H. imperatrix All	144.6 ± 11.2 (125-170) (n=27)	71.5 ± 3.7 (63-79) (n=29)	59.6 ± 11.3 (48-84) (n=9)	25.3 ± 1.4 (23-28) (n=14)	9.3 ± 0.7 (8.5-10.6) (n=7)
H. imperatrix Males	154.5 ± 10.1 (140-170) (n=8)	74.6 ± 2.1 (72-78) (n=8)	63.8 ± 13.8 (50-84) (n=5)	24.3 ± 1.1 (23-25.5) (n=6)	9.9 ± 1.1 (9.1-10.6) (n=2)
H. rubinoides All	121.8 ± 7.2 (113-135) (n=9)	69.5 ± 3.7 (63-79) (n=11)	42 (n=1)	23.4 ± 1.4 (21-25) (n=7)	7.9 ± 0.6 (7.5-8.3) (n=2)
H. rubinoides Males	122.0 ± 6.3 (113-130) (n=5)	68.8 ± 4.1 (64-73) (n=5)	42 (n=1)	24.3 ± 1.2 (23-25) (n=3)	8.3 (n=1)
H. jacula All	118.3 ± 7.5 (105-135) (n=32)	67.6 ± 4.9 (57-78) (n=34)	43.8 ± 4.9 (37-55) (n=34)	26.4 ± 1.6 (23-29) (n=33)	7.0 ± 0.6 (5.9-8.4) (n=34)
H. jacula Males	126.7 ± 5.5 (117-135) (n=9)	72.3 ± 5.4 (62-78) (n=10)	49.8 ± 4.1 (44-55) (n=10)	25.9 ± 1.5 (24-28) (n=9)	7.2 ± 0.7 (5.9-8.0) (n=10)



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