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FIRST DESCRIPTION OF THE NEST, EGGS, HATCHLINGS, AND INCUBATION BEHAVIOR OF THE WHITE-BELLIED ANTPITTA (*GRALLARIA HYPOLEUCA*)

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Primera descripción del nido, huevos, pichones y comportamiento durante la incubación de la Gralaria Ventriblanca (*Grallaria hypoleuca*).

Key words: White-bellied Antpitta, *Grallaria hypoleuca*, Formicariidae, nest, eggs, breeding, parental behavior, nesting behavior.

INTRODUCTION

Antpittas (Grallariinae) are largely terrestrial birds that, together with the antthrushes, make up the family of ground antbirds (Formicariidae) and are related to the typical antbirds (Thamnophilidae) (Sibley & Ahlquist 1990). Often inhabiting forests with dense understory vegetation, the secretive habits of antpittas are such that their presence is often only detected by their voice. These characteristics have left ornithologists with sparse information regarding natural history in these birds. Notably, the breeding biology of the antpittas is poorly known; nests have been described for fewer than half of the known species (Protomastro 2000), and published descriptions exist for only 6 of 31 species in the genus *Grallaria* (Bell & Bruning 1976, Wiedenfeld 1982, Quintela 1987, Protomastro 2000).

The White-bellied Antpitta (*Grallaria hypoleuca*) ranges in the Andes from Colombia to Peru, preferring humid forest undergrowth, edges, and second growth at 1400–2200 m elevation (Hilty & Brown 1986, Ridgely & Greenfield 2001). The only subspecies found in Ecuador is G. hypoleuca castanea. There, the species inhabits the subtropical zone of the eastern Andean slope, and is notably numerous around Cabañas San Isidro, in western Napo province (Ridgely & Greenfield 2001). Like others in its genus, the White-bellied Antpitta is difficult to see, spending most of its time on or near the ground. It is similar in habits to other montane Grallaria antpittas, but is more tolerant of degraded and fragmented habitats (Ridgely & Greenfield 2001). I can find no previous reports of nesting in this species. Here I describe the nest, eggs, and hatchlings from one nest in Ecuador, and relay observations of parental behavior at the nest during incubation.

METHODS

While searching for bird nests in cloud forest at Cabañas San Isidro, near the town of

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Cosanga (0.0°36'S, 77°52'W), on the eastern slope of the Ecuadorian Andes, I flushed an adult White-bellied Antpitta off its nest. The nest was first discovered on 19 May 2001 and I checked the nest almost daily through 1 June. My colleague Tina Sommer then checked the nest daily until 6 June. The nest then went unwatched until the final observation on 15 June. Eggs were weighed with a field balance on 21 May. Egg dimensions, nest dimensions and height were measured on 27 May with a small ruler; substrate height and forest canopy height were estimated. During the incubation period, the nest was videotaped twice (25 May and 31 May) from about 07:00 to 13:30 (EST) to monitor parental activity. The camera and tripod were placed ~10 m from the nest and were camouflaged with vegetation.

RESULTS

The nest was found in primary cloud forest at about 2000 m elevation, with an average canopy height of ~25 m. Large ferns dominated the forest undergrowth and ferns partially concealed the nest from horizontal view. There was a bamboo thicket about 30 m from the nest and there were no man-made trails nearby. The nest was placed 1.25 m above the ground, in a vertical fork in the trunk of a live tree. This substrate tree had an estimated height of 11 m. The nest's composition included large twigs (3 mm in diameter) as well as smaller twigs and rootlets. Very little moss was found in the nest. The nest was a circular cup with an outside diameter of 14.2 cm, an inside diameter of 10.7 cm, and an inside depth of 6.4 cm. Outside depth could not be determined because the nest merged indistinctly with decaying leaves at its base and with the substrate tree.

The nest contained two eggs, which were light green with small light-brownish blotches fairly evenly distributed over the shell. One egg measured 32 x 24 mm (9.17 g) and the other measured 30 x 23 mm (7.85 g). Both eggs hatched on 5 June; the hatchlings were covered with gray down and had bright orange bills and gapes. On 15 June (Day 10) the nest was empty and the fate of the nestlings was uncertain; the nest was intact, there were no remains or feces left in the nest, and no fledglings were seen in the area. Given the long nestling period of the Scaled Antpitta (*Grallaria guatimalensis*) (17–19 days; Dobbs *et al.* 2001), it is likely that the nest was depredated.

The adults usually crouched down in the nest when I approached, and only flushed when I reached about 1 m of the nest. Presence of the video camera did not noticeably affect their behavior.

Although sexual monomorphism in this species precluded sex determination in the adults, the parents were observed sharing incubation duties. Both parents incubated the eggs for roughly equal periods, with each parent sitting on the nest for bouts ranging from 23 min to 124 min. Mean on-bout duration on the first recording date was 65 $\pm$ 26 min (n = 5, data presented are mean $\pm$ SD) and was not significantly different from the mean on-bout duration on the second recording date (99 $\pm$ 20 min, n = 4; $P = 0.07$).

The exchange of incubating parents was generally quick, and the incubating adult seemed to anticipate the arrival of its replacement. In two of the seven exchanges observed, the incoming and outgoing adults traded places simultaneously; in two more exchanges, the outgoing parent left only 1 s after the arrival of its replacement. In the other three exchanges, both parents were on the nest for 22 $\pm$ 1 s, and in two of these cases the incubating parent initially stood up, then sat back down for a short time before leaving. The incoming parent was at the nest for an average of 19 $\pm$ 8 s before sitting down to

incubate, and in no case took longer than 30 s before sitting on the eggs. No mate feeding was observed during incubation. Both parents often brought a small fiber to the nest when assuming incubation duty. This occurred on three out of five times on the later film date; film quality on the first date was not good enough to allow detection of such small material. After arriving at the nest, the adult placed the material in the nest before sitting down to incubate.

The parents were observed incubating the eggs for 88% of the time that was videotaped. Of the time when no parent was incubating, the majority occurred in the early morning. On the later recording date, the nest was left without a parent for a period of at least 45 min. Continuous coverage of the nest was achieved after 09:17 on both recording dates. Early morning absence was noticed on other dates during incubation. At all five nest checks made between 06:40 and 07:00, the parents were absent and the eggs were quite cold to the touch. Unfortunately, no behavior was monitored or taped after 13:30, but an adult was found incubating at one check of the nest made at 16:30. No behavior of adults or nestlings was monitored after hatching.

DISCUSSION

Although there seems to be no previous record of nesting in the White-bellied Antpitta, the date of nesting is in accord with reports of birds of this species found in breeding condition in the central and eastern Andes of Colombia (March–Sepember; Hilty & Brown 1986). Height, size, and construction of this nest appear to be fairly typical of known *Grallaria* antpitta nests (Wiedenfeld 1982, Quintela 1987, Whitney 1992, Protomastro 2000, Dobbs *et al.* 2001). Unlike the nests of the Pale-billed (*G. carrikeri*), Variegated (*G. varia*), and Rufous (*G. rufula*) antpittas (Wiedenfeld 1982, Quintela 1987, Whitney 1992, Protomastro 2000), this nest was placed in a living upright tree, and not on a rotten stump or fallen log. Nest substrate may vary between or within geographic regions, and Dobbs *et al.* (2001) noted that the Scaled Antpitta has been found to nest on both fallen logs and upright live or dead trees. Thus, nest placement in the White-bellied Antpitta could potentially vary through its range.

The eggs of the White-bellied Antpitta are also similar to those of other *Grallaria* antpittas, which are nearly always light blue or green (Wiedenfeld 1982). An egg (8.3 g) extracted from a female White-bellied Antpitta collected in northern Peru was described as light blue without mention of mottling (Parker et al. 1985). Other known eggs in the genus have lacked mottling or dark blotches (Dobbs *et al.* 2001), and the light brown blotches on the eggs in this nest may simply be stains from the nest. The number of eggs in antpitta clutches is almost invariably two (Wiedenfeld 1982), and this nest continues in that pattern. The eggs of the White-bellied Antpitta are slightly larger than those reported for the Streak-chested Antpitta (*Hylopezus perspicillatus*; Skutch 1969) and the Thrush-like Antpitta (*Myrmothera campanisona*; Tostain & Dujardin 1988), which would be expected as these two antpitta species reach a smaller size at maturity (Welty 1975). The eggs of the Scaled Antpitta, a species matching the White-bellied Antpitta in adult body length (Hilty & Brown 1986), are similar in length and width to those of White-bellied Antpittas (Dobbs *et al.* 2001), while egg dimensions of the larger Variegated Antpitta exceed those of White-bellied Antpittas (Protomastro 2000).

There are few antpitta species for which the behavior during incubation has been reported; I will therefore make comparisons with antpittas outside of as well as within the genus *Grallaria*. As was seen in Streak-chested

Antpittas and Scaled Antpittas (Skutch 1969, Dobbs *et al.* 2001), White-bellied Antpitta parents share in the incubation of eggs. Furthermore, in all three species, the adults appear to forage near daybreak and then seldom leave the eggs unattended (Skutch 1969, Dobbs *et al.* 2001). In a nest of Scaled Antpittas observed by Dobbs *et al.* (2001), the eggs were covered 86.7% of the time observed, which is similar to my observations of White-bellied Antpittas. For Streak-chested Antpittas, Skutch (1996) describes even greater nest coverage over the whole day, up to nearly 100%. Only two full on-bouts were recorded for the Scaled Antpitta nest, lasting 91 and 140 min (Dobbs *et al.* 2001), largely overlapping the range seen for White-bellied Antpittas. Similarly, Variegated Antpittas displayed on-bouts of 60 to 150 min (Erard 1982). Streak-chested Antpittas, however, are known to incubate for much longer sessions of 5–6.5 h (Skutch 1996). In contrast to Scaled Antpittas, in which both parents were always on the nest during the exchange of incubation duties for 15–30 s (Dobbs *et al.* 2001), White-bellied Antpitta parents usually made unceremonious and nearly simultaneous exchanges like those described for the Streak-chested Antpitta (Skutch 1996). Scaled Antpittas also remained perched at the rim of the nest cup for 10–11 min before sitting down to incubate, whereas White-bellied Antpittas always spent less than 30 s before beginning to incubate.

Skutch (1996) reports a gender pattern in the incubation duties of the Streak-chested Antpitta, i.e., the female incubated through the night and for a midday session, while the male covered the nest in a long morning on-bout and a long afternoon on-bout. The shorter incubation on-bouts seen in Scaled, Variegated, and White-bellied antpittas do not support this pattern. As more nesting behavior in this family is described, it will be interesting to see if this pattern varies according to genus.

Species in closely related families, such as the typical antbirds (Thamnophilidae) and the ovenbirds (Furnariidae), have been reported to add material to the nest while incubating (Haverschmidt 1953, Skutch 1969, 1996). I believe that the present study is the first report of antpittas adding material to their nest during incubation, but this behavior could nonetheless be widespread in this group, as the breeding behavior of antpittas is so poorly known (Dobbs *et al.* 2001).

As more complete information on nesting in antpittas and antthrushes is assembled, we will be able to better understand the evolution of life history traits within this important Neotropical family. Furthermore, montane habitats in Central and South America are being destroyed at a rapid rate. Understanding the natural history, and particularly the breeding behavior, of antpittas and other birds can help identify critical habitat needs. Natural history observations therefore serve as important first steps toward conservation and should remain an important aspect of tropical bird research.

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