The nest and eggs of the Santa Marta Brush-finch *(Atlapetes melanocephalus)* with notes on its reproductive biology

El nido y los huevos del Gorrión-montés de Santa Marta *(Atlapetes melanocephalus)* con anotaciones sobre su biología reproductiva

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Abstract

We present the first description of the nest and eggs of the Santa Marta Brush-Finch *(Atlapetes melanocephalus),* a species endemic to the Santa Marta Mountains, Colombia. Three nests were found; all were bulky cups built with different materials and located in different vegetation types, as found in other members of the genus *Atlapetes*. Nests contained two eggs, white with small brown spots. Nesting of *A. melanocephalus* apparently is not restricted to a specific habitat, suggesting that nests of the species could be found in almost any habitat with dense vegetation within its elevational range.

Key words: *Atlapetes melanocephalus,* eggs description, nest description, reproductive biology, Santa Marta Mountains.

Resumen

Presentamos la primera descripción del nido y los huevos del Gorrión-montés de Santa Marta *(Atlapetes melanocephalus)*, una especie endémica de la Sierra Nevada de Santa Marta, Colombia. Encontramos tres nidos, todos en forma de taza abultada pero construidos con materiales distintos y ubicados en sitios con diferentes tipos de vegetación, como se ha encontrado en otros miembros del género *Atlapetes*. La nidada era de dos huevos blancos con manchas cafés. Aparentemente la anidación de *A. melanocephalus* no está restringida a un tipo de hábitat, lo que sugiere que sus nidos pueden encontrarse en casi cualquier hábitat con vegetación densa en el rango de elevaciones ocupadas por la especie.

Palabras clave: *Atlapetes melanocephalus,* biología reproductiva, descripción de nido, descripción de huevos, Sierra Nevada de Santa Marta.

Introduction

The Santa Marta Brush-finch (Emberizidae, *Atlapetes melanocephalus)* is one of at least 20 bird species restricted to the Santa Marta Mountains, northern Colombia. In this mountain range, *A. melanocephalus* is abundant between 700 and 3200 m elevation (Hilty & Brown 1986, Remsen & Graves 1995) in different types of forest, brush, forest edges, grown pastures, coffee plantations, and gardens (Todd & Carriker 1922; C. A. Olaciregui, pers. obs). Individuals move about in pairs or small groups actively and conspicuously, sometimes as a part of mixed-species flocks; in such flocks *A. melanocephalus* is a nuclear species and one of the most numerous (Hilty & Brown 1986). In fact, *A. melanocephalus* is probably the most common endemic bird species on the San Lorenzo Ridge. The species is likely to be closely related to the Perijá Brush-Finch *Atlapetes nigrifrons* (Paynter 1978, Donegan & Huertas 2006) and also to the "*A. latinuchus*" group (Paynter 1978).

Little information regarding the reproductive biology of *A. melanocephalus* has been published, as with the other endemic species of the Santa Marta

massif. Historically, M. A. Carriker reported birds in reproductive condition between January and April, and T. B. Johnson observed adults with fledglings between November and June in the San Lorenzo Ridge (Hilty & Brown 1986). There are no nest descriptions for the species, except for that of Todd & Carriker (1922), who reported a dome-shaped nest with two white eggs. This observation was considered in need of confirmation by Todd & Carriker (1922) and thought to be "suspect" by Paynter (1978) because no other species of *Atlapetes* is known to build domed nests. Here we present the first confirmed description of nests and eggs of *A. melanocephalus.* This new information contributes to a better understanding of the reproductive biology of the genus, which remains poorly documented (Peraza 2009).

Methods

Nesting records of *A. melanocephalus* were obtained in the El Dorado Nature Reserve (11°06' N, 74°04' W) and its buffer zone, on the San Lorenzo Ridge, Santa Marta Mountains. The reserve protects 700 ha of wet, mostly montane forest between 900 and 2600 m elevation, and is located in an Important Bird Area (Franco & Bravo 2005) and an Alliance-for-Zero-Extinction site (Ricketts *et al.* 2005). Forests in different successional stages, as well as mostly intact forest, are found in the area. In the lower part, the vegetation is typical of humid tropical forest towards the Gaira River Basin, with a canopy up to 25 m tall. In the middle part, sub Andean forests are characterized by tall trees reaching 20 m (*e.g., Ficus* spp., Moraceae; *Chrysophyllum* sp., Sapotaceae; *Sloanea* sp., Elaeocarpaceae) and high epiphytism. Low vegetation is typical of ridges in the highest part, with high-elevation elements like *Paragynoxys* (Asteraceae), *Escallonia* (Escalloniaceae), *Hesperomeles* (Rosaceae), *Ceroxylon* (Arecaceae), and *Brunellia* (Brunelliaceae). Above 2300 m, the abundance and dominance of *Chusquea* sp. (Poaceae) bamboo is highly noticeable. We found two nests through observations of individuals or pairs of adults exhibiting characteristic behavioral states: frequent visits to one site, aggressive and anxious behaviors, repeated vocalizations, and transport of insects (Ralph *et al.* 1996). The third nest was found opportunistically.

We took the following measurements of nests in cm: nest height, external and internal diameter, nest depth, and nest height above the ground. We also described nesting materials. To characterize vegetation structure of nesting sites, around each nest we established a 2 m x 2 m (8 m^2) plot to estimate the percentage of plant material present around each site. We assigned plant species and materials to different categories based on taxonomic (a dominant species or genera) or ecological (a dominant structure) parameters.

Results

NEST FINDING.- The first nest was found on 22 May 2008 in ferns on the edge of an ecological path of El Dorado Nature Reserve. The nest was discovered through observations of an individual repeatedly returning to the same point following the same route with insects in its bill. The second nest was found on 22 June 2008, close to the edge of a road. The nest was discovered because an active pair returned to the same site on several occasions, where they behaved anxiously and vocalized frequently. A third nest was found on 2 June 2009 in the garden of the El Dorado lodge.

NEST CONTENT AND FATE.- On the day the first nest was found, it contained two nestlings. The next day, it was found empty. Due to the young age of the nestlings, they were almost certainly preyed upon. The second nest was found with two nestlings, which fledged successfully (Fig. 1A, 1B). The third nest was found containing two eggs, but was later abandoned.

Figure 1. (A) Adult of *Atlapetes melanocephalus* in the San Lorenzo Ridge feeding chicks in the second nest; (B) Chicks of *A. melanocephalus* begging.

NEST SITE CHARACTERISTICS AND VEGETATION COVER.- The first nest was found approximately 80 cm from the edge of an ecological path, at approximately 2100 m elevation. It was placed among ferns (*Pteridium* spp. and *Sticherus* sp.; Fig. 2A). The second nest was found near a cliff on the edge of the road at approximately 2580 m elevation (Fig. 2B). The third nest was found on the top of a cypress bush (*Cupressus* sp.) in the garden of the El Dorado lodge at 1960 m. All nests differed noticeably in the structure and composition of the vegetation of the nesting site and this was observed to influence the materials used to build two of the nests.

Major differences in vegetation composition between nesting sites found in natural vegetation were due to a higher homogeneity of the site of nest 1 with respect to nest 2; in the former, the vegetation cover was dominated mainly by bro-

Figure 2. Vegetation cover of nesting sites of first (A) and second nest (B) of *Atlapetes melanocephalus* in the San Lorenzo Ridge.

Figure 3. Nest structure for the first (A) and second (B) *Atlapetes melanocephalus* nests found in the San Lorenzo Ridge.

meliads (*i.e., Mezobromelia hospitalis*; 51%) and ferns (*Pteridium* sp. and *Sticherus* sp.; 42%) whereas in the latter, despite it being dominated by *Chusquea* bamboo (47%), vegetation cover was highly heterogeneous. Such heterogeneity was related to the terrain because in some areas the slope favored the presence of some plants like *Lycopodium* sp. (Lycopodiaceae; 23%) and *Monochaetum rotundifolium* (Melastomataceae; 12%), whereas other species dominated in flat zones.

NEST AND EGG CHARACTERISTICS. All nests were open bulky cups composed largely of relatively long, flat plant materials including bark strips, grass blades, and bamboo leaves. However, they differed in detail in the composition of the cup and some measurements (Table 1). The first nest was constructed mainly with dry leaves of a grass (Poaceae), with thin bark strips on the outer side covering the upper edge of the cup and with some *Sphagnum* moss in the middle portion of the cup, externally (Fig. 3A). Internally, it was lined with some thin plant fibers. The second nest was internally covered with the same type of fibers, but it was con-

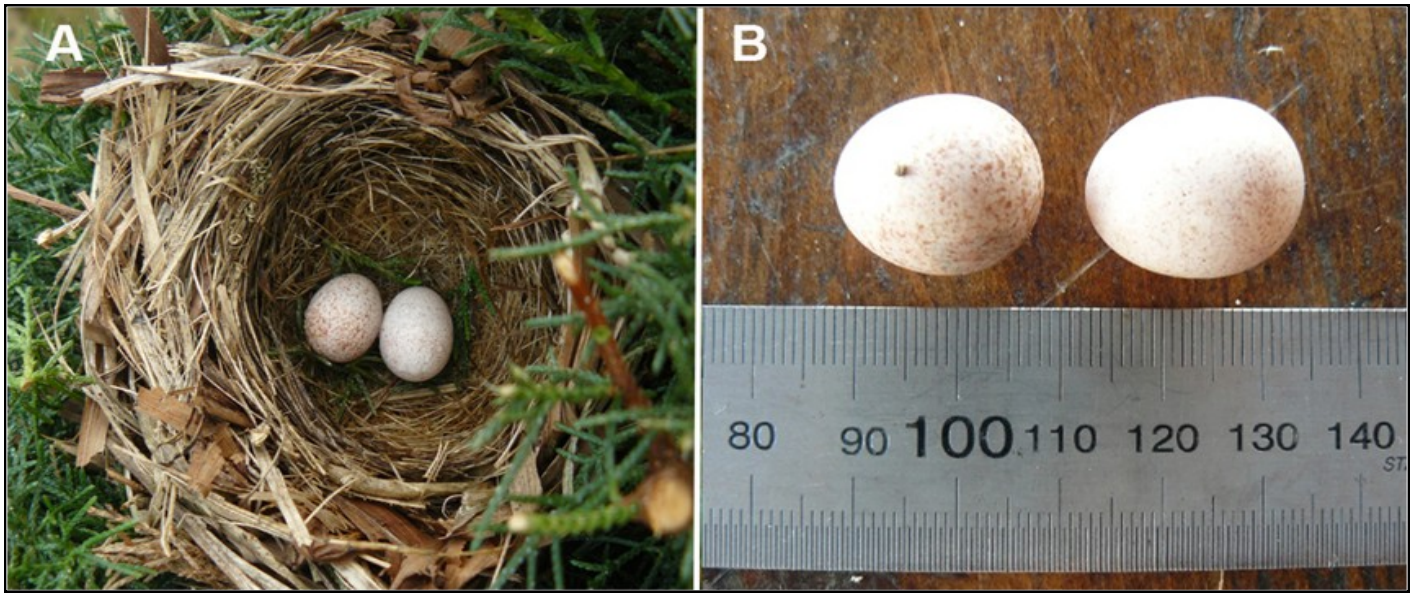

Figure 4. Eggs of *Atlapetes melanocephalus* in a third nest found in the San Lorenzo Ridge.

Table 1. Measurements of nests of *Atlapetes melanocephalus* found on the San Lorenzo Ridge, Sierra Nevada de Santa Marta, Colombia.

Characteristic	Nest 1	Nest 2	Nest 3	Mean and SD
Height (cm)	6.7	6.7	7.2	6.87 ± 0.28
External Diameter (cm)	10.0	8.8	9.2	9.33 ± 0.61
Internal Diameter (cm)	6.5	5.3	6.8	6.21 ± 0.77
Depth (cm)	5.0	6.4	4.8	5.4 ± 0.87
Height above ground (cm)	83.7	116	245	148.23 ± 85.34

structed primarily with dry leaves of bamboo *(Chusquea tuberculosa)* on two crossed hanging limbs of *Macleania* sp. (Fig. 3B). The third nest was composed mainly of dry grass (Poaceae), with the same lining in the interior. Clutch size was two eggs, both white, densely covered with brown blotches, one egg more than the other (Fig. 4A, 4B). They measured 20.9 x 15.1 mm and 19.4 x 15.2 mm, respectively.

Discussion

The clutch size of two eggs found in *A. melanocephalus* is similar to that of other species in the genus *Atlapetes* (Rowley 1962, Paynter 1978, Oppel *et al.* 2003, Cisneros-Palacios 2005, Biancucci & Martin 2008). The timing of nesting was generally consistent with information recorded by Fundación ProAves (unpubl. data) indicating individuals in reproductive condition are found from April to June; also, Morales *et al.* (2009) observed nest construction by this species in July.

The open-cup nests described here for *A. melanocephalus* differ from the dome-shaped nest made of grass and rootlets reported by Todd & Carriker (1922). Almost all of the nests described for *Atlapetes* have been characterized as bulky cups (reviewed by Paynter 1978, Peraza 2009) which indicates our findings are more consistent with what is thought to be the dominant nest type in the genus. Also, Todd & Carriker (1922) reported two pure white eggs, an observation inconsistent with our finding of strongly marked eggs.

Based on the inconsistencies noted above, the nest reported by Todd & Carriker (1922) probably belonged to another species. Black-Striped Sparrow *(Arremonops conirostris)*, also found in the range of *A. melanocephalus*, lays pure white eggs and may have dome-shaped nests (H. Greeney pers. obs.). However, there remains the possibility that the nest found by Todd & Carriker (1922) indeed was of *Atlapetes melanocephalus* and they simply misinterpreted the architecture of the nest they found, thinking that naturally fallen material was a "dome" built by the birds. Also, with greater sample sizes for *A. melanocephalus* nests, they may prove to occasionally lay unmarked eggs as the ones described by the previous authors, as is known for other species of emberizids such as *Arremon* (formerly *Lysurus) castaneiceps* (H. Greeney pers. obs.).

Although nesting materials for *Atlapetes* nests have been found to be primarily grasses and dry

leaves, other materials like dry and fine or thick twigs, grass or bamboo stems, fern leaves, pine needles, lichens and mosses may also be incorporated (Rowley 1962, Greeney *et al.* 1998, Salaman *et al.* 1998, Oppel *et al.* 2003, Cisneros-Palacios 2005, Biancucci & Martin 2008). Nesting material is generally taken from the surroundings and varies according to the local vegetation; for example, in *A. pallidiceps* nesting material varied from almost entirely bamboo (90%), to 70% grasses, with twigs and stems but not bamboo (Oppel *et al.* 2003). In the nests of *A. melanocephalus* we examined, the nest material used was also influenced by the surrounding vegetation.

A. melanocephalus nested in sites with dense vegetation and nests were well concealed, as in other species of the genus (Oppel *et al.* 2003, Biancucci & Martin 2008). All nests were placed in low, bushy vegetation and were found just below the top layer of the foliage, as in other species (Oppel *et al.* 2003). Nest placement has been found to vary between *Atlapetes* species, from overhanging branches away from the main stem (Oppel *et al.* 2003) to a small cavity shielded by tall herbaceous vegetation at the foot of a landslide (Salaman *et al.* 1998).

Our observations and evaluations show that nesting of *A. melanocephalus* is not restricted to a specific type of habitat. We conclude that nests of the species can be found in almost any habitat especially with dense vegetation, including coffee plantations in the lower part of its elevational range. The characteristics of the nest will be useful for locating other nests of the species and to develop studies on reproductive biology.

Acknowledgments

Our observations were made while conducting research and conservation activities for Fundación ProAves. Thomas Donegan, Harold Greeney, F. Gary Stiles and C. Daniel Cadena made thorough and important comments on the manuscript. We also thank the Corporacion Autonoma Regional del Magdalena (CORPAMAG) for granting permission to ProAves for research in the San Lorenzo region.

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Recibido: 06 de agosto de 2010. *Aceptado:* 01 de noviembre de 2012.