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First description of the nest, eggs and nestlings of Scallop-breasted Antpitta *Grallaricula loricata*

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The genus *Grallaricula* (Grallariidae) comprises 8–9 species of small, semi-terrestrial antpittas (Krabbe & Schulenberg 2003, del Hoyo *et al.* 2017, Remsen *et al.* 2017). Following the first nest description for Rusty-breasted Antpitta *G. ferrugineipectus* (Schwartz 1957), the first for the genus, our knowledge of the breeding biology of other *Grallaricula* remained a mystery until the start of the 21st century, when the first nests were described for Ochre-breasted Antpitta *G. flavirostris* (Holley *et al.* 2001, Maillard-Z. & Vogel 2003). Less than a decade later, nest descriptions and reproductive data were available for half of the species (Greeney *et al.* 2008), with the most recent addition being a nest description for Crescent-faced Antpitta *G. lineifrons* (Greeney & Jipa 2012). To date, nest descriptions are available for five species and egg descriptions have been published for six species (see Discussion), with Ochre-fronted Antpitta *G. ochraceifrons* and Scallop-breasted Antpitta *G. loricata* being the only two species lacking descriptions of both nests and eggs.

Scallop-breasted Antpitta is endemic to the north coastal mountains of Venezuela, where it inhabits the understorey of humid montane forests, generally above 1,400 m (Verea & Greeney 2014, Greeney 2018). As a range-restricted species facing severe habitat loss, it is currently considered Near Threatened (BirdLife International 2017). Despite several studies in the past two decades that have improved our knowledge of its distribution, plumage, moult, and basic habits (Verea *et al.* 1999, 2009, Verea 2004, 2007, Verea & Solórzano 2011), the reproductive biology of Scallop-breasted Antpitta remains completely unknown (Verea & Greeney 2014). Here we provide the first descriptions of the nest, eggs and nestlings, based on two active nests and five inactive nests found in Venezuela's Sierra de Aroa National Park.

Methods and Results

All of the following observations were made in the El Silencio section of Sierra de Aroa National Park, near Pico El Tigre, Yaracuy, Venezuela. We found the first active nest (hereafter nest 1), containing two nestlings, on 26 May 2013, at an elevation of 1,696 m along the road to Pico El Tigre (10°24'36"N, 68°48'39"W). Both nestlings were still in the nest the following day but we found the nest empty, but intact, upon our return on 31 May. The second active nest (hereafter nest 2) was c.0.25 km south-east of nest 1 at an elevation of 1,767 m, and contained a single egg on 1 June 2013 at 13.30 h. Upon our return at 06.30 h on 2 June, the nest held a second egg. We visited this nest until 3 June and subsequently on 21 June. During the first three weeks of June 2013 we found five additional nests, all inactive when found, but almost certainly belonging to Scallop-breasted Antpitta based on similarities in architecture with the two active nests (see below) and based on the experience of HFG with the nests of other *Grallaricula*. Three of these were very close to nest 1 and probably belonged to the same pair. One was close to nest 2, and the final inactive nest was at 1,943 m near the crest of a ridge c.1.1 km south-east of nest 2 (10°24'15"N, 68°48'01"W).

All nests were architecturally very similar, being shallow, open cups composed externally of moss and neatly lined with dark fibres and rootlets (Fig. 1). A conspicuous



Figure 1. Nest of Scallop-breasted Antpitta *Grallaricula loricata*, Sierra de Aroa National Park, Yaracuy, Venezuela, 21 June 2013 (Jhonathan Miranda)

detail common to all nests was the presence, below the cup, of a sparse platform of long (c.100 cm) unbranched twigs or leaf petioles that were clearly arranged to provide support for the main cup. These bases of supporting twigs were very similar to those described for nests of Peruvian Antpitta *G. peruviana* (Greeney 2009) and Ochre-breasted Antpitta (Greeney *et al.* 2012). Measurements for nests 1 and 2, respectively were: external diameter (measured at perpendicular angles), 111 × 108 mm, 115 × 110 mm; external height (thickness), 53–55 mm, c.65 mm; internal diameter, 78 × 70 mm, 70 × 70 mm; internal depth, 38 mm, 40 mm. All nests were in the understorey of humid montane forest typical of the region, with a closed canopy, c.15–25 m high, and dominated by trees in the families Apocynaceae, Elaeocarpaceae, Cunoniaceae and Podocarpaceae. The understorey surrounding the nests was fairly open and dominated by Rubiaceae, Piperaceae and ferns. The two active nests were built 86 cm and 97 cm above ground, while inactive nests ranged in height from 55 cm to 119 cm. Mean (\pm SD) height of all nests was 92.20 \pm 23.99 cm. Nest 1 was in a small sapling (1.6 m tall), supported basally by several small branches and by the petioles of epiphytic ferns growing on the side of the substrate tree. Nest 2 was in a Rubiaceae and supported by several small branches. The remaining (inactive nests) were all in very similar situations.

The eggs in nest 2 were short subelliptical, with a white ground colour sparsely flecked and blotched with various shades of brown and lavender. We did not measure them. Adult behaviour while we were in the vicinity of the nest was 'nervous'; they frequently changed perches (thin horizontal branches 0.5–1.5 m above ground), rhythmically twitching their lower bodies in typical *Grallaricula* fashion (Greeney 2018) and occasionally flicking their wings. The only vocalisations noticed during our presence at the nest were the typical, drawn-out, somewhat melancholy notes described by Vereá (2004), but these were always made while the calling individual was hidden in the undergrowth.

Based on comparisons with nestlings of known age of other *Grallaricula* (see Greeney *et al.* 2010, Greeney 2012), we estimate that the nestlings in nest 1 were *c.*8–12 days old when the nest was found. They were mostly covered in dense, wool-like, rufescent or rusty-brown down, wings with more developed flight feathers and prominent orange commissures, all similar in form and colour to that of other *Grallaricula* nestlings (Greeney 2012). We recorded the following measurements from each nestling: wing 13.6 mm, 13.5 mm; bill depth at nares 13.4 mm, 13.1 mm; bill width at nares 14.4 mm, 14.8 mm; bill length from front of nares 14.8 mm, 14.6 mm; exposed culmen 18.8 mm, 18.3 mm; tarsus 20.9 mm, 20.5 mm.

Discussion

Although the taxonomic affinities of Scallop-breasted Antpitta have not been investigated, based on plumage and vocal similarities it is probably closely allied to Peruvian and Ochre-fronted Antpittas, which two have been suggested to form a superspecies (Graves *et al.* 1983). Unsurprisingly, therefore, the nest, egg and nestling of Scallop-breasted Antpitta appear very similar to those of Peruvian Antpitta (Greeney *et al.* 2004a,b). The relatively shallow, open-cup nest agrees in general form with all other described *Grallaricula* nests, all of which also have a well-defined lining of dark, flexible fibres. In being composed externally of moss and mossy twigs, it is most similar to Peruvian (Greeney 2009), Ochre-breasted (Holley *et al.* 2001, Maillard-Z. & Vogel 2003, Greeney *et al.* 2012) and Crescent-faced Antpittas (Greeney & Jipa 2012), and differs from the leaf, stick and petiole exterior of nests of Slate-crowned *G. nana* (Greeney & Sornoza 2005) and Rusty-breasted Antpittas (Schwartz 1957, Niklison *et al.* 2008). Although the process of nest construction has not been observed, the nest of Scallop-breasted Antpitta clearly consists of a loose platform of twigs supporting the well-formed nest cup, a key architectural detail that may turn out to unify the nests of all *Grallaricula* (Greeney *et al.* 2008, 2012, Greeney 2009).

With respect to the form and coloration of the eggs, those of Scallop-breasted Antpitta are also consistent with other descriptions within the genus *Grallaricula*. Their whitish to beige ground colour and variable markings of brown, cinnamon and lavender are well aligned with egg descriptions for Ochre-breasted Antpitta (Greeney *et al.* 2012), Hooded Antpitta *G. cucullata* (Sclater & Salvin 1879, Oates & Reid 1903), Peruvian Antpitta (Greeney *et al.* 2004a), Slate-crowned Antpitta (Greeney & Sornoza 2005) and Sucre Antpitta *G. cumanensis* (Kreuger 1968), but differ from eggs of Rusty-breasted Antpitta (Schwartz 1957, Niklison *et al.* 2008), the only member of the genus known to have eggs with a pale greenish ground colour. Similarly, mid-aged nestlings' dense covering of rusty-brown down supports the suggested uniformity of nestling appearance in the genus (Greeney 2012, 2018, Greeney & Jipa 2012) and the resemblance of *Grallaricula* nestlings to those of *Hyllopezus antpittas* (Greeney *et al.* 2016, Greeney 2018).

Our observation of active nests in May and June suggests that the reproductive period of March–May suggested by previous authors (Schäfer & Phelps 1954, Schäfer 1969) may extend at least through June, perhaps concluding with the onset of the drier months in the coastal mountains of Venezuela. Based on the moult and reproductive condition of adults captured in mist-nets, Vereá (2004) concluded that Scallop-breasted Antpitta may breed during most of the year. Further sampling is needed to confirm this, but it is possible that Scallop-breasted Antpitta may have two reproductive peaks during the year, as suggested by nesting records of the ecologically similar Peruvian Antpitta (Greeney 2006, 2009).

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