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THE NESTLING AND PARENTAL CARE OF SLATE-CROWNED ANTPITTA (*GRALLARICULA NANA*) IN NORTHEASTERN ECUADOR

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El pichón y cuidado parental del Gralarita Coronipizarrosa (*Grallaricula nana*) en el noreste del Ecuador.

Key words: Nest architecture, nestling, parental care, fecal sac, Andes, cloud forest, Slate-crowned Antpitta, *Grallaricula nana.*

Distributed through the Andes (from 1300 to 2900 m) from northern Venezuela to northern Peru, the Slate-crowned Antpitta (*Grallaricula nana*) is relatively poorly known (Krabbe & Schulenberg 2004). Only the nominate race occurs in Ecuador (Ridgely & Greenfield 2001). Since Schönwetter (1979) first described the egg, only one other study has provided information on its breeding biology (Greeney & Sornoza 2005), describing the nest and providing information on adult behavior during incubation. As variation in nest architecture and the materials used in nest construction may be useful for testing phylogenetic hypotheses (Zyskowski & Prum 1999), particularly among antpittas (Greeney *et al.* 2008), here we provide additional details of nest architecture, construction materials, and placement, from three nests found at the Tapichalaca Biological Reserve, and one from the Yanayacu Biological Station & Center for Creative Studies, both in eastern Ecuador. In addition, we provide the first description of the nestling of the Slate-crowned Antpitta and observations on parental care.

Tapichalaca (04º30'S, 79º10'W) is located north of Valladolid in the southeastern Zamora-Chinchipe Province, while Yanayacu (00°36'S, 77°53'W) lies 5 km west of Cosanga in the northeastern Napo Province. Habitat at both sites is steep, forested, mature cloud forest, interspersed with large tracts of naturally occurring *Chusquea* bamoo. For more complete site descriptions see Krabbe *et al.* (1999) (Tapichalaca) and Valencia (1995) (Yanayacu). We collected three nests from Tapichalaca, the two described by Greeney & Sornoza (2005), plus an additional nest found during incubation of a single egg in November of 2004. We collected a fourth nest at Yanayacu after fledging of the single nestling on 21 November 2006. We allowed nests to dry for at least 3 months, then broke them into distinguishable categories of material and

FIG. 1. Nest of Slate-crowned Antpitta (*Grallaricula nana*) with an older nestling, 4 days prior to fledging. November 2006, Yanayacu Biological Station, Napo, Ecuador. Photo by H. F. Greeney.

weighed each category separately. In addition to those nests described above, we provide nest site characteristics for two inactive nests found at Tapichalaca.

At the Yanayacu nest, found on 17 November 2006, we used a video camera, placed c. 5 m from the nest, to record parental care and nestling behavior at the nest. Based on studies of this type at the nests of a variety of species (Greeney pers. observ.), we feel that adult behavior was unaffected. We videotaped activity at the nest for 4 h on the afternoon of 17 November, from 07:30–15:30 h on 19 November, and for 4 h on the morning of 20 November (total of 16.4 h). At 18:00 h on 20 November, the nestling was still in the nest, but was gone by 11:00 on 21 November. As there were no signs of disturbance, we assume the nestling fledged successfully.

Nestling. On 17 November, at 14:00 h (EST) and 4 days prior to fledging, the nestling weighed 19.6 g. The nestling filled the small

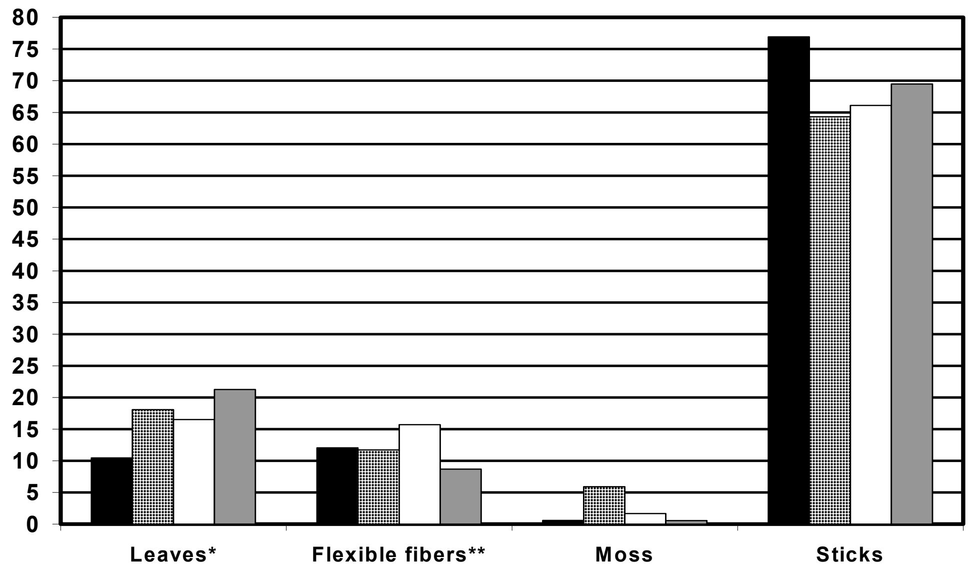

FIG. 2. Relative quantities of materials used in the construction of four nests of Slate-crowned Antpitta (*Grallaricula nana*) from eastern Ecuador. Within the "leaves" and "flexible fibers" categories, the relative proportions of distinguishable materials are indicated by one asterisk (*) across all nests, mean % ± SD of this category represented by (a) *Chusquea* leaves = 27.4 ± 1.49, (b) dicot leaves = 36 ± 21.3, (c) fern leaves = 21.5 ± 21.5 ± 15.9, (d) miscellaneous herbaceous matter = 15 ± 5.1; by two asterisks (**) across all nests, mean % ± SD of this category represented by (a) dark fibers = 79.3 ± 17.2, (b) pale fibers = 20.7 ± 17.2.

nest (Fig. 1), and was entirely covered in dense, wool-like, rufous-brown down. The upper mandible was almost completely dark, with the lower still mostly orange. The gape was pale yellow and the mouth lining pale white. The skin was blackish with an orange cloaca. The feathers of the wings were well emerged from their sheaths and generally dark grey. The secondaries and inner primaries were edged in rufous, with similar, but stronger, markings on the wing coverts.

Parental care. Over the course of the 3 days of filming, we saw little difference in activity between morning and afternoon sessions. One exception to this, was that the nestling produced only 0.5 fecal sacs per hour on the afternoon prior to fledging, rather than the 1.2/h produced during all other feeding sessions. Two adults attended the nestling. Across the entire period, adults removed a mean of 1 fecal sac/h, never consuming them at the nest. The nestling was fed at a mean rate of 5.4 feeds/h. Prey items were generally small (> 1 cm), and delivered singly. Most were unidentifiable, but at least 10% were lepidopteran larvae and 7% were earthworms. The nestling was brooded for only 3.4% of the observation time, most of which occurred during a nearly half hour bout of heavy rain the day before fledging.

Nest architecture. Nests were all shallow, frail cups of leaves and leaf strips supported by a platform of sticks and sparsely lined with fine fibers. Mean height of five nests was 1.9 ± 0.4

m. Mean dimensions of five nests (cm ± SD) were: external diameter, 10.7 ± 1.0; external height, 5.6 ± 1.6; internal diameter 6.7 ± 0.5; internal depth, 2.5 ± 0.6. Nest linings were so sparse that we were unable to reliably separate it from the rest of the structure. All weights given for various nest components, therefore, refer to the total amount of each material separated out from the entire nest. The total weight of each of the three nests from Tapichalaca was 11.0, 15.4, and 10.3 g, respectively. The Yanayacu nest weighed 10.4 g. We were able to separate each of the nests into eight recognizable categories of materials: sticks, thin dark fibers, thin pale fibers, *Chusquea* bamboo leaves, dicot leaves, fern leaves, mosses, and miscellaneous herbaceous scraps. A summary of nest components from each nest is presented in Figure 2. All mosses seem to have been brought in incidentally, probably attached to sticks. The types of materials used, and the percentage of each, were remarkably uniform between nests and between study sites. The nest from Yanayacu provided minor exceptions, with the inclusion of more pale fibers in relation to dark fibers (nearly 50% vs 6–17% in the others) and more dicot leaves (63% vs 12–40% in the others) in relation to other leafy material. In addition, one nest at Tapichalaca had a considerably larger base of sticks, adding to its overall weight.

Conclusions. The nestling described here was similar to the description and figure (Greeney *et al.* 2004) of the nestling of the Peruvian Antpitta (*G. peruviana*). The coloration of the mouth lining, however, was strikingly different from that of all other antpittas where this character has been described (Greeney *et al.* 2008). If, and how, this character varies geographically within or between species is unknown, and understanding the adaptive significance of such a striking morphological deviation from other antpittas would be an interesting line of investigation.

As noted by Greeney & Sornoza (2005), all nests of the Slate-crowned Antpitta, like those of the Peruvian Antpitta, were found in poorly supported positions (Greeney *et al.* 2004). This differs from the sapling fork-supported nests of the Ochre-breasted Antpitta (*G. flavirostris*) (Holley *et al.* 2001, Maillard & Vogel 2003). Though not previously quantified, our observations here also support the observation that Slate-crowned Antpittas use little moss in nest construction (Greeney & Sornoza 2005). A complete clutch of one egg in three nests from southern Ecuador (Greeney & Sornoza 2005, this study), and the presence of a single nestling in northeastern Ecuador, suggest that Slate-crowned Antpittas regularly lay only one egg. Our observations also support the previous assertion that Slate-crowned Antpittas prefer to breed during drier periods (Greeney & Sornoza 2005). Interestingly, this appears to be a trait shared with other bamboo-nesting species in eastern Ecuador (e.g., Greeney *et al.* 2005, Gelis & Greeney 2006, Martin & Greeney 2006).

The uniformity of nest architecture seen both between and within sites, suggests that nest architecture may be a fairly constrained trait in Slate-crowned Antpittas. Interestingly, what little differences we saw between the two sites relates to the color of the thin fibers (mostly from the inner portion of the cup). Similar variation in the color of nest linings, between Yanayacu and other Ecuadorian cloud forests, has been observed for the Slaty-backed Nightengale Thrush (*Catharus fuscater*) (Greeney & P. R. Martin unpubl.). While the significance of changes in nest lining color is unclear, it may reflect differences in climate or predation risk, both of which can have an effect on avian nest architecture (Deeming 2002).

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