Male-Like Plumage in Female *Anthracothorax* Hummingbirds: A New Observation and Review

Plumaje masculino en hembras de colibríes del género *Anthracothorax*: nueva observación y revisión de casos conocidos

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Abstract

Sexual dichromatism in plumage is common in hummingbirds (Trochilidae). However, female-limited polymorphism and anomalies, where females exhibit male plumage, also occur. The mechanisms behind these morphs, however, remain unclear. This note presents the first record of a male-like female in *Anthracothorax nigricollis* (Black-throated Mango) west of the Andes, confirming that this phenomenon is not exclusive to specific populations or subspecies. Moreover, we compile previously known records of male-like females in the genus *Anthracothorax* and highlight some best practices to avoid false positives in the sexual determination of specimens.

Key words: dimorphism, hummingbird, polymorphism, sexual dichromatism

Resumen

El dicromatismo sexual en el plumaje es común en los colibríes (Trochilidae). Sin embargo, también ocurren polimorfismos exclusivos de hembras y anomalías, donde las hembras presentan plumaje de macho. Los mecanismos detrás de estos morfos son poco claros. Esta nota presenta el primer registro de una hembra con plumaje de macho en *Anthracothorax nigricollis* al oeste de los Andes, lo que confirma que este fenómeno no es exclusivo de una población o subespecie específica. Además, recopilamos registros previamente conocidos de hembras son plumajes de machos en el género *Anthracothorax* y destacamos algunas buenas prácticas para evitar falsos positivos en la determinación sexual de los especímenes.

Palabras clave: colibrí, dicromatismo sexual, dimorfismo, polimorfismo

Several species of hummingbirds (Trochilidae) exhibit sexual dichromatism, in which males and females exhibit different plumages as adults. Males have a greater diversity of colors and more extreme colors (with shorter and longer wavelengths), while females have more opaque plumages (Beltrán *et al.* 2021) Polymorphism is defined as the presence of two or more distinctly different forms (morphs), in the same life stage, within the same population, where the rarest form cannot be mantained due to recurrent mutation (Ford 1945, Galeotti *et al.* 2003, Huxley 1955) and in some cases may be exclusive to a single sex. However, where one morph is so rare that it cannot be considered as a polymorphism; here, we refer to these as morphological anomalies.

Examples of male-like female morphs include *Florisuga mellivora*, *Anthracothorax nigricollis* and *Anthracothorax prevostii* (Dickey & Van Rossem 1938, Quesnel 1995, Stiles & Skutch 1989, Falk *et al.* 2021) In these cases, females express one of two possible plumages: one typical female plumage and one that resembles that of the males. The case of *F. mellivora* is probably the most studied. It has been estimated that approximately 20% of females have a plumage that resembles that of the male, which has been associated with a lower rate of attack by other hummingbirds (of the same or other species), higher number of visits to food resources and longer time per visit (Falk *et al.* 2021, 2022). For both *Anthracothorax* and *Florisuga*, wing and tail measurements are larger for males and beaks are longer in females: combining these differences, sex can be distinguished in more than 95% of individuals (F.G. Stiles, pers. comm.).

The evolutionary mechanisms that maintain the

polymorphism in *F. mellivora* females are not yet clear, nor is it known whether this is an intermediate stage in the gain or loss of sexual dimorphism, whether the proportions of male-like female morphs found in *F. mellivora* are similar in other hummingbird species, and how frequent female-limited polymorphisms or anomalies are throughout the phylogeny of Trochilidae (Diamant *et al.* 2021, Clark *et al.* 2022 p. 202).

In this note, we report and comment previous records of male-like females in the genus *Anthracothorax* and a new record of male-like female morph of *A. nigricollis* west of the Andes (trans-Andean). This record confirms that this anomaly, previously recorded in Trinidad and Tobago, possibly in Brazil (see below), is not exclusive to one species of *Anthracothorax*, and one subspecies or population of *A. nigricollis* (ML26479321 - Black-Throated Mango - Macaulay Library 2015, Quesnel 1995, Rochford 2012, WikiAves on Instagram 2024). Moreover we make some recommendations to ease the detection of male-like females.

On 24 Apr 2023, DC recorded a male-like individual of *A. nigricollis* (Black-throated Mango) hatching a nest (Fig. 1). The nest was on a power line, approximately 8 m above ground, exposed to the sun, a common occurrence for this species (Greeney 2023). The record was made in front of the Centro Ecoturistico Calima los Tubos, in the territory of the Consejo Comunitario del Alto y Medio Dagua in Buenaventura, Valle del Cauca (nest coordinates 3°50'40"N 76°47'36"W). The nest was between the Dagua River (about 50 m), on the west and the Cali-Buenaventura highway to the east. The hummingbird continued to brood the nest and made intermittent departures on April 25 and 26. The observations were made in the framework of an expedition that planned to visit several locations in the Pacific region of Colombia, which made it difficult to make a standardized monitoring of the nest. However, DCM managed to make some additional visits to the nest described below.

Between May 9 and May 30, DCM visited the nest irregularly. The male-like bird exhibited typical behaviors of a nesting female (see annex). Moreover, we confirmed that the nest was active. On May 12, we observed the female standing on the edge of the nest and inserting her beak into it, presumably feeding the young. By May 16, DCM was able to see the tip of a chick's beak. Furthermore, during the monitoring period, we did not observe either a female-like *A. nigricollis* or a second male-like bird. Although it is known that hummingbirds typically lay two eggs and rear two chicks, we could only confirm the presence of one. It remains unclear whether the second chick was not observed due to the angle of observation—the nest was approximately 8 meters high, making it difficult to see—if the second egg or chick did not survive, or if there was only ever a single individual in the nest.

The observations described here lead us to consider two hypotheses: the first is that the adult bird is a male showing parental care, something not previously reported in Trochilidae (Clark 2022). The second hypothesis, which we consider more plausible, is that it is an adult female that developed a plumage typical of an adult male. This would not be the first record of a female hummingbird exhibiting male plumage nor the first record in this species (Quesnel 1995) but it would be the first trans-Andean record of *A. nigricollis*. Below, we describe previous records of the genus in South America, and discuss the evidence which support the second hypothesis.

The oldest record of male-like females in *Anthracothorax* that we found was described in *A. prevostii* from El Salvador. It was suggested that the male-like plumage could be the definitive plumage in females, appearing only in older individuals (Dickey & Van Rossem 1938). More recent records of this phenomenon in *A. prevostii* confirm this pattern (Stiles & Skutch 1989, Howell & Webb 2010). In the specific case of *A. nigricollis*, the earliest record of a male-like female was reported by Quesnel (1995) at Talparo, Trinidad Island, in Trinidad and Tobago. In this paper, what was assumed to be the same individual was extensively monitored from 1989 to 1992. Throughout four years of monitoring, a male-like bird made several nests nearby and raised several chicks. In this monitoring, the most relevant record was in March 1990. During this month, the bird was rebuilding an

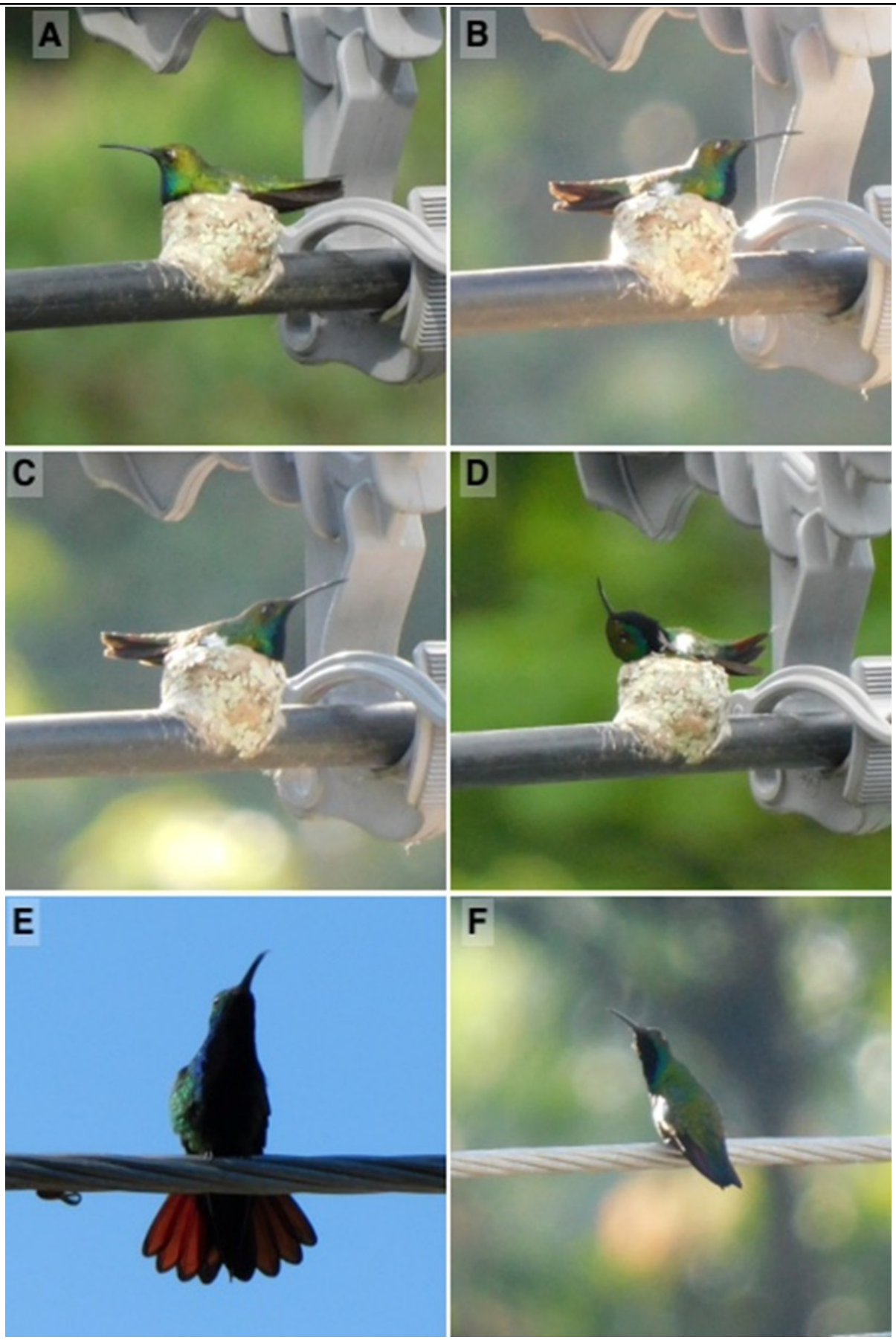

Figure 1. Different angles of the male-like hummingbird in the nest **(A-D)** and perching on the power lines around it **(E-F).** Pictures and one video can also be found at: https://ebird.org/checklist/S134955303.

old nest and by 20 March it had deposited the first egg. As a general pattern, hummingbirds deposit a second egg two days after the first. So on 22 March, Quesnel was observing the nest from 5:35. At 6:00, when the bird first left the nest, only one egg was observed. With no other individuals approaching the nest, by 6:25, when the female again left the nest, there were two eggs. In the words of Quesnel (1995) "No bird in female plumage had visited the nest; the 'male' was a functional female." Unfortunately, when the author decided to collect this individual, after two more years of observation, the bird did not return. In addition to Quesnel's (1995) record, there are two more records in Trinidad and Tobago: the first in South Oropouche, Trinidad (Rochford 2012) and the second in Tobago Forest Reserve, Tobago (ML26479321 - Black-Throated Mango - Macaulay Library 2015). Initially, the fact that all of these early records of females with male plumage were in Trinidad and Tobago would have led one to believe that this was a particularity of this population. However, our record west of the Andes, in Buenaventura, Valle del Cauca, Colombia, and a WikiAves publication in the social media Instagram, probably in Brazil (WikiAves on Instagram 2024), suggest that such occurrences are not restricted to these islands.

Although it was not possible to observe the interior of the nest and confirm egg laying as in Quesnel's (1995) observations, we believe that our observations of the bird in male plumage tending the nest, hatching the egg(s) and feeding one chick, coupled with our lack of knowledge of males exhibiting parental care behaviors, plus the results described by Quesnel (1995), make the hypothesis of a female in male plumage the most likely.

Based on previous knowledge, this is the first record of a male-like female morph in this species on the western side of the Andes, which confirms that this anomaly is not exclusive to a particular taxon or population of *Anthracothorax*. We do not know whether male-like females are common or rare in *Anthracothorax*, since it is virtually impossible to identify male-like hummingbirds via observation, unless the bird is engaging in a female-exclusive behavior such as taking care of a nest and feeding chicks. Future research questions regarding this genus include: Is this morph restricted to older females? Is the male-like morph a female-limited polymorphism, as observed in *Florisuga*? Is this male-like morph a genetically heritable trait, or is it the result of a rare genetic mutation or expression disorder? Establishing that this male-like morph occurs across multiple populations was the first step. The next step is to correctly identify male-like females in *Anthracothorax* and other hummingbirds. This is a challenging task in the field, although identification could be more reliably achieved through examining specimens and/or birds in hand.

We emphasize the importance of corroborating sex determinations in hummingbirds and other birds beyond plumage alone. Additionally, we highlight the need for careful identification of museum specimens and recommend documenting gonadal development when preparing specimens—or marking them as unidentified if gonads are not observed. Implementing these taxidermy practices can help prevent false positives and misidentifications, such as those reported by Clark *et al.* (2022). Moreover, these practices can provide valuable insights into the prevalence of male-like female morphs in Trochilidae (Diamant *et al.* 2021, Clark *et al.* 2022). Finally, it is possible that male-like females in *Anthracothorax* retain their typical morphometric dimorphism despite exhibiting male-like plumage, as observed in *Florisuga* (Falk *et al.* 2021). Therefore, we suggest checking classic morphometric traits, as they may help correctly identify some individuals both in the field and in collections.

Literature cited

Beltrán, D.F., A.J. Shultz & J.L. Parra. 2021. Speciation rates are positively correlated with the rate of plumage color evolution in hummingbirds. Evolution 75(7): 1665–1680. https://doi.org/10.1111/evo.14277

Greeney, H.F. 2023. Black-throated Mango (*Anthracothorax nigricollis*), version 2.0. In Birds of the World (B. K. Keeney, Editor). Cornell Lab of Ornithology, Ithaca, NY, USA. https://doi.org/10.2173/bow.bltman1.02

Clark, C.J. 2022. Invited commentary on "intersexual social dominance mimicry drives female hummingbird polymorphism." Proceedings of the Royal Society B: Biological Sciences 289(1986): 20221700. https://doi.org/10.1098/rspb.2022.1700

Clark, C.J., B. Robinson & J.V. Remsen. 2022. Female plumage polymorphism is rare in hummingbirds. Journal of Ornithology 163(3): 735–748. https://doi.org/10.1007/s10336-022-01975-4

Diamant, E.S., J.J. Falk & D.R. Rubenstein. 2021. Male-like female morphs in hummingbirds: the evolution of a widespread sex-limited plumage polymorphism. Proceedings of the Royal Society B: Biological Sciences 288(1945): 20203004. https://doi.org/10.1098/rspb.2020.3004

Dickey, D.R. & A.J. Van Rossem. 1938. The birds of El Salvador. Field Museum of Natural History, Chicago, IL, USA. https://doi.org/10.5962/bhl.title.3068

Falk, J.J., D.R. Rubenstein, D.R., A. Rico-Guevara & M.S. Webster. 2022. Intersexual social dominance mimicry drives female hummingbird polymorphism. Proceedings of the Royal Society B: Biological Sciences 289(1982): 20220332. https://doi.org/10.1098/rspb.2022.0332

Falk, J.J., M.S. Webster & D.R. Rubenstein. 2021. Male-like ornamentation in female hummingbirds results from social harassment rather than sexual selection. Current Biology 31(19): 4381-4387.e6. https://doi.org/10.1016/j.cub.2021.07.043

Ford, E.B. 1945. Polymorphism. Biological Reviews 20(2): 73–88. https://doi.org/10.1111/j.1469-185X.1945.tb00315.x

Galeotti, P., D. Rubolini, P.O. Dunn & M. Fasola. 2003. Colour polymorphism in birds: causes and functions. Journal of Evolutionary Biology 16(4): 635–646. https://doi.org/10.1046/j.1420-9101.2003.00569.x

Howell, S.N.G. & S. Webb. 2010. A guide to the birds of Mexico and northern Central America (Repr). Oxford University Press, New York, NY, USA

Huxley, J. 1955. Morphism and evolution. Heredity 9(1): 1–52. https://doi.org/10.1038/hdy.1955.1

ML26479321 - Black-throated Mango - Macaulay Library. 2015, May 25. https://macaulaylibrary.org/asset/26479321

Quesnel, V.C. 1995. The case history of an aberrant Black-throated Mango hummingbird *Anthracothorax nigricollis*. Bulletin of the British Ornithologists' Club 115: 25–27.

Rochford, M. 2012. Nesting Behaviour by a Male Plumaged Black-throated Mango Hummingbird, *Anthracothorax nigricollis*. Living World, Journal Trinidad and Tobago Field Naturalists' Club 80.

Stiles, F.G. & A. Skutch. 1989. A Guide to the birds of Costa Rica. Cornell University Press, Ithaca, NY, USA.

wikiaves_oficial. 2024, April 20. Instagram. https://www.instagram.com/reel/C53zeV0Rv-Y/