FIRST DESCRIPTION OF THE NEST, EGGS, AND COOPERATIVE BREEDING BEHAVIOR IN SHARPE'S WREN (*CINNYCERTHIA OLIVASCENS*)

Primera descripción del nido, los huevos y comportamiento de cría cooperativa en el Soterrey Caferrojizo (*Cynnicerthia olivascens*)

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ABSTRACT

We provide the first description of the nest, eggs and nestlings of Sharpe's Wren (*Cinnycerthia olivascens*) from northeastern Ecuador, and we document the occurrence of cooperative breeding in this species. *Cinnycerthia olivascens* builds large enclosed ball nests with a downward-projecting tubular entrance. The eggs are off-white with sparse reddish-brown speckling. We show that at least three adults may participate in nest-building and probably contribute to nestling provisioning. Our video observations document fledgling and show that the nestlings' diet consisted of small invertebrates.

Key words: *Cinnycerthia olivascens*, cooperative breeding, natural history, Sharpe's Wren .

RESUMEN

Describimos por la primera vez el nido, los huevos y los pichones del Soterrey Caferrojizo (*Cinnycerthia olivascens*) del noreste de Ecuador, y documentamos la existencia de cría cooperativa en esta especie. *Cinnycerthia olivascens* construye un nido encerrado, en forma de bola, con una entrada tubular. Los huevos son blancuzcos con manchas de color canela. Por lo menos tres adultos construyen el nido, y probablemente contribuyen al cuidado de los pichones. Por medio de grabaciones de video se documentó la salida de los pichones del nido y se observó que su dieta de los pichones consiste de invertebrados pequeños.

Palabras clave: cría cooperativa, *Cinnycerthia olivascens*, historia natural, Soterrey Caferrojizo.

Sharpe's Wren (*Cinnycerthia olivascens*), sometimes called the Sepia-brown Wren (e.g. Ridgely & Greenfield 2001), is a resident of Andean slopes from central Colombia to northern Peru. This confusing English-name nomenclature stems from recent taxonomic changes. Sepia-brown Wren is the former name of an Andean *Cinnycerthia* complex now treated as three allopatric species: Sharpe's Wren, the Peruvian Wren (*Cinnycerthia peruviana*) of Peru, and the Fulvous Wren (*Cinnycerthia fulva*) of southern Peru and Bolivia (Brumfield & Remsen 1996). Including the Rufous Wren (*Cinnycerthia unirufa*), *Cinnycerthia* contains four currently recognized species (Remsen *et al.* 2008).
Cinnycerthia wrens live in dense understories, and most aspects of their breeding biology remain undescribed (Kroodsma & Brewer 2005). Here we present the first nest, egg, and nestling description for *C. olivascens*, as well as notes on breeding behavior, including evidence of cooperative breeding.

We studied three nests at the Yanayacu Biological Station and Center for Creative Studies (00°35' S, 77°53' W, elev. 2150 m). This site is located 5 km west of Cosanga, adjacent to the private reserve of Cabañas San Isidro in Napo Province, northeastern Ecuador. The reserve consists of primary subtropical forest with extensive patches of *Chusquea* bamboo in the higher sections. We found the first nest under construction on 4 January 2002, but did not

monitor it further. Subsequently, we observed three adult *C. olivascens* attending a second active nest on the morning of 20 April 2007. This nest contained two fairly large nestlings and one egg; the nestlings fledged on 25 April. We filmed the nest for 52.5 hours over the course of nine days, including the post-fledging period. Additional opportunistic observations supplemented the filming and were helpful in determining prey items fed to the nestlings. This nest was collected nine days after fledging, and dried for two months. To analyze the composition of the nest ball and lining, we separated the nest into distinguishable components, weighing each component separately. Lastly, we discovered a third nest on 15 November 2007. At this nest, an adult was incubating a clutch of three eggs; it was not monitored further.

The three nests we discovered were constructed an average (± SD) of 2.2 m ± 0.7 m above the ground in small shrubs or trees 3.0-3.5 m tall (one *Hedyosmum*, Chloranthaceae, one *Erythrina*, Fabaceae, one unidentified). All were built into forks of the substrate, two supported by triple forks. One nest was located in a large patch of *Chusquea* bamboo, whereas the other two were sited near small streams.

The nests of *C. olivascens* were bulky enclosed ball nests with a downward-projecting tubular entrance (Fig. 1), a nest type termed "dome and tube" or "closed/retort/fork with vertical tube" by previous authors (Hansell 2000, Simon & Pacheco 2005). We measured the second nest in detail. Externally, the main chamber of the nest measured 24 cm tall by 21 cm wide and 20 cm across, with a sparse 11 cm tail formed by dangling moss. To enter the nest, adults flew directly up a downwards-facing entrance tube. The opening to this tube was 8 cm above the bottom of the nest ball and continued upwards for 12.5 cm, oriented at an angle 15 degrees off vertical. The tube's opening measured 5.7 cm wide

Figure 1. Nest and egg of Sharpe's Wren, *Cinnycerthia olivascens*, found on 20 April 2007. The arrow points up the entrance tube into the nest. Photos by BGF.

by 3.4 cm tall, but narrowed just inside the entrance, measuring 3.1 cm x 3.2 cm. Before emptying into the enclosed pouch, the tube widened again to 4.5 cm x 5 cm.

We recognized six separate categories of nest materials. The nest was primarily constructed of rootlets, with large amounts of moss and *Chusquea* leaves woven into the nest ball (Fig. 2). The entrance tube was constructed almost entirely of dark rootlets, whereas inside the pouch, the entire chamber was lined with *Chusquea* leaves (Fig. 2). The internal egg cup, undifferentiated from the chamber lining, measured 9 cm wide and 5 cm deep. Overall, the internal nest chamber measured 9 cm in diameter by 10.5 cm tall.

The second nest we discovered contained one egg, whereas the third nest had a full clutch of three eggs. Eggs were off-white with sparse dark reddish-brown speckling concentrated at the larger end. On average (± SD), the four eggs measured 21.4 ± 0.2 x 15.1 ± 0.5 mm. The egg in the second nest was largely intact but empty. A small hole pierced the shell in the middle (see Fig. 1), and a crack circumscribed the egg near the hole.

We examined the two nestlings in the second nest, five days before fledging. At this time they weighed 23.1 and 23.0 g, within the range of average adult weights for *C. olivascens* (males: 25.9 g, females: 23.0 g) given by Brumfield and Remsen (1996). Other than their bright yellow bills and flanges, they resembled adult individuals. Their head, especially the crown, was noticeably gray-brown in contrast to their overall warm brown color. However, they lacked the defined gray auriculars Brumfield and Remsen (1996) considered characteristic of juvenile *C. olivascens*.

We observed four birds in the vicinity of the first nest while it was still under construction, at least three of which were actively participating in nest building. Similarly, we observed three individuals around the second nest, all presumably adult birds. Without color bands, it was impossible to determine whether all three fed nestlings, but we suspect this to be true. The three adults at the second nest all roosted in the nest at night, continuing to do so after fledgling.

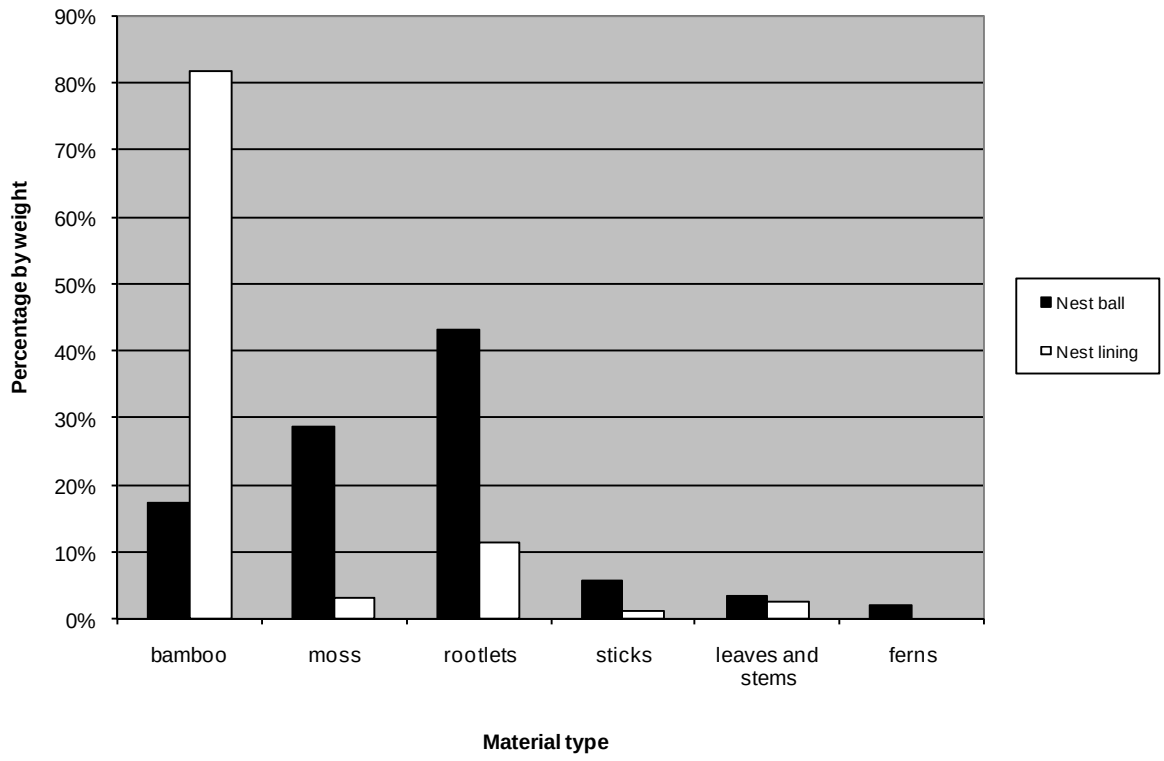

Figure 2. Nest components of the nest ball and lining of the Sharpe's Wren, *Cinnycerthia olivascens*.

Adults fed small invertebrates (estimated size: 0.5-2.0 cm) to the nestlings via quick trips into the nest. Nestlings begged as the adults approached within 1 m of the nest, and often continued begging after the feeding adult left. Relative frequencies of different prey items could not be established, but the nestlings' diet included small snails, crickets, flies, beetles, adult Lepidoptera, and grub-like insects.

Fledging occurred at 08:03 (EST), two hours after the adults first left the nest for the day. At this time, the first fledgling moved to the nest entrance and sat for 76 s while adults called continuously from the nest area. It then left the nest, and the second fledgling appeared at the nest entrance, leaving after only a 43 s wait. Adults then entered the nest twice in rapid succession, removing a fecal sac each time. Adults continued to vocalize loudly, giving a variety of calls including a high-pitched whistle that we had not previously detected.

We continued to monitor and opportunistically film this second nest after fledging. The fledglings sometimes perched on top of the nest, hopping and pecking at the nest in apparent foraging attempts. On one occasion, we observed a fledgling in this position tear a hole in the entrance tube. This hole was quickly patched by the nearby adults, which remained active in nest maintenance and repair. We observed adults pulling moss off the exterior of the nest and adding bamboo leaves, moss and sticks to the inside of the nest, once moving moss from the exterior into the nest chamber. The three adults and two fledglings continued to roost in the nest for at least seven days after fledging.

Our records suggest that the breeding season of *C. olivascens* in northeastern Ecuador extends from at least November until at least the end of April, a period roughly corresponding with change from drier to wetter periods in this area. The nests and eggs we studied were similar to the two other *Cinnycerthia* nest and eggs described, those of *C. peruviana* (Gochfeld 1979) and *C. unirufa* (Asociación Bogotana de Ornitología 2000). There were, however, distinct differences. Whereas all three *C. olivascens* nests we found were built solidly in the strong fork of a shrub or small tree, the nest of *C. peruviana* was attached to the top of a bamboo stalk, the weight of the nest bending the top of the stalk downwards. All three species used predominantly rootlets and mosses to construct their nests, but *C. olivascens* constructed an entrance tube made of rootlets, in contrast to the moss-encircled entrance tube observed in *C. peruviana* (Gochfeld 1979). Dimensionally, the external chamber measurements of the *C. olivascens* nest revealed that it was volumetrically larger than Gochfeld's (1979) *C. peruviana* nest (24 cm x 21 cm x 20 cm compared to 20 cm x 30 cm x 15 cm), but had a smaller internal chamber (9 cm x 9 cm x 10.5 cm compared to 10 cm x 10 cm x 15 cm). All five individuals at the second nest we studied – three adults and two fledglings – roosted in the nest, possibly providing a thermal benefit during cold nights. This behavior has also been observed in *C. unirufa*, with up to nine individuals roosting in a nest (Asociación Bogotana de Ornitología 2000). It is unknown how many adults attended the *C. peruviana* nest described by Gochfeld (1979), but its larger internal chamber might suggest that there were several helpers.

Cinnycerthia wrens are well-known to be social foragers, but this is the first published documentation of cooperative breeding for this genus. Although our sample size was small and we could not ascertain the relative contributions of different adult individuals, we show that at least three adults may participate in nest construction, and three or more adults probably provisioned the nestlings. Cooperative breeding is common in the Troglodytidae (Barker 1999, Brewer 2001) and its occurrence can be analyzed in a phylogenetic context. A recent phylogeny of the family demonstrated that *Cinnycerthia* belongs to a clade that also includes the genera *Cyphorhinus* and *Henicorhina* and some species of *Thryothorus* (Barker 2004). Within this clade, cooperative breeding has been documented in *Cyphorhinus*, one species of *Thryothorus* (i.e., *Cantorchilus* sensu Mann et al. 2006) and now *Cinnycerthia*, but is not known to occur in *Henicorhina* (Barker 1999, Gill 2004). Future phylogenetic work and more natural history data on breeding systems across the Troglodytidae are needed to further explore the evolution of this trait within the family.

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LITERATURE CITED

Asociación Bogotana de Ornitología. 2000. Aves de la Sabana de Bogota, Guía de Campo. Asociación Bogotana de Ornitología y Corporación Autónoma Regional de Cundinamarca, Bogotá, Colombia.

BARKER, F. K. 1999. The evolution of cooperative breeding in *Campylorhynchus* wrens: a comparative approach. Ph.D. Dissertation, University of Chicago.

BARKER, F. K. 2004. Monophyly and relationships of wrens (Aves: Troglodytidae): a congruence analysis of heterogeneous mitochondrial and nuclear DNA sequence data. Molecular Phylogenetics and Evolution 31: 486-504.

BREWER, D. 2001. Wrens, dippers, and thrashers. Yale University Press, New Haven, CT.

BRUMFIELD, R.T. & J.V. REMSEN, JR. 1996. Geographic variation and species limits in *Cinnycerthia* wrens of the Andes. Wilson Bulletin 108: 205-227.

GILL, S.A. 2004. First record of cooperative breeding in a *Thryothorus* wren. Wilson Bulletin 116: 337-341.

GOCHFELD, M. 1979. Nest description and plumage variation of the Sepia-brown Wren *Cinnycerthia peruana*. Bulletin of the British Ornithologists Club 99: 45-47.

HANSELL, M. H. 2000. Bird nests and construction behavior. Cambridge University Press, Cambridge, UK.

KROODSMA, D. E. & D. BREWER. 2005. Family Troglodytidae (Wrens). In: DEL HOYO, J., ELLIOTT, A. AND D. A. CHRISTIE (eds.). Handbook of the Birds of the World. Vol. 10. Cuckoo-shrikes to Thrushes. Pags. 356-447. Lynx Edicions, Barcelona.

MANN, N. I., F. K. BARKER, J. A. GRAVES, K. A. DINGESS-MANN, & P. J. B. SLATER. 2006. Molecular data delineate four genera of "*Thryothorus*" wrens. Molecular Phylogenetics and Evolution 40: 750-759.

REMSEN, J. V., JR., C. D. CADENA, A. JARAMILLO, M. NORES, J. F. PACHECO, M. B. ROBBINS, T. S. SCHULENBERG, F. G. STILES, D. F. STOTZ and K. J. ZIMMER. Version 26 September 2008. A classification of the bird species of South America. American Ornithologist's Union. http://www.museum.lsu.edu/~Remsen/SACCbaseline.html.

RIDGELY, R.S. & P.J. GREENFIELD. 2001. The Birds of Ecuador. Volume 2: Field Guide. Cornell University Press, Ithaca, NY.

SIMON, J. E. & S. PACHECO. 2005. On the standardization of nest descriptions of Neotropical birds. Revista Brasileira de Ornitologia 13: 143-154.

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