Breeding biology of Yellow-browed Antbird *Hypocnemis hypoxantha*

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Summary.—We provide novel data concerning the nests, eggs and parental care of Yellow-browed Antbird *Hypocnemis hypoxantha* based on two nests in eastern Ecuador and Peruvian Amazonia, one of which was video-taped. Both adults participated in incubation, with earliest and latest feeding events at 06.11 h and 17.22 h, respectively. Feeding behaviour is described, with intervals of 1–114 minutes (mean = 38.3 minutes) and tettigoniid cicadas the primary prey. Nestlings frequently produced faecal sacs (interval range = 4–132 minutes, mean = 37.8 minutes) immediately following food delivery, and the sac was always carried from the nest by an adult. Two events involving a parent bird being chased from the nest are described, the first involving a male Fulvous Antshrike *Frederickena fulva*. Systematics are discussed in light of nest morphology and architecture.

Yellow-browed Antbird *Hypocnemis hypoxantha* is a distinctive Amazonian thamnophilid that comprises two currently recognised subspecies: nominate *hypoxantha* in western Amazonian lowland and foothill forests from southern Colombia south to central Peru, and *H. h. ochraceiventris* in south-east Amazonian Brazil (Zimmer & Isler 2003). Generally found below 400 m, the nominate subspecies occasionally ranges as high as 900 m (Zimmer & Isler 2003, Ridgely & Tudor 2009).

The species' reproductive biology is almost completely unknown (Zimmer & Isler 2003). Willis (1988) provided a cursory description of a nest with nestlings from Colombia, but included few details of the nest and no description of the eggs or behaviour. Here, we provide details of nest architecture and describe the eggs and parental care behaviour for the first time, based on two nests, in eastern Ecuador and Amazonian Peru.

Methods

The first nest (hereafter Ecuadorian nest) was found on 5 October 2012, at the Shiripuno Research Center in Pastaza province (210 m; 01°06'S, 76°43'W). Shiripuno is within Yasuní Biosphere Reserve, floristically described as wet-evergreen Amazonian lowland forest comprising a mix of *terra firme* and *várzea* (see Loiselle *et al*. 2007 for details of a nearby locality).

The second nest (hereafter Peruvian nest) contained a single nestling and was located near the Amazon Conservatory for Tropical Studies, dpto. Loreto, Peru (*c*.120 m; 03°15'S, 72°55'W). Habitat is typical Amazonian lowland forest, with a mix of *várzea* and *terra firme* (see Brooks *et al*. 2005 for a more complete site description). On 4 July we bracket-mounted a motion-triggered Stealthcam (model G42NG) 76 cm from the nest and recorded ten-second video clips with a minimum of 30-second intervals between clips for two full days (5–6 July). The only exception to 5–6 July was the description of the antshrike invading the nest (see last paragraph of Results regarding *Frederickena fulva* invasion) on 4 July as it was a unique situation.

Results

Description of nest and eggs.—The Ecuadorian nest was 1.4 m above ground, in an area of relatively level-ground mature *terra firme* forest, *c*.30 m from the edge of a large swampy area with a broken canopy dominated by palms. Canopy height was 30–40 m above the nest, with an open understorey composed of small saplings. The nest was a deep pouch, suspended from the rim of one side to the central rachis of an epiphytic fern growing on a *c*.8 m-tall sapling. Some of the rootlets and flexible fibres that attached the nest to the substrate were also wrapped around the adjacent leaflets and to another fern frond that crossed over the supporting frond, providing some overhead cover. The nest was composed predominantly of dicot leaves, bound with rootlets and fungal rhizomorphs. Externally, the nest was decorated with additional, loosely attached dead leaves, small sticks and leaf petioles, some of which formed a loose tail hanging *c*.20 cm below the nest and increased its resemblance to naturally collected detritus. Internally, the egg cup was neatly lined with dark, flexible fibres and fungal rhizomorphs.

The Peruvian nest was similar in form and attachment, 81 cm above ground and attached to the pinnately compound leaf of a small legume sapling (*Inga* sp.). It was constructed of similar materials, but these were somewhat less uniformly distributed in the external portion. The right side was constructed predominantly of leaves, and the other almost exclusively of twigs and thin, flexible black or green fibres. The base of the nest also contained more leaves than other portions.

Measurements of the Ecuadorian and Peruvian nests, respectively, were: external width 8.0 cm and 10.0 cm; external depth (front to back) 8.5 cm and *c*.11 cm; external height (from front rim to bottom) 8.5 cm and 13.0 cm; internal diameter (measured at perpendicular angles), 4.5 cm wide by 5.0 cm front to back and 4.0 cm by *c*.4.5 cm; internal depth 4.5 cm and 7.5 cm.

The two eggs at the Ecuadorian nest were completely undeveloped. They were white with fairly evenly distributed pale cinnamon flecks and scrawls, intermixed with darker,

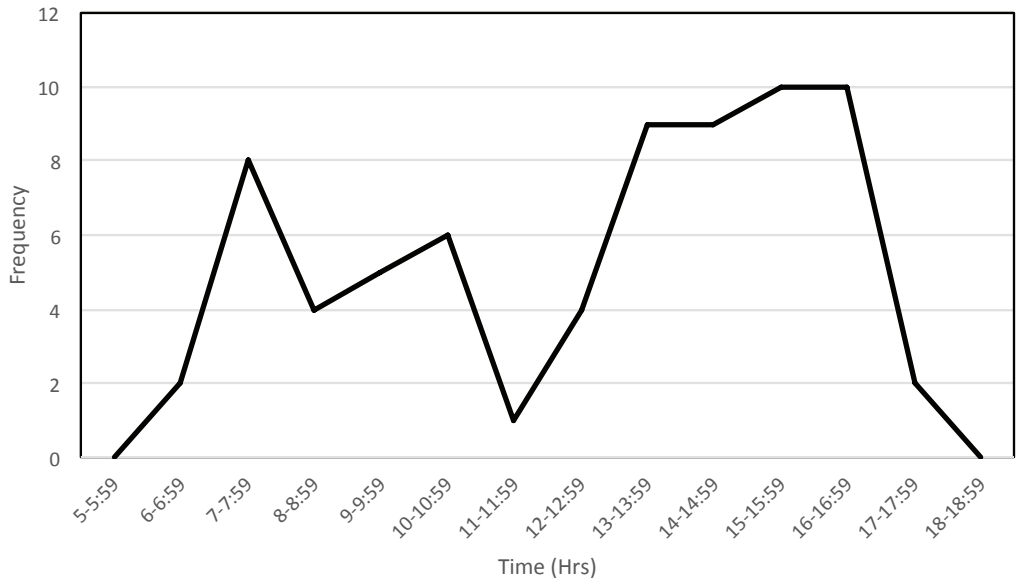

Figure 1. Activity periods of Yellow-browed Antbird *Hypocnemis hypoxantha* in Peru based upon video camera activity.

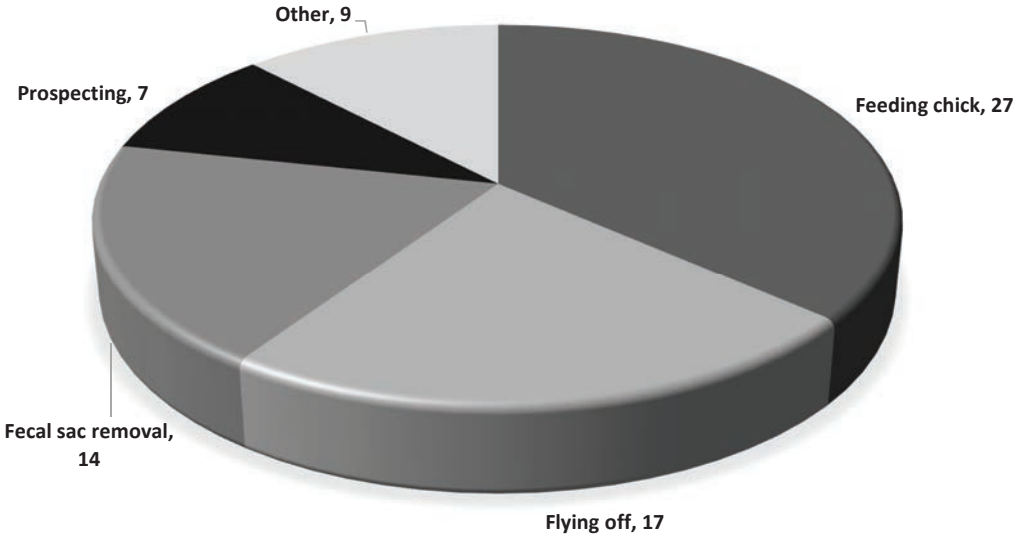

Figure 2. Video clip captures of adult Yellow-browed Antbird *Hypocnemis hypoxantha* in Peru based upon video camera activity.

red-brown blotching. They measured 19.0 × 13.8 mm and 19.7 × 13.4 mm, mass 1.99 and 1.95 g, respectively.

Activity patterns.—Video at the Ecuadorian nest revealed that both adults participated in incubation. At the Peruvian nest, we recorded 73 video clips, with the earliest and latest feeding events occurring at 06.11 h and 17.22 h, respectively, with temperatures of 25–29°C. The first burst of activity was generally around 07.00 h, following nocturnal quiescence, with a second period of activity in the afternoon at 13.00–17.00 h, (Fig. 1). Video clips of adults were allocated as follows: feeding chick = 37%, flying off = 23%, faecal sac removal = 19% and prospecting nest = 10% (Fig. 2, Table 1).

Feeding behaviour.—The most frequently recorded behaviour was food swallowing by the chick (n = 31, Table 1). The chick was recorded swallowing large prey items (i.e., prey that were large enough to be seen, e.g., orthopterans) on 17 occasions and small prey items on 14 occasions, which were not significantly different (X^2 = 0.29, P = 0.59). Adults were recorded delivering large prey on 14 occasions and small prey on 13 occasions, which were also not significantly different (X^2 = 0.3, P = 0.84). All 14 large-insect prey delivered to the chick were orthopterans, of which ten were identified as katydids (Tettigoniidae) and one as a grasshopper

Table 1
Behaviours with associated frequency and % occurrence at the Amazon Conservatory for Tropical Studies, dpto. Loreto, Peru.

Parent behaviour	**Frequency**	**%**
Feeding chick	27	37
Flying off	17	23
Faecal sac removal	14	19
Prospecting	7	10
Probing chick's mouth	4	5
Chased off by another bird	2	3
Resting on nest, inactive	2	3
Removing katydid leg from nest	1	1
Chick behaviour	**Frequency**	**%**
Swallowing food items	31	84
Begging	6	16

% is percentage frequency of 73 clips, where some video clips may have recorded >1 behaviour.

Figure 3. Yellow-browed Antbird *Hypocnemis hypoxantha* in eastern Ecuador. A: adult perched on rim of nest; B: *in-situ* photo of nest showing resemblance to naturally collected material; C: nest lining and eggs; D: adult (H. F. Greeney)

(Acritidae). Intervals between feedings were variable, ranging from 1–114 minutes (mean = 38.3 minutes).

Other behaviours.—The nestling produced a faecal sac during 14 of 27 prey deliveries, and the sac was always carried from the nest by the adult (Table 1). The intervals between faecal sac production were 4–132 minutes (mean = 37.8 minutes).

Twice, the attending adult was chased from the nest by a second bird (Table 1). The first chase was by a male Fulvous Antshrike *Frederickena fulva* on 4 July 2015 at 14.15 h. The clip began with two birds fighting just above the nest, followed by the antbird flying off while the male antshrike perched on the edge of the nest inspecting it. Although tiny vertebrate prey are sometimes consumed by small passerines (*cf*. Delgado & Brooks 2003), the antbird chick was not eaten. The second chase was on 6 July 2015 at 06.11 hrs when another bird (unidentified), about the same size as the parent, flew towards the nest, appearing to make contact with the adult on the nest. Both birds flew away quickly and out of view.

Discussion

Nest architecture and egg coloration of *H. hypoxantha* is similar to related species (Bates *et al*. 1999, Zimmer & Isler 2003, Isler *et al*. 2007) in the *H. cantator* clade (Oniki & Willis 1982, Tostain *et al*. 1992, Cadena *et al*. 2000, David & Londoño 2013). However, the one-sided attachment points on the nests of *Hypocnemis* differ from the genus *Drymophila* (Bates *et al*. 1999, Isler *et al*. 2013, Tello *et al*. 2014), whose nests are rim-supported but from multiple sides (Zimmer & Isler 2003, Greeney 2007), and strikingly so from the base-supported nests of *Sciaphylax* (Hennessey 2002) (previously placed in *Myrmeciza*, see Isler *et al*. 2013). *Hypocnemis* do, however, appear to share this nest construction trait with species of *Cercomacra* and *Cercomacroides* (Huber 1932, Snethlage 1935, Skutch & Eckelberry 1969, Kratter 1998, Pinho *et al*. 2006, Florez-V. & Londoño 2014), the final two genera placed together with *Hypocnemis*, *Drymophila* and *Sciaphylax* in the tribe Pithyini (Tello *et al*. 2014). Indeed, direct comparisons by HFG of the nests of multiple species of *Cercomacra* / *Cercomacroides*, with those of several species of *Hypocnemis* (including the present) suggest that, architecturally, nests of these three genera are nearly indistinguishable, despite descriptions in the literature (see citations above and discussion in Tello *et al*. 2014). In sum, the nest architecture of *H. hypocnemis* and other members of the genus provides support for a close relationship with *Cercomacra* and *Cercomacroides*, as opposed to other members of the Pithyini (Tello *et al*. 2014).

Incubation at the Ecuadorian nest was starting during the middle of the drier period in that region (Loiselle *et al*. 2007), suggesting that fledging would have occurred near the start of the local rains. The Peruvian nest held a single nestling during the earlier half of the dry season (Brooks *et al*. 2005). These records suggest that *H. hypoxantha* may be a dry-season breeder across its range, though Ecuadorian breeding records for other thamnophilids suggests that, as a whole, these understorey insectivores may breed year-round (Tallman & Tallman 1997, Greeney *et al*. 2004, Greeney 2007.). In south-east Peru *H. subflava* and *H. peruviana* also breed during the dry season (August–November: Tobias *et al*. 2011, David & Londoño 2013).

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