

Incidence of intermediate specimens or hybrids in the brush-finches *Atlapetes* (Aves: Passeriformes)

Tasa de ocurrencia de ejemplares intermedios o híbridos en el género Atlapetes (Aves: Passeriformes)

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Abstract. We discuss certain cases of hybrids or intermediate specimens in the genus *Atlapetes*, some of which have been overlooked in the literature or recently reported. The incidence of hybridization in the genus is approximately double that observed in Passeriformes in general, a factor potentially relevant to the natural history and evolutionary processes of diversification of the genus.

Palabras clave: hybrid, intermediate, diversification, passerines.

Resumen. Discutimos ciertos casos de hibridización o ejemplares intermedios en el género *Atlapetes*, algunos de los cuales han sido pasados por alto en la literatura o recientemente reportados. La tasa de ocurrencia de híbridos en este género, es aproximadamente el doble de la tasa registrada en los Passeriformes en general, un factor que pueda tener relevancia para la historia natural y procesos evolutivos de la diversificación del género.

Keywords: híbrido, intermedio, diversificación, passeriformes.

In their paper on *Atlapetes* brush-finches, Sánchez-González *et al.* (2015) considered that "Hybrids appear to be very rare among *Atlapetes* species." Based on García-Moreno & Fjeldså (1999), they reported only a "single bird that may be a hybrid between [Bay-crowned Brush-Finch] *A. seebohmi* and [Rufous-eared Brush-Finch] *A. rufigenis*" amongst "hundreds of specimens" studied and referred also to a "single intermediate individual between [Grey-eared Brush-Finch] *A. melanolaemus* and [Bolivian Brush-Finch] *A. rufinucha*". The latter case was also remarked upon by Remsen (1993). These authors further reported specimens considered "intermediates" between two geographically proximate subspecies of Yellow-breasted Brush-Finch *A. latinuchus* (subspecies *latinuchus* and *comptus*) based on their fieldwork. McCarthy (2006) and Carantón-Alaya *et al.* (2018) included other lists of hybrids or suspected hybrids in this genus.

In this paper, we discuss whether the claim of Sánchez-González *et al.* (2015), that hybridization is "very rare" in *Atlapetes*, can be supported. By using the term hybrid, we refer to claimed cases of specimens or individuals that appear to be hybrids between sympatric species. This situation differs from at least one case (involving Moustached Brush-Finch *A. albofrenatus*, discussed below), where intermediates between two taxa occur in a particular small region where one or more of the parent morphotypes are absent. The birds occurring in these areas are not necessarily properly referred to as hybrids, since a hybridization event may have been historical: the parents of specimens studied today may themselves be hybrids or descendants of hybrids. Such cases, and instances where hybridization may have been more historical, or where this is suspected but not known, are referred to here as involving intermediates.

Donegan & Huertas (2006) discussed a specimen referred to as the "Perijá bird" from dpto. Cesar (Instituto de Ciencias Naturales, Universidad Nacional, Bogotá, catalogue no. ICN 32646), which is morphologically intermediate between Moustached Brush-Finch *A. albofrenatus* and Black-fronted (or Perijá) Brush-Finch *A. nigrifrons*. This was overlooked by Sánchez-González *et al.* (2015) and asserted by Carantón-Alaya *et al.* (2018) to be a hybrid of those two species. Donegan *et al.* (2014) studied the latter situation in detail, uncovering field notes evidencing a second individual of this morphotype and seven specimens of intermediate plumage between the "Perijá bird" morphotype and nominate *A. albofrenatus* (six at the Academy of National Sciences Philadelphia and one at the University of Michigan). They presented photographs taken in the field of live birds showing intermediate morphotypes. It is unclear whether the Perijá bird specimen itself represents an intermediate, a hybrid or an undescribed taxon (Donegan *et al.* 2014), but it can be reported that intermediates exist between either: (i) *A. albofrenatus* and "Perijá bird" morphotype; or (ii) *A. albofrenatus* and *A. nigrifrons*.

Carantón-Alaya *et al.* (2018) further reported on a recently collected specimen, diagnosed as a hybrid between White-naped Brush-Finch *Atlapetes albinucha* and Dusky-headed Brush-Finch *Atlapetes fuscoolivaceus*, whose status as such was confirmed using molecular data. This appears to have occurred following a range expansion with deforestation, resulting in two previously allopatric (and morphologically very different) species coming into contact. Previously, Fjeldså & Krabbe (1990) reported a hybrid between Rusty-bellied Brush-Finch *A. nationi* and White-winged Brush-Finch *A. leucopterus* (see also McCarthy 2006).

Donegan & Huertas (2006, p.108) in relation to Slaty Brush-Finch *Atlapetes schistaceus* reported an "an apparent intergrade *A. s. tamae* / *A. s. schistaceus*" (Museo La Salle, Bogotá no. 7552) with "a speculum on one wing but not the other". We reviewed our photographs of this specimen, which further reveal an intermediate dorsal coloration.

Our own studies of *Atlapetes* (specimen numbers listed in Donegan & Huertas 2006, Donegan 2007) resulted in a finding of 2/330 (0.6%) hybrids or intermediates based on specimens in museums. This figure rose to 9/338 (2.7%) including specimens that were targeted (due to their locality in the intermediation zone between the "Perijá bird" and *albofrenatus* in depto. Norte de Santander: data in Donegan *et al.* 2014).

Of the 31 species of *Atlapetes* recognised by Gill & Donsker (2020), at least 10 (32%) namely *seebohmi*, *rufigenis*, *melanolaemus*, *rufinucha*, *fuscoolivaceus*, *albinucha*, *leucopterus*, *nationi* [either *nigrifrons* or a related undescribed Perijá taxon] and *albofrenatus* have been found to have given rise to intra-generic, between-species intermediates or hybrids. (Certain other examples cited by McCarthy 2006 involve species now usually placed in other genera, such as *Arremon*). This rate far exceeds, and in fact is almost double, the 16.8% incidence for the phenomenon recorded for Passeriformes globally by Aliabadian & Nijman (2007). This rate is recorded despite the relatively lower intensity of study and collections of Neotropical (and in our case especially, Colombian) birds versus those from other regions (e.g. Nearctic, Palearctic). In a further two *Atlapetes* species, hybrids or intermediates have been recorded between recognized, diagnosable subspecies which are likely to be good phylogenetic species, namely within *latinuchus* and *schistaceus*; the observed incidence of hybridization could be re-evaluated with possible future taxonomic splitting.

Hybrids or intermediates therefore appear to be relatively prevalent between species in the genus *Atlapetes*, compared to some other passerine birds. This may have several implications for future studies. First, taxonomic studies of the group should take into account that morphotypes represented by few specimens require particular attention. For example, the undescribed "Perijá bird" morphotype is known from just a single museum specimen, taken in a mountain range that has been heavily deforested. The possible status of this specimen as a hybrid should be considered carefully alongside other possible hypotheses. However, a hybrid origin should not be assumed: some *Atlapetes* are simply very rare or localized in their distribution. One recent taxonomic description based on just three old specimens (Antioquia Brush-Finch *A. blancae*: Donegan 2007) proved controversial, some claiming it more likely to involve a hybrid or other explanations than a valid species (e.g. Planet of Birds 2013) until its recent rediscovery in the field (Correa Peña *et al.* 2019, Valencia *et al.* 2020).

The observed incidence of hybridization could also be relevant to the history of diversification of the genus *Atlapetes*, which merits further molecular study into the possibility of hybrid speciation or recurrent introgressive hybridization. Only a few examples of these have been claimed to date in birds (Ottenburghs 2018); *Atlapetes* could be a good place to look for further examples.

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